User Guide nanoCAD Construction 25

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Intro

This manual describes work in nanoCAD Construction 25

Legend

Important! Information on actions that may lead to work difficulties

Note: Useful information on the topic

Example: Link to the internal manual page or file

Link: Link to a resource on the Internet

Video: Link to the video instruction

Abbreviations

LBM - left button mouse.

RBM - right button mouse.

Main sections

Procedure - The section describes the user actions for constructing the object being described.

Edit dialog - This section describes the commands and parameters of the object editing dialog. As a rule, the editing dialog is invoked by double-clicking on the object.

Properties - the section describes the parameters on the functional panel "Properties", referring directly to the object being described.

Grips - the section describes the intelligent design handles of the object being described. Handles appear when selecting an object in the drawing.

Features of the team - the section describes special techniques for working with the called team.

Basic knowledge

About the program

nanoCAD Construction — this is an integrating software solution for the nanoCAD platform, designed to speed up and simplify the design of units, development, design and editing of design documentation, management of design data, aimed at the domestic user, made on the basis of regulatory recommendations.

The tools nanoCAD Construction 25 complement the familiar environment nanoCAD, without disabling or reassigning its commands, toolbars, and menu items.

Technology work **nanoCAD Construction 25** is based on the use of object-dependent parts with assembly and parametric dependencies pre-installed on them.

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Compatibility

nanoCAD Construction installed together withnanoCAD.

Important! Drawings must be saved only in *.dwg format. When resaving in other formats (for example, *.dxf), objects **nanoCAD Construction** will be permanently converted to proxy graphics and will not be able to be edited.

Important! When resaving a drawing that has proxy objects without an installed nanoCAD Construction, в другие версии формата *.dwg, объекты nanoCAD Construction to other versions of the *.dwg format, the objects will be converted to proxy graphics and will not be able to be edited.

When transferring files to a user or customer drawings that do not have nanoCAD Construction and not having the ability or desire to use nanoCAD Construction Enabler, you need to convert all the objects nanoCAD Construction in the standard system primitives.

To dismember individual objects nanoCAD Construction , use the standard command "EXPLODE".

To dismember all objects nanoCAD Construction, use the command "SPEXPLODEALL". This command automatically selects all objects nanoCAD Construction in the drawing and explodes them into primitives.

nanoCAD integration

nanoCAD Construction integrated into nanoCAD as modules.

Default file opening setting

By double-clicking on the drawing file (or by using the "Open" command from the context menu), the nanoCAD platform is loaded without loading the nanoCAD Construction .

Windows 8 and above

In order for the nanoCAD Construction module to load, it is necessary:

- 1. Open the application selection menu: RMB on the *.dwg file. Open with Select another application.
- 2. Select applications to open and check the box "Always use this application to open .dwg files".

Нет картинки открытия СПДС на английской винде

3. Ready.

Windows 7

In order for the module nanoCAD Construction to load, you must:

- 1. Launch nanoCAD.
- 2. Open settings.



Main menu: Tools - HOptions....



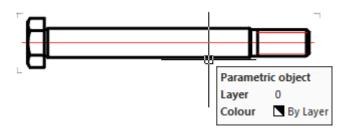
Ribbon: Manage - Castomization - HOptions.

- 3. In the settings window, open the "Current profile" drop-down list.
- 4. Select "SPDS". Along with the choice of profile, the mode of operation of the platform will also change. In the settings tree: Application preferences Licensing Modules Platform mode.
- 5. Click the "OK" button.
- 6. Restart nanoCAD to change settings.
- 7. Setting completed. Files will now open with the nanoCAD Construction.

Selected and allotted object

An object refers to an nanoCAD graphic item as well as an object created by the nanoCAD Construction .

Allotted object



An object is considered allotted (indicated) if additional graphic information appears on the screen when the mouse cursor is moved to it:

- the object is highlighted in color;
- the "rectangle corners" of the object appeared;
- the object information tooltip appeared.

Note: The mouse keys are not pressed in this case - you just hover the cursor over the object.

Scaling to the allotted object

- Move the mouse pointer over the nanoCAD Construction object until "rectangle corners" appears, the object color changes, or an info tip appears;
- Hold down the SHIFT key and press RMB. It will auto scale to the center of the screen.

To scale to the selected object, the user coordinate system (UCS) must be set to * WORLD *.

Selected object



An object is considered selected after it has been clicked with LMB:

- the image becomes dotted or highlighted;
- the insertion point is displayed;
- "grips" are displayed.

Object context menus

To set additional options for the current command, right-click context menus are widely used when invoking commands. The content of the context menu depends on whether the editable object is selected or allotted.

Workspace

Menu



All tools nanoCAD Construction 25 located in the ribbon (in the main menu) tab "Construction".

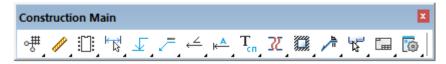
Commands nanoCAD Construction 25 grouped by purpose and organized hierarchically. When you select a menu item marked with a black triangle, the corresponding dropdown menu is activated. This way you can access all the tools nanoCAD Construction 25.

Menu nanoCAD Construction 25 also serves for loading / unloading individual functional panels nanoCAD Construction 25, call dialogue "nanoCAD Construction 25 - Settings" and to access some common features nanoCAD Construction 25.

Toolbars

You can access the nanoCAD Construction 25 tools through the toolbars. Toolbars are divided by purpose. The user can place on the screen those panels that contain the most frequently used groups of tools.

There is also a universal toolbar "Construction Main" - instrumental two-level panel on which groups of tools are located for working with symbols and graphical constructions defined by standards nanoCAD Construction 25.



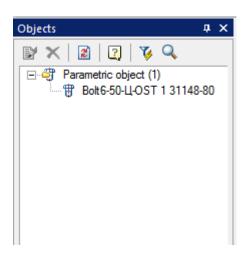
Tools are grouped by purpose (group of callouts, group of commands for setting level marks, etc.).

Click the LMB user to select the first in order tool of the group. If you click and hold the corresponding button on the panel with the mouse, a sub-panel opens, containing the rest of the tools in this group. Without releasing the LMB, you need to move the cursor to another command of this group, and then release the button. As a result, the selected command will be launched.

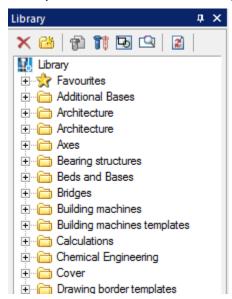
Functional panels

On the left side of the screen are added functional panels, such as:

Objects - displays all objects nanoCAD Construction 25 created in the drawing. Directly from this palette you can perform a series of actions with objects: edit, delete, hide and search for them.



Library - contains a database of objects nanoCAD Construction 25 used for design.



IFC - works with IFC objects in the drawing.



Help system

Background information is available to the user at any time. The help system has two access modes - general and contextual.

General mode provides access to the help content in the absence of a command being executed.

Contextual mode automatically provides access to reference information that corresponds to the command being executed.

Background information is divided into two parts.

The first part is the program help nanoCAD Construction 25.

The second part - the basic standards nanoCAD Construction 25.

Scale

Option 1. Making projections in model space

Suppose the principal species in the model space are performed one by one.

Additional types, sections are made with scale factors other than the main species.

Features insert frame

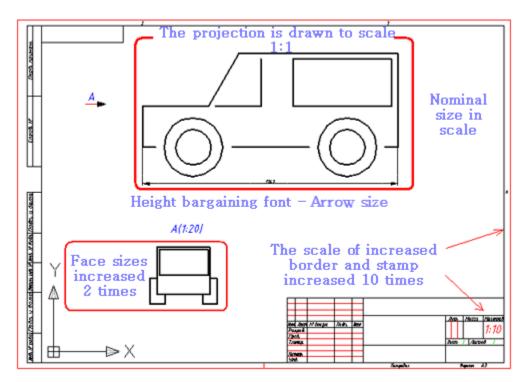
When placing a border with a title stamp in model space given its scale relative to the principal species. Frame increases or decreases.

Features design drawings

When dimensioning must take into account the scale factor drawing (the value of the dimension text, the value of the arrow, spacing, etc.) and numerical designations for each species.

Assume frame is increased with respect to the main sight 10 times. In this case the arrowheads, dimension text height and other text labels should be increased by 10 times. A nominal size of the text for the main species should be marked on a scale of 1:1.

When applied to the kinds of sizes, made in a different scale (in our example, 1:20), nominal size must be multiplied by a scaling factor.



Example of projection drawing frame, increased 10 times

Especially when printing

In this example, the sheet is printed at 1:10 in order to maintain a standard frame size, title block text and symbols. Such technology is not supported Construction Site 25.

Option 2. Making projections in model space

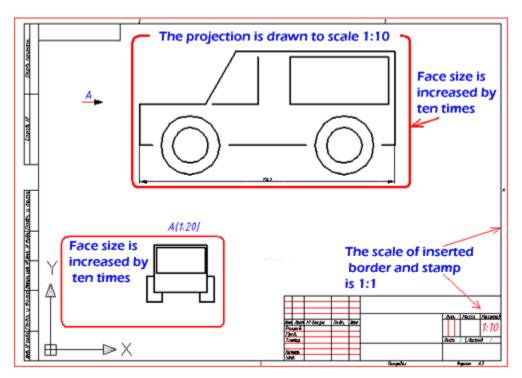
Features insert formats

The frame is inserted into the space pattern in the scale of 1:1.

Main types, made a scale of one to one in the model space scale when placed on a frame with a title block.

Particulars of

The magnitude of arrowheads, dimension text height and other text refer to all types are specified in a scale of 1:1. When dimensioning must take into account only the scale factor of the form in which they are applied.



Example of drawing. Frame in a 1:1 projection in a given scale

Especially when printing

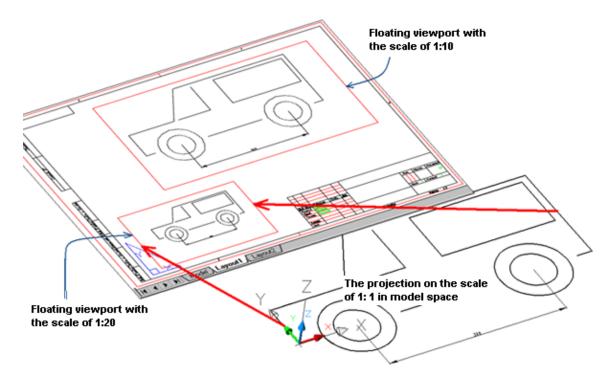
Under this option, registration in model space frame with projections printed at a scale of 1:1. This variant of design drawings in model space adopted in Construction Site 25.

Option 3. Making projections in paper space

The most convenient way to design drawings projections. All images of objects executed in one-to-one scale model space.

Border and title stamp inserted in 1:1 scale in paper space.

Scale for each species, cut or section is given in the floating viewport in paper space. No need to convert the nominal values of dimensional numbers. Floating viewport - a kind of lens with a predetermined magnification (scale) of the portion of the drawing.



Border and two floating viewports placed in paper space

Particulars of

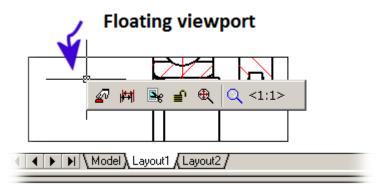
Scale factor when dimensioning for each species is taken into account automatically.

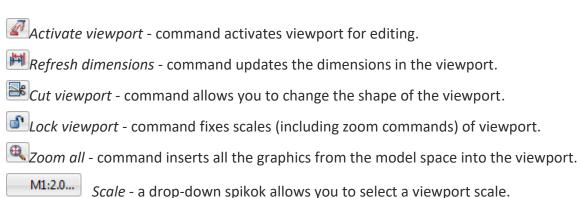
Especially when printing

Frame with projections printed in 1:1. scale in nanoCAD Construction 25 frame and title block inserted in model space or sheet at a scale of 1:1.

Paper space commands

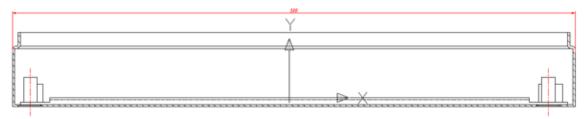
When designing drawing projections in paper space, the context menu is available nanoCAD Construction 25. To call the menu, place the cursor in the area of the floating viewport and press RMB.





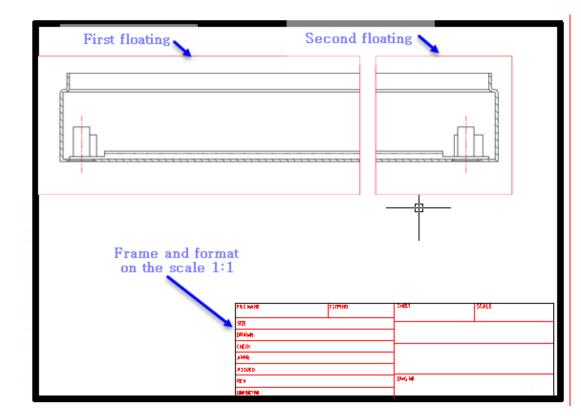
Example of design drawings of extended objects

Especially useful when you make a paper space drawings of extended objects. A small example. In model space, one to one (in real terms) has been drawn projection with dimensions 500 mm horizontally.



Projection with dimensions of 500 mm horizontally

Objective: To formalize this projection in paper space on the frame size A3.



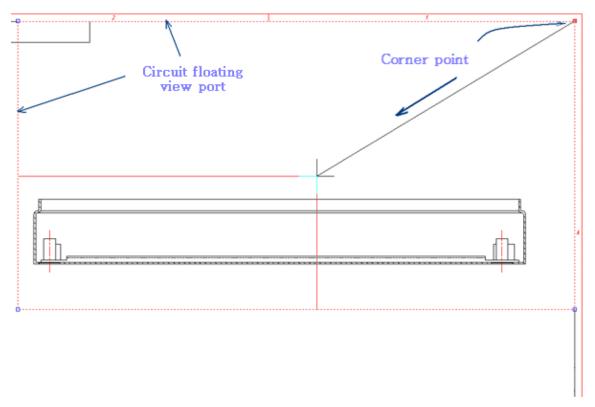
Result projection design in paper space



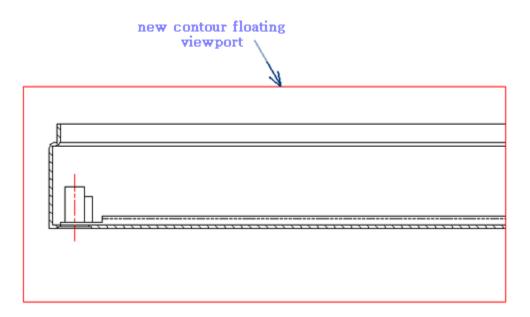
We turn to paper space by selecting a bookmark *Sheet1 (Layout1)*. Insert Frame A3 clicking the icon *format* in the main toolbar nanoCAD Construction 25.

After placing the frame in paper space is created by default floating viewport rectangular shape. Inside it displays all the objects in the model space. Zoom while arbitrary and requires further editing.

Resize a floating screen. To do this by clicking on its contour the left mouse button, move the highlight corner points. Part of the projection will then be hidden loop viewport. We did a kind of trimming images.



Move the corner points of the floating viewport

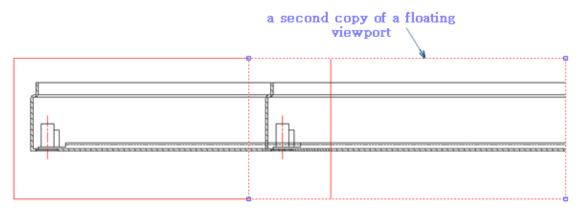


Result after the transfer of the image projection of the angular points of the contour floating viewport

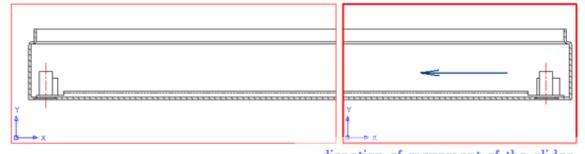


Panel Viewports (Viewports)

Once the boundaries of the first viewport defined, define the scale of the image. Distinguish the border of the viewport. We define the scale of the image using the dashboard Viewports (Viewports) . To get the image on the right part of the projection make a copy of the floating screen and move it to the right.



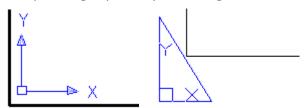
Move the copy right of the screen



direction of movement of the slider

Changed the boundary of the right floating viewport

With a team of pan define the right side projection view inside the right floating viewport. To do this, double-click the left mouse button within the contour of the viewport. Sign space layout changes to mark the user coordinate system (UCS-UCS).



Especially when printing

Before printing frame with the projections need to go out of the floating viewport to paper space. To do this, double-click the left mouse button outside the boundaries of the viewport. Sign appears in paper space.

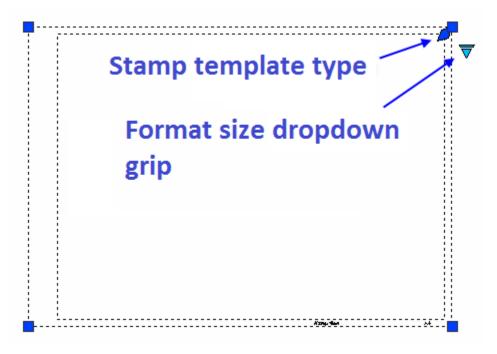
Controls features

Intelligent controls grips

Intelligent grips are intended for editing the properties of design elements inserted into the drawing without calling the editing dialog.

Intelligent grips are included in the settings nanoCAD Construction : *Main options - Edit - Enable enchanced grips*.

Descriptions of grip actions are found in the description of the corresponding design elements.



The appearance of the grip corresponds to its action (frequently used ones are shown):

- Node move grip
- Graphics move grip
- Grip for adding a new node
- Direction grip
- Tilt grip
- Text alignment grip
- ▼Grip for selecting a value from a drop-down list

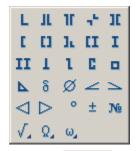
Special characters and fonts

The dialogs remote printing and editing tables are buttons insert special characters by which a dialog box in which you presented the symbols used in architectural design.

For remote printing button "Insert special character".

To the Editor button table // "Insert Character".

Select the character you want by clicking on it with the left mouse button, after which it is automatically inserted at the current cursor editing table.



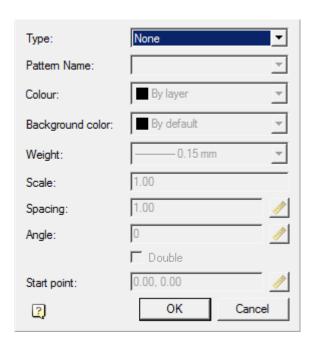
Buttons $\sqrt{\Omega}$ opens a list of uppercase and lowercase letters of the Greek alphabet.



Special characters are correctly displayed only text based on the fonts nanoCAD Construction (.shx). Displaying characters when pasting in text based on TrueType-font, the screen looks incorrect (replaced by question marks, boxes, etc., depending on the settings of TrueType-font).

Parameters hatch

In the dialogs for editing nanoCAD Construction objects, there may be a "Hatch" button, which opens the "Hatch" editing dialog other than nanoCAD.

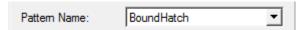


Procedure

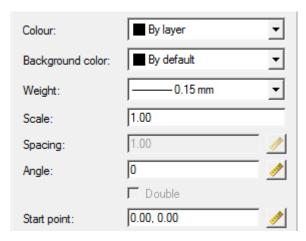
1. Select a hatch type:



- None hatch will not;
- Predefined hatch is selected by abrasive from the list of standard hatches;
- Custom hatch is selected by abrasive pattern from the list of custom hatches;
- *User-Defined* hatching is formed in the form of parallel lines with a set interval and rotation angle. When you turn on the "Double" switch, the second row of lines will be drawn perpendicular to the first.
- 2. Select a hatch pattern (if possible). Depending on the selected sample, certain parameters will become available.



3. Configure the available options.



4. Click the "OK" button. The hatching will be adjusted and added to the appropriate location.

Jobs in the current scale

The nanoCAD Construction uses the concept of a current scale, which differs from the global scale in effect in the platform, expressed in units.

The current scale - is a setting that automatically scales objects in the drawing up or down.

In the model space, a global scale of 1:1 is allowed - that is, 1 mm of the construction object is equal to 1 unit of the platform drawing.

Changing the current scale affects the following objects:

- Drawing design objects nanoCAD Construction;
- platform line types containing breaks or text;
- library objects;
- dimensions and text nanoCAD Construction .

There are 2 types of scaling in the application: symbol scale and measurement scale.

When working with SPDS, symbol scale is more often used.

Scaling is usually selected during the initial setup of the application and is not changed thereafter.

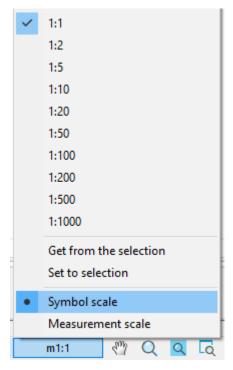
Symbol scale

The scale of symbols can be set in two ways:

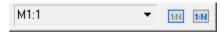
1. Set the "Use symbol scale" setting to "Yes".

2. Select the "Symbol scale" type on the scale button in the status bar (in this method, the "Use symbol scale" setting will automatically change to "Yes").

Next, you need to select the desired value on the scale button in the status bar.

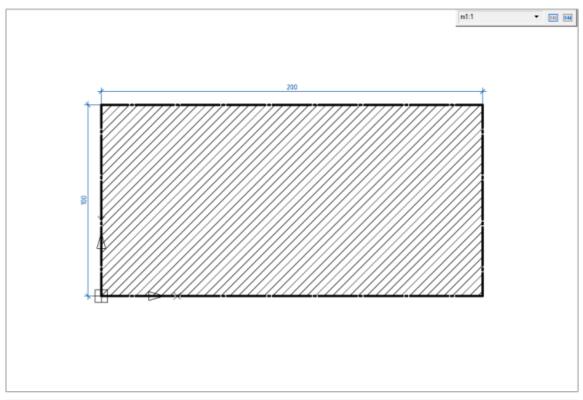


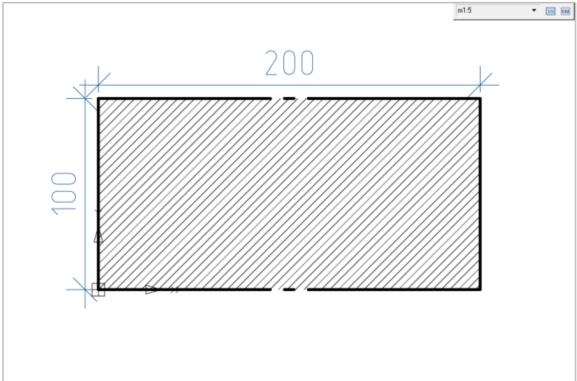
or in the "Scale" panel.



The scale of symbols is characterized by (using the m1:5 scale as an example):

- design elements (dimensions, callouts, etc.) are inserted 5 times larger;
- standard database parts are inserted at a scale of **1** (i.e. geometry unchanged) with a current linetype scale (dash length in dashed lines) of **5** (five times larger);
- geometry is inserted with a linetype scale (dash length in dashed lines) of 5;
- the displayed size value is taken as is;
- the mode is signaled by the letter "m" on the "Scale" toolbar.



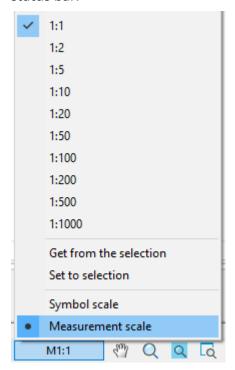


Measurement scale

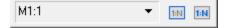
The measurement scale can be set in two ways:

- 1. Set the "Use symbol scale" setting to "No".
- 2. Select the "Measurement scale" type on the scale button in the status bar (in this method, the "Use symbol scale" setting will automatically change to "No").

Next, you need to select the desired value on the scale button M1:1 in the status bar.



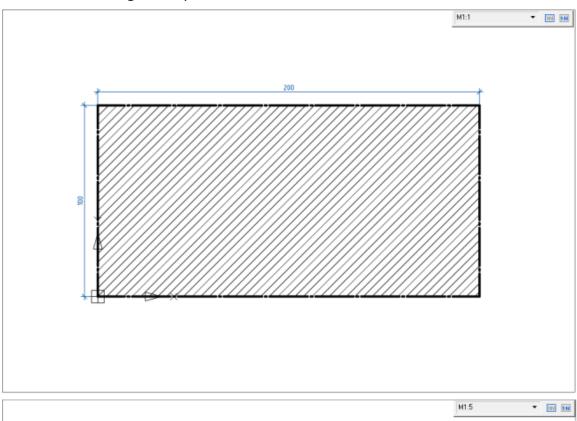
or in the "Scale" panel.

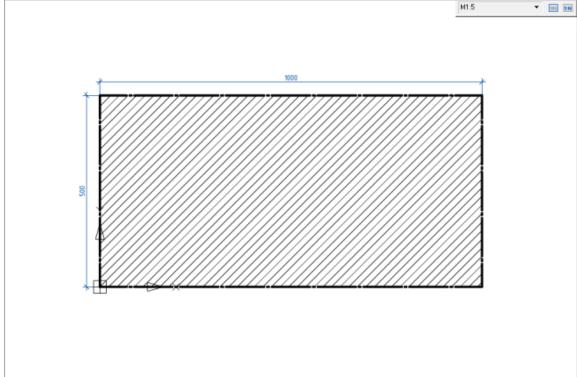


The following is typical for the measurement scale (using the M1:5 scale as an example):

- design elements (dimensions, callouts, etc.) are inserted at a scale of **1:1**, i.e. they will not change;
- standard database parts are inserted **5** times smaller (geometry) with the current linetype scale (dash length in dashed lines) equal to **1**, i.e. no changes;
- geometry is inserted with a linetype scale (dash length in dashed lines) equal to **1**, i.e. without changes;
- the displayed value of dimensions (if they are not inside formats and are not associated with application objects) takes a scale factor that is inverse to the current scale (i.e. it will be 5 times larger than the measured one);

• the mode is signaled by the letter "M" on the "Scale" toolbar.





Working with scales

The design scale is convenient when drawing in model space at a scale of 1:1, with subsequent design in sheet space on a viewport. In this case, the design elements will look uniform on viewports with different scales.

The measurement scale is used when initially drawing the model at a scale other than 1:1.

By default, the current scale of symbols is set to m1:100 and the scale of measurements is set to M1:1.

When no objects are selected, changing the scale using the scale bar or the scale button changes the current drawing scale.

If there are selected objects, the scale button and bar display their scale. Changing the scale affects only the selected objects, without changing the current drawing scale.

To change the scale in the current document, you need to do the following:

- 1. Set the value of the "Use symbol scale" setting, or select the scale type on the scale button in the status bar (in this case, the "Use symbol scale" setting will take the value automatically);
- 2. Select the desired value on the scale button in the status bar or on the "Scale" panel.

To change the default scale for new documents, you must <u>save the current design</u> <u>settings in the Settings - File - Save Settings.</u>

Interaction with global scales

Scale dimension feature (VAR:DIMSCALE) - parameter from <u>modify dimension style</u> on tab "Fit".

Measurement scale (VAR:DIMSCALE) - parameter from <u>modify dimension style</u> on tab "Primary units".

Scale dimension feature (VAR:DIMSCALE) affects the "Symbol scale". Measurement scale (VAR:DIMSCALE) affects the "Measurement scale".

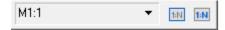
Changing global scales affects drawing design objects inserted into the drawing with the same scale value. For example, if a linear dimension is inserted with a symbol scale of 1:10 and the scale of the dimension elements is 10, they will be linked, changing the scale of the dimension elements will change the scale of the linear dimension symbols.

When changing the scale of an object manually, the connection with global scales is lost.

Instrumental panel "Scale"



Main menu: View - Toolbars - NanoCAD Toolbars - Scale.



The scale of standard product database objects and design elements can be set using the scale list from the scale panel, see "Working with scales".

To move the scale from one object to another, there are buttons:

"Get Scale" - button repeats the command "Get from the selection" of the scale button in the status bar. When selecting, you must specify the object from which the scale will be get. The value will be saved in memory.

"Set scale" - button repeats the command "Set to selection" of the scale button in the status bar. When selecting, you must specify the object on which the new scale will be set.

Selecting the direction of drawing

When drawing some graphics nanoCAD Construction may require special functions choice of direction of drawing. For example, when constructing <u>Weld seam</u>.

Functional toolbar "Destination" is automatically activated when a call instruction nanoCAD Construction, which is available for control of the direction of drawing.



Toolbar commands "Destination":

- \(\frac{1}{2}\)Perpendicular. Construction perpendicular to the selected segment.
- Free. The choice is arbitrary direction.
- / Along. Construction along the selected segment.
- → Parallel. Parallel to the selected segment.

When constructing select the desired command and specify the length of the drawing, to be followed by leveling (except commands "Free").

Special keys

Key SHIFT

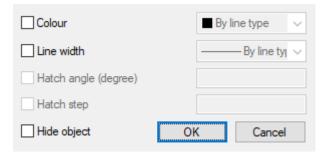
Key Shift used:

Holding down the SHIFT key is used when placing a dimension value. To place a
dimension value closer to any extension dimension line, move the mouse pointer
while holding down the SHIFT key. To complete the command, left-click.



Key Alt

• To redefine the parameters of primitives included in standard parts, use the Alt + RMB combination, which calls the "Overrides" dialog:



Allowed to override the following properties: color, line thickness, slope and pitch hatch of hidden objects.

Key Ctrl

 Holding down the Ctrl key is used to set the angle of extension lines when placing dimensions.



 Holding down the Ctrl key is used in the <u>Form Editor</u> to select the control type when dragging a variable onto a user form.

- Editing a table at the place (Ctrl + left-click).
- Ctrl+5 strikethrough text, works in text input fields (in callouts, sizes, etc.), table cells, TC and TP.
- Ctrl+U text underline, works in text input fields (in callouts, sizes, etc.), table cells,
 TC and TP.
- Ctrl+O overline text, works in text input fields (in callouts, sizes, etc.), table cells,
 TC and TP.

Geometric constructions

Tools nanoCAD Construction for the geometric constructions are specific for mechanical design. All objects created with their help, made up of primitives nanoCAD, and does not require special tools for editing.

Editing inserted objects in a drawing can be performed using a universal object editor nanoCAD Construction, called button "Editing". After selecting the object being edited is automatically recognized by the type and loads the appropriate dialog box.

Furthermore, editing objects nanoCAD Construction 25 it can be made by other means:

- called the command "Edit" in the context menu;
- by calling the "Edit" command from the tooltip of the selected object. This method is set in the "Editing" section of the design settings nanoCAD Construction;
- double-clicking the LMB on the object nanoCAD Construction. This method is set in the "Editing" section of the design settings nanoCAD Construction;
- use grips of object;
- on the function panel "Properties";
- standard command ERASE, MOVE, COPY, ROTATE, STRETCH.

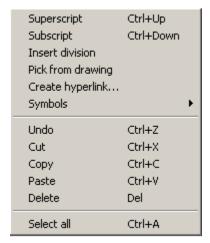
Object-dependent parts

Object-specific details - the details of this database nanoCAD Construction with the described properties of behavior when they are placed in the context of the assembly. With the change in the parameters of one such detail all the related object-specific details are automatically changed in accordance with their values in the database. Using this technology works, it is important to take into account the order of application of object-dependent items.

When applying standardized object-dependent parts of the image cursor-pointer signals the automatic recognition of the insertion point and the direction of the applied rendering details.

Context menu entry fields

In the context menu the following entry is available.



History - recall last entry.

Recent - recall the most frequently used values.

Superscript - insert superscript (a combination of Ctrl+Up).

Subscript - insert a subscript (a combination of Ctrl+ Down).

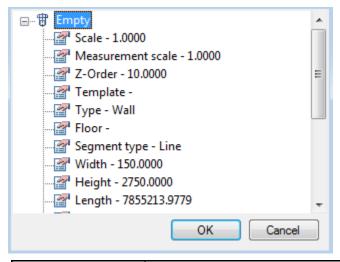
Insert division - insert shot.

Pick from drawing - the command allows you to take data from the drawing and the properties of a standard part. When you select this command, the panel *Select the value* appears:



- Measure distance (Z) to take drawing diamensionally linear or geometric size. Command can be selected by pressing Z.
- \triangle Measure angle (X) take the angular size of the drawing. Command can be selected by pressing X.
- Measure Perimeter (C) to take drawing the perimeter of a closed polygonal line or length. Command can be selected by pressing C.
- \square Measure area (V) take the value of the drawing area of the closed loop. Command can be called by pressing V.
- Complex area(Shift+V) take a few drawing value areas closed loop.

- Calculator (M) Calculate the number with built-in calculator in nanoCAD Construction 25.
- Take from notes (,) insert text information from the notebook.
- Take from property (B) allows you to take command of the sub-parameters database in Construction Site 25. Parameter is inserted preserving the dynamic link with the object. When you change a parameter line items are changed in the input field.

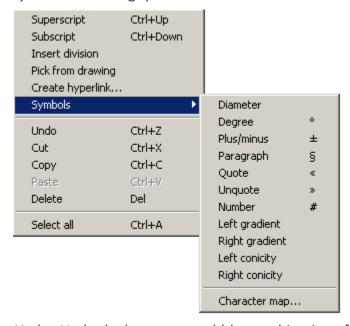


Note: To insert static text, hold the Ctrl key while selecting parameter.

 $oxed{T}$ Mark text object (N) - to take the text from the drawing.

Cancel - stop the command and return to the Previous menu.

Symbols - inserting special characters



Undo - Undo the last command (the combination of Ctrl+Z).

Clipboard operations

Cut (a combination of Ctrl+X).

Copy (combination *Ctrl+C*).

Paste (a combination of Ctrl+V).

Delete - Delete the entry field.

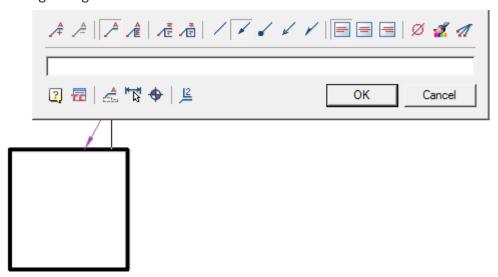
Select all - highlight the input field.

Template

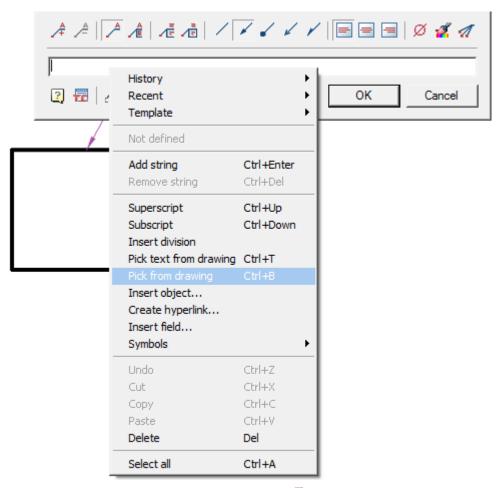
Templates are used to create objects of the same type with the same properties.

An example of creating and applying a template based on callouts.

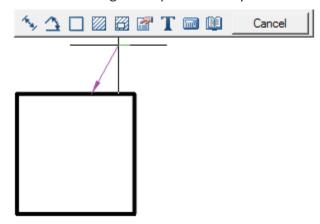
1. There is a rectangle of arbitrary area. Let's assign a callout to it. Open the callout editing dialog.



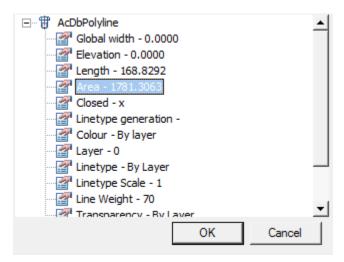
2. From the entry field callouts call the context menu and select the command "Pick from drawing." The "Value picker" dialog opens.



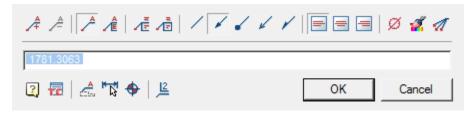
- 3. In dialogue "Value picker" call command "Take from property.
- 4. Select a rectangle and press the key "Enter".



5. In dialogue "Properties" selecting "Area" and press "OK".



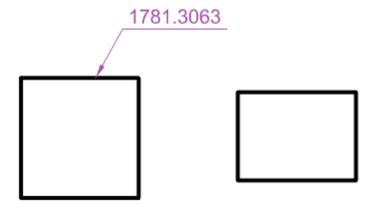
6. The link to the property appeared in the text of the callout, in this case - the area of the figure.



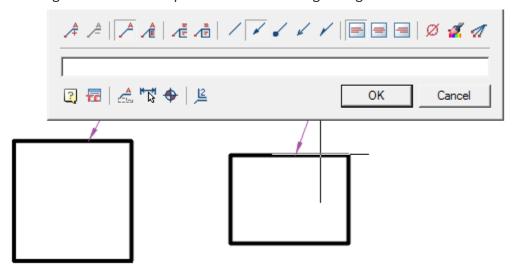
7. From the entry field callouts call the context menu and select the command "Template - Append".



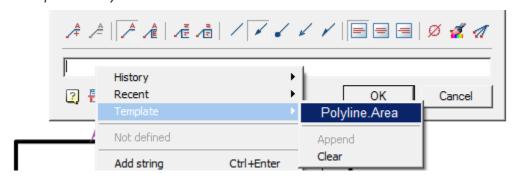
- 8. Close the callout editing dialog.
- 9. We build another rectangle, different in size from the first.



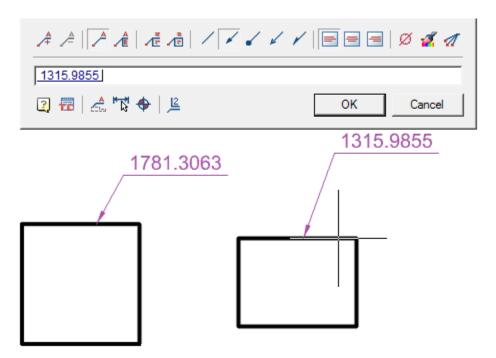
10. Assign him a callout. Open the callout editing dialog.



11. From the entry field callouts call the context menu and select the command "Template - Polyline.Scale".



12. Select the second rectangle to calculate the area. The area will be calculated automatically.



Such templates can be used not only for callouts, but also for other elements, for example:

- position designation;
- node designation;
- note level field;
- e.t.c.

Regen



Main menu: View> •• Regen.



- Update objects nanoCAD Construction;
- It recalculates table;
- Updates overlapping objects;
- Updates automatically calculates the attribute values.

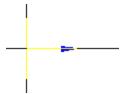
The cursor-pointer

Depending on the location (over the selected or chosen object) and the command being executed, the cursor-pointer takes on a different appearance.

Examples:

• The application of a single object.

Under a single object we understand insert parts from a database without automatic reference to other object-dependent parts.

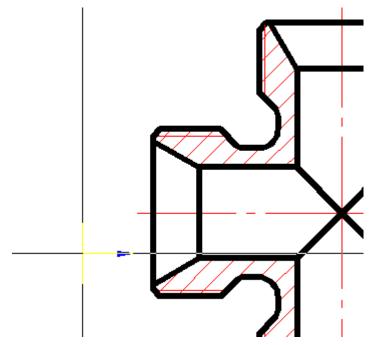


Mouse pointer is displayed as a standard cross-hair, blue arrows and if there is a preview of the items - the item itself displayed.

Blue arrow indicates the insertion point and the direction of the applied drawing object.

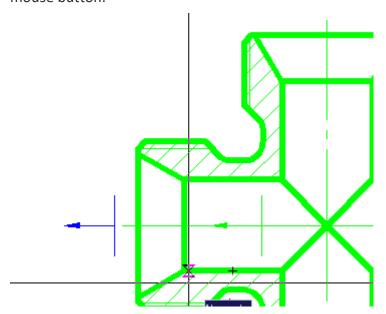
After you specify the insertion point of the applied object of the cursor, the mouse pointer changes, the user is prompted to set the direction of drawing an object, it will coincide with the direction of the blue arrow. To confirm the direction you need to left-click.

• Recognition of object-dependent parts.



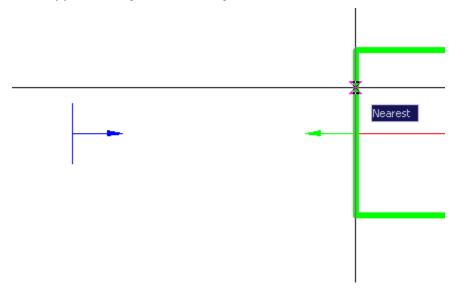
If you insert a part in an assembly before the cursor passes over the inserted workpiece, with inserted part can be installed according to the parts over which the cursor is, the

original item is highlighted, and the position is determined automatically inserted details. To confirm the installation of dependencies inserted details, just click the left mouse button.



After this, a dialog box appears with parameters inserted parts.

• Application of standard shaft end.

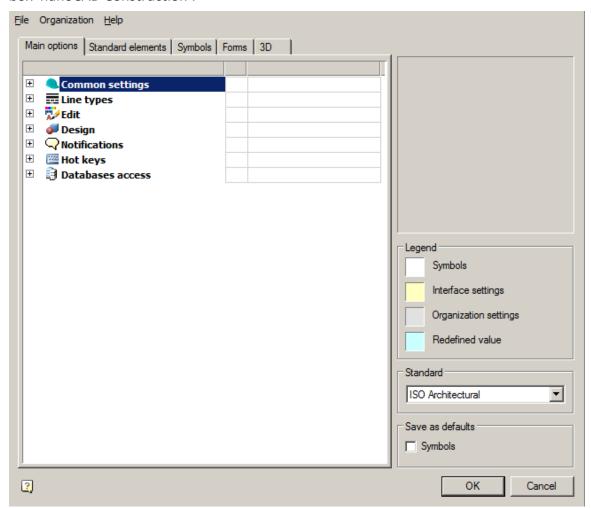


Settings

Settings



Customizing the interface and settings for design elements nanoCAD run in the dialog box nanoCAD Construction :



The header of the dialog displays the path to the settings file.

Main menu

Menu "File"

Menu "File" contains controls:

Save settings - saves changes to the current settings file.

Save settings as... - saves changes in settings to a new settings file.

Load settings - loads settings from the specified file.

Types of uploaded files:

- Configuration files (*.xml)
- Skin Settings (*.cfg)
- Interface Settings (*.icf)

Configuration files *.cfg and *.icf used in nanoCAD Construction lower version 25 and contain settings that are currently stored in AppOptions.xml.

Restore start settings - loads settings preinstalled in nanoCAD Construction .

Important! The function of saving the settings, when the saved file is the same as the one already existing, does not overwrite the old file, but complements it.

When changing the standard, for example, from the ESKD to ISO, both standards will be available in the settings file.

Menu "Organisation"

Menu "Organisation" manages enterprise standard settings.



Enterprise Standard - a single configuration file (parameters, layers, profiles) for the enterprise. All settings are stored in one file.

In the settings dialog, the profiles table and the "Organisation" settings layers are highlighted in light gray.

Menu "Organisation" contains controls:

• *Create organisation settings* - command allows you to create a corporate settings file for subsequent transfer to other machines or for location on a shared server.

Creating the settings file:

1. After the command is called, a selection field appears next to each parameter and section.

- 2. You must specify (check) which settings will be included in organisation settings. Then click the "OK" button. The dialog box prompts you to enter the location and name of the corporate settings saving.
- 3. Indicate the path, name and confirm. A file with corporate settings will be created.
 - Set settings file... the assigned organisation settings settings file overrides the custom settings file AppOptions.xml. New documents will be created in accordance with the values in organisation settings settings file.
 - Flush command to refuse to use the organisation settings. In this case, the control file becomes the user settings file AppOptions.xml.
 - Apply organisation settings to document the command applies corporate settings to files created earlier or in another place that do not have these settings.

Important! The user can not delete layers and profiles of organization settings from the corresponding tables in the settings dialog.

When saving settings with new values, they are saved only in the current document.

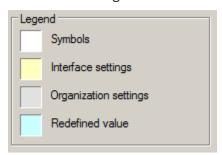
The configuration settings in the organization settings file and the standards within the configuration must strictly correspond to the downloaded settings in the application. If there is a mismatch, the override of the settings will not work!

Work area

Contains:

- 1. Tabs with settings settings:
 - Main options
 - Standard elements
 - Symbols
 - Forms
- 2. Graphic window for displaying custom parameters (not editable).

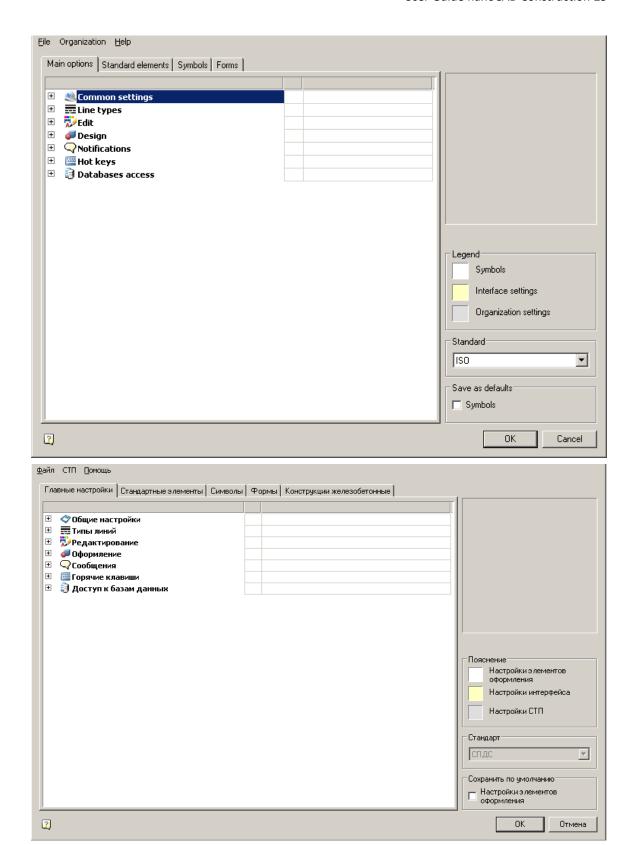
3. Container "Legend" with the legend of the kind of settings (not editable).



- Symbols parameters with this background refer to the design parameters. In the nanoCAD Construction low version 25 settings are stored in the format files *.cfg
- Interface settings parameters with this background refer to the interface parameters. In the nanoCAD Construction low version 25 settings are stored in the format files *.icf
- Organisation settings parameters with this background indicate that they were downloaded from the Organization settings.
- Redefined value- parameters with this background indicate that they have been changed by the user.
- 4. The "Standard" container is intended for displaying the default development system of the design documentation (the choice is possible if there are more than one standards).
- 5. The "Save as defaults" container contains configuration items that indicate what will be saved by default when you click the "OK" button. Contains the selection field "Symbols".

Main options

The tab is used to configure the general parameters of the interface nanoCAD Construction .

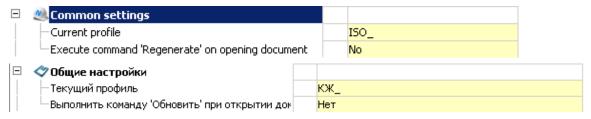


It contains sections:

<u>Common settings</u>

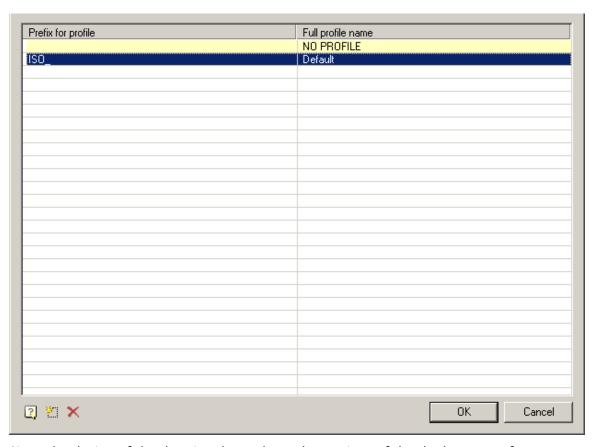
- Common settings
- Eline types
- 🌄 <u>Edit</u>
- **Design**
- Notifications
- <u>Material</u>
 Hot keys
- Database access

Common settings



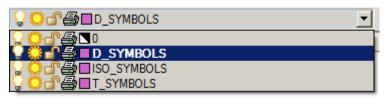
Current profile

Layer profiles are designed to organize the work of different departments of the enterprise over a single drawing file. Each user at the same time works with their group of layers, controlling their visibility by means <code>nanoCAD</code>.



Since the design of the drawing depends on the settings of the deployment of registration of the layers and the current profile of the drawing, then for each object type you want to specify in the settings option to be placed on the appropriate layer (for example, callouts given layer "Leaders")

Depending on the current profile to the layer name prefix will be added.



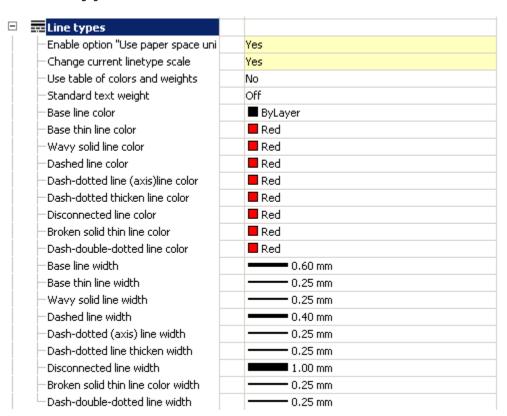
Thus, it is possible to group layers created by users with similar profiles (for example, the objects created by the designer - prefix "D", and technologists - prefix "T").

When adapting the distribution in the setup.ini file, you can assign a prefix in the parameter by default APP OPTIONS PROFILE.

Execute command "Regenerate" on opening document

The command "Regenerate" whenever you open a document

Line Types



Enable option "Use paper space units fo scaling" automatically

Automatically changes the setting nanoCAD Construction "Scale to paper space units" ("Use paper space units for scaling") for the types of lines.

Change current linetype scale

It enables or disables the scaling of line types in the standard objects when you change their size.

Use table of colors and weights

It enables or disables the use of the table of colors and weights. If enabled, you can use the standard colors from the table. "Compatibility Mode" - is used when working with documents created in early versions ofnanoCAD Construction .

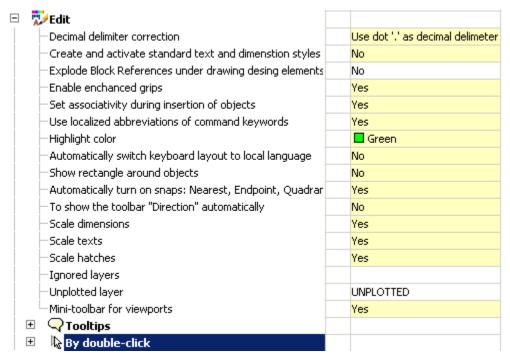
Standard text weight

It standardizes the value of the weight of the text for all text in the document.

Color and line width

Is to set the standard design elements.

Edit

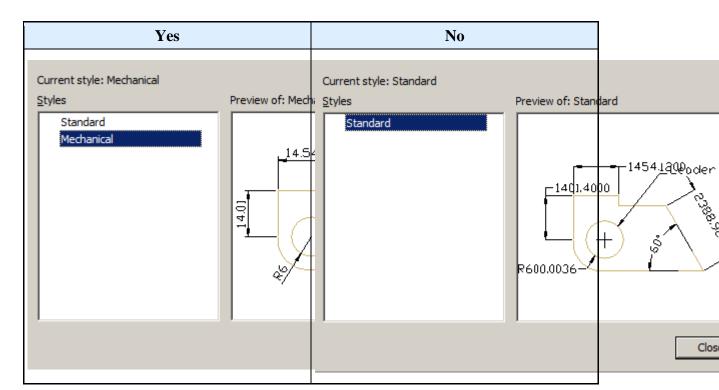


Decimal delimeter correction

- Do not correct decimal delimeter does not perform any actions with a separator.
- Use dot '.' as decimal delimeter automatically replaces the delimiter with a dot.
- *Use system locale decimal delimeter* -in this case, the separator will be replaced with the symbol set in the system settings.

Create an activate standard text and deimension styles in new documents

Managing the creation of standard styles. The default setting is "Yes". Specifying the value "No" allows you to create new documents without predefined standard dimensional styles.



Explode Block References under drawing design elements

Yes - when overlapping objects nanoCAD Construction blocks nanoCAD break up.

No - when overlapping objects nanoCAD Construction blocks nanoCAD masked with the command wipeout.

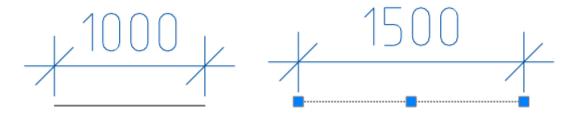
Enable enchanced grips

When this function is enabled, additional handles are displayed on the objects nanoCAD Construction .

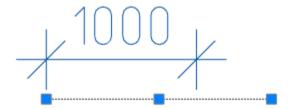
Set associativity during insertion of object

By default, the setting is enabled. When you turn off, the binding of the inserted objects to the primitives is inactive.

Example with dimensions. If the setting is enabled, then, when setting the dimensions on the line, the size will be associated with the line. When you change the line, the size changes.



If the setting is turned off, only the line will change.



Use localized abbreviations of command keywords

Abbreviations for the keywords of the commands are described in the file with the extension .pgp and are located in the installation location nanoCAD Construction

Highlight color

The color of the highlighting of primitives, when their indication is required. For example, the line's highlight when specifying a size for the placement.

Automatically switch keyboard layout to local language

When you call dialogs with fields nanoCAD Construction automatically turns on the layout set in the system settings.

Show rectangle around objects

Display control of the frame around objects nanoCAD Construction and blocks nanoCAD.



When this option is enabled, scaling is turned off Shift+RBM.

Automatically turn of snaps: Nearest, Endpoint, Quadrant, Center

Temporarily includes bindings when inserting objects nanoCAD Construction .

With the option disabled, the "Direction" toolbar may not work correctly.

To show the toolbar "Direction" automatically

The "Direction" toolbar control that appears when you insert database objects and a number of drawing design teams.



Scale dimensions

Yes value:

- 1. The measurement scale specified in the "Dimensional Styles" on the "Primary units" tab is replaced by the measurement scale specified in the Design Settings Main Options Design.
- 2. The global scale specified in the "Dimension Styles" on the "Fit" tab is replaced by the design scale specified in the Design Settings Main Options Design.

The value is "No". The scale is not replaced.

Scale texts

The value is "Yes". When you change the scale using the Scale toolbar, the "Height" parameter in the "Text Format" dialog for the multi-line text and the command line for the single-line text proportionally changes.

The value is "No". When you zoom in using the Zoom toolbar, the Height option does not change.

Scale hatches

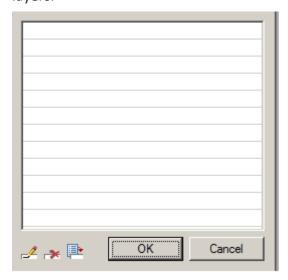
The value is "Yes". When zooming with the Scale toolbar, the Scale parameter in the Hatch dialog is proportionally changed.

The value is "No". When zooming with the Scale toolbar, the Scale option in the Hatch dialog does not change.

Ignored layers

Specifies layers nanoCAD, on which primitives will not overlap with objects nanoCAD Construction .

When you click on the ellipsis, the "Excluded Layers" dialog opens to edit the list of layers.



The dialog menu allows you to add a layer and enter it manually, delete a row with a layer or select a layer from the ones available in the drawing.

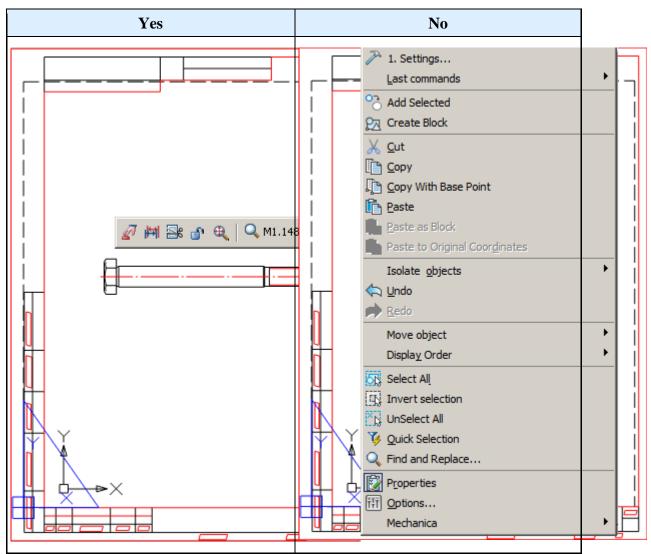
Unplotted layer

Specifies which layer the objects will be placed on nanoCAD Construction , which will not be printed.

Mini-toolbar for viewports

The nanoCAD Construction toolbar control that appears when you right-click inside the viewport.

If the option is off, then when you right-click inside the viewport nanoCAD the standard menu will be called up nanoCAD.

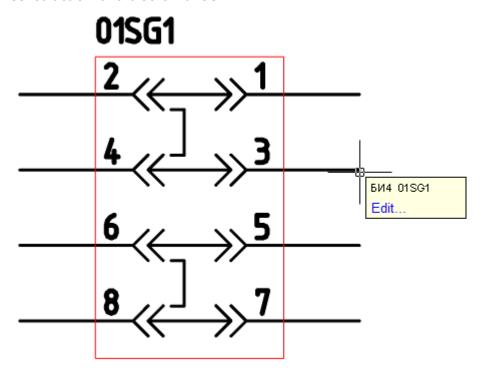


Tooltips



Show tooltips

Advanced Tooltip Management Tool (with hyperlink "Edit...") for objects nanoCAD Construction and blocks nanoCAD.



Show delay, ms

Tool to control the speed of the appearance of tooltips.

Hide delay, ms

Tool for managing the duration of the tooltip display.

By double-click



Program objects

Sets the rule that when you double-click on object nanoCAD Construction , the editing dialog of this object will be called.

With the option disabled, the properties of the object are called.

Dimensions, Regular texts, Multi-texts

With the option enabled, double-clicking the left mouse button on the size brings up the editing dialog nanoCAD Construction.

With the option disabled, the properties of the object nanoCAD or edit dialog nanoCAD.

Design



Use symbol scale

Changes the type of scaling:

- Yes Drawing scale.
- On Model scale.

More details in the description of work with the current scale.

Drawing scale

Sets the default scale of design elements and the scale of the types of geometry lines.

Note: The scale type of the dimension lines is reserved and is always 1 by default.

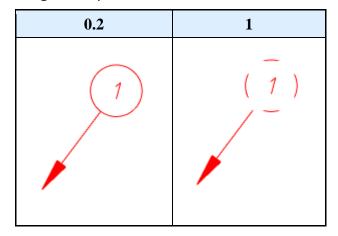
Model scale

Sets the default measurement scale. The displayed value, which is set when dimensioning, increases in direct proportion to the scale value. For example, if you set the size of a 10 mm section and the measurement scale is 1:10, the displayed value is 100.

Text wipeout offset

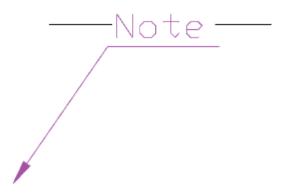
Sets the standard indentation of the geometry marking from the text.

Using the example of a size marker. With a larger size, the square background overlaps the geometry.

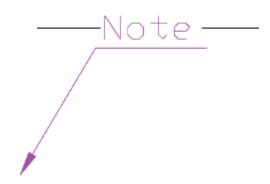


Cut CAD-platform elements

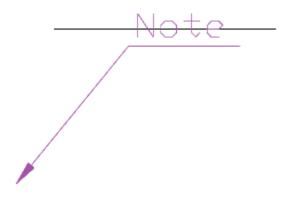
"Wipeout" - closes the primitive.



"Cut" - cut the portion of the primitive. If you delete or move carved primitive returns its status.



"No" - It does not cover the primitive.



Notifications



Enable hints

Tool tips display control.

This option does not apply to messages with the status "Error".

Avoid mouse pointer

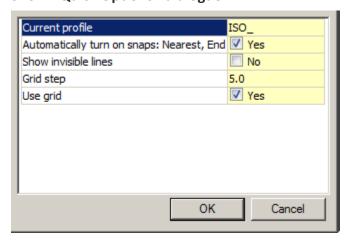
When this option is enabled the message will be moved around the screen so as not to obstruct the selection.

Hot keys

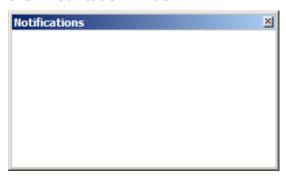
Keyboard Assignment Tool for calling the quick settings dialog and the notification messages window.



Show < Quick Options > dialogue



Show notification window



Databases access

The database includes, in addition to standard elements, table and format templates, bolt assembly templates, groups and markers, as well as examples and other user

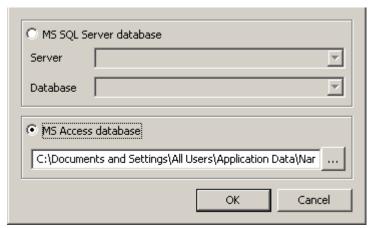
elements. The choice of a specific database is determined by the configuration of the path to the data source.



Data Source

The database nanoCAD Construction 25 includes, in addition to standard elements, table and format templates, bolt assembly templates, groups and markers, as well as examples and other user elements. The choice of a specific database is determined by the configuration of the path to the data source.

When you click on the button in the "Data source" field, the dialog for specifying the data source appears.



nanoCAD Construction 25 provides work, both with local databases, and with the database on the MSSQL server.

If you are using an MS SQL database, you must select the "Data Source - MSSQL" radio button. In the "Server" field, specify the server name (along with the name of the SQL Database Server Instance). For example: SERVER, or SERVER\SQLEXPRESS. In the "Database" field, you must specify the name of the database to which you are connecting.

If you are using a local database, you must select the "Data Source - Local Database" radio button, and then specify the path to the database file.

As a local database for computers with the x32 bit capacity, format files *.mcs (MS Access).

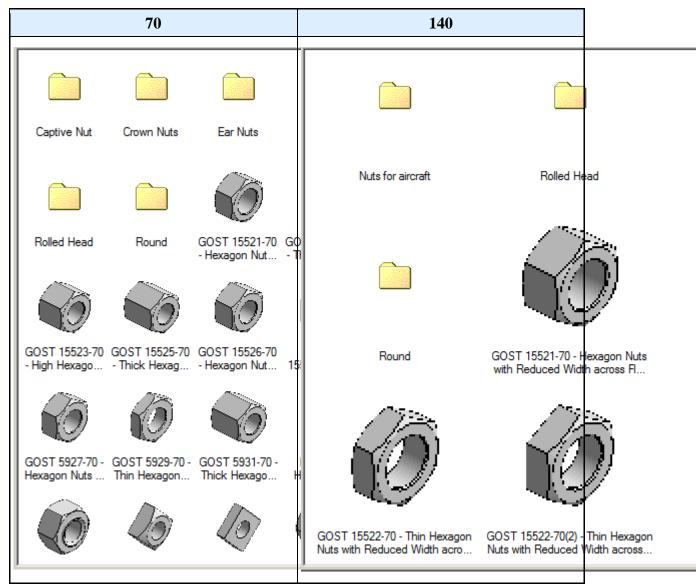
As a local database for computers with the x64 bit capacity, format files *.mdf (LocalDB, for Windows Vista and higher).

Required drivers are installed automatically when installed nanoCAD Construction 25.

By default, with a local installation, the database is located in the folder %programdata%\nanosoft\nanoCAD Construction 257.0\DataRW\.

Picture size

The size of the preview image for the database elements in pixels.

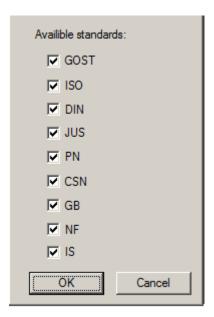


Select object in browser

- Single click
- Dowble click

Use only these standarts from the library

Restricting the used standards filter.

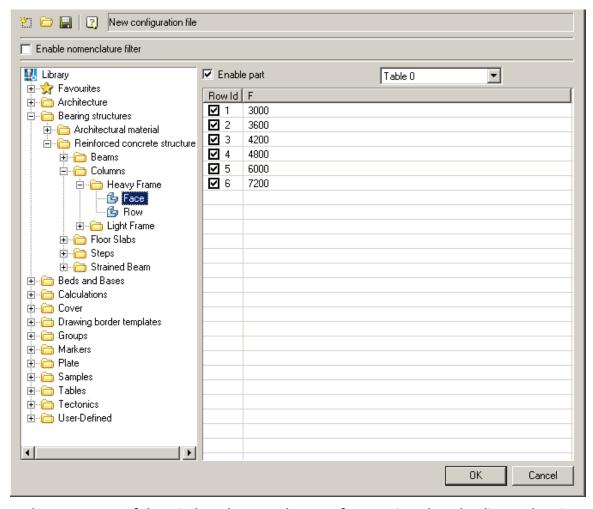


Filter of nomenclature

To limit the selection of parts from the catalog of standard and standardized products nanoCAD Construction 25 it is possible to automatically filter the database using nomenclature filters.

To enable and configure a nomenclature filter, you must enable this feature in the settings nanoCAD Construction 25.

The filter editor is called by pressing the button with the ellipsis. As a result, the settings window of the nomenclature filter appears:



In the upper part of the window there are buttons for creating, downloading and saving files of the nomenclature filters, as well as a switch for enabling / disabling database filtering according to the selected filter. nanoCAD Construction 25 allows you to switch between different filters and temporarily turn them off.

The structure of the database is displayed in the left part of the window nanoCAD Construction 25, the icons of which show the current state of each element of the database:

- **b** the standard icon of the database element. Indicates that all sizes and the element itself are allowed to be used.
- 🗳 prohibition to use icon. Indicates that this element is not allowed to be used.
- 4 partial use icon. Indicates that this element is allowed for use with a limited set of standard sizes.

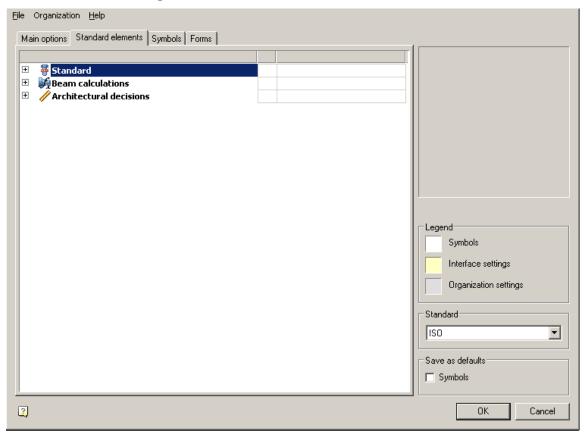
To enable / disable the use of the entire element, use the "Allow part use" switch. To disable a specific part size, you must uncheck the column ID of a line of this size in the part dimension table.

Note: Database access settings are interface settings.

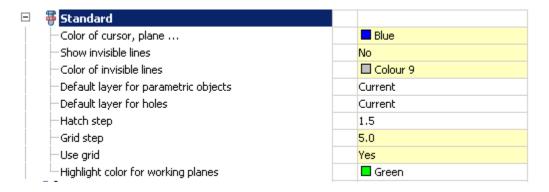
If you use data compression on a disk, you may experience problems connecting to local databases (for x64 versions).

Standard elements

The tab is used to configure standard elementsnanoCAD Construction .



Standard



Color of cursor, plane...

The control display color selection standard elements when they are selected, the automatic installation of dependencies.

The color display can be selected from a set and the built-in color picker.

Show invisible lines

Control the display of invisible (hidden) lines of standard graphic elements.

Color of invisible lines

The control display color selection invisible (hidden) lines of standard graphic elements.

The color display can be selected from a set and the built-in color picker.

Default layer for parametric objects

The control layer selection, which by default will be placed standard parts database.

A layer can be selected from the existing (previously created) or create a new layer in the same window.

Default layer for holes

The control layer selection, which by default will be placed holes created by the operation "Bolting".

A layer can be selected from the existing (previously created) or create a new layer in the same window.

Hatch step

How to set the hatching step, is used by default.

Grid step

The control is used for the step of asking the values of the diameter and length of the shaft sections created using the "Spindles".

When you insert a section of the shaft the value of its length and diameter will be rounded up to a multiple grid spacing.

Use grid

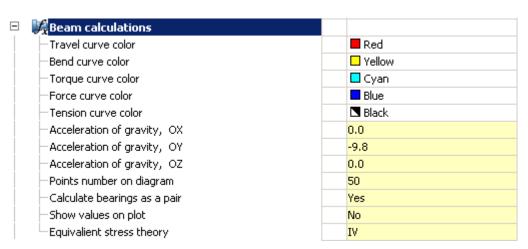
Control Using the "spacing".

If the grid is not used, the values of the diameter and length of the shaft portions are not rounded.

Highlight color for working planes

Highlight color for working planes

Beam calculations



Curve colors travel, bend, torque, force, tension

Color control diagrams displayed in the calculation of gross.

The selected color is preserved when exporting diagrams in the drawing.

The color display can be selected from a standard set and set of built-in your palette.

Acceleration of gravity OX, OY, OZ

Set design parameters for the respective axes of acceleration of the shaft.

Points number on diagram

Control increments partition diagram plotted in the entire length.

Calculate bearings as a pair

Complementing the strength calculation of shaft reactions bearings.

Show values on plot

Control the display of numerical values on the diagram exported to the drawing.

The values are displayed at the critical points of the shaft.

Equivalient stress theory

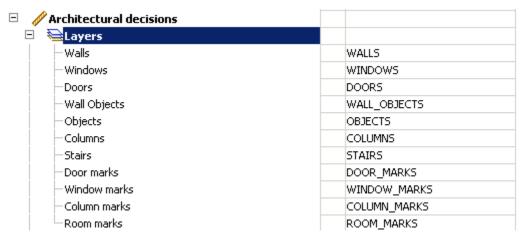
Sets the strength of the theory to calculate the equivalent stresses shafts.

Architectural decisions

Setting up layers for different elements of the standard, the size and type of stairs, and the appointment of templates to various reports nanoCAD Construction.

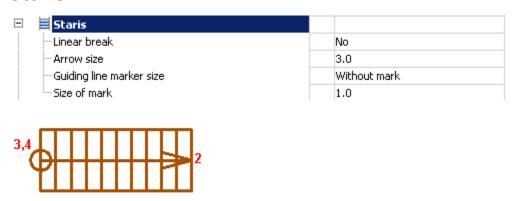


Layers



The names of the layers under the standard elements. After inserting a standard element, it will be placed on the appropriate layer is configured.

Staris



- 1. Linear break
- 2. Arrow size
- 3. Guiding line marker size: Without mark, Empty, Filled, Opaque
- 4. Size of mark

Report templates



When forming report templates will be taken from the settings.

Engineering networks



Connectors

Set the storage address labels connectors in the base element.

Traces

Set the address tag storage paths in the database elements.

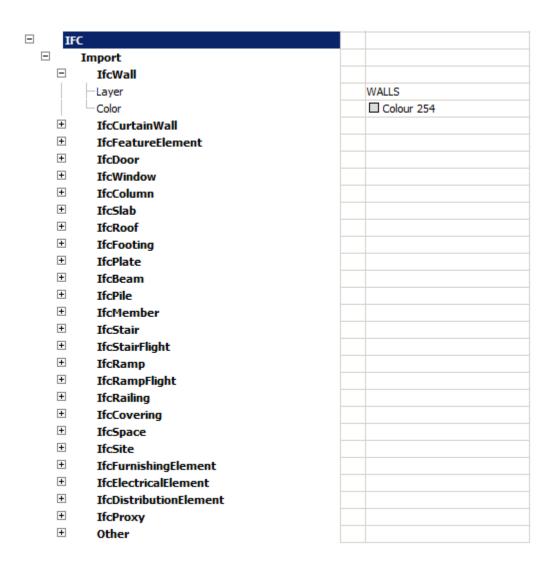
Equipment

Set the address tag storage equipment in the base elements.

IFC

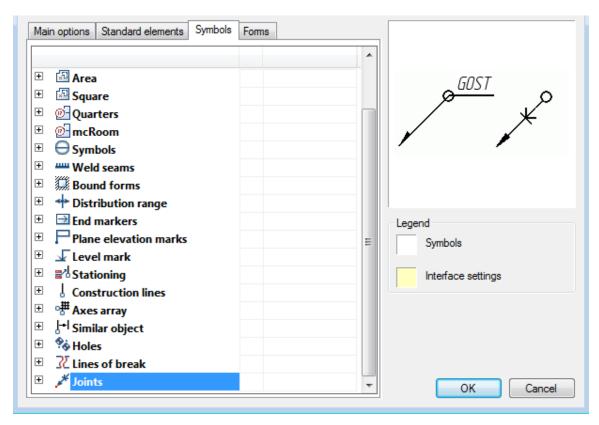
Import

It allows you to configure the IFC objects disposable layer and color.



Symbols

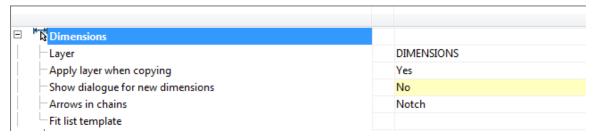
Tab "Symbols". Designed to customize the display of drawing symbols of nanoCAD Construction .



- <u>Dimensions</u>
- Notes
- Views, sections, cuts etc
- Symbols
- Welds seams
- Bound forms
- Distribution range
- End marks
- Plane elevation marks
- Level mark
- Stationing
- Construction lines
- Axes array
- Similar, object
- Holes
- Lines of break
- Joints

Dimensions

Setting allows you to change the size of the layer, which is automatically updated with new dimensions and copied settings dialogs, etc.



Layer

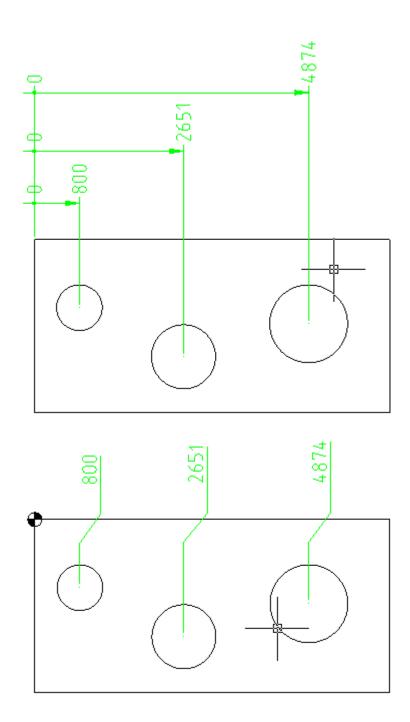
Allows you to choose the layer, which by default will include new dimensions and copied.

Apply layer when copying

When this option is copied dimensions will be placed on the drawing layer selected for size. When off, dimensions placed on the active layer.

Show dialog for new dimension

Control built ordinate dimensions. If the option is used ordinate dimensions standard ISO, built-in platform nanoCAD. When this option is used ordinate dimensions nanoCAD Construction .



Open a dialog to automatically

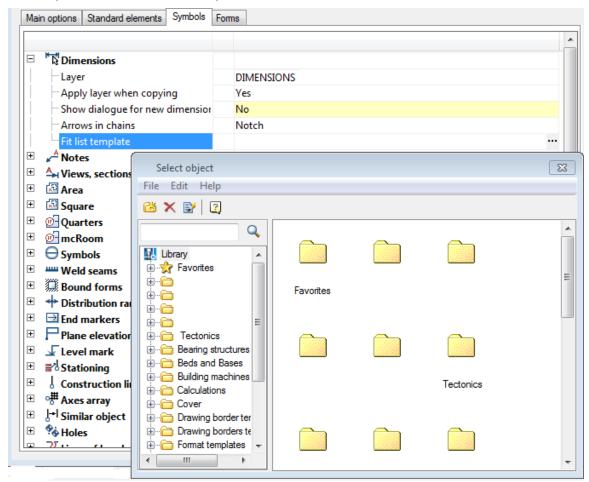
Control automatic opening dialogue sizes.

Arrows in chains

Replaces used in nanoCAD arrows in dimensional chains. There is a possibility to replace the serifs, or replace point at all.

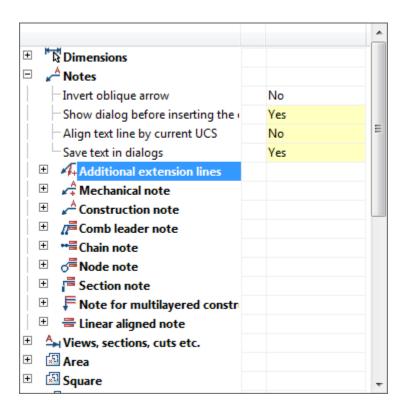
Spreadsheet template tolerances

Allows you to select a table template tolerances available in the database.



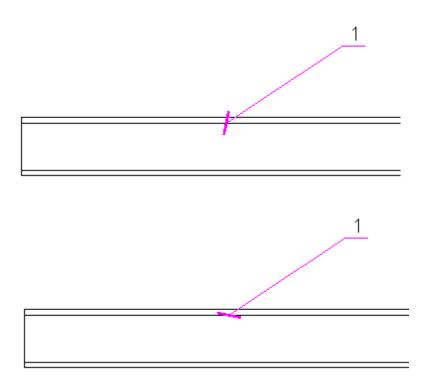
Notes

Settings of notes, such as text, arrows, pointers.



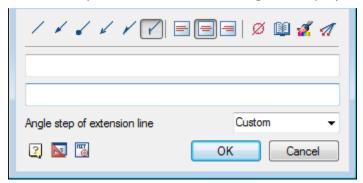
Invert oblique arrow

Allows you to choose the direction of oblique arrow in leader.



Show dialog before inserting the object

When this option is enabled, the dialogue is displayed before inserting note.



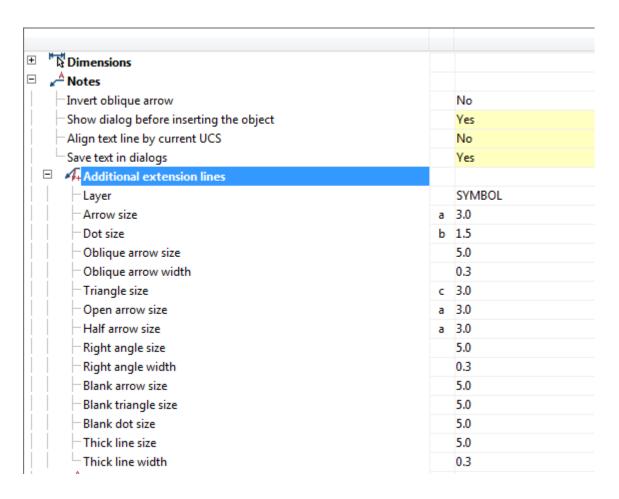
Align text line by current UCS

When this option is on, shelves of leaders are rotated by the User coordinate system.

Save text in dialogs

When this option is enabled on inserting the following notes previously entered text remains in the input field.

The remaining options allow you to change the size of text, indexes, thickness, layer placement, color, etc.



Additional extension lines

□ 👫 Additional extension lines	
Layer	SYMBOLS
- Arrow size	a 3.0
- Dot size	b 1.5
Oblique arrow size	3.0
Oblique arrow width	0.0
Triangle size	c 3.0
Open arrow size	a 3.0
Half arrow size	a 3.0
Right angle size	3.0
Right angle width	0.0
Blank arrow size	3.0
Blank triangle size	3.0
Blank dot size	3.0
Thick line size	3.0
Thick line width	0.3

Mechanical note

🕰 Mechanical note		
Layer		SYMBOLS
- Colour		■ ByObject
Line thickness		ByLayer
Designation font size	C	7.0
Arrow size	а	3.0
Open arrow size	а	3.0
Half arrow size	а	3.0
- Dot size	Ь	1.5
Oblique arrow size		3.0
Oblique arrow width		0.0
□ A Text		
Text style		Standard
Text color		■ Black
Text height	c	2.5
Text weight		ByObject
Horizontal text offset from the end of line	d	1.5
Vertical text offset from line	e	1.0
Width factor		0.0

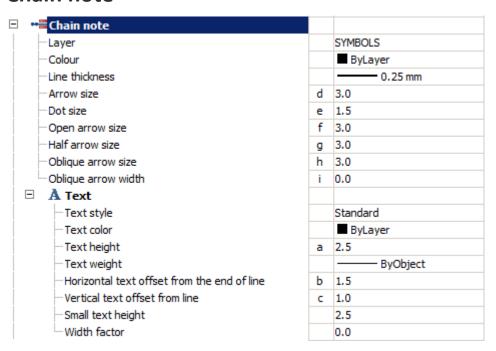
Construction note

🚣 Construction note		
Layer		SYMBOLS
Colour		■ ByLayer
-Line thickness		0.25 mm
Arrow size	e	3.0
- Dot size	f	1.5
Open arrow size	g	3.0
Half arrow size	h	3.0
Oblique arrow size	i	3.0
Oblique arrow width	j	0.0
A Text		
Text style		Standard
Text color		■ ByLayer
Text height	a	2.5
Text weight		ByObject
—Small text size	ь	2.5
Horizontal text offset from the end of line	C	1.5
Vertical text offset from line	d	1.0
Width factor		0.0

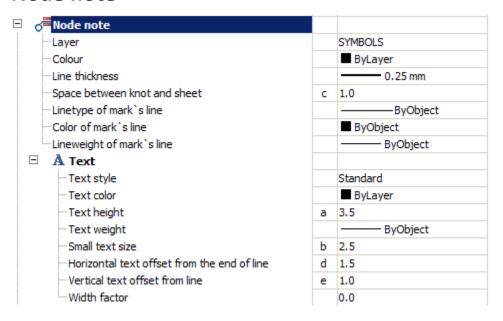
Comb leader note

r=Comb leader note		
Layer		SYMBOLS
- Colour		■ ByLayer
Line thickness		0.25 mm
- Arrow size	d	3.0
- Dot size	e	1.5
Open arrow size	f	3.0
Half arrow size	g	3.0
Oblique arrow size	h	3.0
Oblique arrow width	i	0.0
A Text		
Text style		Standard
Text color		■ Black
Text height	a	2.5
Text weight		ByObject
Horizontal text offset from the end of line	b	1.5
Vertical text offset from line	C	1.0
—Small text height		2.5
Width factor		0.0

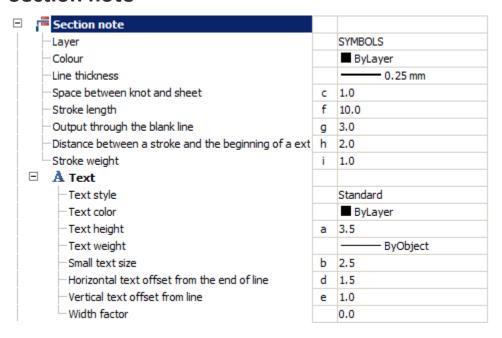
Chain note



Node note



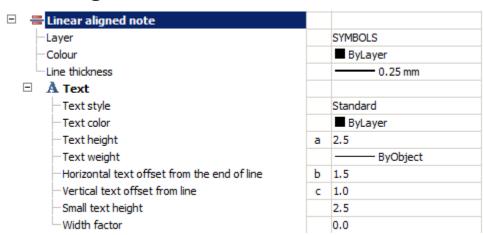
Section note



Note for multilayered constructions

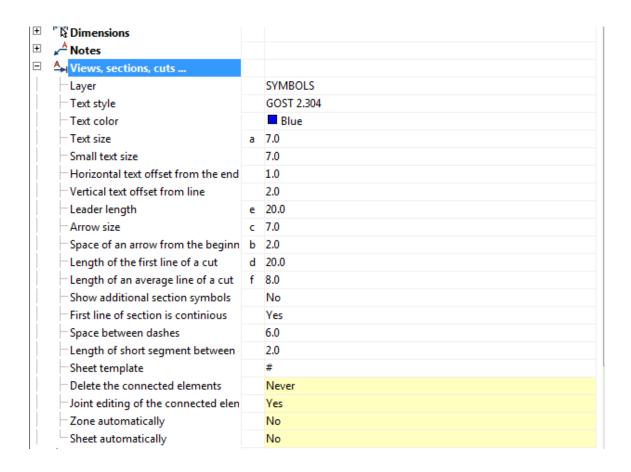
Note for multilayered constructions	
Layer	SYMBOLS
Colour	■ ByLayer
-Line thickness	0.25 mm
- Arrow size	d 3.0
- Dot size	e 1.5
Open arrow size	f 3.0
Half arrow size	g 3.0
Oblique arrow size	h 3.0
Oblique arrow width	i 0.0
Right angle size	2.0
Right angle width	0.0
□ A Text	
Text style	Standard
Text color	■ ByLayer
Text height	a 2.5
Text weight	ByObject
Horizontal text offset from the end of line	b 1.5
 Vertical text offset from line 	c 1.0
Width factor	0.0

Linear aligned note



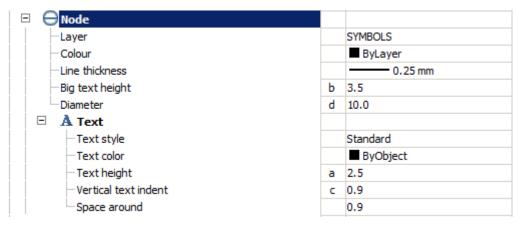
Views, sections

Settings of views, sections, detail views. It allow you to choose the layout for placing cuts and sections, color of symbols, text, size of text, lines, arrows.



Symbols

Node



Layer

Selection of the layer on which is located the node designation.

By clicking on the ellipsis to open the dialog "Table layers", where you can configure the layer.

Colour

The color of a node designation lines.

Line thickness

The thickness of the unit designation lines.

Diameter (d)



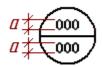
Text

Text style

Text style node designation.

text height (a)

When the value of unfilled "Page" at installation site designations.



Text color

The color of the text node designation.

Vertical text indent (c)

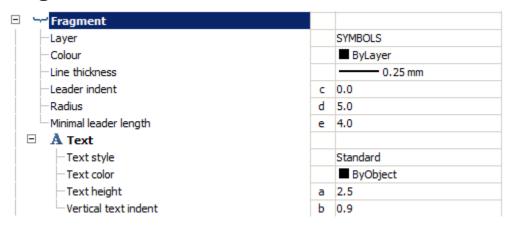


Big text height (b)

When you empty the meaning of "Page" at installation site designations.



Fragment



Layer

Selection of the layer on which is placed a fragment of the designation.

By clicking on the ellipsis to open the dialog "Table layers", where you can configure the layer.

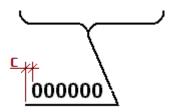
Colour

Color designations fragment lines.

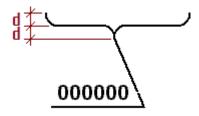
Line thickness

The thickness of the lines refer to the fragment.

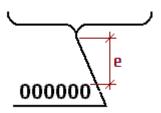
Leader indent (c)



Radius (d)



Minimal leader length (e)



With a length of less than the specified callout, the text will be placed without bubbles.

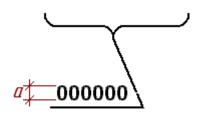
More than the set value	Less than the set value
000000	000000

Text

Text style

Text style notation fragment.

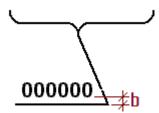
Text height (a)



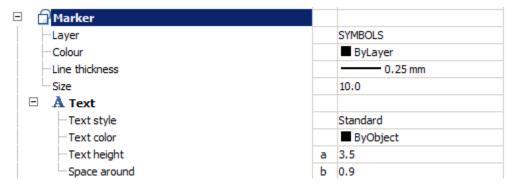
Text color

The color of the text refer to the fragment.

Vertical text indent (b)



Marker



Layer

Selection of the layer on which is placed a marker position.

By clicking on the ellipsis to open the dialog "Table layers", where you can configure the layer.

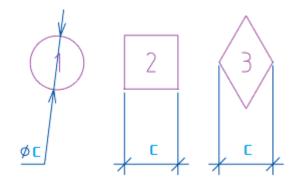
Colour

Color positional marker lines.

Line thickness

Thickness positional marker lines.

Size (c)



Text

Text style

Text Style node designation.

Text height (a)



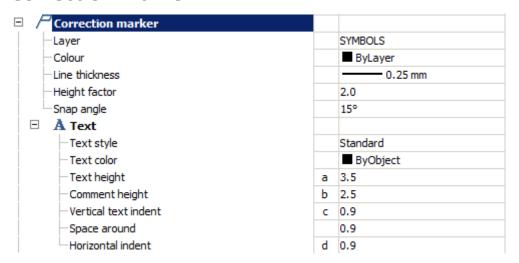
Text color

The color of the text node designation.

Space around (b)



Correction marker



Layer

Selection of the layer on which is placed a marker changes.

By clicking on the ellipsis to open the dialog "Table layers", where you can configure the layer.

Color

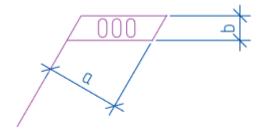
The color of the marker line changes.

Line thickness

The thickness of the marker line changes.

Height factor

Attitude a/b



Snap angle

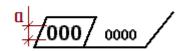
Step-lines to callouts.

Text

Text style

Text Style marker changes.

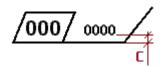
Text height (a)



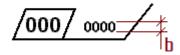
Text color

Text color marker changes.

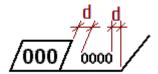
Comment height (c)



Vertical text indent (b)

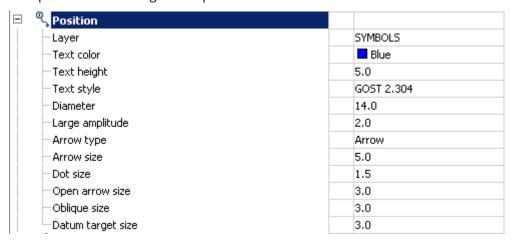


Horizontal indent (d)



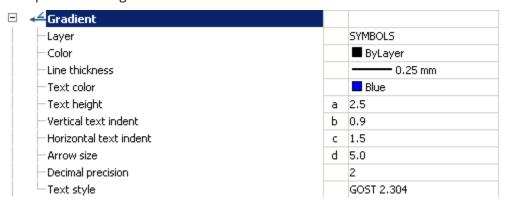
Position

Setup Menu icon designation position.



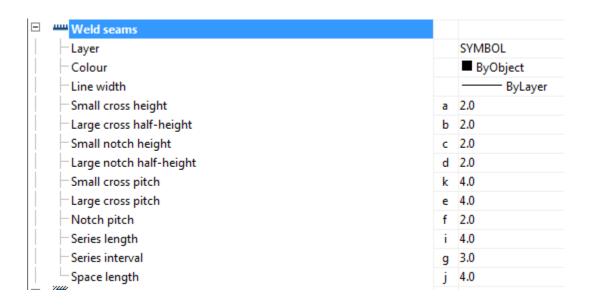
Gradient

Setup menu icon gradient.



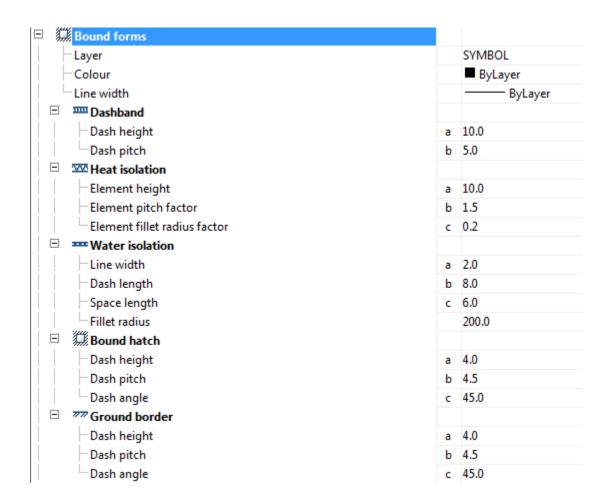
Welds

Settings of weld symbols allow you to change the layer for label placement, color, style and size of lines and text.



Boundary form

Settings of boundary forms allow you to change the layer for label placement, color symbols, line thickness, and the dimensions of the various elements of the boundary shapes.



Distribution range

Settings of distribution range allow you to change the layer for label placement, color, size lines, arrows.



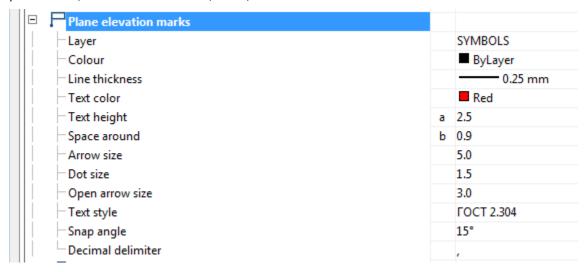
End markers

Settings for end markers allow you to change the layer for label placement, color and size designations.



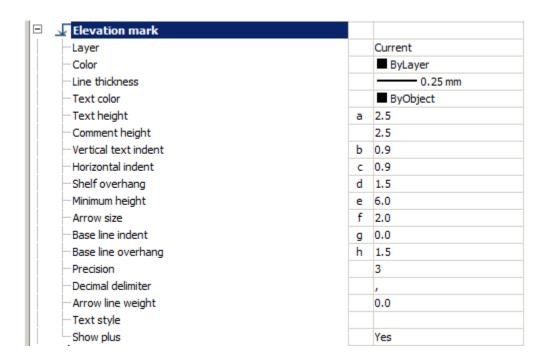
Plane elevation marks

Settings of elevation mark on the plane, that allow you to change the layer for label placement, color lines and text, lines, and text size.



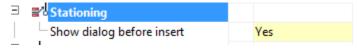
Elevation mark

Settings of symbol of Elevation mark, that allow you to change the layer for label placement, color lines and text, lines, and text size.



Designation stationing

Settings of stationing.

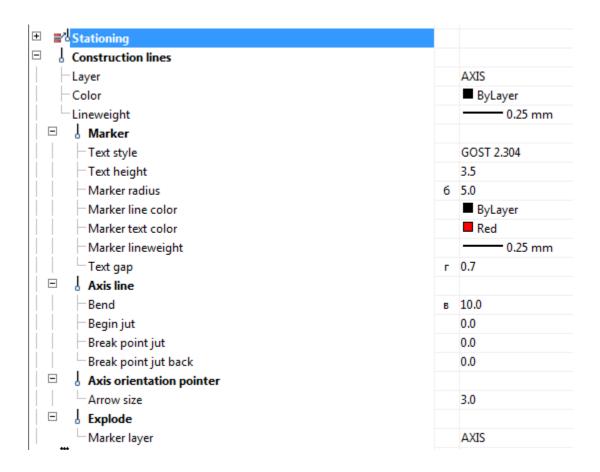


Show dialog before inserting

If enabled, shows dialogue before inserting the stationing symbol.

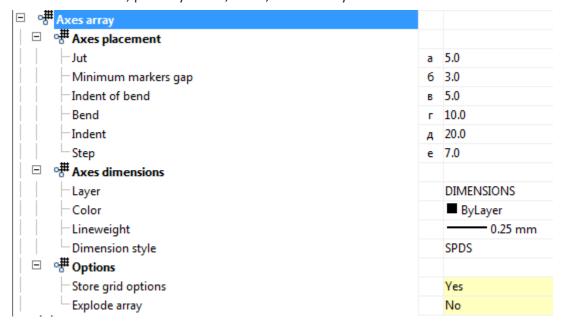
Construction axis

Settings of construction axes, that allow you to change the layer for label placement, color lines and text, size markers, axial lines, arrows.



Axes array

Settings of construction axes array. It allows you to change the location of the construction axes, place symbols, color, size and style of text and lines.



Store grid options

When this option is enabled, each following array of axes will use the parameters of the previous.

Explode an array

When this option is enabled, array created will be split to individual axes.

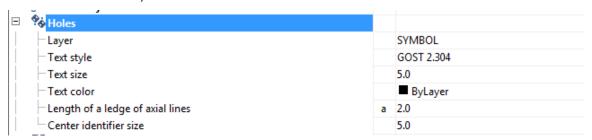
Similar object

Settings of objects similar to axis. It allows you to change the weight and color of the line, as well as a layer.



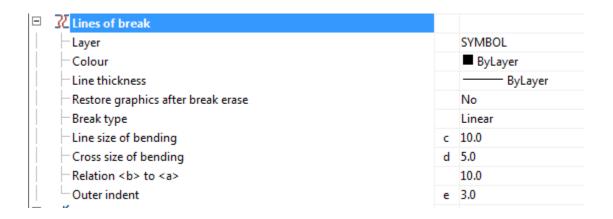
Holes

Settings of holes that allow you to change the layer for label placement, text style, size and color of the text, etc.



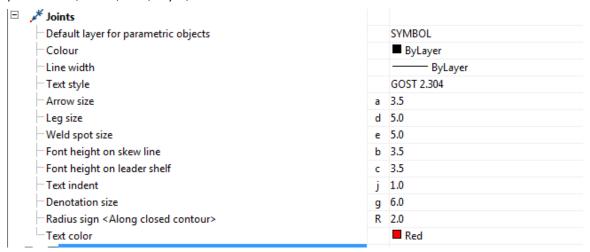
Line of break

Settings of break lines, that allow you to change the layer for label placement, color, and line sizes, type of fracture lines, etc.



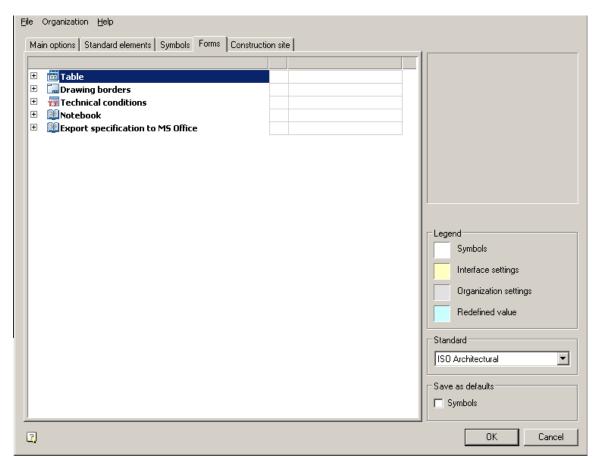
Fixed Joints

Settings of symbols of permanent connections, that allow you to change the layer, label placement, color, size, style, text and lines.



Forms

Menu tab "Forms". Designed for setting up the parameters of parts of the text tools to create a standard layout elements.

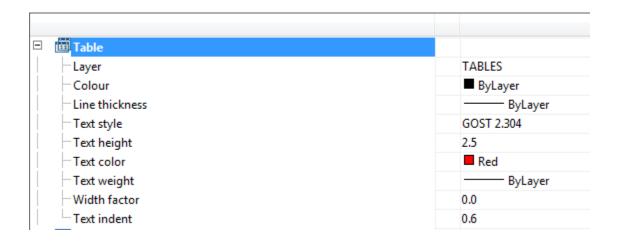


It contains the following sections:

- <u>Table</u>
- Drawing borders
- <u>Technical condition</u>
- Notebook

Table

Settings of the tables in nanoCAD Construction .



Layer

Specifies layer for placing tables.

Color

Sets color of table elements.

Line thickness

Allows you to choose the thickness of the lines of text in the table.

Option "by layer" sets the line width from the layer it is placed (default value).

Option "By block" sets the line width for by the block in which it is included.

Option "By object" sets the line width individually using properties palette.

Selecting "Default" sets the default line thickness for the table.

You can also set the line width of a standard set of values.

Text style

Sets the default text style in the table

Text Height

Allows you to choose the standard text height.

Text Color

Control choice of color of text in tables.

Text weight

Allows you to choose the thickness of the lines of text in the table.

Option "by layer" sets the line width from the layer it is placed (default value).

Option "By block" sets the line width for by the block in which it is included.

Option "By object" sets the line width individually using properties palette.

Selecting "Default" sets the default line thickness for the table.

You can also set the line width of a standard set of values.

Width factor

Sets width factor for text in table cells.

Text Indent

Sets text indent in table cells.

Drawing borders

Settings for drawing borders in nanoCAD Construction



Layer

Allows you to select the layer for the drawing border.

Text style

Sets the default text style within the drawing border.

Inventory fields of the next sheets

Enables placing of inventory title blocks on drawing border.

Create viewport in paper space

Creates a viewport when drawing border is inserted on the sheet.

Technical conditions

It specifies settings of text of the technical requirements of nanoCAD Construction.



Line spacing default

Sets the default line spacing in the text of the technical requirements.

Font Height

Sets a default text height.

Text oblique

Sets a default value of the slope of the text in degrees.

Text Color

Sets color of text in technical requirements

Text style

Sets the default text style specifications.

Header height

Sets a default value of header height in technical requirements.

Header oblique

Sets a default value of the header oblique angle in degrees.

Header Color

Sets color of header

Header Style

Sets the default header style.

Header align

Aligns the heading of technical requirements for the title block.

Default Layer

Sets the standard layer to accommodate the technical requirements.

Designations indicate areas near to the position

Automatically inserts lettering area next to the item number.

Offset from title block(x)

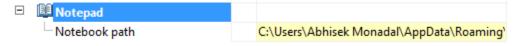
Sets the value of the indentation from the left edge of the title block horizontally.

Offset from title block(y)

Sets the offset value from the main vertical lettering.

Notepad

Settings for notebook in **nanoCAD Construction 25**.



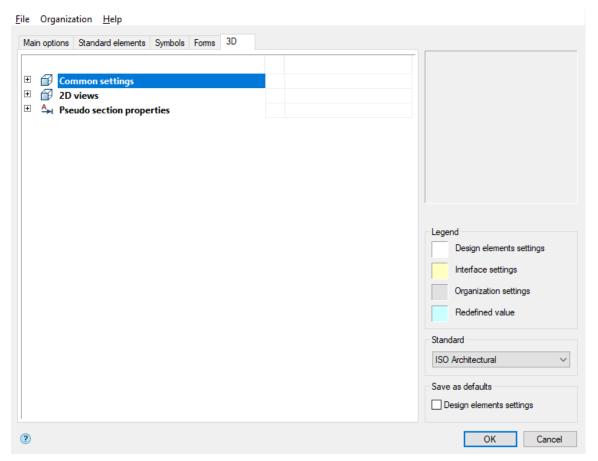
Path to the notebook

Specifies the path to the notebook.

Additional information on configuring the notebook here.

3D

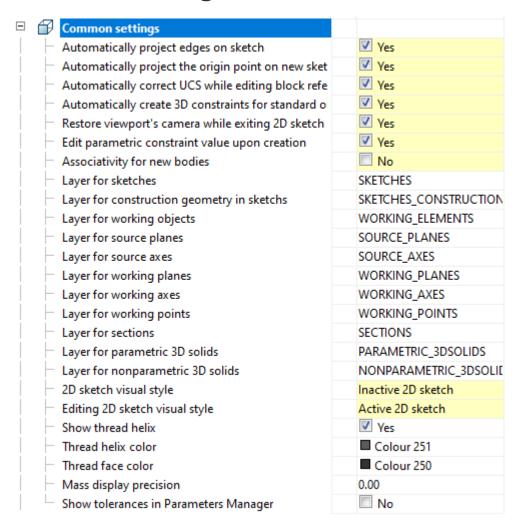
The tab is used to configure 3D settings nanoCAD Construction . The tab is available with a license for 3D.



Картинка "Данные штампов по умолчанию"

- Common settings
- 2D views
- Pseudo section properties
- Данные штампов по умолчанию

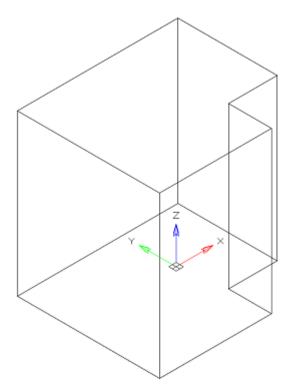
Common settings



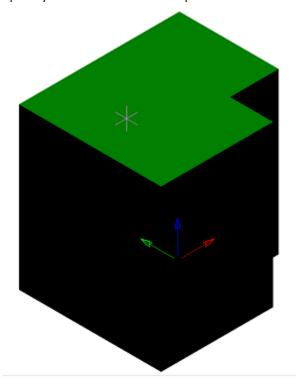
Automatically project edges on sketch

The parameter when adding a new sketch adjusts the display of the projection of the edges of a flat face taken as the working plane for the sketch.

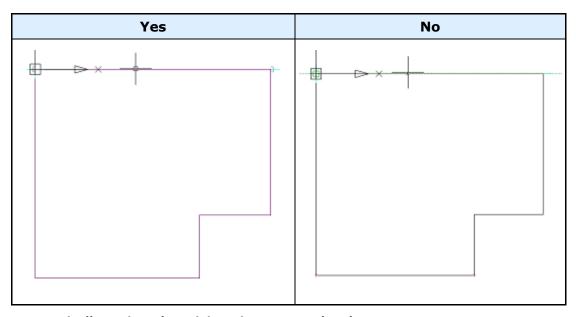
Call command "Add planar sketch".



Specify a flat face as a work plane.

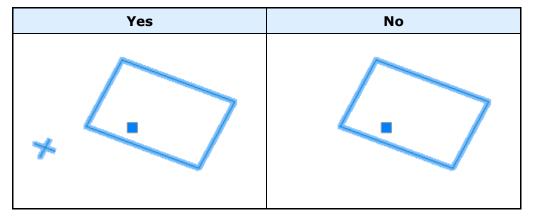


Depending on the setting, a projection will be added to the sketch.



Automatically project the origin point on new sketch

Controls the projection of the origin point when creating a new sketch.



Automatically correct UCS while editing block references with 2D constraints

Automatic correction of UCS when editing a block reference with 2D constraints.

Automatically create 3D constraints for standard objects

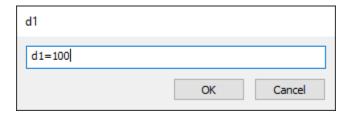
Automatically create 3D constraints when inserting standard objects into parts and assemblies.

Restory viewport's camera while exiting 2D sketch editing mode

If enabled, the view camera will be in position before the sketch is edited.

Edit parametric constraint value upon creation

Controls whether the dependency editing dialog is opened immediately after installation.



Associativity for new bodies

The enabled option allows you to build fixed bodies without the possibility of defixation. The sketch must be attached to some plane.

Laver for sketches

It allows you to customize the name of the layer on which will be placed flat sketches.

Layer for construction geometry in sketchs

Allows you to customize the name of the layer on which the design primitives will be located.

Layer for working objects

It allows you to customize the name of the layer on which the objects will be located.

Layer for source planes

Allows you to customize the name of the layer on which the source GCS planes will be located.

Layer for source axis

Allows you to customize the name of the layer on which the source GCS axis will be located.

Layer for working planes

Allows you to customize the name of the layer on which the created work planes will be located.

Layer for working axis

Allows you to customize the name of the layer on which the created work axis will be located.

Layer for working points

Allows you to customize the name of the layer on which the created work points will be located.

Layer for sections

It allows you to customize the name of the layer on which section will be located.

Layer for parametric 3D solids

Allows you to set the name of the layer on which the parametric 3D bodies will be located.

Layer for nonparametric 3D solids

Allows you to customize the name of the layer on which non-parametric 3D parts will be located.

2D sketch visual style

Visual style of 2D sketch primitives.

Editing 2D sketch visual style

Visual style of 2D sketch primitives during editing.

Show thread helix

Controls the display of the thread helix.

Thread helix color

Thread helix color.

Thread face color

Thread face color.

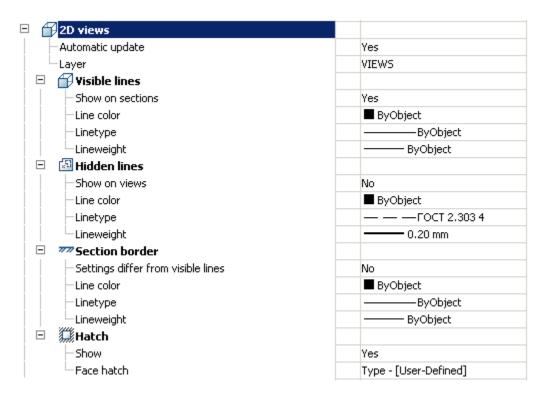
Mass display accuracy

Mass display accuracy for inspector properties and part and assembly unit properties.

Show tolerances in Parameters Manager

Mass display tolerances in Parameters Manager and properties of parts and assemblies.

2D views



Automatic update

Sets the update mode 2D views

Layer

It defines the layer which will be located 2D views

Visible lines

Show on sections

Adjusts the image visible lines on sections

Line color

Specifies the color of visible lines

Linetype

Specify the type of visible lines

Lineweight

It determines the weight of visible lines

Hidden lines

Show on sections

It adjusts the display of invisible lines on 2D views

Line color

Specifies the color of hidden lines

Linetype

Specify the type of hidden lines

Lineweight

It determines the weight of invisible lines

Section border

Settings differ from visible

It determines whether the parameters are different boundary lines of the section visible lines

If not, the next line settings are not valid.

Line color

Specifies the color of the boundary line section

Linetype

Specifies the type of the boundary line section

Lineweight

It determines the weight of the boundary line section

Hatch

Show

It controls the display of hatching

Face hatch

Settings such as shading

3D. Pseudo section properties



Hatch

Show

It controls the display of hatching.

Face hatch

Settings such as shading.

Surface transparency

Settings such as shading. Default 0 - full transparency.

Configuration utility

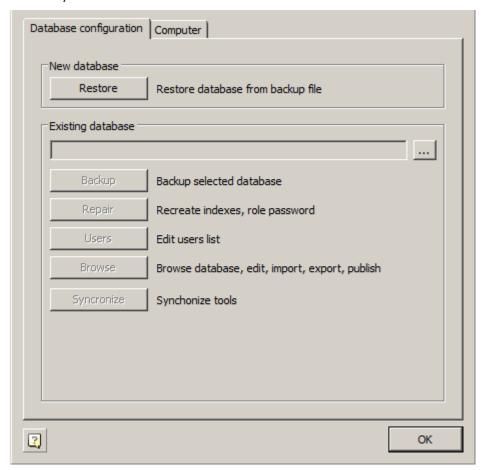
Configuration Utility

C:\Program Files\Nanosoft\nanoCAD Construction 25\mg11_McConfiguration.exe
The utility is designed to manage a database of parametric objects of nanoCAD
Construction 25.

The choice of a particular database depends on the size of the organization and the number of licenses used in it.

If the application is used in a large organization that uses a lot of licenses nanoCAD Construction, it is advisable to store the database on one server(MSSQL). Any change to the database will be immediately available to all users.

If you have multiple licenses in your organization, or you can not maintain the server, it is advisable to use local databases without using a server. The configuration utility allows you to connect files *.mcs - for win32 and *.mdf - for win64 (on Windows Vista and higher). Updating the database on different machines will have to be done manually.



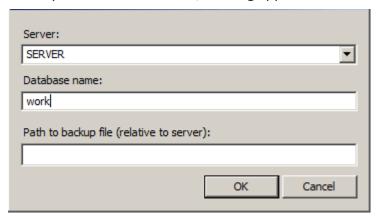
Creating and restoring the database

Restore

Creates the database MS SQL Server from a backup created earlier. File "std.mdf" from the distribution as an archive does not fit.

For initial creation of a database it is possible to use a file of a backup of a database published on **spds.ru**.

When you select a command, a dialog appears "Select Data Source".



In this dialog, specify the machine name and the name of the Instance of SQL Server on this machine, which is supposed to restore the database. The desired values can be entered manually, or choose from a list of SQL Server present on the local subnet.

Important! To restore a database, you have access to it and have sufficient rights established by the administration of SQL Server

In the "Database" must specify a new database name standard nanoCAD Construction 25, and then click "OK".

In field "Path to backup file (relative to server):" appears enter the relative path to the database. It must be a local path (UNC is not supported).

Note that when restoring a database on the server (different machine from the one that runs the configuration utility), database backup file must also reside on the server. This is necessary to ensure that SQL Server account have the right to recover the database from the specified file.

When you click on "OK" to start the recovery process (restore) the database.

In the menu of the current database, use the following commands:

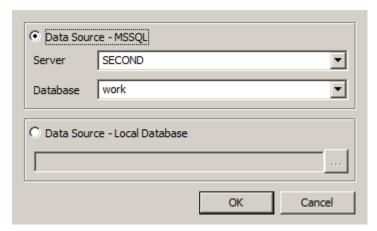
You should not use administrative tools SQL Server (Enterprise Management or SQL Management Studio) to restore the database from a file archive created by archiving of the configuration utility

Current datebase

The path to the current database.



By clicking on the button opens a dialog "Select Data Source" to specify the server and database.



In the dialog box, you can select the type of data source:

- MSSQL The server and database fields are filled in.
- Local base The file on the disk is selected. The format of the local database files can be mcs(Access) and mdf(LocalDB).

This field contains the path to the current database in the form of:

SQL:<Server Name \ Name Instance>:<database name>

The field to the local database contains the absolute path to the database file.

Important! After specifying the database, the base control buttons will be available, depending on the type of database and access rights.

Backup

Creates a file - a copy of the current SQL Server database for subsequent recovery. By pressing the button, a dialog appears to specify a relative path to the file archive database.



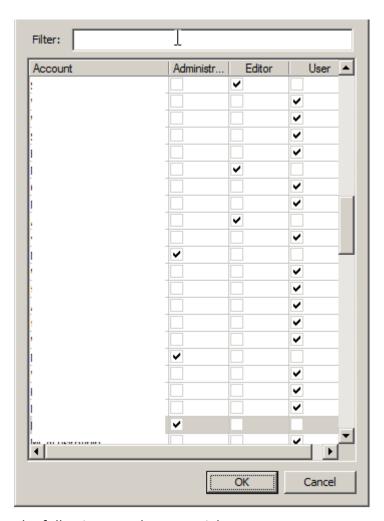
Clicking on "OK" will create an archive file.

Repair

Fixes corrupted database.

Users

Allows you to edit user rights (to run, you need to have the appropriate rights).



The following templates are right:

User - sees only system and its objects. Edits only its objects.

Editor - sees only system and its objects. Edits only its objects. Has the right to publish its objects.

Administrator - sees all the objects in the database. Has the rights to edit all objects and publish them.

Filter selects from the list of users on the typed letters contained in the user name. The list can be sorted by attributes, for this click on the column headings.

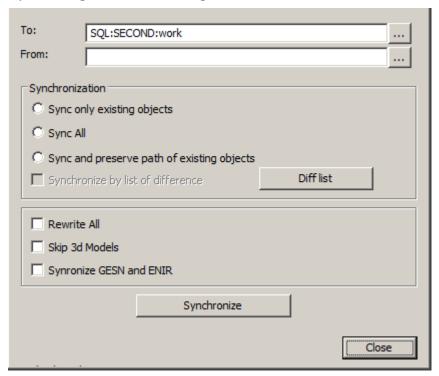
View

Starts window browser base, where you can modify the database structure:

- Delete and move folders and objects;
- Import and export objects (it is possible to import multiple files at once);
- Publication and editing objects;
- Create shortcuts;
- Renaming, editing notes, setting the preview pictures.

Synchronize

Open dialog "Database Management".



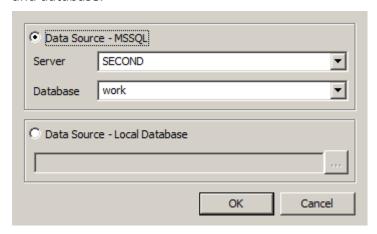
This utility is designed to provide an update target databases from the source. Through it may be, for example, to update the local database sections or individual users with respect to a single central database Company (located, for example, on a server).

To synchronize the database to choose:

Target database - this database to be updated;

Source database - this update source.

By clicking on the button opens a dialog "Select Data Source" to specify the server and database.



In the dialog box, you can select the type of data source:

- MSSQL The server and database fields are filled in.
- Local base The file on the disk is selected. The format of the local database files can be mcs(Access) and mdf(LocalDB).

This field contains the path to the current database in the form of:

SQL:<Server Name \ Name Instance>:<database name>

The field to the local database contains the absolute path to the database file.

Database Synchronization:

- Synchronize only existing objects -in the target database will be updated only those objects that are present in the target database.
- Synchronize all in the target database will be updated all the objects present in the original database (if the target object does not present, it will be created), object paths are set as in the original database.
- Synchronize and preserve path of existing objects in the target database will be updated all the objects present in the original database (if the target object does not present, it will be created), the path to the objects that exist in the target database will be stored for no longer exist will be created.

Synchronize by list of difference - synchronizes the database objects selected in the difference list.

Rewrite All - overwrites all database objects from the source database to the target database.

Skip 3d Models - do not modify the 3d model found in the database.

Synchronize GESN and ENIR - for the product "Construction Site": synchronizes the tables of the GESN and ENIR.

Button "Synchronize" synchronizes to the previously configured parameters. When synchronizing, it imports from the target database to the source database based on the specified synchronization parameters. When you import, only those objects will be updated, the modification date of which in the source database is later than the modification date in the target database.

Procedure for updating nanoCAD Construction.

On the SQL-server there is a database of enterprise details containing user-defined elements. The company received an update nanoCAD Construction , including an updated backup of the database.

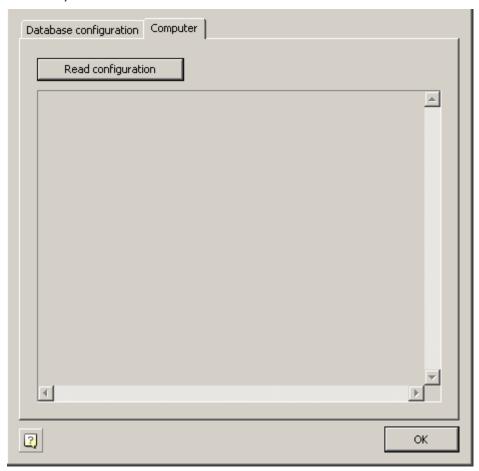
To update the database correctly, you must:

- 1. Run the Configuration Utility.
- 2. Restore the update database nanoCAD Construction from a backup.

- 3. Press button "Synchronize", a dialog will open. Analyze the list of differences of objects in the current database and in the update, for which in the "Synchronize" dialog it is necessary to click on the button "Diff list". All necessary facilities (concerns standard objects nanoCAD Construction, change of which is not required) export, and after synchronization import into an already updated database.
- 4. In the dialogue "Synchronize" select the type of synchronization "Synchronize all" and press button "Synchronize":
- 4.1. User objects created in the database will be saved when they are synchronized.
- 4.2. Modified standard objects nanoCAD Construction will be merged. When synchronizing, each different item will be analyzed if a new view is added it will be saved, if the script is changed, for example the date of changes in the current database and in the update will be compared, a newer script will remain. Thus, these details merge, and if they are present and different in both bases, the new ones are taken.

Configuration Utility (system data)

Tab "Computer" is designed to collect data about the hardware of the computer running the utility.



To display information simply click "Read configuration".

Transfer settings to another computer

Custom settings files are located in the folder

%APPDATA%\Nanosoft\nanoCAD Construction 25\ru-RU\AllOptions.xml - configuration file nanoCAD

To transfer settings, you must copy these files to the appropriate folders, and then in the settings nanoCAD Construction 25 specify the path to the settings for the design elements.

The application database is located along the following path:

%programdata%\Nanosoft\nanoCAD Construction 25\DataRW\std.mcs

User objects stored in the local database must be exported or transferred as part of the entire database.

Important! The function of saving the settings, when the saved file is the same as the one already existing, does not overwrite the old file, but complements it. I.e., when changing the standard, for example, from the ESKD to ISO, both standards will be available in the settings file.

> All changes to the profile table must be saved to the configuration file, otherwise these changes will only be displayed in the current work session.

Layers and profiles

Objects nanoCAD Construction 25 when inserted, can be placed on a special layer. In this case, you do not need to pre-create the desired layer or make it the current one: the program will automatically do this regardless of the current layer.

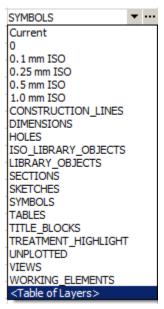
In the settings of design elements, some objects have a parameter **Layer**.

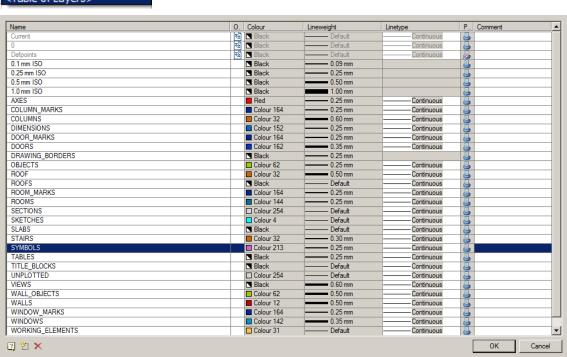
Each time an insert is inserted, the object is placed on the current layer nanoCAD.

To change the object's insertion layer, select the desired layer in the list or write its name in the input field of the drop-down list:



You can also take advantage of **Table of Layers**, selecting an item in the layer selection drop-down list.





In the dialog box "Table of Layers" a list of the layers available for use is given.

the symbol in the "On driwing" column indicates the layers that are present in the current drawing.

Button "New Layer" adds a new layer to the table.

Button "X Delete Layer" removes the selected layer from the table.

Layer Profiles

Layer Profiles used when working together on drawings. Profiles allow you to automatically add a prefix to the names of the layers used to insert objects nanoCAD Construction 25.

To add and edit profiles, use the button in the parameter line "Current profile" dialog box "Settings", tab "Main options".

In the dialog box **Table of profiles** lists available profiles.

Button " Add profile" adds a new profile to the table.

Button "X Delete profile" removes the selected profile from the table.

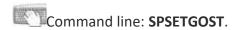
Add a profile, select it in the table and close the dialog with the OK button. Close the dialog box "Settings".

When inserting objects nanoCAD Construction 25to the special layer, a prefix corresponding to the current profile will be added to the layer name:

Important! The function of saving the settings, when the saved file is the same as the one already existing, does not overwrite the old file, but complements it. I.e., when changing the standard, for example, from the ESKD to ISO, both standards will be available in the settings file.

> All changes to the profile table must be saved to the configuration file, otherwise these changes will only be displayed in the current work session.

Overriding styles



This command is required to create (override) dimension style, text style and line types in accordance with the standards of environmentnanoCAD Construction for further work correctly.

Using this command can take in two cases:

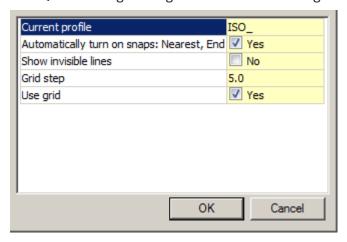
- 1. If the file was not created in the environment nanoCAD Construction
- 2. Dimension styles, text styles, or types of lines have been changed by hand and requires their recovery.

Quick options

Shortcuts for calling quick settings are set by setting hotkeys:



The Quick Settings dialog contains the following items:



- Current profile indicates the current profile.
- Automatically turn on snaps: Nearest, Endpoint, Quadrant, Center when you insert objects from the binding database, they automatically trigger.
- **Show invisible lines** displays and hides invisible lines of standard parts hidden with the "Alt+RBM".
- **Grid step** step of changing the diameter and length of a section of the shaft with its dynamic rendering.
- **Use grid** to use or not to use a grid snap when dynamically rendering a portion of a shaft.

Drawing design

Coordinate axes

Array of orthogonal axes

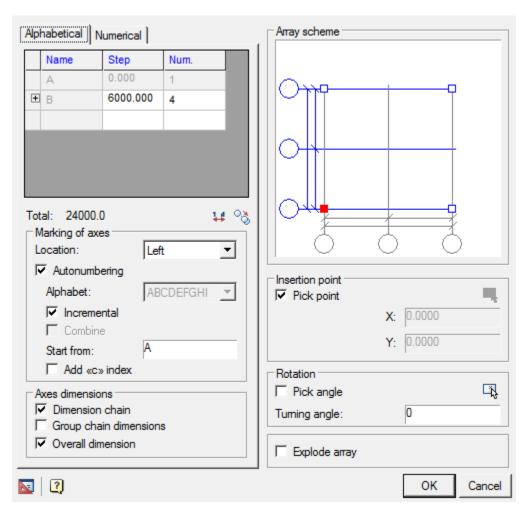
Main menu: Construction - Coordinate axes - #Construction grid.

Ribbon: Construction - Architecture - #Construction grid.

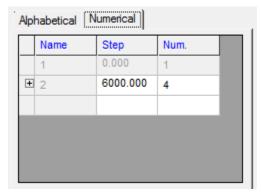
Toolbar: #Construction grid ("Coordinate axes").

Command line: SPGRID.

Dialog **array axes** has two tabs - *Digital* and *Letter* to adjust accordingly alphanumeric array axes.



In the table, select the first line *step* between adjacent axes (in units of nanoCAD) and the total *number of* axes. You can create multiple sequences with different axes step between the axles and a different number of axes in each sequence. To do this, the bottom line in the column *Step* select the desired step value. The new line will be added automatically.



Column *Total* under the table, the distance between the extreme axes of the array. Button allows you to copy the settings from another array axes inserted into the drawing.

Button ¹⁴ reverses the number and letter codes available when auto-numbering is disabled, ie. modes: Disabled, According to GOST, Decremental.

Marking Tool Group axes includes the following elements:

list of *markers* to select the position of the markers in the array axes or to disable their display.

Available options markers vertical axes Left \Right\Two Sided\Hide

Available options markers vertical axes Up\Down\Two Sided\Hide

in the entry field *Start with* specified value of the first axes. By default, digital axes numbering starts at "1" for the letter - from "A".

Switch Add 'c' index to the notation of the axes.

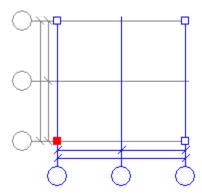
switch Autonumbered to control automatic placement of axes numbers.

Available options Autonumber Incremental\Decremental\GOST \disabled.

Axial Tool Group comprises three dimensions switch for controlling the display sizes between the axes of the array:

- dimensional chain
- group chain dimensions
- overall dimension

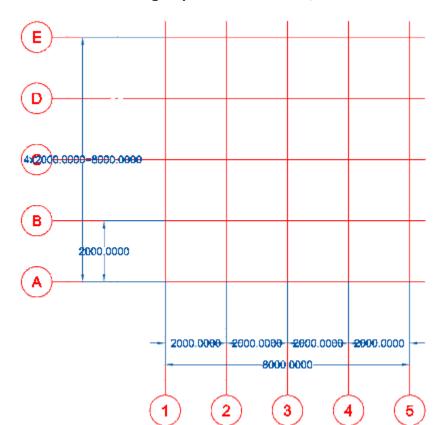
In the graphics window, specify the position of the base point in the array, which will correspond to the insertion point. Move the cursor to the desired site and click the left mouse button. Base point indicated by the red squares.



By default, when you insert the array you want to specify the insertion point in the drawing. To disable this mode, clear *Specify a point*. In the fields below, specify the X, Y coordinates of the insertion point, or select a point on the drawing by clicking .

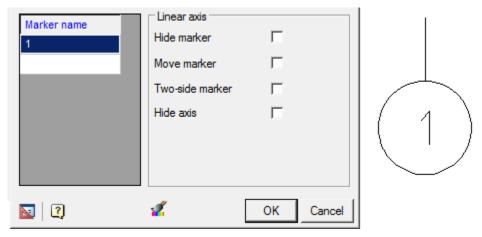
Switch *Specify angle* serves to activate the visual selection angle array axes. If required, enter the exact value of the angle of rotation in the input field, enter the angle in the drawing by clicking .

Turn on the switch *Split an array* if you want to insert an array broken into separate axes and axial dimensions.



When the switch is on **group chain dimensions**, the size of the axes will be as follows:

You can edit individual array axes on the drawing after insert. Call of axes editing can be done by double-clicking on the marker axes (you must enable edit mode by double-clicking in the settings nanoCAD Construction 25). To edit the axes can zoom the display so as to bring it closer to the marker. If the display scale of the array axes is small, then when you double-click will be called configuration dialog array. Editing dialog array axes has the form



You can change the name of the marker (if configured array mode is in mode of disabled Autonumbering). Controls the display of the axes by means of a switch **Hide axes**.

You can edit the distance between axes by double-clicking dimensions on the drawing and entering its value.

The drawing can be edited using an array of axes grips.

Position of the axes can also be changed via the **STRETCH** command.

Array of polar axes

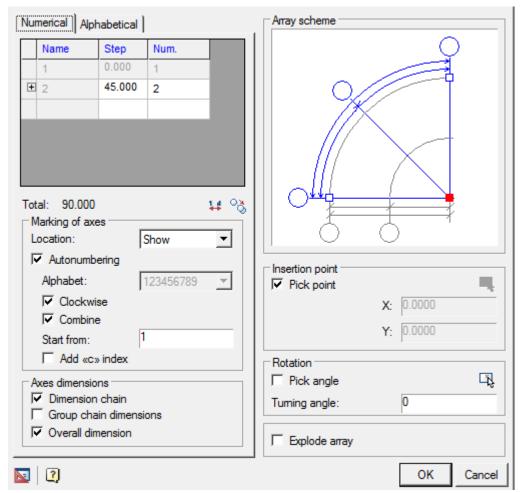
Main menu: Construction - Coordinate axes - 4Polar grid.

Ribbon: Construction - Architecture - 4Polar grid.

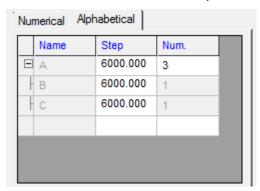
Toolbar: 4Polar grid ("Coordinate axes").

Command line: SPPGRID.

Dialog *array axes* has two tabs - *Digital* and *Letter* to adjust accordingly alphanumeric array axes.



In the table, select the first line *step* between adjacent axes (degrees for digital and literal axes mm) and the total *number of* axes. You can create multiple sequences with different axes step between the axles and a different number of axes in each sequence. To do this, the bottom line in the Step column select the desired step value. The new line will be added automatically.



Meaning the first step in the alphabet first axis determines the distance from the center axis of the array.

Button allows you to copy the settings from another array axes inserted into the drawing.

Button ! reverses the number and letter codes.

Tool Group *Labeling axes* includes the following elements:

list of *markers* to select the position of the markers in the array axes or to disable their display.

Available options markers arc axes Start\End \On both sides\Castle\Hide.

Available options markers radial axes **Show\Hide**.

in the entry field *Start with* specified value of the first axis. By default, digital axes numbering starts at "1", for the letter - from "A".

Switch Add C index to the axis name.

switch Autonumbered to control automatic placement of axis numbers.

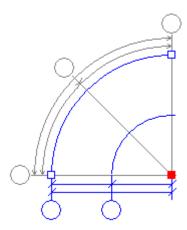
Available options Autonumber radial axes Clockwise\CCW \disabled.

Available options Autonumber arc axis from the center of \K Center \Disable.

Tool Group *Axial dimensions* contains two switches that serve to control the display size between the axes of the array:

- dimension chain
- group chain dimensions
- overall dimensions

In the graphics window, specify the position of the base point in the array, which will correspond to the insertion point. Move the cursor to the desired site and click the left mouse button. Base point indicated by the red squares.

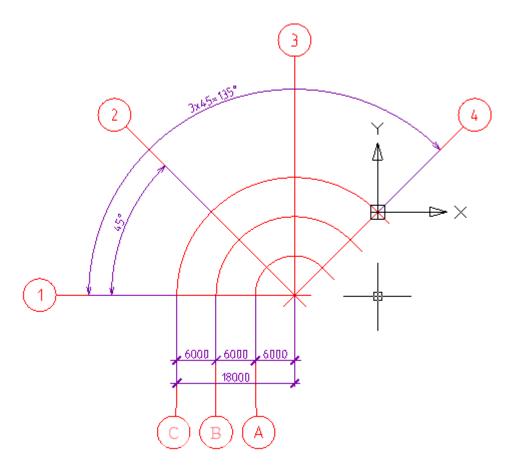


By default, when you insert the array you want to specify the insertion point in the drawing. To disable this mode, clear *Specify a point*. In the fields below, specify the X, Y coordinates of the insertion point, or select a point on the drawing by clicking.

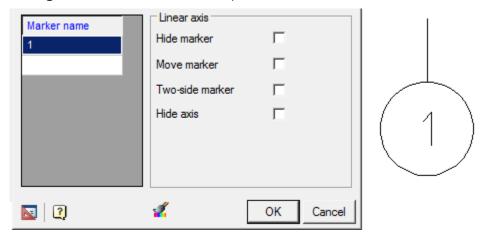
Switch *Pick angle* serves to activate the visual selection angle array axes. If required, enter the exact value of the angle of rotation in the input field, enter the angle in the drawing by clicking .

Turn on the switch *Explode array* if you want to insert an array broken into separate axis and axial dimensions.

When the switch is on **group size**, the size of the axes will be as follows:



On the drawing you can edit individual array axis. Call of axis editing can be done by double-clicking on the marker axis (you must enable edit mode by double-clicking in the settings nanoCAD Construction 25).



You can change the name of the marker (if configured array mode is in state of disabled Autonumbering).

Controls the display of the axis by means of a switch Hide axis.

Double click, you can change the value of the axial sizes (included in the chain, or the total size). When resizing shifted all axes, watching this.

The drawing can be edited using an array of axes grips.

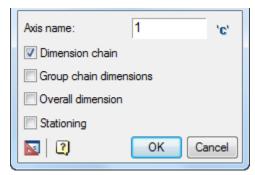
Single axis



Ribbon: Construction - Architecture - L Construction axis.

Toolbar: Lonstruction axis ("Coordinate axes").





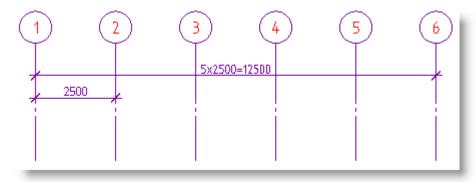
- 1. In the dialog box Single axis indicate the number of the first axis inserted. Click OK.
- 2. Specify start point or the name of the first axis.
- 3. Specify the endpoint of the first axis.
- 4. Enter the *distance* to the next axis or *the insertion point*. Complete the cyclic command by pressing Esc.

When you enter the distance from the keyboard position of the axis the current cursor position is given.

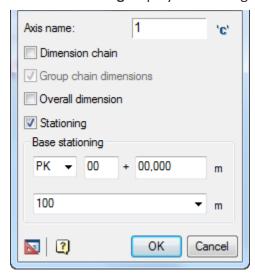
Switch 'c' Add the index 'c' to automatically add an index to the designation of the axis.

Switches *Dimensional chain* and *total size* includes automatic dimensioning between the axes. Dimensions may be linear or angular.

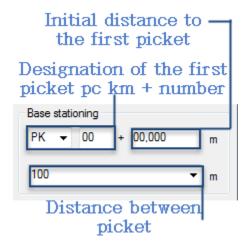
Dimension grouping joins chain of dimension into one single group dimension.



Switch **Stationing** displays stationing dialog.

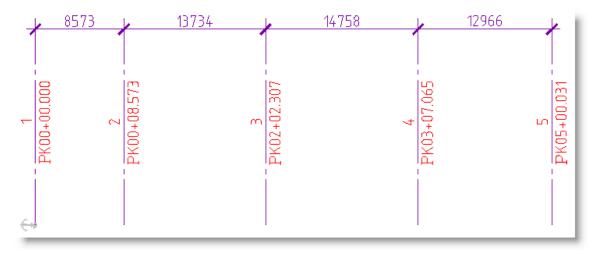


Stationing can be chosen from a list of *PC* or *CM*. You can also specify the number of the first picket. You can set the initial value, enter it in the appropriate input box.



Stationing is calculated as the ratio of the actual distance between pickets to the specified distance in meters plus supplement.

At a given distance between pickets 10m axis will be as follows:

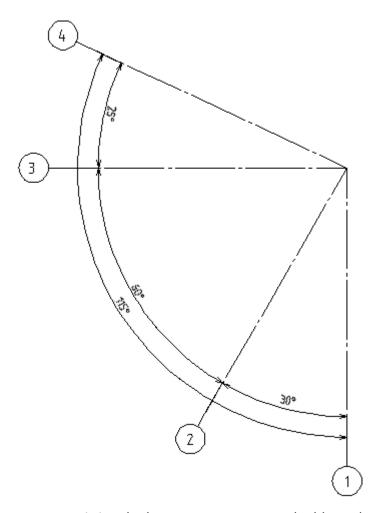


Anchor shows the direction of reference between the axes.

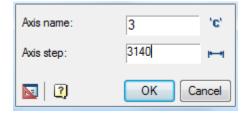
Axes inserted into the drawing are automatically numbered in ascending order by numbers or letters (depending on the designation of the first axis).

When you insert an axis, in context menu also some commands are available (N-Name, E-New, A-angle, and D-Dialog):

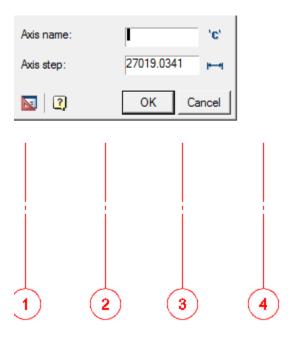
- When you choose *N-name* on the command line, you are prompted to enter a new designation for the next axis
- Team New Eallows you to select a new location inserted axis.
- A-angle translates insert axis in append mode radial axis



• *D-Dialog* is invoked to set parameters and add another axis.



When you click on "OK" dialog will be created in the drawing axis, located at a predetermined distance (angle) from the previous dialog with the entered name.



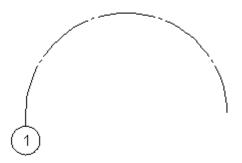
When the command completes *Single axis* is finished the markers of axes are separated automatically.

Arc construction axis

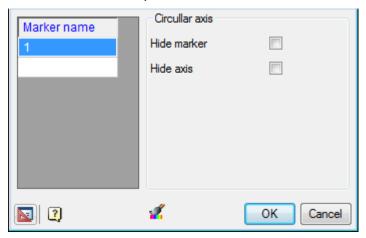
- Main menu: Construction Coordinate axes Separate arc construction Axis.
- Ribbon: Construction Architecture Separate arc construction Axis.
- Toolbar: Separate arc construction Axis ("Coordinate axes").
- Command line: SPARCCLINE.

To create a separate arc axis

- 1. Specify **center point of the** axis.
- 2. Specify radius of arc (click or enter a value on the keyboard).
- 3. Specify **the start angle** (click or enter a value on the keyboard).
- 4. Specify **end angle** (click or enter a value on the keyboard).



The double-click to open the context menu arc axis.



Column *Marker name* contains a list of the names of the markers. To add a new marker, click in an empty field and enter the name of the marker.

Options arc axis:

- **Hide marker** hides the marker so it is only displayed in the drawing axis;
- Move marker moves marker to the other end of the shaft;
- Two side marker adds a marker at the other end of the axis;
- Hide axis the axis hides, only the marker;

Circular construction axis

Main menu: Construction - Coordinate axes - Separate Circular Construction Axis.

0

Ribbon: Construction - Architecture - Separate Circular Construction Axis.

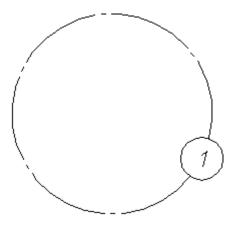


Toolbar: ○ Separate Circular Construction Axis ("Coordinate axes").

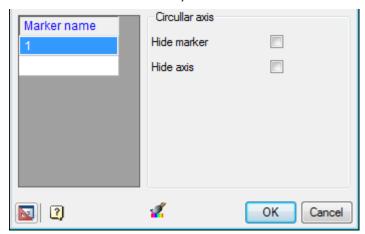
Command line: SPCIRCCLINE.

To create a separate rotary axis:

- 1. Specify center point of the axis.
- 2. Specify the radius of the arc.
- 3. Specify marker angle.



Context menu of the rotary axis is as follows:



Column **Marker name** contains a list of the names of the markers. To add a new marker, click in an empty field and enter the name of the marker.

Arc axis

- Hide marker hides the marker and is only displayed in the drawing axis;
- Hide axis the axis hides, showing only the marker;

Add markers



Ribbon: Construction - Architecture - Add marker.

Toolbar: Add marker ("Coordinate axes").

Command line: SPADDMARKER.

1. In the drawing select the coordination axis.

2. In the dialog box Additional markers specify a name to the marker.



- 3. Click OK.
- 4. Specify the name of the second additional marker and click OK or click Cancel to exit.

Orientation mark for construction line

Main menu: Construction - Coordinate axes - - Orientation Mark for Construction Axis.

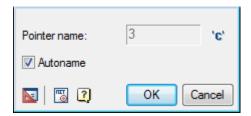
Ribbon: Construction - Architecture - L. Orientation Mark for Construction Axis.

Toolbar: Grientation Mark for Construction Axis ("Coordinate axes").

Command line: SPCLINEORIENT.

- 1. In the drawing select the coordination axis.
- 2. Specify *insertion point* or *distance* in the selected direction. Distance is introduced based on the current scale nanoCAD Construction 25.

When editing inserted into the drawing pointer orientation dialog box appears *pointer* axis orientation



Marker **Autoname** automatically sets the name of the pointer axis orientation. By turning off the marker, you can specify your own name index.

Set the input field with a new name index. If necessary, add to the name of the index 'C', using the button 'C'

Separate markers

Main menu: Construction - Coordinate axes - 🚜 Separate Markers.

Ribbon: Construction - Architecture - 🕹 Separate Markers.

Toolbar:
\$\mathbb{A} \text{Separate Markers ("Coordinate axes").}

Command line: SPSEPARATEMARKERS.

Select the drawing focal axis and confirm. Markers axes are automatically moved apart so as to avoid overlapping.

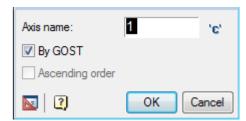
Rename construction lines

Main menu: Construction - Coordinate axes - Rename Construction Axes.

Ribbon: Construction - Architecture - 🖟 Rename Construction Axes.

Toolbar: I Rename Construction Axes ("Coordinate axes").

- Command line: SPRENAMECLINES.
- 1. Select construction line.
- 2. In the dialog box, enter the name of the axis. Click OK.
- 3. Select the drawing focal axis that you want to rename.

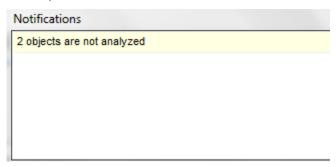


Switch by GOST enabled by default is used to select the direction of renaming. Also included is a marker which will verify compliance with GOST: axis names: exception letters, Cyrillic characters, similar numbers, etc.

When the switch is ascending order axes from left to right and top to bottom.

If you turn off both switches numbering axes in descending order, i.e, from right to left and top to bottom.

If some of the selected axes are arranged non-parallel to the first axis, a message is shown, which indicates the number of these axes.



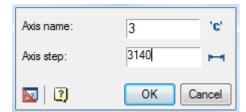
Similar construction line

- Main menu: Construction Coordinate axes Similar to Construction Axis.
- Ribbon: Construction Architecture Similar to Construction Axis.
- Toolbar: Similar to Construction Axis ("Coordinate axes").
- Command line: SPSIMILARCLINE.
 - 1. Select the drawing coordination axis.
 - 2. Specify the distance or the insertion point next axis. In the context menu of available commands (N-Name/E-New/D-dialog/ A-fill angle).
 - 3. Complete the action of the cyclic command.

Plug-axis automatically numbered in ascending order

When you insert available context menu commands (1-Name, 2-Dialog and, 3-Angle)

- When you choose *one-name* on the command line, you are prompted to enter a new designation for the following axis.
- Command 2 Dialog brings up a box next axis



When you click *OK* to the axis it is added to the input field name in the distance determined in the pitch axis of the previous axis.

Push-button pitch / angle $\stackrel{\longleftarrow}{}$ or $\stackrel{\triangle}{=}$ changes over the distribution of axes when inserting - orthogonal or polar.

Exit the dialog box by clicking Cancel.

• Command *3-angle (3-distance)* changes over the distribution of axes when inserting.

Refresh intersections of constructions axes

Main menu: Construction - Coordinate axes - *Refresh Intersections of Constructions Axes.

Ribbon: Construction - Architecture - *Refresh Intersections of Constructions

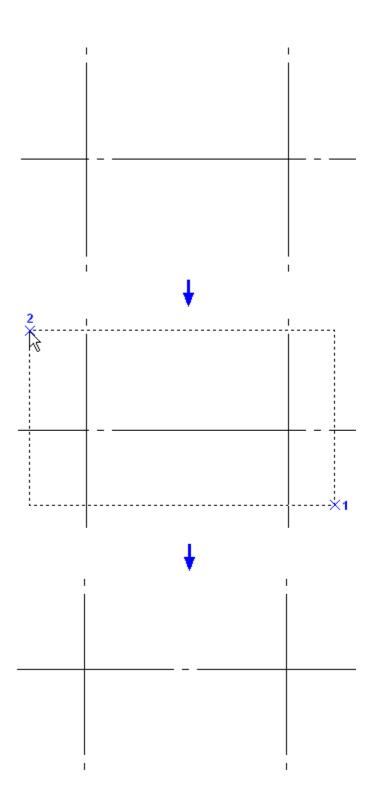
Axes.

Toolbar: **Refresh Intersections of Constructions Axes ("Coordinate axes").

Command line: SPREFRESHCLINECROSS.

Updates intersection focal axes, providing the requirements of GOST dash-dotted lines crossing in long strokes.

- Select the drawing focal axis and confirm
- Intersection will be updated automatically.



Adding axis to the array

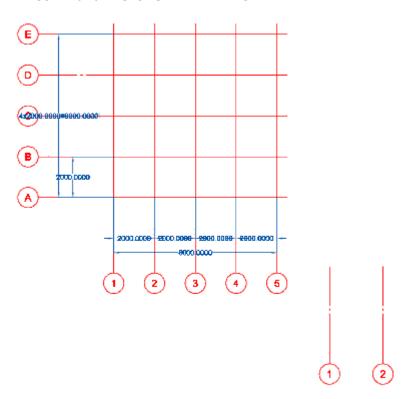
0

Main menu: Construction - Coordinate axes - Add Axes to Grid.

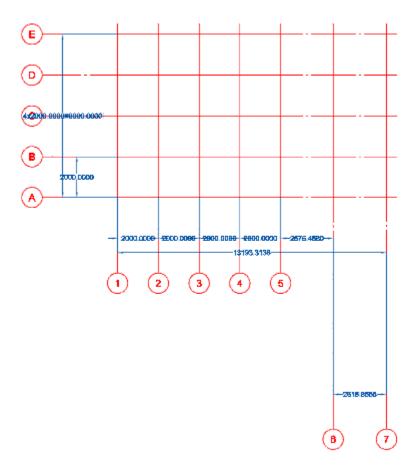


Toolbar: **Add Axes to Grid ("Coordinate axes").

Command line: SPGRIDADDAXES.



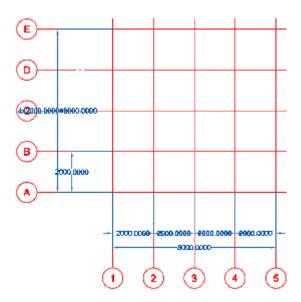
- Select an array of axes
- Select the axis you want to add



Axis will be added to the array, and will be numbered in accordance with the sequence of the array.

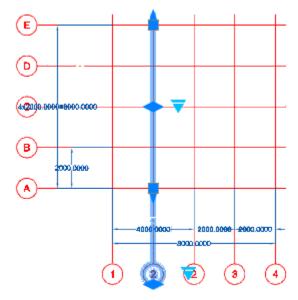
Removing the axes of the array

- Main menu: Construction Coordinate axes **Extract Axes from Grid.
- Ribbon: Construction Architecture **Extract Axes from Grid.
- Toolbar: **Extract Axes from Grid ("Coordinate axes").
- Command line: SPGRIDEXTRACTAXES.



- Select an array of axes
- Select the axis you want to remove from the array, for example, the axis 3

The extracted axis is excluded from the numbering of the array and will be independent axis.



Architectural decisions

Wall

Main menu: Construction - Architecture > Add Wall.

Ribbon: Construction - Architecture > Add Wall.

▼ Toolbar: Architecture > Add Wall.

Command line: SPWALLADD.

Walls can be straight and arc sections. To construct the arc wall segment in the context menu select the command **arc**.



Ways of building arcs will be available in the context menu:

Arc - consistently indicates the starting, middle and end Points;

Bulge - consistently indicates the initial endpoint of the arc and the given bend;

Center - consistently indicates the arc center's starting and end points;

Segment - used for constructing rectilinear segments;

Justify - Consistently indicates left, center and right points;

Also in the context menu are the following options:

Axis - toggles for drawing the wall relative to its axis (*left, center, right*);

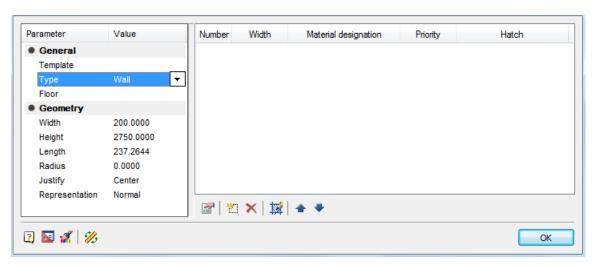
Offset - - lets you draw a wall with an indent;

Properties - opens the properties dialog box wall;

Match - allows you to copy the properties being built with any existing walls.

Properties dialog wall

Dialog can be accessed from the context menu to create a wall, or by right-clicking on an already built facility.

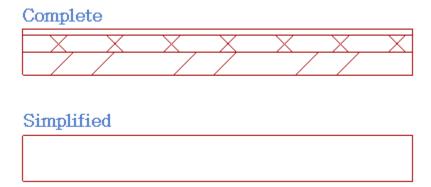


Key parameters are displayed in the left pane of the dialog box. In the right pane of the dialog box you can set the wall material. You have the opportunity to create a multi-layered wall.

All parameters of the walls can be set independently or choose **Template**. The template determines the composition of the wall, its width and height. If the user changes any of these parameters, then the connection is lost with the template.

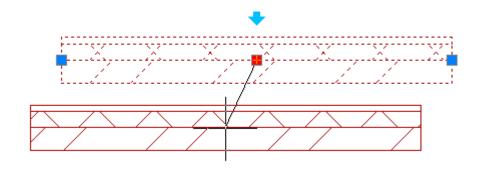
- are Wall material. Opens the material of the wall, where you can see and edit the list of available materials.
- **New layer**. Creates a new blank layer comprising the wall. Column *Material* selects the required material from the drop-down list. Priority layer will determine cleanup schedules while crossing the walls: a layer with a higher priority is displayed on top of layers with a lower priority.
- Delete Layer. Removes the layer from the wall.
- Hatch . Allows you to set or change the shading layer.
- Move Up. Moves the list of layers on the active layer above the line.
- Move Down. Moves the list of layers on the active layer below the line.

You can specify *full* or *simplified* representation. In the simplified representation layers and hatching are turned off.

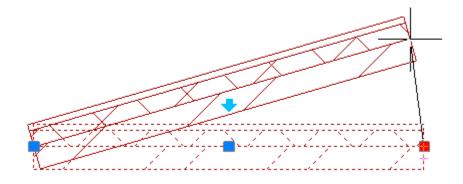


Editing with grips

Central grip moves wall parallel to its original position.



Recent handles allow the wall to turn.



Blue arrow allows you to turn the wall.

Polygonal wall

0

Main menu: Construction - Architecture > Add PolyWall.



Toolbar: **Add PolyWall (toolbar** "Architecture").

Com

Command line: SPPOLYWALLADD.

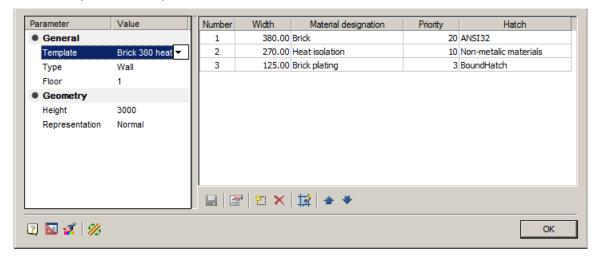
Polygonal wall provided in the form of a closed polygon.

The order of insertion

- 1. Call command.
- 2. Specify the first point of the construction of the wall.
- 3. Specify the following point.
- 4. To complete the construction of press Enter. Wall will be closed automatically.

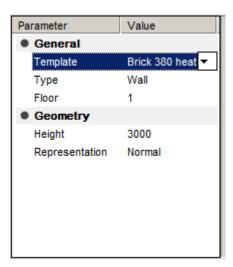
Dialog properties wall

Dialogue can be accessed from the context menu to create a wall, or by right-clicking on the already-built facility.



The main parameters of the wall are displayed on the left side of the dialog box. In the right part of the dialog is set composition of the wall. In this case it is possible to create multi-layered walls.

Options



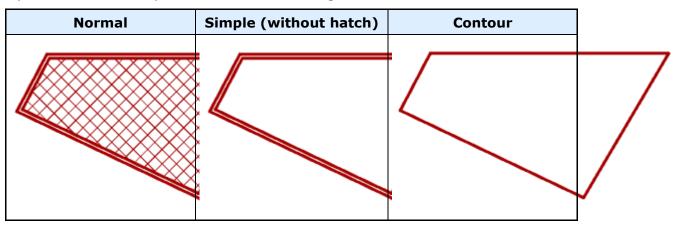
Template - Selecting the wall structure template.

Type - Wall Type: wall or partition.

Floor - Choose the floor

Height - The height of the wall.

Representation - The representation in the drawing.



The composition of the wall

All parameters of the wall you can set your own or choose from option "Template". The template determines the composition of the wall, its width and height. If the user changes any of these settings, the connection is lost with the template.

Number	Width	Material designation	Priority	Hatch
1	380.00	Brick	20	ANSI32
2	270.00	Heat isolation	10	Non-metalic materials
3	125.00	Brick plating	3	BoundHatch

The composition of the wall is controlled by commands:

- Wall's materials. Opens the "Wall Material" dialog box, where you can see and edit the list of available materials.

- Add layer. Create a new blank layer as a part of the wall. In the column "Material" it is necessary to choose the desired material from the dropdown list. Layer Priority will determine how cleanup schedules at the intersection of walls: a layer with a higher priority is displayed on top of the layer with a lower priority.

Important! The last layer of the wall fills the remaining space inside the wall, regardless of the specified width.

- Remove layer. Removes a layer from the walls.
- Hatch. It allows you to create or change the shading layer.
- Move up. Moves in the list of layers of the active layer on the line above.
- Move down. Moves in the list of layers of the active layer on the line below.
- Flip wall. Visually changes the order of the layers of the wall.

Editing walls

Convert to wall

Main menu: Construction - Architecture -Wall Edit > Convert to Wall....

Ribbon: Construction - Architecture > Convert to Wall....

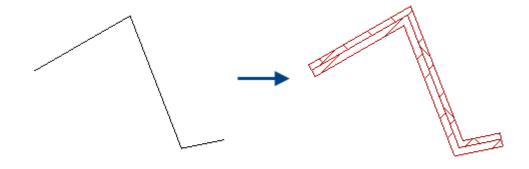
Toolbar: Architecture > Convert to Wall....



Command allows you to convert the wall lines and arcs.

Call the command and specify the primitives for conversion. In the <u>dialog box</u>, specify the required parameters of the wall.

At the end of the command, specify the delete source primitives or not.

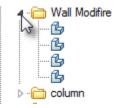


Wall modifier

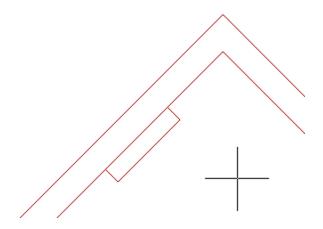
- Main menu: Construction Architecture -Wall Edit > Add Wall Modifier.
- Ribbon: Construction Architecture > PAdd Wall Modifier.
- Toolbar: Architecture > PAdd Wall Modifier.
- Command line: SPWALLMODADD.
- Library: Architecture Modifiers



When using a build modifier of base elements, you can choose different configuration object.



To connect the modifier to the wall run the mouse pointer across any wall modifier bound to the *walls*. To unbind modifier from the wall or tie it again, you can through the context menu commands *Attach/Detach*.



Convert to wall modifier



Ribbon: Construction - Architecture > Convert to Wall Modifier.

Toolbar: Architecture > Convert to Wall Modifier.

Command line: SPWALLMODCONV.

Command is working as follows:

- · After launch the command you need to select objects on the drawing;
- Specify insertion point.

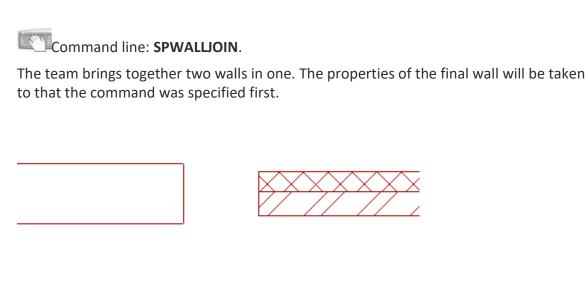
After that, the user-created modifier can be used as ordinary modifier from database, but its graphics and parameters are fixed.

Join wall

Main menu: Construction - Architecture -Wall Edit > **Join.

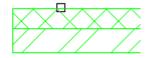
Ribbon: Construction - Architecture > > Join.

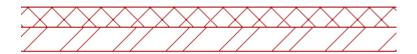
Toolbar: Architecture > 🛭 Join.











Break the wall



Main menu: Construction - Architecture -Wall Edit > ** Break.



Ribbon: Construction - Architecture > ** Break.



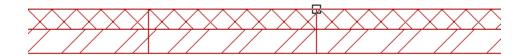
Toolbar: Architecture > **Break.



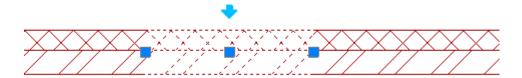
Command line: SPWALLBREAK.

Command allows you to break the wall into several sections. The mouse cursor indicates the point of decomposition.





When the command completes space partition walls are not visible, and see how there can be a partition of the individual segments were selected.



Extend wall

Main menu: Construction - Architecture -Wall Edit > Extend.

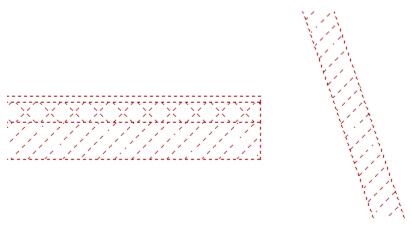
Ribbon: Construction - Architecture > Extend.

Toolbar: Architecture > Extend.

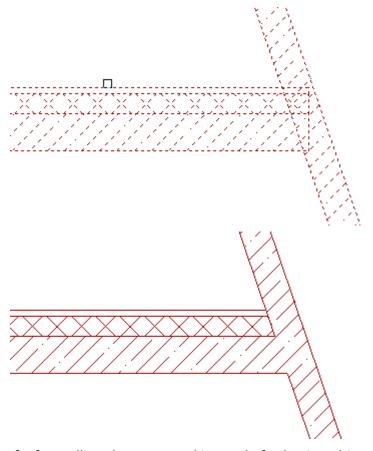
Command line: SPWALLEXTEND.

Wall extends to the nearest intersection.

The first step in the implementation of both teams are selected object.



Then you must specify the object you want to extend. The facility will be completed before crossing.

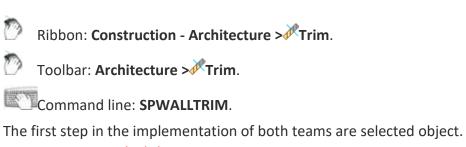


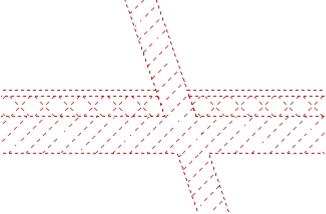
If, after calling the command instead of selecting objects press *space bar* on the keyboard, then, were selected for the second stage of the command wall, will be extended to the nearest intersection.

Trim wall

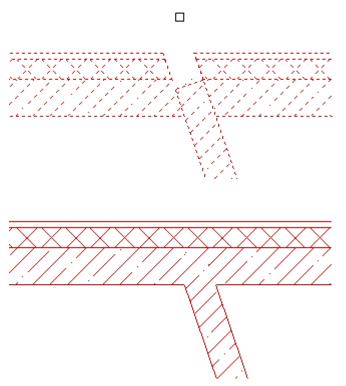


Main menu: Construction - Architecture -Wall Edit > Trim.





Mouse indicate the portion of the wall that you want to crop.



If, after calling the command instead of selecting objects, press *space bar* on the keyboard, then, were selected for the second stage of the command wall will be cut to the nearest intersection.

Make Corner

Main menu: Construction - Architecture -Wall Edit > Make Corner.

Ribbon: Construction - Architecture > Make Corner.

Toolbar: Architecture > Make Corner.

Command line: SPWALLCORNER.

Command allows you to create the angle between the walls.

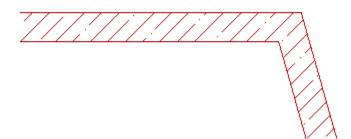




Both walls are selected alternately, the angle between them to be formed. selection order does not matter.



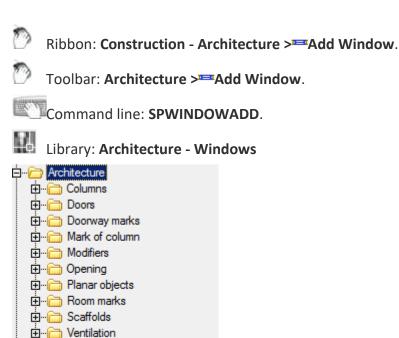




Window

0

Main menu: Construction - Architecture >■Add Window.



Using the construction of the base elements of the window, you can choose different configurations for the object.

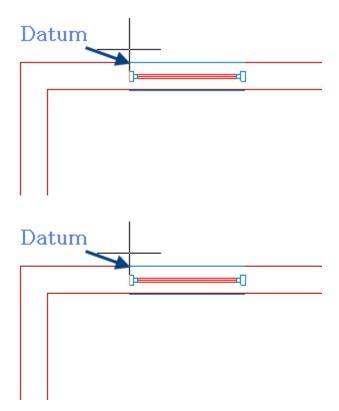


⊞... Walls
⊞... Windows

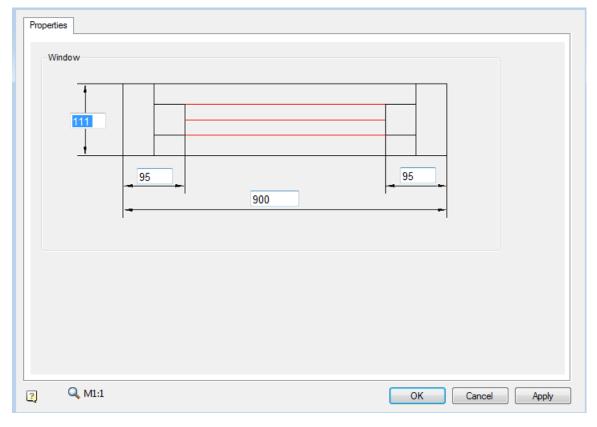
A window can be constructed either as a separate entity or attached to a wall. Run the mouse pointer across any wall window bound to the *walls*. Detach from the window wall or tie it again, through the context menu commands *Attach/Detach*.



Base point - allows you to change the position of the base point of the window. Click on the shortcut menu, you must specify the new position of the base point. Inserting an object distance is measured from the base point.



Properties - opens a dialog box where you can specify the window dimensions.

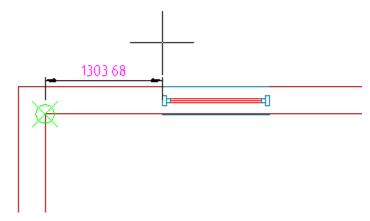


Analog - allows you to copy the properties of the window being created with the existing one.

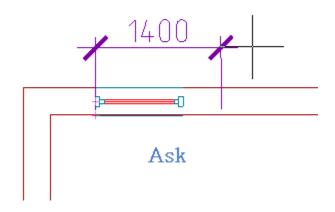
Snap - the ability to bind to the window wall.

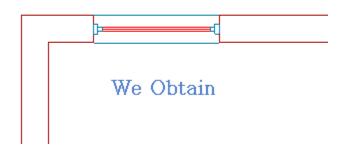
Unbind - allows user to detach from the window wall and build an independent object.

Reference - allows you to set the benchmark for accurate positioning of the window.



Width - allows you to set the width of the window, indicating it on the drawing.





Editing handles

Square blue knob lets you change the position of the window. Light blue arrows allow flipping of the window.



Door

Main menu: Construction - Architecture > Add Door.

Ribbon: Construction - Architecture > Add Door.

Toolbar: Architecture > Add Door.

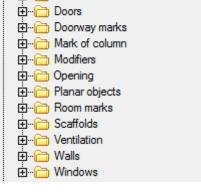
Command line: SPDOORADD.

Library: Architecture - Doors

Architecture

Architecture

Doors



Causing the construction of the base elements of the door, you can choose different configuration object.

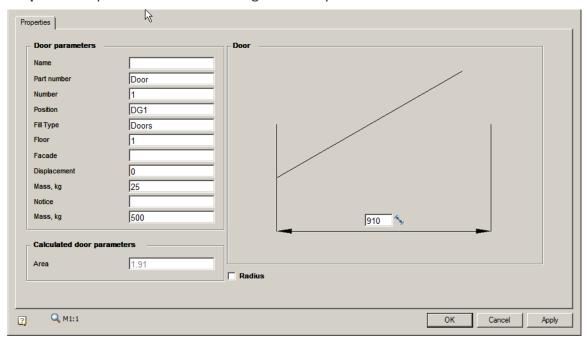
The door can be constructed as a separate entity located or attached to a wall. When the command, as soon as the mouse crossed any wall, door is bound to the *wall*. Disconnecting from the walls is possible through the context menu commands.

Base point - allows you to change the position of the reference point door. Clicking on the shortcut menu, you must specify the new position of the base point. Inserting an object distance is calculated from the base point.

Flip horizontally - deploys an object horizontally.

Flip vertically - expands vertically.

Properties - opens the door to a dialogue where you can set the width of the door.

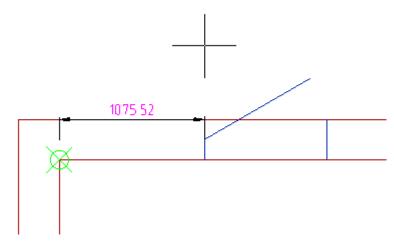


Analog - to copy properties of the future with the existing door.

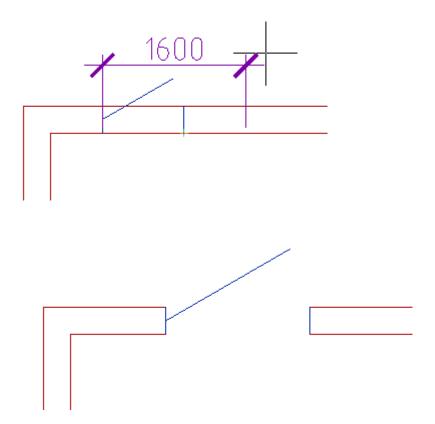
Snap - the ability to bind the door to the wall.

Unbind - allows to decouple the door from the wall and build an independent object.

Reference - allows you to set the benchmark for accurate positioning door.

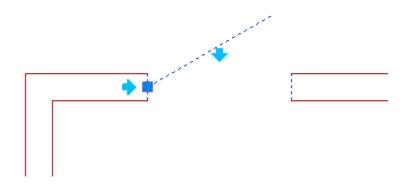


Width - allows you to specify the width of the door, indicating it in the drawing.



Editing grips

Square blue knob lets you change the position of the door. Light blue arrows allow flip door.



Column

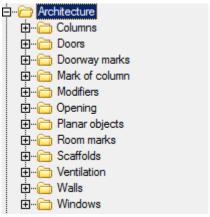
Main menu: Construction - Architecture > + Add Column.

Ribbon: Construction - Architecture > + Add Column.

Toolbar: Architecture > Add Column.



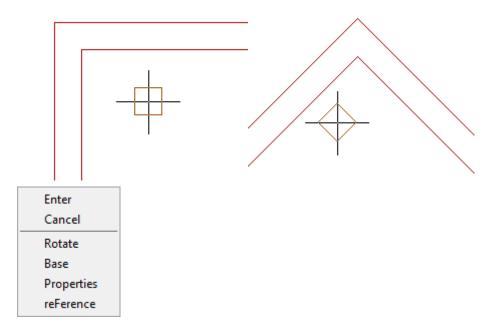




Using the library you can select different types columns as your need.



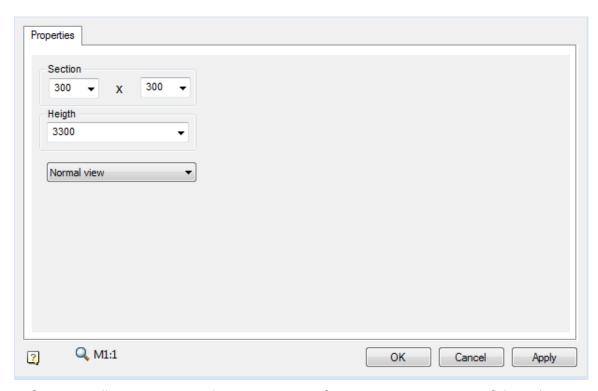
The column is not attached to the wall, but the slewing angle is oriented to the nearest wall. Needed to build the object and show the command to specify the insertion point.



Rotate - allows you to set the angle of rotation of the column.

Base - allows you to change the position of the reference point of the column. Clicking on the shortcut menu, you must specify the new position of the base point.

Properties - opens a dialog *column*, where you can specify the column.



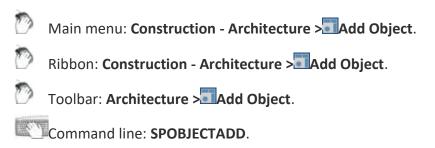
Reference - allows you to set the starting point for accurate positioning of the column.

Editing handles

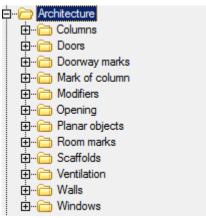
In the column there is only one handle, allowing movement of the object.



Add Object

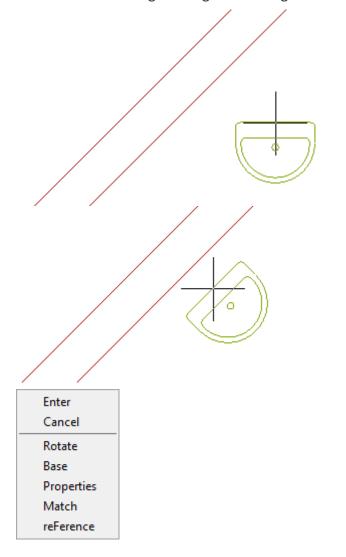






Database elements required can choose the type of object.

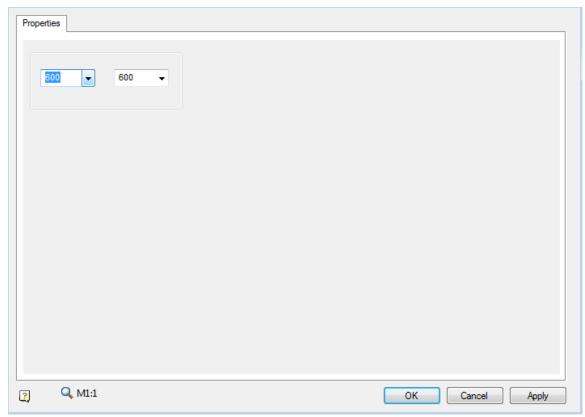
Construction of the *facility plan* can be directed to the wall. To do this, move the cursor to the wall and change its angle according to the angle of the wall.



Rectangle - allows you to set the angle of rotation of the object.

Base - allows you to change the position of the reference point of the object. Clicking on the shortcut menu, you must specify the new position of the base point.

Properties - opens the Properties dialog box of the object if the object has editable properties.



Reference - allows you to set the benchmark for accurate positioning of the object.

Editing handles

The object plan usually has only one handle, which moves the object.

Stairs



Stairs include linear and arc segments. For building arc section you need to select *Arc* in context menu.



After that in context menu will be options for creating arc available.



Line - starts mode for creating linear segments.

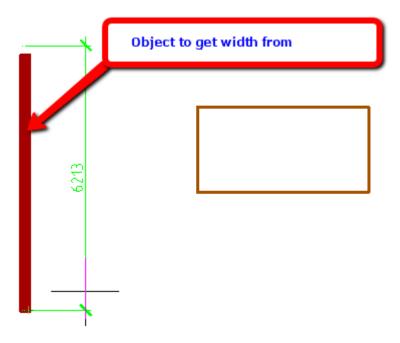
Bulge - starts mode for specifying first, middle and end points of arc.

Center - starts mode for specifying center, start and end point of arc.

Besides these there are following options available:

Rectangle - starts mode for creating stairs by specifying rectangle.

Width - allows to specify width of stairs by selecting it on the drawing.



Axis - switches position of point of insertion of stairs (Left, Center, Right).

Properties - opens stairs' dialogue.

Match - allows to copy properties of current stairs from existing one.

Reference - allows to create stairs from any reference point on specified distance.

To create stairs you have to specify required parameters in properties panel.

Justify	Center	
Width	1200.0000	
Start left march width	600.0000	
Start right march width	600.0000	
End left march width	600.0000	
End right march width	600.0000	
Stair type	Тор	
Orienting line	At footsteps only	
Step width	300.0000	
Footstep count is driven of step length	Yes	
Footstep count	28	
First footstep offset	0.0000	
Last footstep offset	0.0000	

Room



Main menu: Construction - Architecture > ARoom.

Ribbon: Construction - Architecture > Room.

Toolbar: **Architecture** > ARoom.

Command line: SPROOM.

Procedure

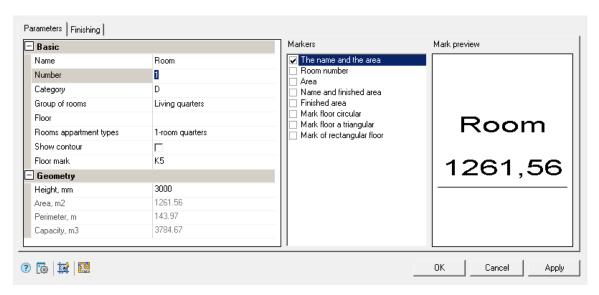
1. Call the command.

2. Select the construction method (from the context menu or from the command line). Variants of "rooms":

- Full Automatically detects the contour of the room along the closed contour of the walls and without taking into account the inner islands.
- *cLear* Automatically defines a room outline along a closed wall contour, taking into account internal islands.
- Rectangle Mode of building a room in the form of a rectangle.
- Polyline Creates a room by specifying an existing polyline.
- Contour -Freeform room construction mode with the ability to create arc segments.
 Switching between arc and straight line segments is also called via the context menu.
- Magnet Allows you to create rooms with complex shapes, automatically defining the shape of the contour segments. Pick the first point of the contour, then move the mouse cursor close to the existing walls or contour.
- *mUltiple contours* Switches to the mode of building a room consisting of several contours.
- One contour Switches to the mode of building a room consisting of one contour.
- 3. Build the room using the chosen method.
- 4. After creating a room, the "Room" dialog box opens.

Dialog

After defining the outline, the "Room" dialog box opens.



Toolbar

"Hatch modify" - calls the room hatch editing dialog.

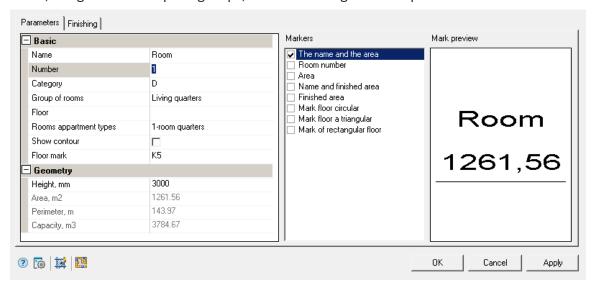
EOverridden area - starts the room selection process.

The dialog has 2 tabs:

- Parameters
- Finishing

Parameters

Tab "Parameters" allows you to change the display settings of various elements of the room, assign different space groups, as well as the geometric parameters of the room.



Basic

Name - sets the name of the room that is displayed when the corresponding mark is applied.

Number - changes the value of the room number when the corresponding mark is applied.

Category - sets the room category.

Group of rooms - sets the room group.

Floor - sets the number of storeys in the room.

Rooms appartment types - sets the type of apartment.

Show contour - controls the display of a selected or newly constructed room. By default, rooms are displayed without a border, only as marks.

Floor mark - sets the value of the floor mark.

Geometry

Height - room height, assigned individually for each room.

Area - room area, calculated parameter.

Perimeter - perimeter of the room, calculated parameter.

Capacity - room volume, calculated parameter.

Markers

On the right side of the "Parameters" tab there is a list of markers that can be added to indicate a room. The highlighted marker is displayed in the preview window.

The number of selectable markers for placement is limited only by the list.

The markers "The name and the area", "Room number", "Area" are part of the room, the rest of the markers are tied to the room. Anchored markers can be edited and deleted directly in the drawing.

Finishing

On the "Finishing" tab, interior elements are indicated with an indication of finishing materials and calculation of areas. When creating a room, the finishing list is generated automatically, taking into account all openings.

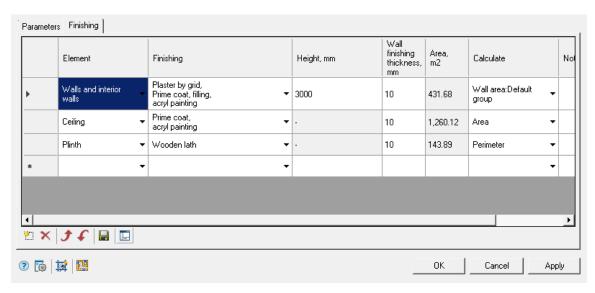
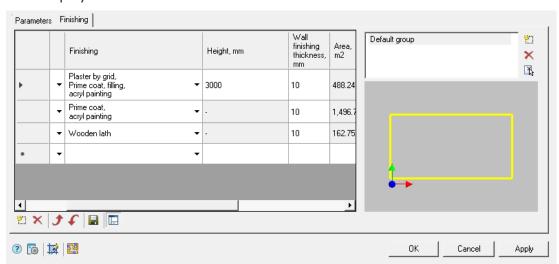


Table columns

- Element selectable finishing element.
- Finishing selection of the type of finishing produced.
- Height, mm element height, the field is available for editing when the "Wall area: Default group" value is selected in the "Calculate" column.
- Wall finishing thickness, mm entering the thickness of the finish, the field is available for editing when you select the values "Area", "Wall area: Default group" and "Perimeter" in the "Calculate" column.
- Area, m2 input of the finishing area, the field is available for editing when the "Modifier" and "Opening" values are selected in the "Calculate" column, for other values the area is calculated automatically.
- Calculate this column sets the type of finishing calculation. Each item from the list has its own calculation type.
- Note text box for entering a note on the trim element.

Toolbar

- **Add button for adding finishing line. Adds a line identical to the selected line. The line immediately following the selected line is added.
- XDelete removing finishing line button. Deletes the selected line.
- $\mathcal{J}Up$ button for changing the order of lines. Moves the selected line up one.
- Fown button for changing the order of lines. Moves the selected line down one line.
- Save as default finishing button for saving the finishing pattern. A saved finishing list will be created by default in every new room.
- ** Wall group selector allows you to create an additional group of walls and interior walls with a finish other than the "Walls and interior walls" element. When



the command is activated, an additional panel for configuring wall groups is displayed.

The panel consists of a list of groups and a graphic window.

The list of groups is used to display, add and edit groups. There is a "Default group" group in the list. This group belongs to the "Walls and interior walls" element and cannot be deleted. The list is controlled by three buttons:

- ***New wall group Adds a new empty group to the group list and a new element with the same name to the trim list. The name of the group is changed directly in the list of groups by pressing the highlighted group again.
- **Delete wall group Removes a group from the list. All walls that belong to the group will be moved to the "Default group". You cannot delete the "Default group".
- Get from drawing The command allows you to specify the walls of the group directly in the drawing, similar to the selection in the graphics window.

The graphic window for selecting walls is necessary for displaying and specifying the walls included in the group. To add or remove a wall from a group, click LMB on the required wall. When a wall is added to a group, the wall will be moved from the group in which it was previously, when deleted, it is moved to the "Default group".

Explication

Explication of rooms

0

Main menu: Construction - Architecture - Schedules > Shedule of rooms.

0

Ribbon: Construction - Architecture > Shedule of rooms.

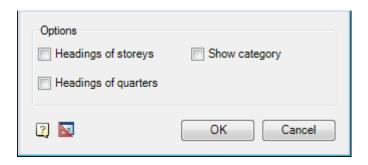


Toolbar: Architecture > Shedule of rooms.



Command line: SPEXPLROOMS.

For the formation of Explication of rooms after calling the command to all premises were selected to be included in the statement.



Explication of Rooms

Room number	Name	Area, m2		
1st flaor				
1	Store Room	1,08		

Sheet of decorations



Main menu: Construction - Architecture - Schedules > Sheet of Decoration.



Ribbon: Construction - Architecture > Sheet of Decoration.

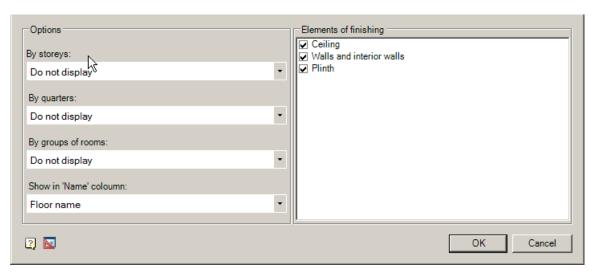


Toolbar: Architecture > Sheet of Decoration.



Command line: SPTABLEROOMS.

For the preparation of list of decorations after the call of command to you need to select rooms to be included in the statement. A dialog box with the options to customize data sorting is appeared.



Settings for table generation and grouping:

- By storeys: Do not display \Column + union \Title
- By quarters: Do not display \Group
- By groups of rooms: Do not display \Group \Merge
- Show in Name column: Name space \ number and name space

When selecting settings on the floors: Do not print, the flats: Do not display by category spaces: Do not display - displays the source table as is.

In the dialog box, you can delete unwanted items in statement finishes.

Double-clicking on a table placed in the drawing, a dialog box opens Gazette decoration, ie at any point in the table can be edited to change the output options and grouping data.

List of openings



Main menu: Construction - Architecture - Schedules > List of openings.

Ribbon: Construction - Architecture > laList of openings.

Toolbar: Architecture > aList of openings.

Command line: SPLISTOFOPENINGS.

Command to generate a list of all allocated openings in the drawing.

Procedure

After running the command you need to select the insertion point of the table.

Then select the openings included in the statement. To do this, select a region (rectangle) all necessary doorways.

Important! In order to correctly fill the list of openings the openings on the drawing must have different positions.

List of columns

Main menu: Construction - Architecture - Schedules > List of columns.

Ribbon: Construction - Architecture > List of columns.

Toolbar: Architecture > List of columns.

Command line: SPLISTOFCOLUMNS.

Command formation for all selected columns specification drawing.

Procedure

After running the command you need to select the insertion point of the table.

Then select the columns that are included in the specification. To do this, select a region (rectangle) all the necessary columns.

List of columns

Pos.	Designation	Name	Own- tity	Mass, kg	Note
1	Column	300×300×3300	4	200	

List of materials

Main menu: Construction - Architecture - Schedules > Materials List.

Ribbon: Construction - Architecture > Materials List.

Toolbar: Construction Architecture > Materials List.

Command line: SPLISTOFCOLUMNS.

Procedure

1. Call command a"Materials List".

- 2. Select the walls and confirm the selection with the "Enter" key.
- 3. Position the bill of materials you created on the drawing. If the selected walls do not have a wall composition with materials, the list of materials will not be created.

Graphics

Similar object



Main menu: Construction -Architecture - Graphics > |-| Similar object.

Ribbon: Construction - Architecture > |-| Similar object.

Command line: SPSIMILAROBJECT.

The command is used to create parallel lines, concentric arcs and circles.

Procedure

- 1. Call the "Similar object" command.
- 2. Specify the object on the drawing for which you want to create a similar one.
- 3. Specify the position of the new object.

Symmetrical rectangle

Main menu: Construction -Architecture - Graphics > Symmetrical rectangle.

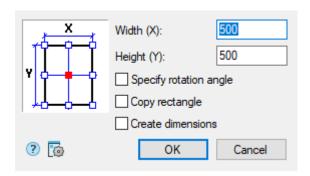
Ribbon: Construction - Architecture > Symmetrical rectangle.

Command line: SPRECT.

The command allows you to insert axisymmetric rectangles into the drawing, which are closed polylines.

Procedure

1. Call the "Symmetrical rectangle" command. The "Axisymmetric rectangle" dialog opens.



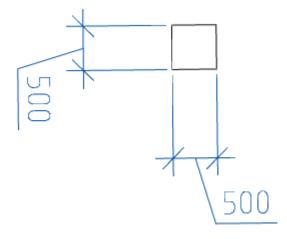
- 2. In the "Axisymmetric rectangle" dialog box, specify the required dimensions for the rectangle.
- 3. Specify the insertion point in the graphic field of the dialog box (on the left) (the current insertion point is marked with a red square).
- 4. Set the modes if necessary:

"Specify rotation angle" - when inserting a rectangle, it will be possible to rotate the rectangle relative to the insertion point;

"Copy rectangle" - after inserting a rectangle, it is proposed to insert copies of it;

"Create dimensions" - sets the overall dimensions of the rectangle.

- 5. Confirm the changes with the "OK" button.
- 6. Place the rectangles on the drawing. Placement of rectangles on the drawing is done cyclically. To complete the command, press the "Enter" key.



Import IFC plans



Main menu: Construction - Architecture - Import IFC plans.



Ribbon: Construction - Architecture - Import IFC plans.

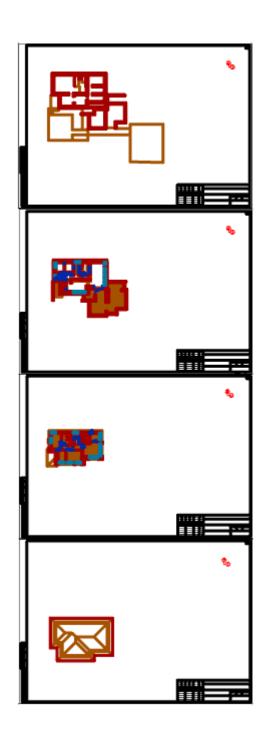


The command allows you to import a plan of an architectural object from an IFC file. Plans are formed from objects nanoCAD Construction .

Procedure

Important! Before importing, make sure that you have the database of elements connected, as it contains objects nanoCAD Construction.

- 1. Call command **II** "Import IFC plans".
- 2. In the browser, select the IFC file from which the import will be made.
- 3. Wait a while while the plans are imported. The larger the file, the longer the import will take.
- 4. Plans will be built on the drawing. They will include: Formats, axes, walls, windows, doors and other architectural objects nanoCAD Construction.



Engineering networks

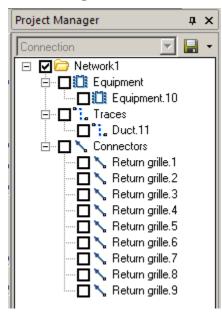
Project Manager

Main menu: Construction - Library objects- Tab manager.

Stoolbar: Library objects - [™]Tab manager.

Command line: SPTABS.

After calling the command "Tab Manager" select "Project Manager".

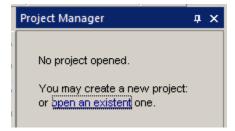


Project Manager is a functional panel that controls all of the engineering networks (equipment, port, trace).

Create project

To create a project, you must:

1. Go to the tab of the project.

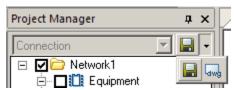


2. Click on "Communications". The project is created.

3. Choose how to save the project file in xml or drawing. To do this, there are in the top right corner of the Project Manager button:

"Specify project path" - it saves the project in xml file on your computer.

"Save the project in the current drawing" - it saves the project in the drawing.



If the drawing objects will be installed utilities to create a project, the project is automatically created, saved in an xml file. Xml file name will be similar to the name of the drawing.

Add new Network

Adding a new network is calling the command "Create New Network" from the context menu function bar "Project Manager".

To rename the network, you must:

- 1. Select network
- 2. Press "F2"
- 3. Enter a new name. Submit (button "Enter").

Make tracing

Context menu command "Make tracing" is similar to the "Automatic tracing"

Edit selected objects

To edit certain objects, you must:

- 1. Select objects(put a check on the objects).
- 2. In the context menu select "Edit checked objects".
- 3. In the dialog box, make the necessary manipulations (see. <u>Template library</u>) and submit.

Save project

By default, the project is stored in the same document dwg file xml, or in the drawing. Saving a project occurs when you save a document dwg.

Equipment

Main menu: Construction - Communications > Equipment.

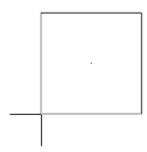
©Toolbar: Communications **>**[□]Equipment.

Command line: SPEQUIPMENT.

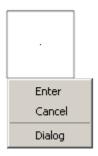
This command is used to insert the object "Equipment" from <u>Template library</u>.

Insertion

1. Call the command insertion equipment. You will be prompted to leave the last used equipment from a library of templates, or if there is no such equipment by default.



2. Select the necessary equipment if needed. To do this in the context menu, select "Dialog". On the form template library to select the necessary equipment and confirm.

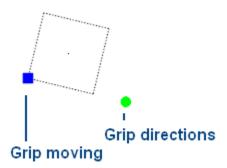


- 3. Select the base point and the direction of insertion.
- 4. Continue to insert the same type of objects equipment (item 1,2,3) or end (press Enter).

Note: Equipment, trace and ports when inserting recent number (the "Number" in the properties)	ve a unique
--	-------------

Editing

Edit location



The object "Equipment" has two grips:

- Grip moving- it allows you to move an object,
- Grip directions- changes the direction of the object.

Editing options

Call for editing by choosing from the context menu of a selected object the command "Edit" or double-clicking on the object editing.

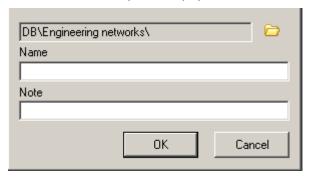
When you call opens the edit form, this form **Template library**.

The process of editing an object "Equipment" is similar to the process of editing the template "equipment".

Save as Template

If you want to save the object "Equipment" as a template to be:

- In the form of editing select "Save as Template" ■.
- In the form of "Create element" and enter the name of the note.
- Confirm entry. The equipment will be added to the <u>Template library</u>.



Trace

Main menu: Construction - Communications > Trace.

Trace.

Command line: SPTRACE.

This command is used for laying tracks between objects "Port" and "Equipment". The trace is taken from Template library.

Insertion

- 1. Call the command inserts trace. You will be prompted to insert the last used trace from the template library, or, if not, the default trace.
- 2. Select the right trace, if necessary. To do this in the context menu, select "Dialog". On the form template library select the desired trace and confirm.

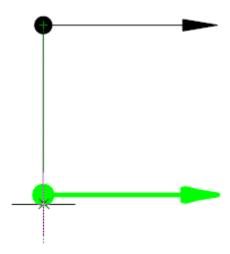


3. Select the first object anchor. If the type of connection trace and the connection type of the object (trace, equipment or port) will be the same, then the object will be highlighted.





4. Select the second object.

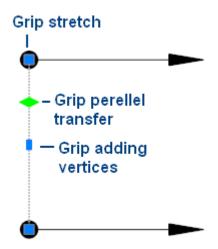


5. Continue inserting trace (paragraph 1,2,3,4) or end (press Enter).

Note: Equipment, trace and ports when inserting receive a unique number (the "Number" in the properties)

Editing

Edit location



The object "Port" has 3 grips:

- Grip parallel transfer it allows you to move an object parallel to the fixed position,
- Grip adding vertices adds the top of the object,
- Grip stretch modifies the provisions of the basic points of the object.

Editing options

Call for editing by choosing from the context menu of a selected object the command "Edit" or double-clicking on the object editing.

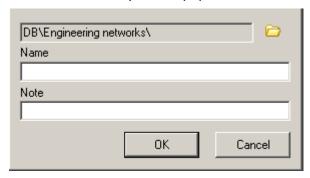
When you call opens the edit form, this form Template library.

The process of editing the object "Trace" is similar to the process of editing the template "Trace".

Save as Template

If you want to save the object "Trace" as a template to be:

- In the form of editing select "Save as Template" \bullet.
- In the form of "Create element" and enter the name of the note.
- Confirm entry. The equipment will be added to the **Template library**.



Port

Main menu: Construction - Communications > \ Port.

©Toolbar: Communications > ****Port.

Command line: SPPORT.

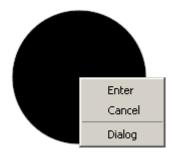
This command is used to insert the object "Port" of Template manager.

Insertion

1. Call the command insert the connector. You will be prompted to insert the connector of the last used template library, or, if not, the port by default.



2. Select the appropriate connector if necessary. To do this in the context menu, select "Dialog". On the form template library select the port and confirm the selection.

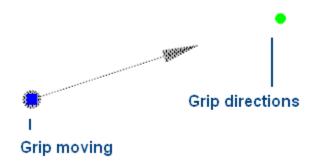


- 3. Select the base point and the direction of insertion.
- 4. Continue to insert the ports (point 1,2,3) or end (press Enter).

Note: Equipment, trace and ports when inserting receive a unique number (the "Number" in the properties)

Editing

Edit location



The object "Port" has two grips:

- Grip moving- it allows you to move an object,
- Grip directions- changes the direction of the object.

Editing options

Call for editing by choosing from the context menu of a selected object the command "Edit" or double-clicking on the object editing.

When you call opens the edit form, this form Template library.

The process of editing the object "Port" is similar to the process of editing the template "Port".

Save as Template

If you want to save the object "Port" as a template to be:

- In the form of editing select "Save as Template" .
- In the form of "Create element" and enter the name of the note.
- Confirm entry. The equipment will be added to the <u>Template library</u>.

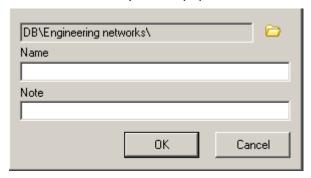


Table of connections

Main menu: Construction - Communications > Table of connections.

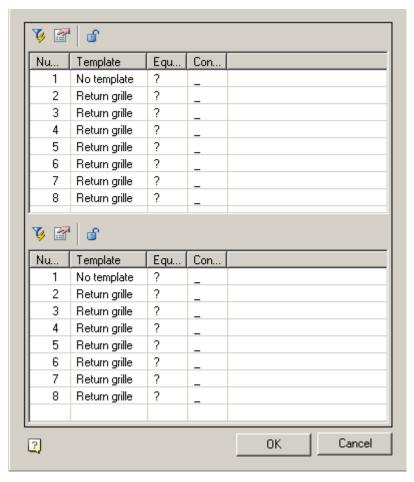
ॐToolbar: Communications >**i**•Table of connections.

Command line: SPPORTTABLE.

Table of connections allows to connect a conditional links between ports.

These compounds are primarily needed to automatically trace divorce.

Dilogue



The form of dialogue "ConnectorsTableForm" consists of two overlapping lists. This is done for the convenience of the binding.

Each is equipped with a list of commands:

- Filer opens the panel filter for columns. It used to filter the list.
- Columns customizable columns.
- Remove selected links remove links from the selected object.

The columns

Number - indicates the sequence number of the object

Template - a template in which the object was created

Equipment -the equipment to which it belongs port

Connection - a list of numbers of objects to which a view objects.

Note: Sign "?" - It is not defined

Linking objects

To assign a connection to another object should be:

- 1. Select the object. Press and hold the left mouse button.
- 2. Lead one to connect objects. You can move an object in the same list and in the backup.
- 3. Lower the left mouse button. The object will be contacted and a mix of both fields to add a number of objects connected to the objects.

When going through the list of object over which the mouse **Note:** cursor will be highlighted in the drawing. This allows you to verify the correctness of the choice of object.

Delete links

- 1. Select the object.
- 2. Call the popup menu
- 3. From the pop-up menu, choose the remote connection, or "All".

Showing links in the drawing

In imposing relations on the drawing shown links between objects on the non-printed layer "ISO_UNPLOTTED".



Automatic tracing

Main menu: Construction - Communications >* Automatic tracing.

Solution Solution Solution

Command line: SPTRACINGADD.

Team automatically separates trace on the already established relations between ports.

The guide trace

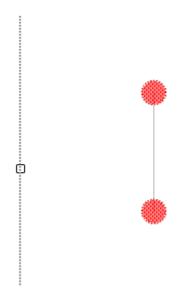
In order to build the correct trace, it is necessary to construct the auxiliary directional trace, which may for example, be positioned along the walls.

Auxiliary trace - trace which is set to "Directional trace" ("Yes").

Building trace

To build trace should:

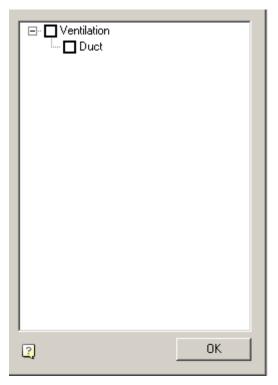
- 1. Select the command "Automatic tracing"
- 2. Specify equipment, ports and directional trace, or select all of the active network by pressing "Enter".



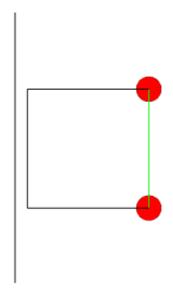
If there is no specified equipment and ports or derectional trace, a dialog appears offering to separate trace on the network.



5. After selecting objects in the dialog "Connection Type" select the types of connections through which trace should be diluted.



6. Confirm your selection. The trace is automatically built according to the design rules.



Note: If the guide has the same pattern as the communications facilities, communications facilities will be connected to the rail.

If necessary, you can cancel by trace, rail and adjust the command again or manually edit the trace built.

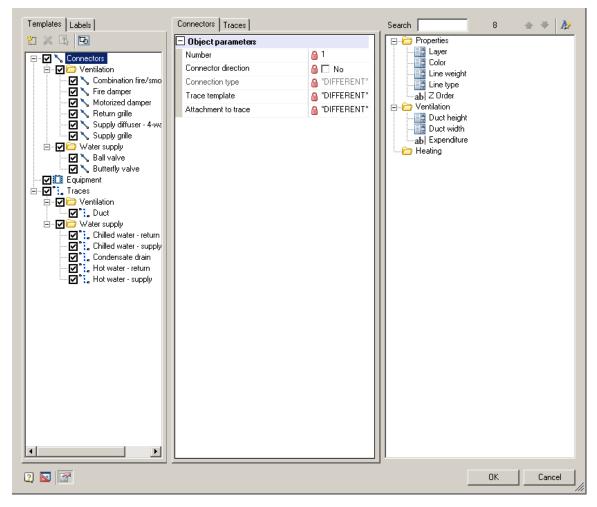
Template library

Main menu: Construction - Communications > Template library.

Toolbar: Communications > Template library.

Command line: SPEQUIPMENTLIBRARY.

Form template library is required to work with templates of engineering networks (add, edit, delete) and consists of three parts: a panel of wood patterns, the list of designated parameters, the panel attributes.



Tree patterns

Tab templates

Tree patterns is divided into 3 main sections: ports, traces and equipment. In each section of the corresponding templates are added.

Switch notes whether the pattern present when editing the parameter list. When the level of several patterns of one type, the parameters will change them together.

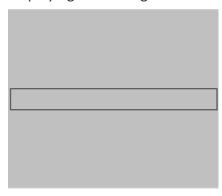
Each type of template tab gets its parameter list.

Important! When you activate the equipment, its ports automatically added to the list of options on the "Connectors".

Replacing graphic

When you select a particular pattern, its schedule will be displayed in the "Preview panel" below.

Displaying the setting knob <a> "Preview panel".



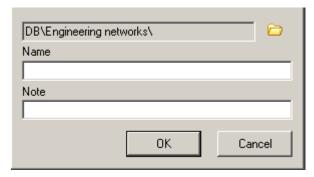
To change the schedule template should:

- 1. Activate pattern
- 2. Press button ♣"Select graphics"
- 3. Specify the new graphics and confirm (press Enter)
- 4. Specify the insertion point and confirm (press Enter)

Adding template

The "New template" adds a new template is selected in the tree section.

When you run the command, the creation of a form of the element, which you must specify the location to save the template in the database elements, name, note and confirm.



The new template is added to the appropriate section.

Important!	For the "Equipment" and "Port" do not forget to specify the schedule. If the schedule is not specified, will use the default schedule.
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Note: To add a template is better to use separate rooms creating Equipment, Trace and Port

Delete template

The **"Erase template" deletes the selected object in the tree. Section can not be deleted.

Save as template

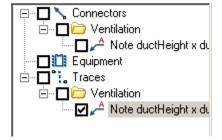
The "Save as template" is active when editing objects Equipment and port, and allows you to save the object as a template.

Tab Labels

In the tab "Labels", you specify which tags will be added to the objects in the inset to the drawing.

The number of labels can be more than one for each type of template.

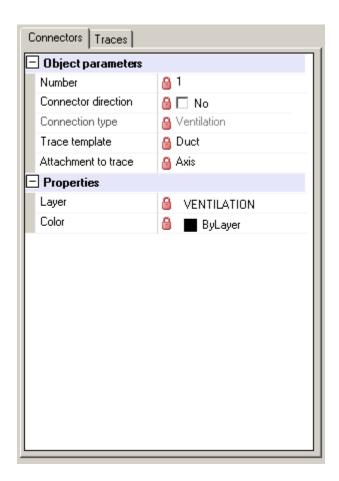
Note: Library displays the label of the folder "Library" specified in the settings.



Parameter List

The parameter list contains the settings of the selected template(s) and allows them to edit.

The parameter list is divided tabs: Connectors, Traces, Equipments. Each tab displays the parameters of ports, traces, equipments, respectively. Options ports belonging to the equipment are displayed on the "Connectors". All three tabs are similar.



Adding an attribute

Adding a new optional parameter is from the Control attributes for this:

- 1. Select attribute
- 2. Not omitting the left button to move the key attribute in the parameter list.

If the list of parameters are specified attributes for all templates defined species, and a new attribute will be added for all.

Re-attribute can not be added.

Edit attribute

The parameter list is divided into two parts: the left-name right - the input field.

Entry fields with a gray background can not be edited.

Remove attribute

emoval of property carried out by pressing the X"Erase attribute" from the context menu of the selected attribute.

If the property can not be removed, the button will be disabled.

Panel attributes

Panel attribute contains additional parameters that may be added to the list of parameters by gripping and handling.

The panel is a two-level tree. The first level of the section, the second - the attribute.

If the panel does not need attributes, you can turn to the "attributes panel" (in the lower left corner of the form).

Adding properties

To add a parameter to the list of parameters necessary to:

- 1. Select an attribute
- 2. Do not omitting left button to transfer the key attribute in the parameter list.

If the list of parameters are specified attributes for all templates defined species, and a new attribute will be added for all.

Re-attribute can not be added.

Options properties

Attributes are divided into 3 types: Dropdown list, checkbox and beditbox.

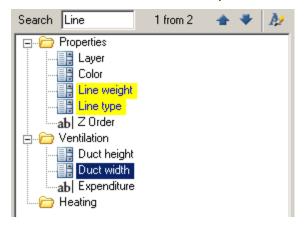
Finds

If you want to find a particular attribute, for this is the search.



Search is provided with a field for entering text search, as well as buttons to navigate through the attributes found

Found attributes are marked in yellow.



Create attribute

<u>Creating an attribute is carried out from the editor library attributes. Button in the upper right corner.</u>

Create trace

Main menu: Construction - Communications > - Create trace.

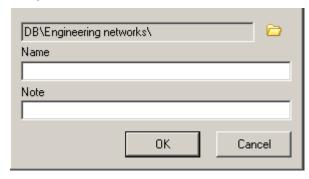
Toolbar: Communications > Create trace.

Command line: SPCREATETRACE.

This command creates a new template trace and places it in **Template library**.

To create

- 1. Select command
- 2. A form will appear "Create element", in which said storage elements in the base template, name, note and confirm the entered parameters.



3. Next, open the edit form, this form <u>Template library</u>. The process of editing the template "Trace" is described in detail in the section <u>Template library</u>.

Create port

Main menu: Construction - Communications > Create port.

ॐToolbar: Communications > **¾** Create port.

Command line: SPCREATEPORT.

This command creates a new template port and places it in **Template library**.

To create

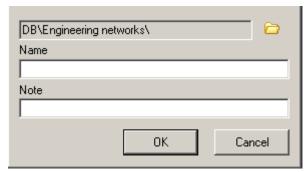
- 1. Select command
- 2. Show on drawing a new graphics for the port. Confirm your selection (press Enter). If the graphics is not selected, the grafics will be taken by default.



3. Specify the base point of insertion port created.



4. After specifying the form will be "Create element", in which said storage elements in the base template, name, note and confirm the entered parameters.



5. Next, open the edit form, this form <u>Template library</u>. The process of editing the template "Port" is described in detail in the section <u>Template library</u>.

Create equipment

Main menu: Construction - Communications > Create equipment.

№Toolbar: Communications > Create equipment.

©Command line: SPCREATEEQUIPMENT.

This command creates a new template equipment and places it in **Template library**.

To create

1. Create graphics equipment.	

2. Set the necessary ports. Subsequently, the interconnection of networks will be carried out between the ports.



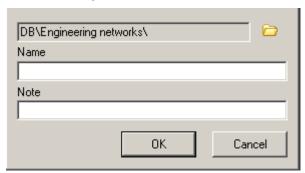
- 3. Select a team creation of the equipment.
- 4. Specify the drawing graphics with ports for the equipment. Confirm your selection (press Enter). If graphics and ports are not selected, the grafics will be taken by default.



5. Specify the base point of the insertion created equipment.



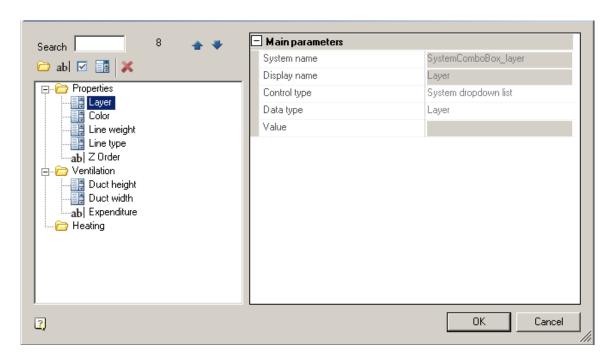
6. After specifying the form will be "Create element", in which said storage elements in the base template, name, note and confirm the entered parameters.



7. Next, open the edit form, this form <u>Template library</u>. The process of editing the template "Equipment" is described in detail in the section <u>Template library</u>.

Attribute library editor

Called from the edit form templates. It is necessary to create a new (missing) attribute.



Dialog

Toolbar - Includes "search attribute" button and edit the attributes of a tree.

Attribute tree - It displays a list of available attributes for editing.

Properties window - It displays the properties of the attribute or class.

Adding an attribute

To add a command is carried out:

□Add category

ab|Add a textbox

☑Add checkbox

Add dropdown list

Adding an attribute or category is made in the selected category or parent category selected attribute.

Edit attribute

To change the location attribute in the tree attributes, attribute to press the left mouse button and drag it to the desired part of the tree.

To edit the properties of the attribute must be:

- 1. Select an attribute or category
- 2. Make changes in the "Paremeters window":

For the category of available properties for the change:

Display Name - a name that will be displayed in the tree attributes.

For the "Editbox" properties are available for changing:

System name - work name attribute to identify it in the system (for example, when building reports).

Display name - a name that will be displayed in the tree attributes.

Control type - feature allows you to change the type attribute. Possible values: textbox, checkbox, dropdown list.

Data type - property defines the value of the type attribute will return.

Value - default value.

For the "Checkbox" properties are available for changing:

System name - work name attribute to identify it in the system (for example, when building reports).

Display name - a name that will be displayed in the tree attributes.

Control type - feature allows you to change the type attribute. Possible values: textbox, checkbox, dropdown list.

Data type - property defines the value of the type attribute will return (always Boolean).

Value - default value (Yes all No).

For the "Dropdown list" properties are available for changing:

System name - work name attribute to identify it in the system (for example, when building reports).

Display name - a name that will be displayed in the tree attributes.

Control type - feature allows you to change the type attribute. Possible values: textbox, checkbox, dropdown list.

Data type - property defines the value of the type attribute will return.

Value - default value.

List items - a list of possible values.

Fixed list - The default is "Yes". Allow only values from the list by using the attribute. If you set to "No", permits to enter their values in a list by using the attribute with the new values will be added to the list. It will also be available the "Maximum size of the list."

Remove attribute

To delete an attribute you must:

1. Select a category, or delete attributes (by selecting a category remove all attributes included in it).

2. Press "KErase selected".

Important!

You can not delete attributes from the category "Properties." This will affect the further work with the utilities.

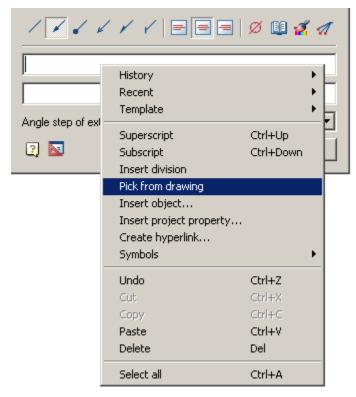
Sample create label

Create a label for equipment.

1. Insert equipment



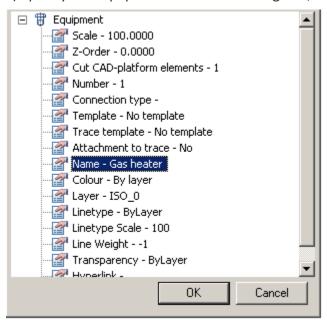
- 2. Add a note (eg, constructional note (spnotep))
- 3. The dialogue form editing notes to add the necessary fields to the drawing for this:
- a) from the context menu of the field call the command "Pick from drawing"



b)In the dialog box "Value picker" choose "Take from property"



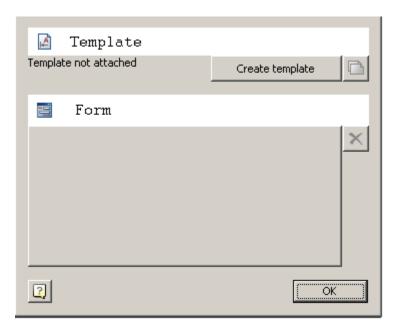
c) Specify the equipment and in the dialog box, select the desired option



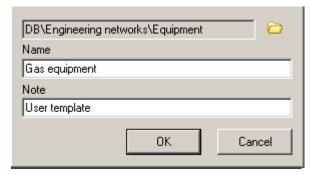
4. Confirm the settings notes and paste it to the drawing.



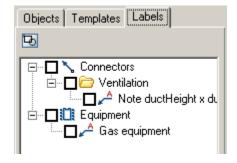
- 5. From the context menu, select notes "Save object as template"
- 6. In the dialog box "Template Wizard", click "Create template"



7. Save the template in the base element according to the settings.



8. Now create a label will be available in the "Labels" in "Equipment"



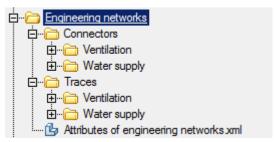
Library

Library: Communications.

The objects of engineering networks (equipment, connectors, tracks) available in the template library are also available in the base of elements.

The section is divided into subsections by type of object: Equipment, Connectors, Routes.

Each subsection is divided by the type of network: domestic gas supply, ventilation, ...



Working with parametric objects

Working with Database Objects

Parts Library nanoCAD Construction 25 is a database and stored in a file with the extension * .mcs. By default, after installing nanoCAD Construction 25 used base recorded in a file in the folder std.mcs data, housed in the installation directory of the program nanoCAD Construction 25.

Select another database possible, specifying the desired file in the "Database access" option in the settingsnanoCAD Construction 25 "The path to the local database".

Parts of the database can be exported as individual files, or import from external files into the current database of standard elements.

The basic tools for working with database objects

The basic tools for working with database objects are:

"Main menu- Construction - Library objects"

or on the toolbar " Library objects"



- Tab manager
- I Standard parts library
- Reinsert object
- Threaded fastening
- BRivet joint

- Markers, Groups
 - Insert group
 - Group objects
 - Add marker
 - Template wizard
- Cover
 - ■Move up
 - Move down
 - Change hiden mode
 - Regenerate supression contours
- · Part trim
 - Add part trim
 - Remove part trim
- Is Add view
- **Change representation**
- Mirrow part
- Regenerate Std Parts
- <u>Insert defined object</u>

Tab Manager

- Main menu: Construction Library objects > Tab manager.
- Ribbon: Construction Library objects > Tab manager.
- Toolbar: 🎖 Tab manager (on toolbar "Library objects").
- Command line: SPTABS.

Object Manager nanoCAD Construction 25 includes the following tools:

- · Manager database of standard objects
- Objects
- Pruning of standard parts
- · Finding and replacing text
- · Copying properties

Tab "Library"

Tab "Library" object manager is a universal means of access to the standard database objectsnanoCAD Construction 25.

Details in the database are classified according to their design purpose.



Management and structure the database by using the toolbar and the context menu that includes the ability to add, delete, or rename folders.

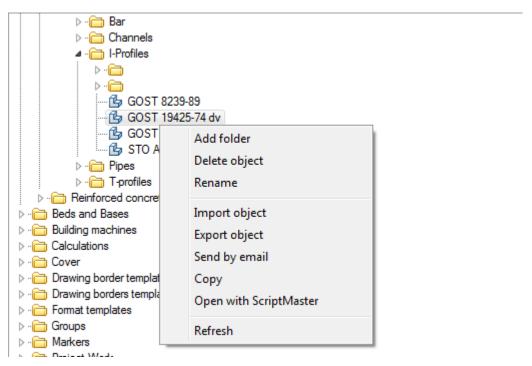
Toolbar

- XDel object. Removes the selected item or folder from the database
- Add folder. Adds a folder to the database
- **linsert object.** Performs insert the selected database object in the drawing
- Dview. Includes preview of database objects
- Search panel. It includes search bar facilities on base
- Refresh. Updates the tree base in the object manager. Press this button after making changes to the database

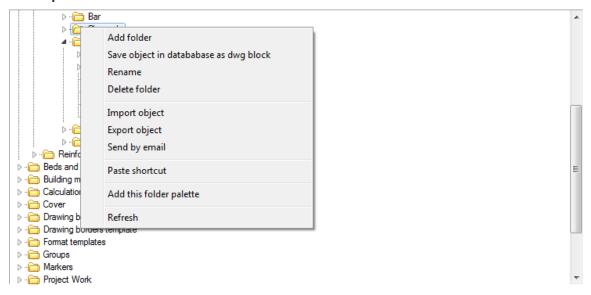
Context menu

The context menu has a different structure depending on call.

In the palette - the object context menu:



In the palette - the context menu of a folder:



"Add Folder" - adds the folder to a dedicated subsidiary. If the command was run on the selected object, the folder will be added to the parent folder object.

"Save object in database as dwf block" - This utility allows you to save a single database of the drawings in format dwg, including standard items nanoCAD Construction 25, design elements and primitives nanoCAD.

"Delete object" - This command deletes the selected object.

"Delete folder" - This command deletes the selected folder with all its contents.

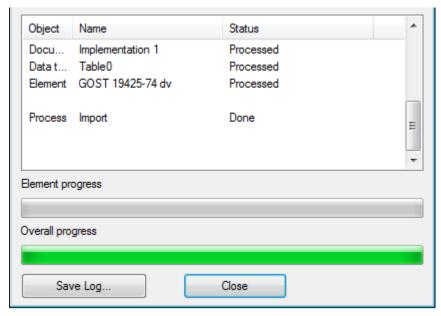
"Rename" - The command allows you to rename an object (folder).

"Import object" - Adding to our previously exported file or folder object database DB.

To import a database from an external file, use the command "Import object" in the context menu invoked by a right-click on any folder or object in the section "Library" object manager. This will bring up a dialog box in which you specify the path to the file.

When importing compares the last modification date of the original (stored in the database) and the imported object. At concurrence of the imported content from content database objects will be updated only if they have more recent modification date.

If the command "Import object" was called for a standard lens, the outer fragment is imported to the folder containing the object.

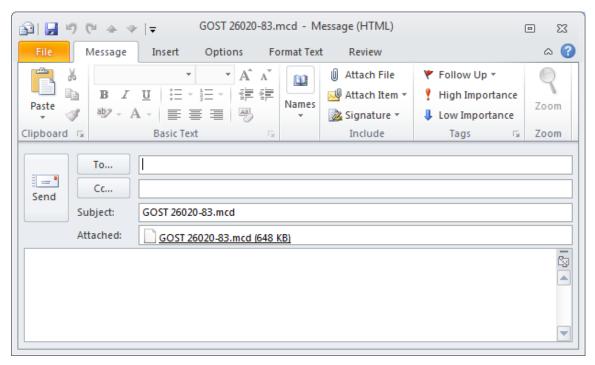


"Export object" - Save the file to disk or folder object database DB.

To export any portion of the database you should use the command "Export object". In the resulting dialog box, then you need to specify the path and file name for saving the captured designated section base.

Note: Import operation into the database or export from the database can be made as separate objects, and entire folders with libraries of parts.

[&]quot;Send by email" - It creates an e-mail with an attachment - Export objects.



[&]quot;Copy" - Stored in a buffer object reference to paste a label on it.

Tab "Objects"

Tab "Objects" object manager is a universal means of reviewing, monitoring, editing facilities nanoCAD Construction 25, are on the drawing.

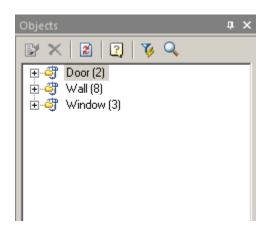
Places on this tab are grouped into sections - for example, standard parts, callout, bolted connections, etc. In order to navigate in the drawing the selected object is highlighted.

[&]quot;Paste shortcut" - Inserts a shortcut to a previously copied object

[&]quot;Open with ScriptMaster" - Opens the object in the Object Wizard to edit.

[&]quot;Add this folder palette" create a bookmark in the palette manager of the objects of the selected folder.

[&]quot;Refresh" - Updating of the database (for example, after editing).

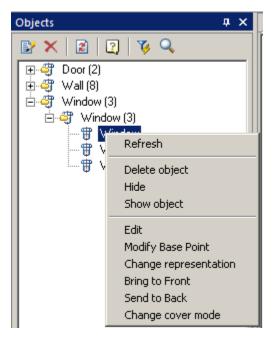


Toolbar

- **Edit object.**It calls the dialog for editing the selected object
- X Del object. Deletes the selected object
- Refresh. Updates the list of objects. The button is used when adding or removing objects from the drawing
- VsQuick select. Search Tool nanoCAD Construction 25 objects in the drawing on the set parameters, run the command "Quick Pick"
- Spind and Replace. Open dialog boxFind and Replace.

Context menu

In addition to the teams that are in the toolbar, the context menu of a selected object contains the following items depending on the selected object, and includes a team of repeating the context menu of the object on the drawing. Thus the tab "Objects" allows you to edit objects without having to search for them saturated drawing regardless of layer.



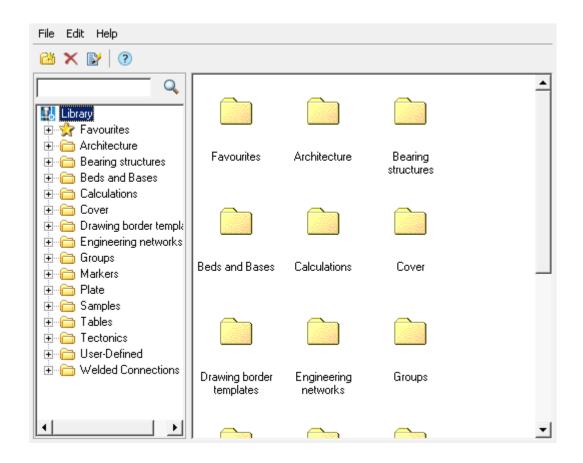
For example, for sub-database nanoCAD Construction 25, further include items <u>"Change representation"</u>, <u>"Bring to Front"</u>, <u>"Send to Back"</u>, and <u>"Change cover mode"</u>.

Option "Hide" makes the selected object invisible in the drawing.

Standard parts library

- Main menu: Construction Library objects > I Standard parts library.
- Ribbon: Construction Library objects > I Standard parts library.
- Toolbar: "Library objects") > I Standard parts library.
- Command line: SPSTD.

Inserting standard parts from the nanoCAD Construction 25 database is carried out using the database manager, which can be presented in full (dialog) form and in the form of a tool palette.



Inserting standard parts

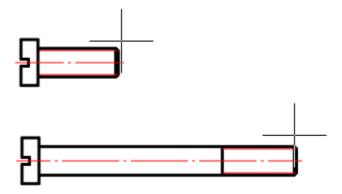
- 1. Select the insert object.
- 2. After selecting the object, specify the insertion point for the object.
- 3. Select the insertion direction (not all parts need to specify a direction vector). The dialog box for selecting object parameters will open.
- 4. Adjust the options in the dialog box.

The standard dialog contains the following sections (sections are divided into tabs):

- Table parameters
- Properties
- Dependences
- Calculations

Important! The composition of the sections (tabs of the insert dialog) is determined by the class of the part, its parameters and the environment of the insert.

The button **Dynamic input" turns on the mode of visual definition of parameters when inserting.



As you move the mouse cursor, follow the change in the size of the object. LMB click to confirm the selection of the parameter value.

The "Apply" button allows you to apply the selected parameter values to the object without closing the dialog box. This deactivates the "Dynamic input" mode.

Important! The description given here refers to the standard dialog for selecting parameters. Some objects of the nanoCAD Construction 25 base use special dialog boxes. In special dialog boxes, the location of the controls may vary.

Note: If the path to the custom help is specified in the "Help" parameter of the standard part form, it will be called if the focus is on the form control. If the focus is on the "Cancel" or "OK" buttons, the help for standard items opens.

5. Click "OK" to complete the dialog.

Toolbar Commands

- Add folder Adds a folder at the specified location in the object tree.
- Delete Deletes the selected object or folder.
- Edit note Changes the name and note of the selected object.



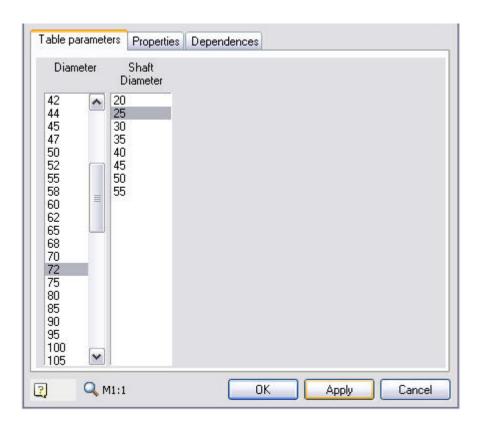
Context menu commands

- Import Imports a base object.
- Export Exports a base object.
- Send by email Exports the object and sends it to the specified mail address.
- Cut Cuts an object, folder.
- Paste Inserts a previously cut object, folder.
- Paste shortcut Inserts a shortcut to a previously cut object, folder.
- Add folder Adds a folder at the specified location in the object tree.
- Delete Deletes the selected object or folder.
- Edit note Changes the name and note of the selected object.
- Publish- Makes the object visible to other users of the network database. Objects
 can be published by administrators and editors (editors only their own objects).
- Remove publish Makes the object invisible to other users of the network database.
 Objects can be unpublished by administrators and editors (editors only their own objects).

Note: The "Publish" and "Remove publish" commands are only available to editors and database administrators.

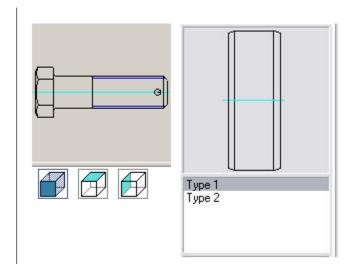
The table settings

On the "table settings" dialog insert standard parts displayed parameters responsible for the geometry of the object. These parameters correspond GOST'u (OST'u).



Properties

Properties of the parts that can be changed and described in the script are displayed on the "Properties". On this tab located custom and reference parameters, switches species details and details of performances.



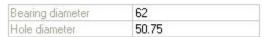
In the process of inserting parts "Glass" automatically set the relationship between the items "Bearing", "End caps" and "Glass" (with parts falling into the aperture).

For items that have parameters available for manual entry or dynamically change tab "Properties" presents additional opportunities.

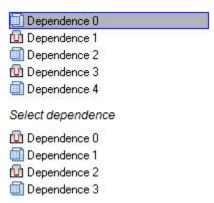
Properties Dependences Parameter Value 27 Length Bearing diameter 62 Hole diameter 50.75 Wall Thickness 4 5 Border thickness 5 Extension thickness Extension diameter 95 Chamfer 1 dimension 2 2 Chamfer 2 dimension ✓ Cut CAD elements OK Apply Cancel

Consider the example of the detail "Glass" features interaction details.

The "Bearing diameter" - gray. This says that this option is not available for editing and dependence associated with the diameter of the bearing.



To enable editing of this option, you must go to the tab "Dependencies" and remove the dependency between the diameter of the items "Bearing" and an inner diameter of workpiece "glass.".



Remove Dependency pressing the "Delete"

After this option is available for editing.

Parameter	Value	
Length	27	
Bearing diameter	70	
Hole diameter	50.75	
Wall Thickness	4	

Dependences

The "Dependences" tab allows editing of dependences set automatically during the details allocation on the drawing, and dependences set with the "Dependences control dialog".

Types of dependencies:



Parametric - settable parameter object equality arithmetic expression object parameters, which occurs accession.



Geometrical dependences - defines the object position in relation to the object to which there is an addition.

To edit parametric dependence it is necessary to select it and set parameter names or arithmetic expressions. The Bidirectional dependence switch defines whether changes in the child object will be transferred to the parent.

To edit parametric dependence it is necessary to select it and set the value of numerical parameter dependence, view - Contradirectional or CoDirectional dependence, dependence type, and axial and surface alignment.

Calculations

For rod attachment parts provided estimation during insertion. The result of the calculation is the recommended thread diameter for given loading conditions and strength class details.

For some types of rolling bearings estimation is also provided. The result of the calculation is the life of the bearing for the given loading conditions.

Reinsert object

Main menu: Construction - Library objects > FReinsert object.

Ribbon: Construction - Library objects > FReinsert object.

Toolbar: FReinsert object (on toolbar "Library objects").

Command line: SPPICKPOINT.

Serves to re-insert the object in the drawing, combines editing commands properties and movement of item.

- 2. Select the drawing or pasted object from the database.
- 3. Specify the new position of the object and insertion point.
- 4. Click ok.

Threaded fastening

Main menu: Construction - Library objects > Threaded fastening.

Ribbon: Construction - Library objects > Threaded fastening.

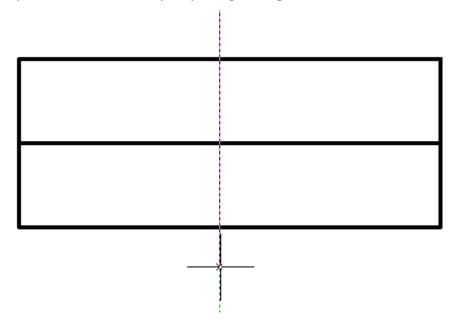
Toolbar: "Library objects">\bullet{\pi}\text{Threaded fastening.}

Command line: SPJOINT.

Tool for inserting a threaded fastening from library nanoCAD Construction 25.

Procedure

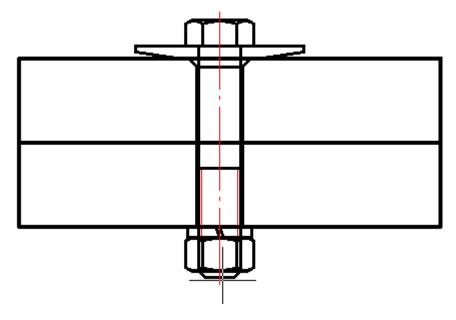
- 1. Specify the starting point of the threaded fastener in the drawing.
- 2. Specify the end point of the threaded fastener, the "Fasteners" dialog will open. When inserting, tools are available to select the direction of drawing. Specifying the start and end points defines the centerline of the fastener. The intersected lines make up the thickness of the part package being fastened.



3. In the "Fasteners" dialog box, customize the look of the threaded fastener.

Note: The thread fastener insert dialog automatically saves the last selected template and thread diameter.

4. Confirm the settings with the "Apply" button, or with the "OK" button if you want to close the dialog at the same time. A threaded fastener will be built.



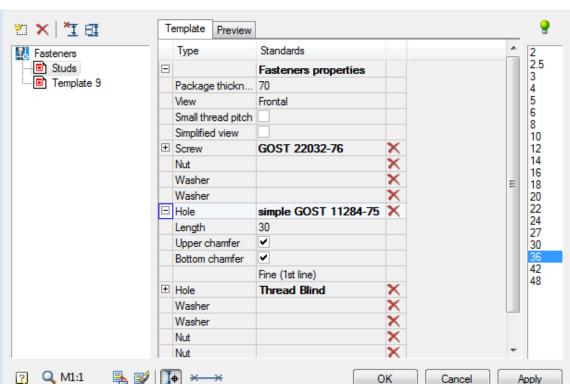
Editing a threaded fastener

You can edit a threaded fastener by editing the "Threaded fastener" object, or by editing individual parts included in the threaded fastener.

When editing, you can change the composition, diameter of the threaded fastener, as well as the parameters of the individual parts that are included in it.

To open the threaded fastener setup dialog, apply any of the standard <u>editing tools</u> to the centerline of a group of parts.

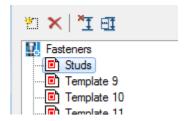
If tooltips are enabled in nanoCAD Construction 25 settings, then when you hover the cursor over the centerline, the "Threaded fastening" tooltip appears.



Threaded fastener settings dialog box

Template list panel

It is possible to save a threaded fastener template for later reuse of assemblies with the same set of parts. To work with templates, use the buttons at the top of the dialog box, and below is a list of available templates:

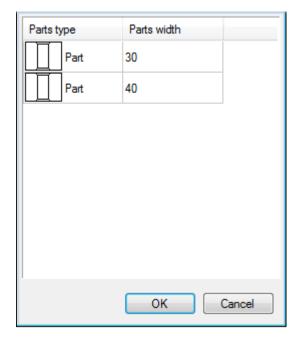


Button "Create new template" adds a new empty template. When creating a new template, the required number of holes is automatically added depending on the number of lines crossed in the drawing.

Button *"Delete template" removes the selected template from the list. "Editing template" stores the current setting of the threaded fasteners. It cannot be removed.

Button "Selecting insertion point" is intended to reselect the insertion point and the length of the threaded fastener in the drawing.

Button "Manually select holes length and placement" opens a window for setting parameters of a package of connected parts.



LMB clicking on one of the cells in the "Parts type" column switches the part / gap:



In the "Parts width" column, the thickness of the corresponding part (or gap) is set. After setting the parameters of the connection package, close the window with the "OK" button.

The context menu of the list of templates contains the commands:

- Add folder
- Delete object
- Rename
- Import object
- Export object
- Send by email
- Copy
- Configuration tool

These commands are similar to those used in the <u>object manager</u> nanoCAD Construction 25.

Tab "Template"

The following settings are available on the "Template" tab in the center of the dialog:

• Fasteners properties

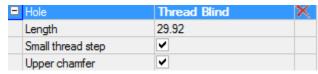
- Package thickness thickness of the package of parts to be joined, in mm.
- View selection of standard image projection.
- Small thread pitch fine pitch switch.
- Simplified view simplified / full image switch.
- Details of the threaded assembly. The components included in the assembly are listed here in order.
 - Screw
 - Hole
 - Spot facing
 - Washer
 - Nut

To select a part of a threaded assembly from the nanoCAD Construction 25 base, click in the cell of the GOST column of the corresponding element.

The "Select object" dialog box will open the attachment parts folder.



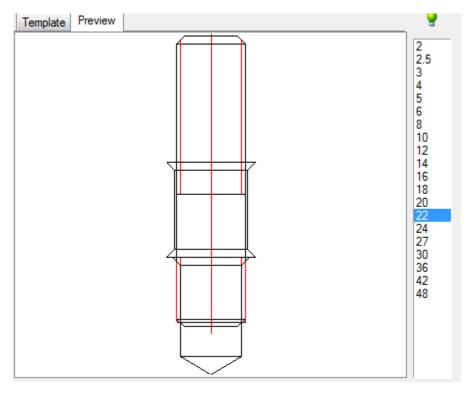
Additional settings for assembly components are available when expanding the list:



Button *Clear" in the right column of the list table clears the selected position.

Tab "Preview"

A preview of the threaded assembly is available on the tab.



List of thread diameters



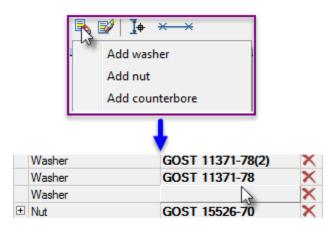
The "lightbulb" icon above the list indicates that the selected diameter value can be used for all objects in the assembly:

The diameter value does not match one or more parts. Assembly is not possible.

The diameter value applies to all parts in the assembly. Assembly is possible.

Button [♣]"Add part to template"

Adds a part to the assembly after being selected from the list. The list of details available for adding depends on the currently selected object:



Button **[™]**"Remove part from template"

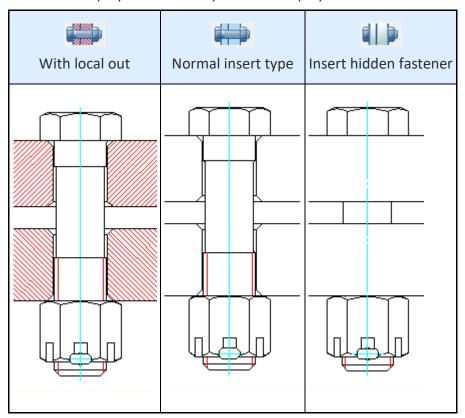
Removes the selected object from the parts list.

Button # "Dynamic selection"

Turns on the mode of visual selection of the bolt length after closing the dialog.

Graphical display type selection list

When inserting a threaded fastener, 3 display methods are available, selected by the "Select fasteners insert part" button on the bottom toolbar of the dialog. The figure on the button displays the currently selected display method:



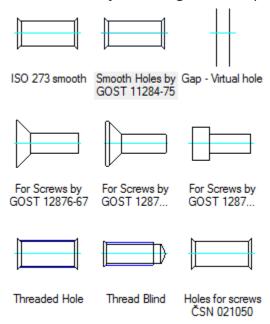
Displaying chamfers on holes

To select the options for displaying chamfers in the drawing, you must correctly place the marks in the hole properties.



Setting the hole type

To change the hole type, click on it in the connection part set and select a different type in the "Select object" dialog box that opens.

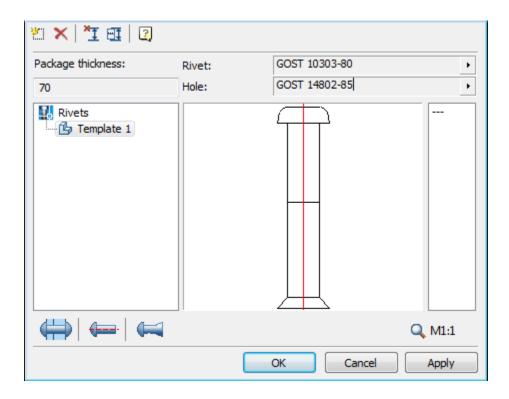


Rivet joint

- Main menu: Construction Library objects > Rivet joint.
- Ribbon: Construction Library objects > Rivet joint.
- Toolbar: \$\bar{\mathbf{B}}\$ Rivet joint ("Library objects").
- Command line: SPRIVET.

Insertion tool riveted joint parts of the base standard elements nanoCAD Construction 25.

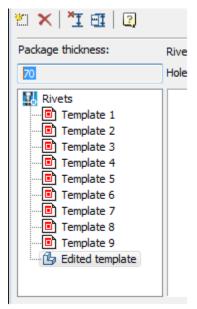
- 1. Specify the starting point for drawing the rivet assembly.
- 2. Specify the endpoint of the rivet assembly. When you insert the available tools of choice destinations rendering.
- 3. In the dialog box **mounting parts** adjust the view of the rivet connections.



To select the type of rivet base nanoCAD Construction 25 click in the rivet.

To select the type of base openings nanoCAD Construction 25 click in the hole for rivets.

It is possible to save **the template riveted joint** for later reuse assemblies with the same set of items. To work with templates use the buttons at the top of the dialog box, and below is a list of available templates:



"Editable Template" stores the current settings bolting. It can not be deleted.

Button ©Create a new template. Adds a new blank template.

Button **XDelete template.** Deletes the selected template from the list.

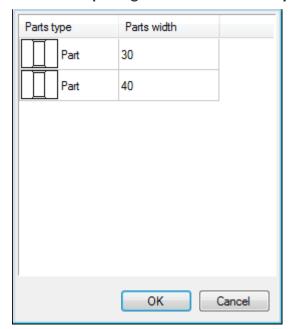
In the context menu templates available commands:

- Add Folder
- Delete object
- Rename
- Import from file
- · Export to file
- Send by email
- Copy

These commands are similar to those used in <u>in the Object Manager</u> nanoCAD Construction 25.

Button **Select the insertion point and the length of the riveted joint.** Designed to reselect the insertion point and the length of the rivet assembly drawing.

Button **Set package connection manually.** Opens setup package of the parts.



Left-click on one of the cells in the column "type items" to switch the item / gap:



In the "Thickness" is set to the thickness of the relevant part (or gap) After configuring the package connected, close the window by pressing **OK**.

The right side of the dialog box mounting parts is a list of values diameter rivets.



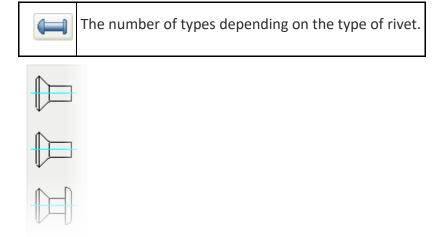
When you insert the rivet connections are available 3 ways to display selected button **Insert mode riveted joint** at the bottom of the dialog box toolbar. Drawing on the button displays the currently selected display method:



2 types available (front and side) display riveted joint:

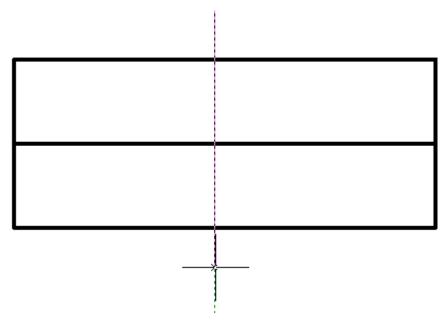


You can choose the type rivet connections:

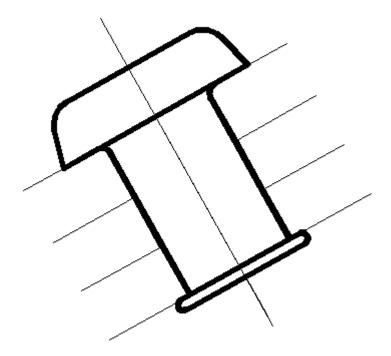


Automatic detection of packet connection

When you insert the rivet connections made automatically recognize the boundaries of the parts. If the line crosses the insertion direction **perpendicular to** a few segments in the drawing, they are defined as the boundaries of parts and installs Connection:



Insertion point and the length of the rivet assembly are determined automatically based on the thickness of the package details.



Editing riveted joint

A dialog box settings riveted joint, apply any of the standard <u>editing tools</u> to the centerline of the group details.

If the settings nanoCAD Construction 25 included tooltips, then when you move the cursor to the center line will show "Rivet connection".

Markers, groups

User Groups

Working with groups in Construction 25 is performed using the following commands:

- Create custom groups
- Inserting User Groups

Create custom groups







Command line: SPGROUPOBJECTS.

Constraints describing the interaction of two or more objects, It is advisable to store these in the objects database in a related group. *Group nanoCAD Construction 25* has the following features:

- Group is stored in the object database, has a pattern preview before pasting.
- Components of the group in addition to objects nanoCAD Construction 25 can be primitives and blocks in nanoCAD.
- Group may be transferred as part of the database file to other users.
- Group may have additional dependencies with other groups and objects.
- Components of the group remain together parametric dependence.
- Components in the group can be specified both individually and in groups.

Thus, the group is a powerful way of organizing and structuring graphics data in a separate local file drawing document.

Create a Group

Button Group objects

Gather and create database objects in the design position in the drawing. On the toolbar, **Library objects**, **click Group objects**.

Select the required objects in the drawing AutoCAD specify the origin of the group.

In the dialog box **New group** on the left side is a list of objects in the group. Name objects in the list is taken from the string value for the specifications set in the properties of objects.

Button **Highlight group objects** highlights and centers on the screen objects in the group.

Button **Set parameter table**. Opens the editor table settings. Table of parameters used to select the group attribute values from a predefined list of values.

Button **Show form editor**. Opens *Form Editor* to create a special dialog box.

Button save changes to database. Saves the base group Construction Site 25.

In the right part of the window picture preview and a list of attributes for the group.

Editing attributes produced in the cells of the table.



Adding attributes produced from the parameter list of objects in the group.

Expand the selected entry in the list (with the "+" next to the name of the object) and double click on the parameter, add an attribute in the table.

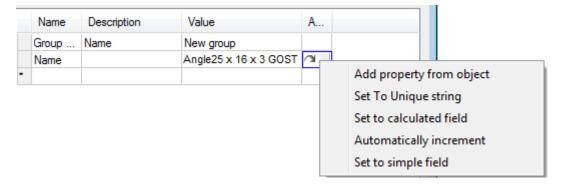
You can install a bidirectional relationship between the group and attribute parameter object that is associated with this attribute. The list of attributes in the column Attribute Properties, click the left mouse button on the icon . Depending on the mode change bidirectional, it will indicate the icon . Thus, when the value of the attribute group, and the parameter of the object is changed.

Save the group of objects in the database by pressing the button save changes to database. Choose a location and name for the group (the default group name matches the specified value attribute Group Name). Click **OK**.

Group created and saved to the database. Now you can insert multiple grouped objects in a drawing, resizing and positioning of objects, while preserving established parametric and geometric constraints.

Important! Group objects only retains information about dependencies between objects and attributes set. For insertion to be carried out correctly, you must have a database of all the objects in this group.

When working with a group of attributes of the various available methods for selecting values. In the context menu of the column *Properties attribute* in the attribute list, select:



- Add property from object allows you to set the attribute value by linking it with an attribute value of another object in the drawing.
- **Set to unique string** allows you to set the attribute-counter, which will increase its value by 1 for each subsequent inserted marker. In the Value column for the visible attribute counter must specify a character string prefix. The drawing will be appended to the prefix value of the counter.
- Set to calculated field allows you to set the attribute value using a mathematical expression, using references to other attributes of the marker and mathematical functions. In reference to another attribute marker use the name of the attribute recorded in braces.
- Automatically increment allows you to set the attribute-counter, which will increase its value to 1, compared with the same attribute of the previous insertion marker. This attribute allows the counter-repetition of identical values for several markers that distinguishes it from the attribute set to a unique value.
- Set to simple field sets the attribute type by default.

Insert group

Insert group may be carried out as the *object manager*, and with a tool **insert group**.

Button linsert Group toolbar Library objects opens a dialog Box group.

In the list of the group and press **OK**. If you insert a group of objects, you must specify the insertion point of the group. If you insert a group of dependencies, you need to select the drawing objects that you want to associate with the dependencies.

In the dialog box **Insert group** commands are available:

Create group. Creates a new group.

XDelete group. Deletes the selected group from the database.

Select items from the drawing for the group. Used to edit an existing or new group.

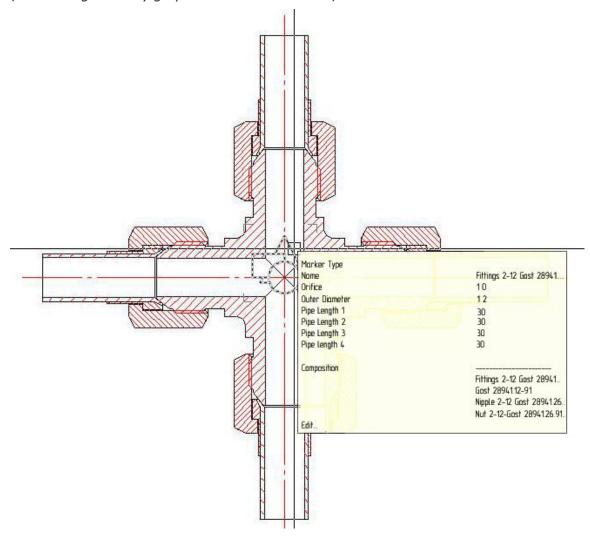
Detail groups. Opens a list of groups of items.

■ Dependence group. Opens a list of groups dependencies.

Switch **multiple** . Enables insertion of multiple groups in the drawing.

Switch **Add group marker**. If installed, together with a group of drawing a marker is added to the group.

Marker group is designed for group editing and data to other objects in the drawing (see *Binding arbitrary graphical and tabular data*).



Editing a Group

After you insert a group of objects in the drawing, or when the command to edit the marker group opens the edit dialog group.

₹ Highlight group objects. Highlights and centers on the screen objects in the group.

- **Edit marker Properties**. Includes editing mode, where you can change the set of objects in the group, add or remove attributes.
- **□Object tree**. Enables and disables the object tree in the left pane.
- **Set parameters table**. This button is available if the group contains a table of parameters. In the dialog box, select the row attribute values, and click **OK**.

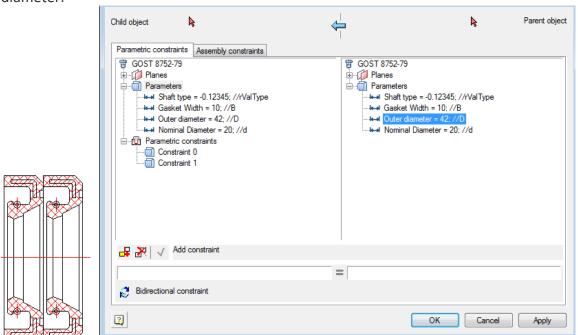
Group dependencies

Group dependencies remain parametric description and assembly relationships between objects. When you insert such groups they are not added to the drawing objects, but only established the relationship between existing objects.

Consider creating and maintaining relationships between the two cuffs.

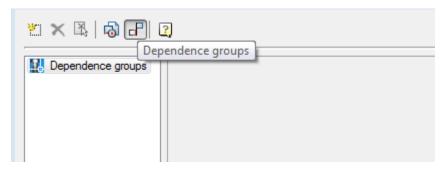
Before you create a group, you must place the drawing objects to **Important!** be included in the group and set the dependencies between objects.

Insert the base of the two objects Cuff GOST 8752-79. Set between the geometric codirectional dependence Combining axis and the plane at a distance obj.B (see Constraints between two objects) and the parametric dependence of the outer diameter.

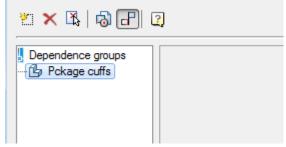


Select Insert group. 🗟

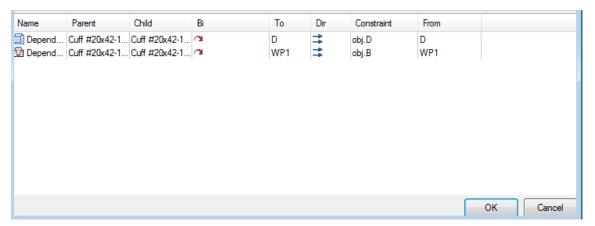
In the dialog box, click **Dependence groups**.



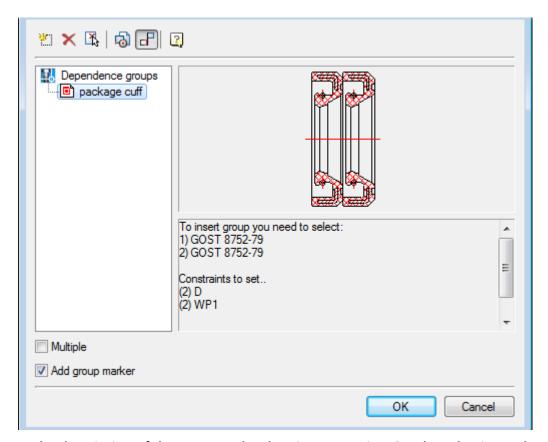
Button Creates group. In the groups list, change the name of the new group (eg, "Package cuffs"). To edit, click the left mouse button on the name of the group.



Click Select group details from drawing and select the drawing both cuffs. Press **Enter**. In the dialog box, **select the dependent** listed in the list established between objects. Click **OK**.



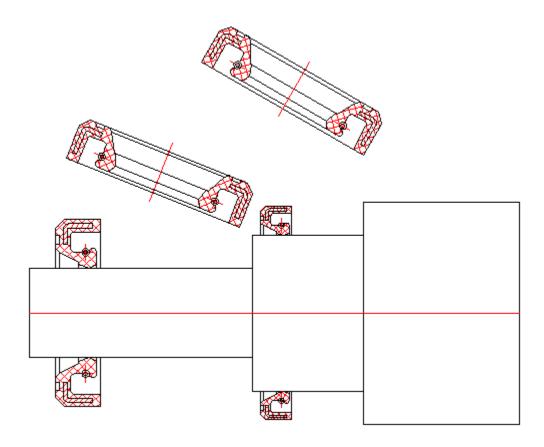
Look at the result of the creation of group dependencies.



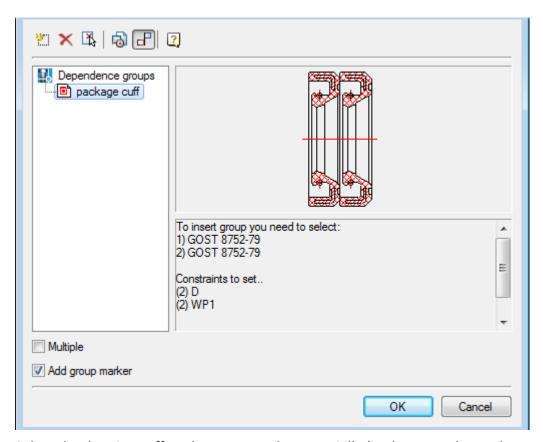
In the description of the group under the picture preview Set the selection order when inserting objects group dependencies.

Group dependencies are stored in the database automatically. Click Cancel to complete the group.

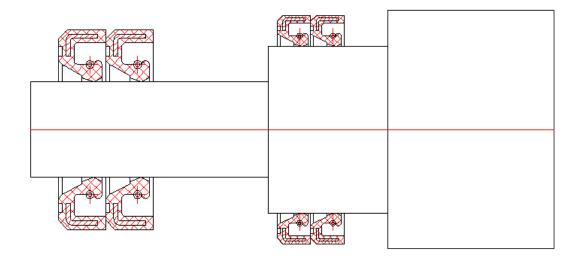
Insert a drawing of the base of the cuff, which must be applied to create a dependency.



Select **Insert group**, click **Group Dependency**. In the list of dependence " **Package cuffs**. " Click **OK.**



Select the drawing cuffs to be connected sequentially (in the example need to perform steps 10-11 twice).



Automatically set dependence stored in the description of the group.

Inserting Groups

Main menu: Construction - Library objects - Markers, Groups 🗐 Insert group.

Ribbon: Construction - Library objects > Insert group.

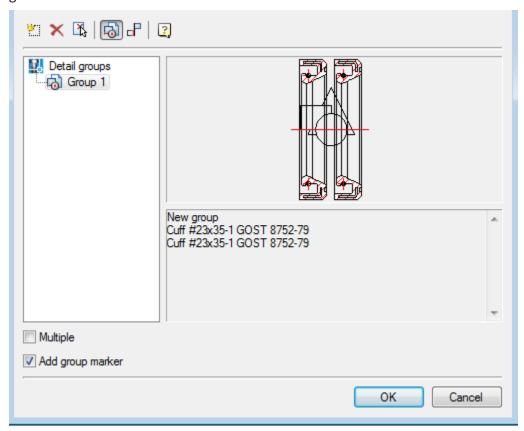
Toolbar: 🗐 insert group ("Library objects").

Command line: SPINSERTGROUP.

Library: **Groups**.

Command Options

Insert group Box lets you create a set of objects with superimposed parametric and geometric constraints.



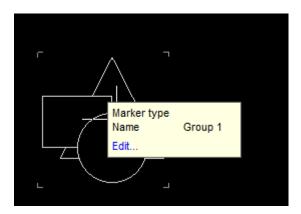
Create group

X Deleting Group

Select group details from drawing

Switch between groups of objects and dependencies

The mechanism used in the team group insert, you can insert a group of objects

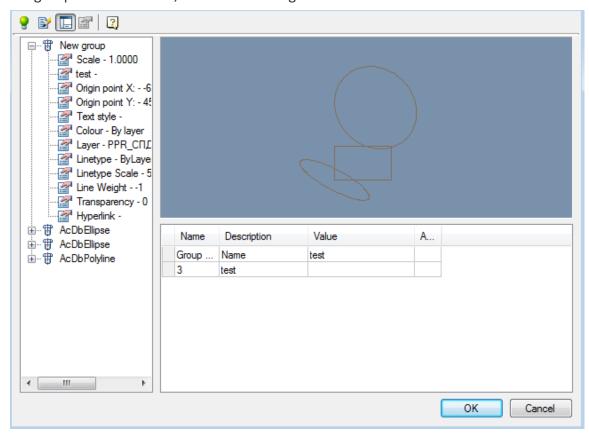


The "Add marker group" enables the group a graphic element - a marker located at the insertion point of the group. In marker may include parameters of individual parts group that can help you when pasting automatically change the geometry of the group of related components.

"Multiple insert" allows you to create multiple copies of the selected group.

If a user group has been maintained by the standard in the folder \$\MCS\Groups, then insert it in the tree by choosing the object manager.

If a group is defined form, then insert dialogue is as follows:



• The dialog box includes a tree of groups - a list of objects and their parameters group. This tree can disable button

- The preview window group
- Form input values group

When you click on you can switch to edit mode group settings.

Universal marker

Main menu: Construction - Library objects - Marks and groups > GAdd marker.

Ribbon: Construction - Library objects > =Add marker.

Toolbar: "Library objects"> ■Add marker.

Command line: SPCREATEUMARKER.

The "Marker" tool is designed specifically to create a connection between an arbitrary graphic object (primitive) nanoCAD and a spreadsheet-specification. A universal marker is a translator of data from drawing objects into the nanoCAD Construction 25table by means of special means - marker attributes.

Marker attributes can be visible or hidden. The values of the visible attributes are displayed in the drawing as text strings.

The marker, as an object nanoCAD Construction 25, can be saved in the object library and used repeatedly. The marker can also be included in the groups of objects nanoCAD Construction 25, providing the ability to specify the entire functional groups.

Create marker

Let's consider creating a marker in the form of a positional leader.

- 1. Set the required current scale.
- 2. Insert two text lines into the drawing and draw a horizontal line between them.

\$ Position \$ Marker

These objects will form a leader shelf template with two text labels. To use text strings as marker attributes, the first character must be "\$".

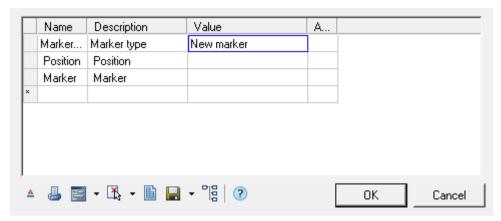
3. Call the command "a"Add marker", use a box or crossing box to select the objects that made up the marker.



4. Snap the base point of the marker.



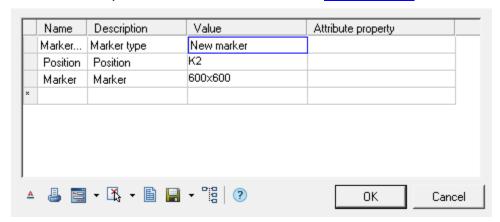
5. The "Creation of a marker" dialog box appears. The properties table will list the attributes entered in the callout text boxes:



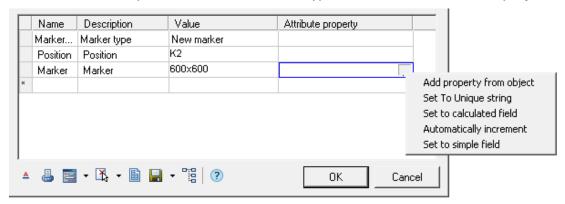
Column "Name" contains the working name of the attribute.

Column "Description" describes the attribute.

In column "Value" the values of the attribute are entered. Values can be either numeric or text. Auxiliary commands are available in the context menu of the "Value" column.



Column "Attribute property" is used to indicate the type of the input attribute. Various attribute labels are provided to indicate their type. The default is "Set to simple field".

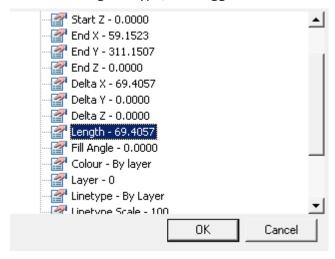


Attribute types:

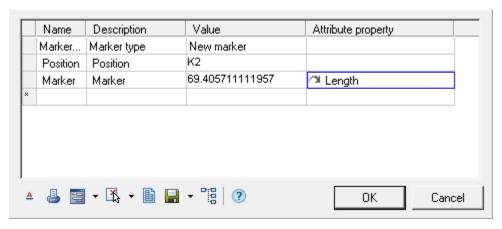
• Add property from object - allows you to set an attribute value by associating it with the attribute value of another object in the drawing.

Important! An object is understood as an object from the base of standard products.

After choosing the type, it is suggested to select the object and the object attribute.



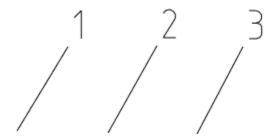
After selecting an attribute, its value falls into the "Value" column, and in the "Attribute property" column the name of the selected attribute.



After assigning an attribute, you can change the type of relationship with an object attribute:

- One-way communication changing the value in an attribute of an object affects the value of the marker.
- Two way communication changing the value in the marker affects the attribute of the object, and vice versa.
- Basic communication an attribute of an object can only be changed from a marker. If the attribute is a table value in a basic relationship, the closest value from the table is displayed. The entered value will be displayed in brackets.
 - Set To Unique string allows you to set a counter attribute that will increase its value by 1 for each subsequent inserted marker. In the "Value" column for the visible counter attribute, you can specify a character string a prefix. In the drawing, the counter value will be appended to the prefix.



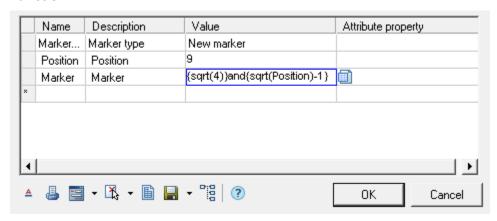


Set to calculated field - allows you to set the value of an attribute using a
mathematical expression, using references to other marker attributes,
operators, and mathematical functions. The name of the desired attribute is
used as a reference to another marker attribute.

Note: Computed attributes are defined and calculated from top to bottom.

Important! Calculations are performed in curly braces.

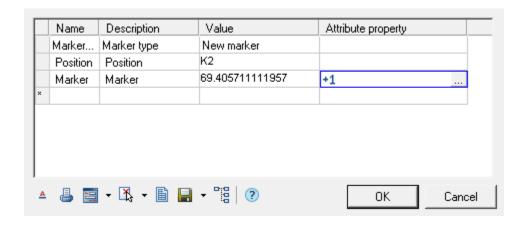
Function:

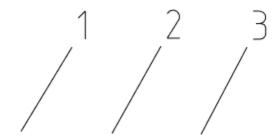


Result:



Automatically increment - allows you to set a counter attribute that will
increase its value by 1 compared to the same attribute of the previous
inserted marker. Such a counter attribute allows repetition of the same
values for several markers, which distinguishes it from an attribute set to a
unique value.





• Set to simple field - sets the default attribute type to plain text.

Note: Attributes included in the block can be included in the marker attribute table nanoCAD!

6. Edit the marker using the marker controls at the bottom of the dialog box.



Include:

- "Marker draw mode". When you click on this button, a drop-down list of rendering modes appears:
 - A Simple marker.
 - ADraw position line.
 - \forall Linear align.

When you select the display method with the addition of a leader line, an additional button "Arrow Type" appears to select the type of arrow:



Click this button and select the desired extension line arrow type.

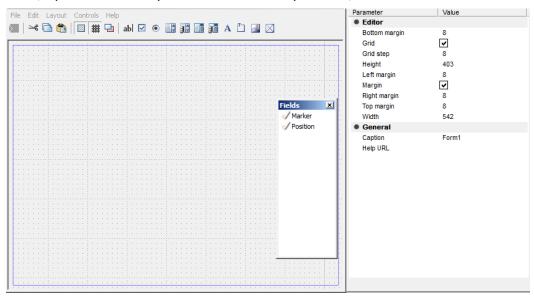
Arrow display parameters are defined in the <u>"Settings - Symbols - Extension - Additional</u> extension lines" settings.

- "Unploted". When this button is enabled, the marker is placed on a special layer that is not displayed when printing. When this mode is activated, the icon on the () button changes and the marker is displayed in gray on the screen (in accordance with the color of the non-printed layer).
- Show form editor"- calls the custom form editor to create a dialog for working with marker attributes.

The following commands are available in the drop-down menu:

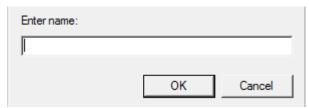
"Edit Form". Open Form Editor.

"Add Form. Adds additional forms, while the marker can change the appearance of the form, by condition or by the user's choice. By default, the marker has one form.



The form editor uses standard Windows form generation technology. The toolkit consists of three blocks - the graphic editor area, the toolbar with form objects and the properties window of the inserted elements. For inserted fields, the "Field Name" ("Variable") can be selected from the list of existing marker description fields. In this case, the default field value is equal to the field value in the marker description.

When adding a second form, you are prompted to enter a name for the form. The variable *Tag - mcFormName* is added to the properties table. This variable is responsible for the name of the form, it can be set in a calculated field and, for example, made equal to execution. Empty or "Main" is considered the main form.



• "Geometry". Used to change the appearance of the generic marker and define the insertion point.

The following commands are available in the drop-down menu:

Get new geometry. The button is used to change the appearance of the universal marker and define the insertion point.

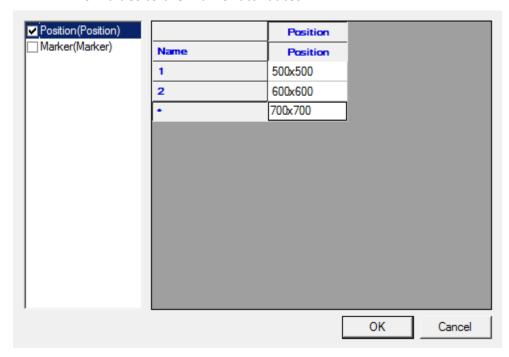
Export marker source graphics. Exports marker geometry to a file.

Add Implementation. Adds additional performances, while the marker can change its appearance, by condition or by the user's choice.

When creating a new implementation, you are prompted to enter its name. When adding implementation, the *Tag - mcImplementation* variable is added to the properties table. This variable is responsible for the name of the current marker implementation. It can be set to a calculated field or linked to a list on a form. Empty or *"Main"* is considered the main implementation.

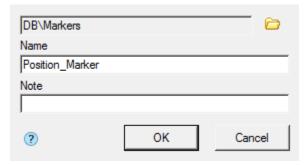


• "Set parameters table". Opens the marker parameter table editor. When inserting a marker and having a table of values, it is possible to assign a group of values to the marker attributes.



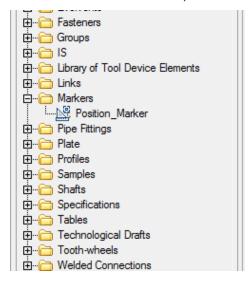
In the list, select the parameters whose values will be selected from the table. In the right part of the window, enter the required number of lines with values. Close the dialog with the "OK" button.

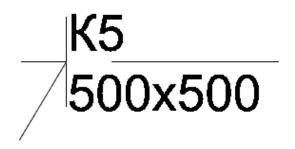
- Save changes to odatabase. The button is intended for writing a marker to library nanoCAD Construction 25.
- **EApply changes to all markers of this types. Applies changes to all markers of this type in the drawing. Serves for changing the marker template for all markers made according to this template and inserted into the drawing.
- 7. If necessary, add any number of hidden attributes, filling in the rows of the table in sequence. The attribute is added in the bottom line of the table, marked with an "*" symbol.
- 8. For future use of the marker, save it to the database as a named object.



In the "Create element" dialog box, specify the path to save, the name of the object and the note (for more information on working with the object base, see the-nanoCAD Construction _25Dobject Manager). After you save the marker, a message appears prompting you to update the existing copies of the marker in the drawing.

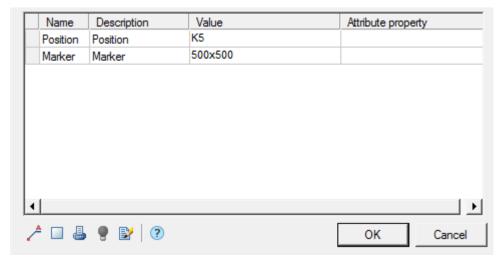
9. nanoCAD Construction 25 makes it possible to immediately apply the created marker. The command line prompts you to install the generated token. Pick an insertion point in the drawing. Identical markers can be simply copied in the future. In other cases, the marker is inserted directly from the base.





Edit marker

Editing of a marker is carried out in a dialog box, the title of which corresponds to the name of the marker. For example, when you call for editing the "Position_Marker" marker, the creation of which was described in the previous paragraph, the dialog box will look like this:



Additional commands are located at the bottom of the window:

- "Marker draw mode". When you click on this button, a drop-down list of rendering modes appears:
 - Simple marker.
 - ADraw position line.
 - \(\forall \)
 Linear align.

When you select the display method with the addition of a leader line, an additional button "Arrow Type" appears to select the type of arrow:



Click this button and select the desired extension line arrow type.

Arrow display parameters are defined in the <u>"Settings - Symbols - Extension - Additional extension lines"</u> settings.

- "Unploted". When this button is enabled, the marker is placed on a special layer that is not displayed when printing. When this mode is activated, the icon on the (3) button changes and the marker is displayed in gray on the screen (in accordance with the color of the non-printed layer).
- "Highlight info source object". Highlights in the drawing the object with which the marker is associated (The function is available if the "Add property from object" mode is set for one or several attributes and the corresponding object was specified when inserting the marker).

• **If** "Edit marker properties". Turns on the edit mode, in which you can change the appearance of the marker, add or remove attributes.

System variables in marker

mcImplementation - Execution management. Empty or "Main" means the main view. mcFormName - Form management. Empty or "Main" means the main form. mcArrowSize - Arrow size control.

mcDefLayer - Controls the marker location layer. The "Value" field contains the name of the layer.

mcShowFormOnInsert - Controls the display of the dialog when inserting. If the value is 0, the dialog is not shown when inserting. The value can be calculated.

Template Wizard

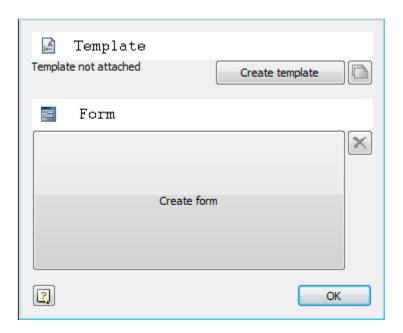
	Main menu: Construction - Library objects - Markers, Groups > Template ard.
0	Ribbon: Construction - Library objects > Template wizard.
0	Toolbar: Template wizard ("Library objects").

Command line: SPTWIZ.

Template Wizard is designed to create easy to use tools of commonly used design elements drawing.

Basic rules

When the command will be asked to select an object to create a template. If the object was preselected, then immediately start dialogue Template Wizard.



Command Options

Button **Create template** - creates a template in the database or applies the changes made in the editor.

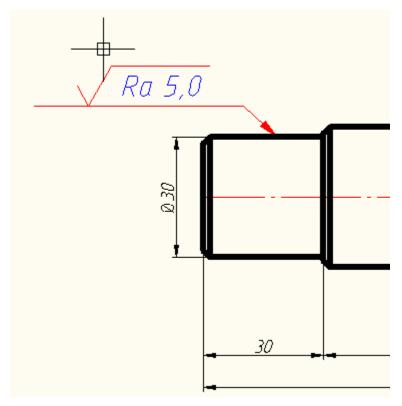
Button **From** - Starts the form template.

Button Create a new template - Creates a new template in the database based on the selected graphics and created form.

Button **XDelete form** - deletes the created form template.

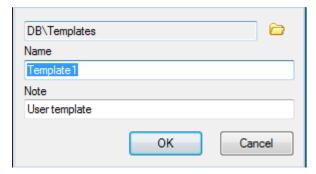
Example of creating a template

Consider the example of creating a template signs of roughness. To do this, the drawing shall bear one designation:



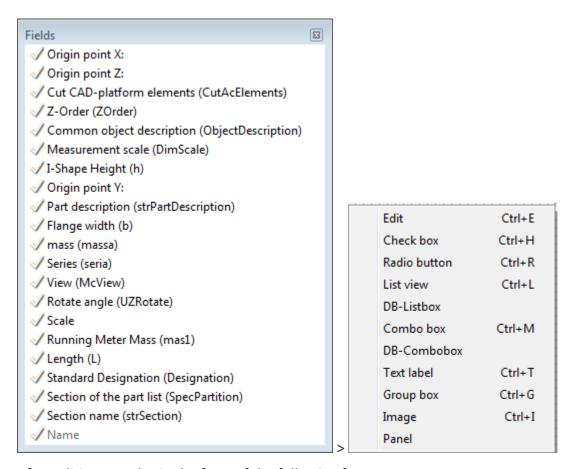
After you run the Wizard Templates chosen designation roughness.

To work with the template you must save it in the database that will be invited to do by pressing the button Create template.

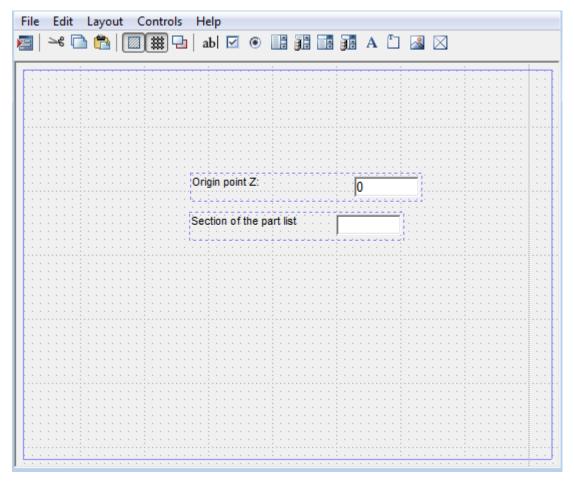


Then click on the **Create a form** and create a form using the notation tools online forms.

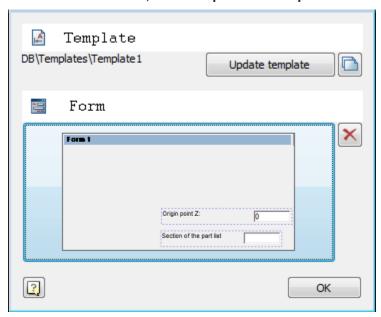
For example, we can take two parameters - the first line designations and direction of irregularities. Both parameters are added to the form as a combo box (drag while holding Ctrl).



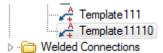
After editing, we obtain the form of the following form:



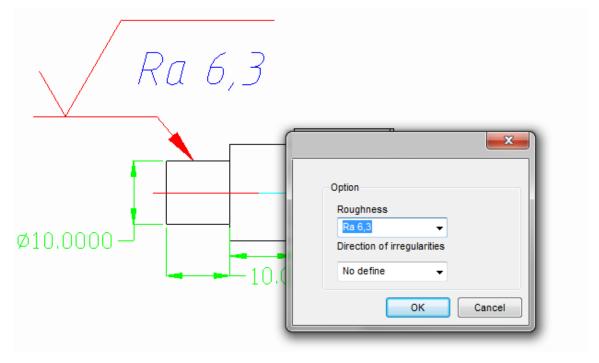
Close the form editor, click to update in template.



Template will be saved in the database and will be displayed in the object manager.

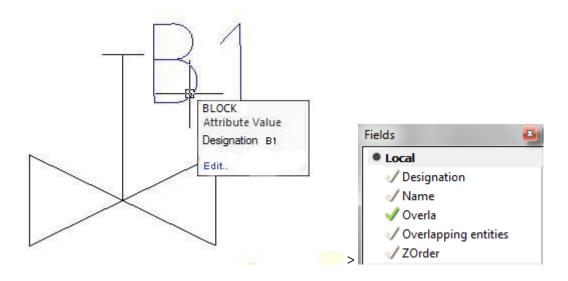


Now when you insert from the database will be able to also place the designation of roughness on the shelf line-outs, but when you edit your form will appear:

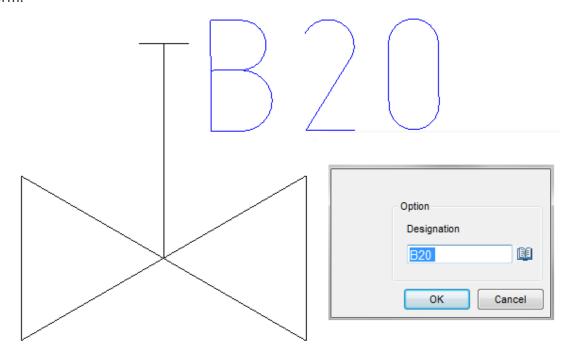


Editing blocks nanoCAD

If the original graphics selected block nanoCAD, its attributes are also displayed in the form editor as available variables.



When creating a form in the database and maintaining such a block is inserted into the drawing as a block of the same source, only the attributes can be set up via a custom form.



Control overlapping objects

Change hidden mode

Main menu: Construction - Library objects - Cover > Change hidden mode.

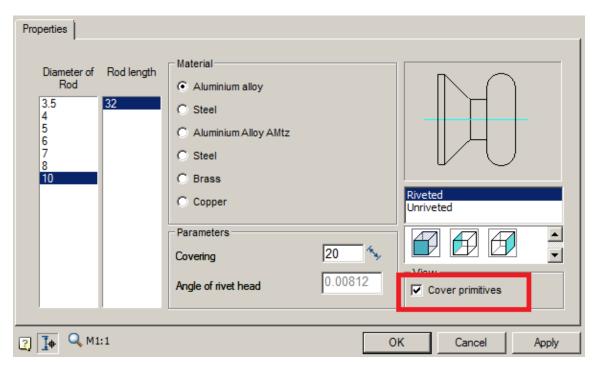
Toolbar: "Library objects"> Change hidden mode.

Command line: SPCHCOVER.

The command switches the display mode of hidden lines.

nanoCAD Construction 25 allows you to hide individual graphics elements. The overlapping nature of the base object or user block is determined by a special parameter - the overlap level *ZOrder*. *ZOrder* - this is a numeric parameter whose value determines the overlap priority. An object with a large ZOrder value overrides an object with a lower value.

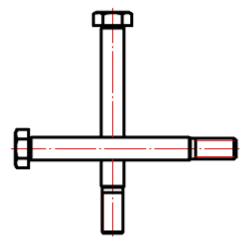
Primitives nanoCAD have the lowest overlapping level and therefore are always overlapped by objects from the database. That at an insertion of object nanoCAD Construction 25 objects nanoCAD did not overlap, it is necessary to disable the switch in the object insert dialog "Cover primitives":



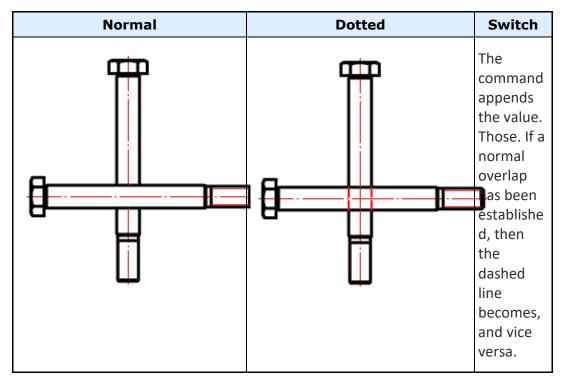
The area in the drawing that the base object covers nanoCAD Construction 25, is called "Contour of suppression". An overlap exists within this contour.

Procedure

1. Call command.



2. In the context menu, select the desired view of the overlapped objects "Normal", "Dotted" or "Switch".



- 3. Select the secant frame for the objects for which you want to change the overlapping mode.
- 4. Repeat if necessary items 2 and 3, or complete the command on the key "Enter".

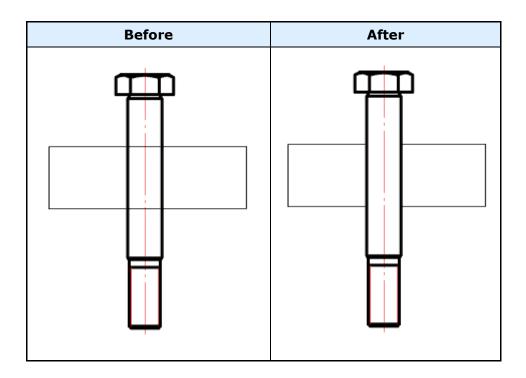
Regenerate suppression contours

Main menu: Construction - Library objects- Cover > Regenerate suppression contours.

Toolbar: "Library objects"> Regenerate suppression contours.

Command line: SPCOVER.

Regenerate the drawing and redraw the contents of the current viewport.



Move up

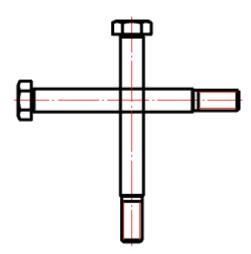


Toolbar: "Library objects"> Move up.

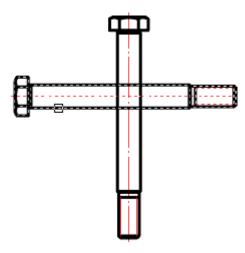
Command line: SPMOVEUP.

Procedure

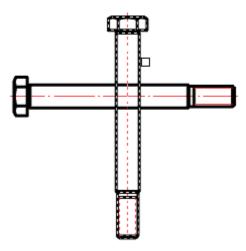
1. Call command;



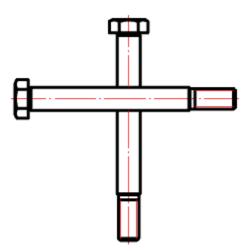
2. Select the objects you want to move up;



3. Select the objects to be compared;



4. After the selection is complete, the objects that need to be moved up will automatically increase the overlap level (ZOrder).



Move down

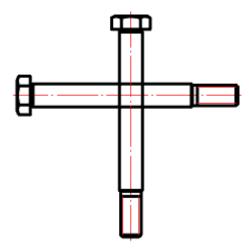
Main menu: Construction - Library objects - Cover > Move down.

Toolbar: "Library objects">
☐ Move down.

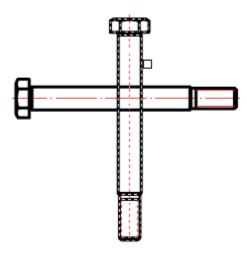
Command line: SPMOVEDOWN.

Procedure

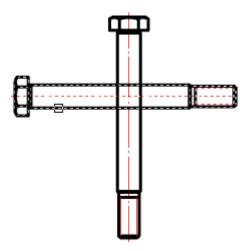
1. Call command;



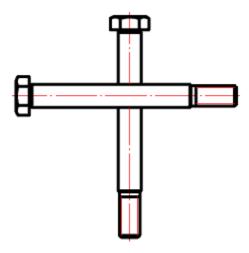
2. Select the objects you want to move down;



3. Select objects to be compared;



4. After the selection is complete, the objects that are to be moved down will automatically decrease the overlap level (ZOrder).



Part trim

Add part trim

Main menu: Construction - Library objects - Part trim > Add part trim.

Ribbon: Construction - Library objects > Add part trim.

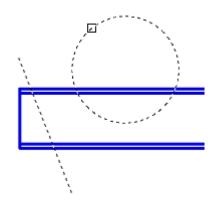
Toolbar: "Library objects"> Add part trim.

Command line: SPTRIM.

The command allows you to trim objects of metal structures.

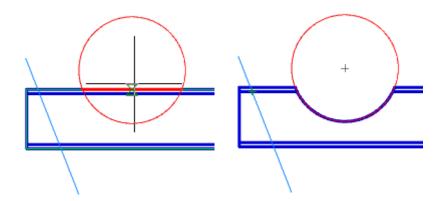
Trimming with contour indication

- 1. Call the command **I**"Add part trim".
- 2. Pick an outline. A contour can be a line segment, circle, arc, polyline (closed and open).

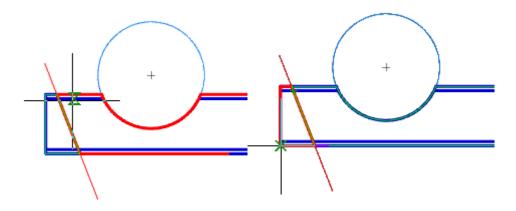


3. Specify trimming objects.

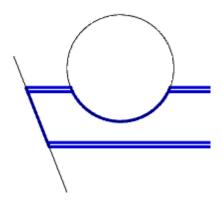
If a circle or closed polyline is used as a path, the trimming object is selected within the path.



If a linear path is used, the trimming object is selected from one side of the path.

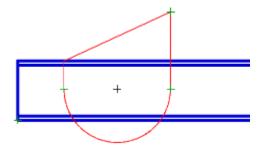


4. Press the "Esc" button to end trimming. The object will be trimmed.

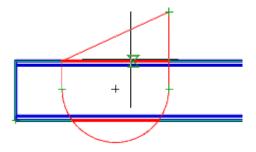


Trimming mode "COntour"

- 1. Call the command **I**"Add part trim".
- 2. Select trim mode "COntour".
- 3. Draw a closed polyline path.



4. Pick a trimming object within the path.



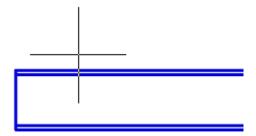
5. Trimming an object is made.



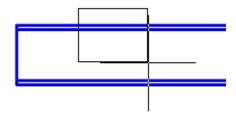


Trimming mode "rectangle by tWO points"

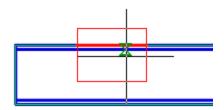
- 1. Call the command **I**"Add part trim".
- 2. Select trim mode "rectangle by tWO points".
- 3. Pick the first corner.



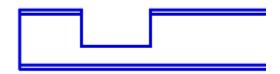
4. Pick the second corner.



5. Pick a trimming object inside the rectangle.



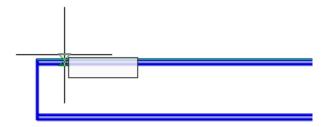
6. Trimming an object is made.



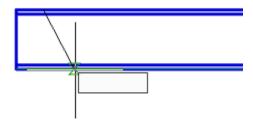
Trimming mode "rectangle by thrEE points"

Allows for trimming at the desired angle.

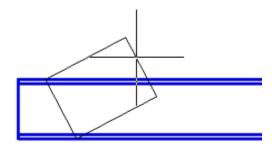
- 1. Call the command **I**"Add part trim".
- 2. Select trim mode "rectangle by thrEE points".
- 3. Pick the first point.



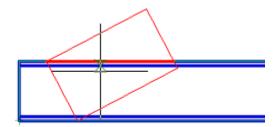
4. Pick the second point.



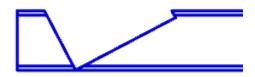
5. Pick the size of the outline.



6. Pick a trimming object inside the rectangle.

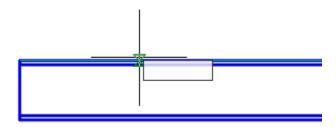


7. Trimming an object is made.

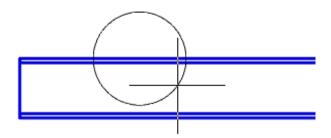


Trimming mode "HOle"

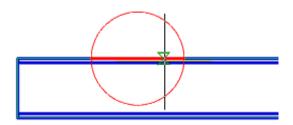
- 1. Call the command **I**"Add part trim".
- 2. Select trim mode "HOle".
- 3. Pick the center of the hole.



4. Pick a radius for the hole.



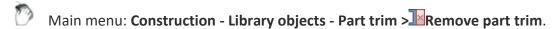
5. Pick a trimming object inside the circle.



6. Trimming an object is made.



Remove part trim





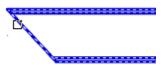


Command line: SPTRIMDELETE.

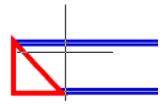
The command removes a previously created trim.

Procedure

1. Call the command \blacksquare "Remove part trim".



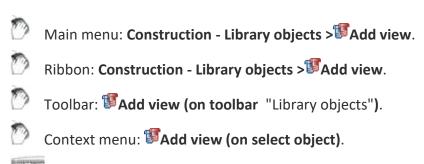
2. Specify the objects you want to reset and press "Enter" (or press "Spacebar") to select all objects.



3. The specified objects will be restored to their original state.



Add View



Designed to quickly add a new type of projection from the base of the inserted object to the drawing.

• Select the object to copy.

Command line: SPADDVIEW.

- Specify the insertion point of the object. Context menu commands Front / left / right / top / bottom standard projection (to insert a particular projection, it is necessary that it be recognized in the object).
- Context menu commands *Point, Angle* mode selection switch, respectively the insertion point or selection mode direction.
- Complete the cyclic command.

Adding a projection view to the object database can be done using the *Add View* from the context menu for the selected object.

Simplified / Full View

Main menu: Construction - Library objects > Change representation.

Ribbon: Construction - Library objects > Change representation.

Toolbar: Change representation (on toolbar "Library objects").

Context menu: #Change representation (on select object).

Command line: SPCHANGEREPRESENT.

- Press the button and select the database object in the drawing.
- Context menu commands Full, Simplified select the object representation.

Switching presentation can be accomplished by using the **Change view** from the context menu for the selected object.

Mirror Part

Main menu: Construction - Library objects > Mirrow part.

Ribbon: Construction - Library objects > Mirrow part.

Toolbar: Mirrow part (on toolbar "Library objects").

Command line: SPMIRROWSTD.

- Press the button and select the database object in the drawing.
- Press Enter.

Occur along the axis of revolution object X.

Regenerate STD parts

Main menu: Construction - Library objects > ■Regenerate Std Parts.

Toolbar: **ERegenerate Std Parts (on toolbar** "Library objects").

Command line: SPREGENSTD.

The team needed to upgrade the graphics part of the object (s).

Operation

1. Call the command "Regenerate STD parts"

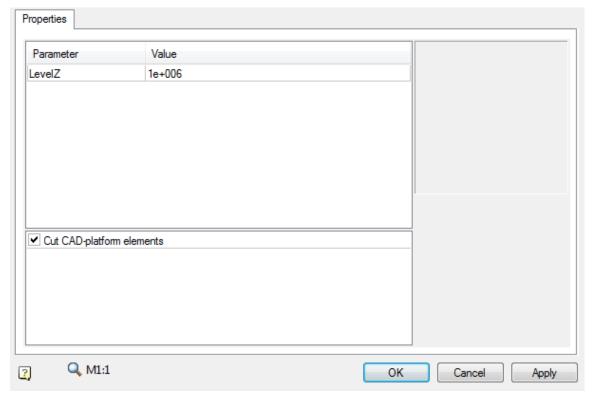
- 2. Specify the objects that you need to update or Enter, if you need to update all of the objects.
- 3. These objects will be updated

User defined object

- Main menu: Construction Library objects > User defined object.
 - Ribbon: Construction Library objects > User defined object.
- Toolbar: **=User defined object (on toolbar** "Library objects").
- Command line: SPCUSTOMOBJ.

Tool *User object* makes it easy to group in objects nanoCAD and nanoCAD Construction 25 into a single object. Custom objects support the ability to overlap other objects in the drawing.

- 1. Select the objects to create a custom object.
- 2. Specify part origin point.
- 3. Specify the drawing insertion and direction.
- 4. In the dialog box, set the value of the level of overlap of the object (for Level Z).



When you create a custom object contour suppression, external contour of the object is automatically detected contour suppression external contour of the object. Subsequently, the control circuit is used when objects overlap on the drawing..

Custom objects support editing with standard tools nanoCAD Construction 25.

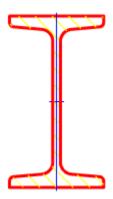
Dialog "Overrides"

Shortcut: ALT+RBM (when you hover over a line or shading standard element).

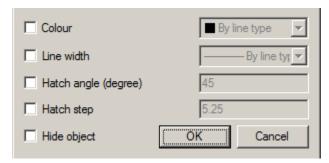
It overrides the style of the individual lines in a standard cell.

Sample call

1. Insert a standard element, such as I-beams. In the properties, select the rendition of "left view" and the type of display "view with a cut".

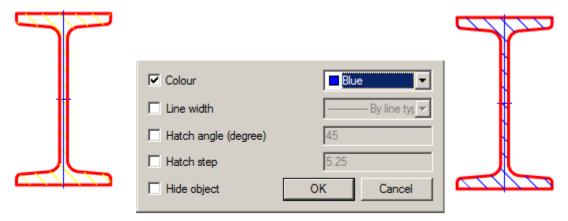


2. Do not get fooled by the hatch and press ALT+RBM. The "Overrides" dialog box.

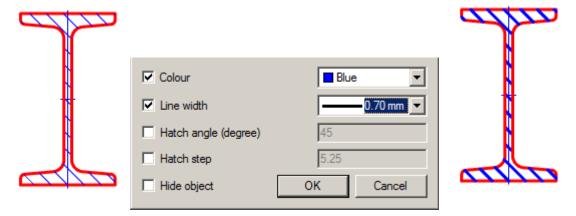


Options

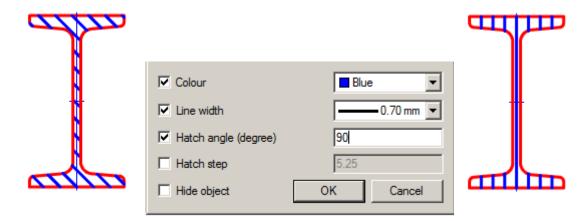
Colour -changes the color of the line.



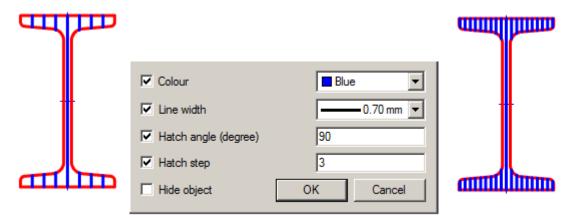
Line width - change the line width.



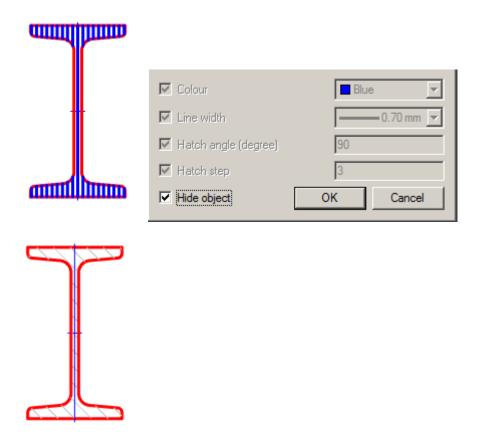
Hatch angle (degree) - controls the tilt hatch. The parameter is active only for the hatch.



Hatch step - changes hatching step. The parameter is active only for the hatch.



Hide object - it makes an invisible line. The other parameters are ignored.



If the <u>setting</u> "Show invisible lines" is "Yes", then the line will be displayed with a color according to the setting of "Color of invisible lines".

Override main lines



Context menu: Override main lines (on the selected object).



Users sometimes need to make retrofit drawings that show both new and existing objects at the same time.

That is, for example, welding new fittings into an existing tank. In this case, the main lines of existing objects (fittings, hatches, bolts, shells, bottoms and any other elements of the base) should be depicted either as thin or dashed lines.

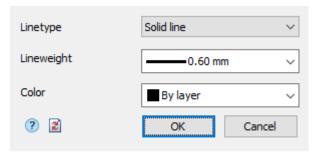
To change these parameters, use the "Override main lines" command.

Procedure

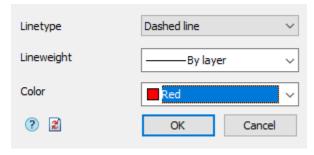
1. Select the standard elements to override.



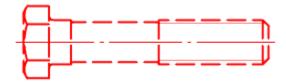
2. Call the "Override main lines" command. The "Overriding the main lines" dialog opens.



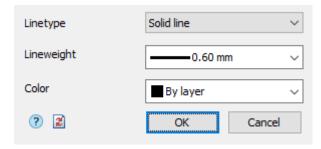
3. Specify the required parameters.



4. Click the "OK" button. The main lines of the selected objects will be overridden.



Dialog



Linetype - the parameter allows you to select the line type from the list: Solid or Dashed line.

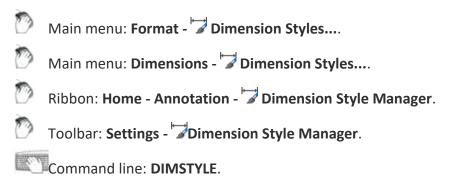
Width - the parameter allows you to select the line thickness from the list.

Color - the parameter allows you to select the color of the lines.

Button "Clear all redefinitions" - removes all previously made overrides, brings the selected objects to the default settings.

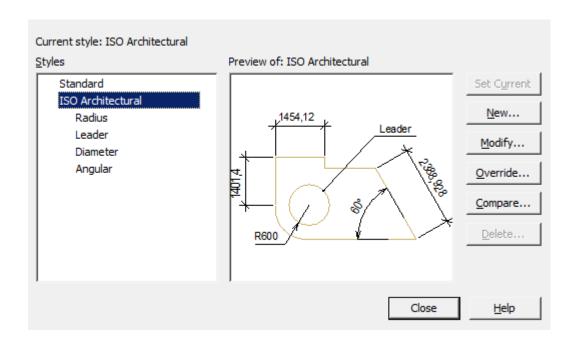
Dimensions

Dimension Style Manager



The software defaults to a government industry standard dimension style.

Dimension styles allow you to control the appearance of dimensions and quickly format them.



Dialog box composition

The inscription "Current style: ..." - information about the current dimension style, which is used when applying dimensions.

"Styles" list - a list of all dimension styles in the document.

The "Preview of: ..." window is a graphical representation of the style selected in the "Styles" list.

Buttons:

- Set current sets the selected dimension style current.
- New... opens a dialogue "Creating style".
- Modify... change the parameters of the style selected in the list. Opens dialog "Modify dimension style".
- Override... change the parameters of the current dimension style. Opens dialog "Modify dimension style".
- Compare... compare two dimension styles, or view a list of all the properties of a style. The comparison results can be copied to the clipboard. Opens dialog "Comparing Dimension Styles".
- Delete... deletes the selected dimension style.

Restoring the Dimension Style

Command line: SPSETGOST, SETGOST.

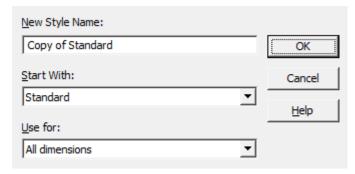
This command is necessary to create (restore) the standard dimensional style of the environment nanoCAD Construction .

Dimension style settings are stored within drawing files. If the file was not created in nanoCAD Construction, then it may not have the required dimension style for correct work in the nanoCAD Construction environment.

Creating a dimension style

Button "New..." in the dialog box "Dimension style manager".

The new style is based on the existing style.



Dialog box composition

Field "New Style Name" - style name.

List "Start With" – the style on the basis of which the new one will be created.

List "Use for" – a dimension sub-style is selected from the list (applicable only to certain types of dimensions).

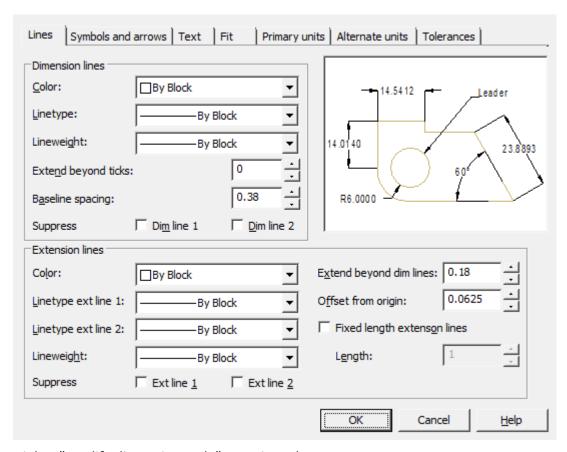
Button "OK" – opens a dialogue "Modify dimension style".

Modify dimension style

In the "Modify dimension style" dialog, properties for a new style are set and parameters of an existing one are edited.

This dialog is called when you click the "Modify..." or "Override..." buttons from the "Dimension Style Manager", as well as from the "Creating style" window.

The name of the edited style is reflected in the title of the dialog.



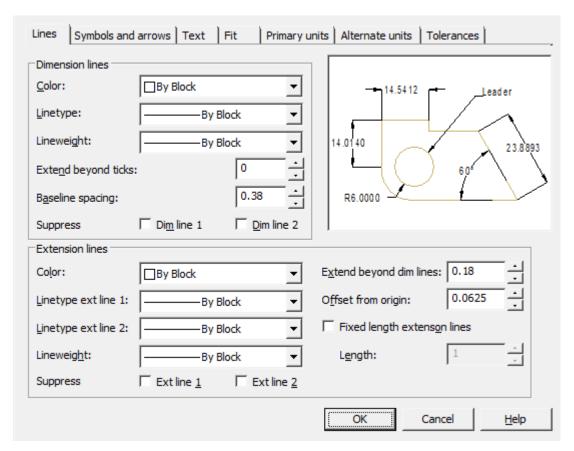
Dialog "Modify dimension style" contains tabs:

- Lines
- Symbols and arrows
- Text
- Fit
- · Primary units
- Alternate units
- Tolerances

The model image on each tab shows a preliminary result of the property changes.

Tab Lines

Sets the format and properties of dimension lines, extension lines, arrows, and center marks.



Simension lines

Color – setting the color of dimension lines.

Linetype – setting the dimension line type.

Lineweight – setting weights for dimension lines.

Extend deyond ticks – when using serifs as dimension arrows, setting the distance the dimension line should extend beyond the extension lines.

Baseline spacing - setting the distance between dimension lines in dimensions from a common base.

Suppress – sets the suppression of the display of dimension lines if they go beyond the extension lines.

- Dim line 1 suppress the first dimension line.
- Dim line 2 suppress the second dimension line.

Extension lines

Color - setting the color of the extension lines.

Linetype ext line 1 – setting the type of the first extension line.

Linetype ext line 2 – setting the type of the second extension line.

Lineweight – setting weights for extension lines.

Suppress – set to suppress extension lines:

- Ext line 1 suppress the first extension line.
- Ext line 2 suppress the second extension line.

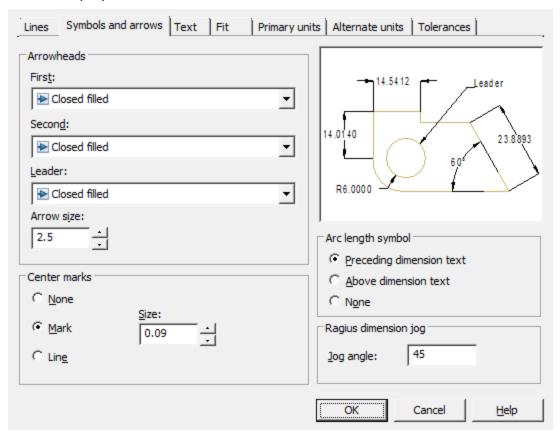
Extend beyond dim lines – setting the distance that extension lines should protrude beyond the dimension line.

Offset from origin – sets the distance by which extension lines deviate from object points.

Fixed length extenson lines - sets the full length of the extension lines from the dimension line to the origin of the dimension.

Tab Symbols and arrows

Sets the format and position of arrows, center marks, arc length symbols, and radius dimension polylines.



Arrowheads

Controls the appearance of dimension arrows.

First – selection of the arrow type for the first dimension line. When you change the type of the first arrow, the type of the second is automatically changed.

Second – selection of the arrow type for the second dimension line.

Leader – setting the arrow type for the leader.

Arrow size – displaying the existing one and setting a new size for the arrows.

Center marks

Controls the placement of center marks and centerlines when placing a diameter or radius.

None - do not create center mark and centerlines.

Mark - create a center mark.

Line - create centerlines.

Size - displays an existing one and sets a new size for the center mark or centerline.

Arc length symbol

Controls the display of the arc symbol in the arc length dimension.

Preceding dimension text - inserts arc length characters before dimension text.

Above dimension text - inserts arc length characters above dimension text.

None - prohibiting the display of arc length symbols.

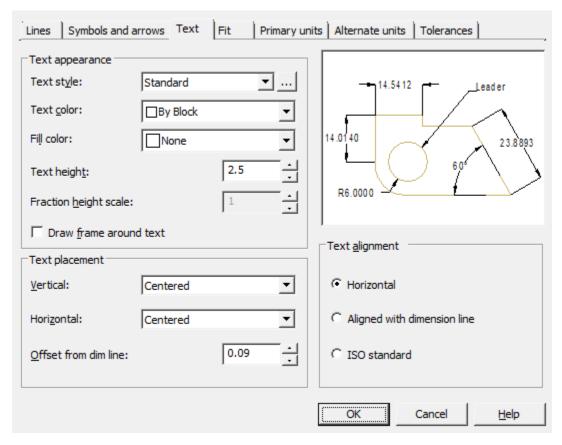
Radius dimension jog

Controls the display of broken lines (zigzags) of radius dimensions, in cases where the center is located outside the page.

Jog angle - sets the angle of the perpendicular line connecting the extension and dimension lines of the radius dimension.

Tab Text

Setting the format, placement and alignment of dimension texts.



Text appearance

Text style – selects the current dimension text style from the list.

Text color – setting the color of the dimension text.

Fill color – setting the background color of the text in dimensions.

Text height - sets the current height of the dimension text. If the text style specifies a fixed height (that is, the style's height value is not 0), then the height entered here is ignored.

Fraction height scale – setting the scale of fractional values relative to the rest of the text. This option is available if the "Unit format" is set to "Fractional" on the "Primary units" tab. The height of fractional texts is determined by multiplying the height of the regular text by a given factor.

Draw frame around text – sets the display of dimension text in a frame.

Text placement

Vertical – select the option to align the dimension text vertically relative to the dimension line:

• Centered - centered dimension text between extension lines.

- Above positioning the dimension text above the dimension line. The distance from the dimension line to the bottom border of the text is equal to the value specified in the "Offset from dim line" option.
- Outdise positioning the dimension text next to the dimension line on the side farthest from the first fit point.
- JIS placement of dimension text in accordance with the requirements of Japanese industrial standards JIS (Japanese Industrial Standards).
- Below the location of the dimension text below the dimension line. The distance from the dimension line to the top border of the text is equal to the value specified in the "Offset from dim line" option.

Horizontal – select an option to position the dimension text horizontally along the dimension line relative to the extension lines:

- Centered centered dimension text between extension lines along the dimension line.
- At Ext Line 1 the location of the text to the left of the first extension line. The distance from the extension line to the text is equal to the sum of twice the dimension arrow ("Symbols and arrows" tab) and the text gap (the "Offset from dim line" option).
- At Ext Line 2 the distance from the extension line to the text is equal to the sum of twice the dimension arrow ("Symbols and arrows" tab) and the text gap (the "Offset from dim line" option).
- Over Ext Line 1 positioning text above or along the first extension line.
- Over Ext Line 2 positioning text above or along the second extension line.

Offset from dim line – setting the size of the current text gap (the width of the empty space around the text located at the break in the dimension line). This value is also used as the minimum length of the broken dimension line fragments.

The text is located between the extension lines only if the lengths of these fragments are not less than the size of the text gap. If text is above or below the dimension line, it will only fit between the extension lines if there is enough space for the dimension arrows and dimension text to be spaced apart by the text gap.

Text alignment

Sets the orientation of the dimension text between and outside dimension lines.

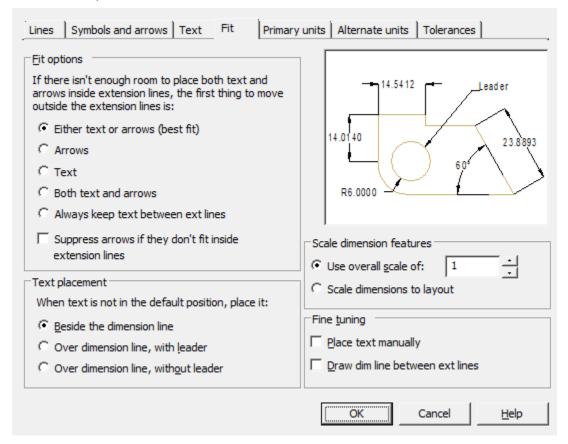
Horizontal – place text horizontally.

Aligned with dimension line – place text along the dimension line.

ISO standart - place along the dimension line if the text is inside the extension lines, or horizontally if the text is outside.

Tab Fit

Controls the position of dimension text, arrows, leaders, and dimension lines.



Fit options

Set the layout of text and arrows if there is not enough space between the extension lines to place them together:

Either text or arrows (best fit) - move either the text or arrows outside the dimension lines, whichever is the best location.

Arrows - move outside the extension lines, first arrows, then text.

Text - move outside the extension lines, first the text, then the arrows.

Both text and arrows - if there is not enough space, then both text and arrows are located outside the extension lines.

Always keep text between ext lines – always place text between extension lines.

Suppress arrows if they don't inside extension lines - if there is not enough space for arrows between the extension lines, they are not displayed.

Text placement

Selecting an action when the dimension text is moved from the default position (specified by the dimension style):

Beside the dimension line – the dimension line moves with the text.

Over dimension line, with leader – dimension lines do not move, but a leader is drawn that connects them and the text. The leader is not drawn if the text is too close to the dimension line.

Over dimension line, without leader – no connections are made between the text and the dimension line.

Scale dimension feature

Use overall scale of – setting the scale factor for all dimension style parameters that specify dimensions, distances and indents, including the height of the text and the size of the arrows.

Scale dimensions to layout - sets a scale factor based on the ratio of units in the current model space viewport and paper space.

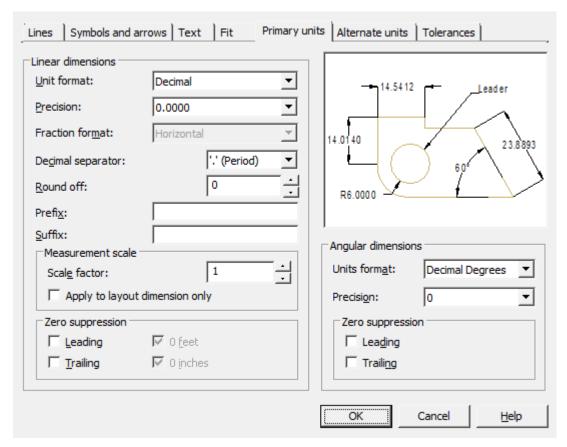
Fine tuning

Place text manually – places the dimension at the point specified when prompted for Dimension line position. All horizontal placement modes are ignored.

Draw dim line between ext lines – draw dimension line between extension lines, even if dimension arrows are positioned outside of them.

Tab Primary units

Sets the format and precision of base units, and dimension text prefixes and suffixes.



Linear dimensions

Unit format - controls the display and format of tolerances in dimension text.

Precision – setting the number of decimal places in the dimension text.

Fraction format – setting format for fractional texts.

Decimal separator – selection of separator type for sizes expressed in decimal units.

Round off – setting rounding rules for all types of dimensions, except for angular dimensions. Example: for a given accuracy of 0.25, all measured distances are rounded to the nearest multiple of 0.25. When you enter a value of 1.0, all measured distances are rounded to the nearest whole value. The number of digits in fractional parts of distances depends on the precision specified in the "Precision" field.

Prefix – defining the dimension text prefix. You can enter special characters or use control codes to display special characters. For example, the control code "%% c" matches the diameter character. An explicit prefix takes precedence over default prefixes such as those used for diameter and radius.

Suffix – definition of a dimension text suffix. You can enter special characters or use control codes to display special characters. For example, typing the suffix mm will add it to the dimension text. The suffix entered here takes precedence over the default suffixes.

Measurement scale

Scale factor – setting the scale factor for linear dimensions. It is recommended not to change the default value of 1.00. The factor has no effect on angular dimensions, rounding accuracy, positive and negative tolerances.

Apply to layout dimension only – applies a scale factor only to dimensions plotted in layout viewports. It is recommended to disable the setting.

Important! Changing the value of the scale of the dimensions of a style in a customization changes the value in the dimensions of the same style that are already assigned. This bug is unrecoverable for technical reasons.

Zero suppression - Controls the suppression of leading and trailing zeros, as well as feet and inches zero.

- Leading suppress leading zeros in all decimal sizes. Example: 0.3000 is written as .3000.
- *Trailing* suppress trailing zeros in all decimal sizes. Example: 11.5000 is represented as 11.5 and 30.0000 is represented as 30.

Angular dimensions

Sets the current corner format for angular dimensions.

Units format – selection of units of measure for angular dimensions.

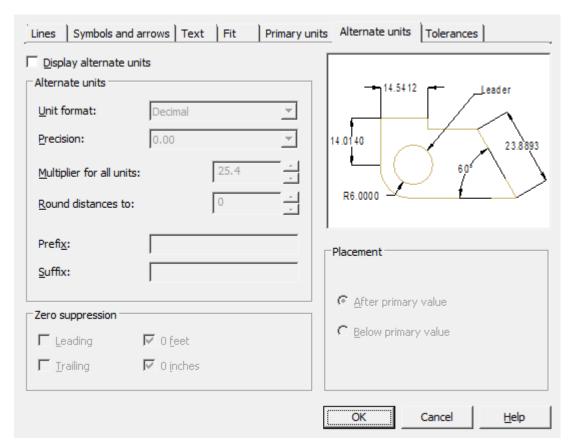
Precision – setting the number of decimal places in angular dimensions.

Zero suppression - control of suppression of leading and trailing zeros.

- Leading suppress leading zeros in all decimal sizes. Example: 0.3000 is written as .3000.
- *Trailing* suppress trailing zeros in all decimal sizes. Example: 11.5000 is represented as 11.5 and 30.0000 is represented as 30.

Tab Alternate units

Setting the format and precision for alternative dimension units.



Display alternate units – inclusion of the possibility of using alternative dimensional units.

Alternate units

Unit format - setting the format of alternative units.

Precision – setting the number of decimal places after the decimal point.

Multiplier for all units - setting the conversion factor from basic units to alternative ones. Example: To convert inches to millimeters, enter 25.4. The value has no effect on angular dimensions and does not apply to rounding precision or positive and negative tolerances.

Round distances to – sets the rounding rule for all types of dimensions, except for angular dimensions. Example: when setting the accuracy to 0.25, all measured distances are rounded to the nearest multiple of 0.25. When you enter a value of 1.0, all measured distances are rounded to the nearest whole value. The number of digits in fractional parts of distances depends on the precision specified in the "Precision" field.

Prefix – defining the prefix of the alternate dimension text. You can enter special characters or use control codes to display special characters. For example, the control code "%% c" matches the diameter character. An explicit prefix takes precedence over default prefixes such as those used for diameter and radius.

Suffix – defining the suffix of the alternate dimension text. You can enter special characters or use control codes to display special characters. For example, entering the suffix mm will add it to the text. The suffix entered here takes precedence over the default suffixes.

Zero suppression

Controls the suppression of leading and trailing zeros and feet and inches zero.

Leading – suppress leading zeros in all decimal sizes. Example: 0.3000 is written as .3000.

Trailing – suppress trailing zeros in all decimal sizes. Example: 11.5000 is represented as 11.5 and 30.0000 is represented as 30.

Placement

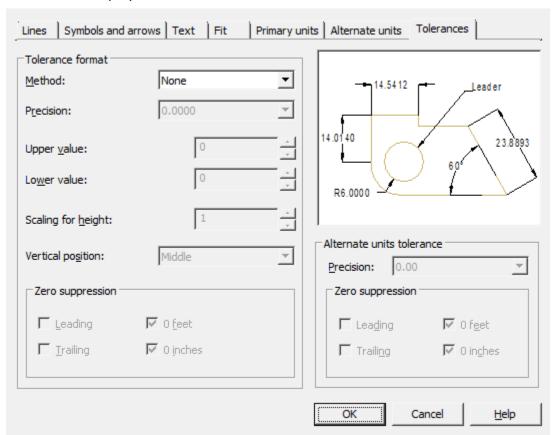
Sets the position of alternate units in dimension text.

After primary value – display the value in alternate units immediately following the value in base units.

Below primary value - display the value in alternate units below the value in base units.

Tab Tolerances

Controls the display and format of tolerances in dimension text.



Tolerance format

Method – choice of method for determining tolerances.

None- disable display of tolerances.

Symmetrical — application of two limit deviations, with which the dimension text is displayed with the same The tolerance is separated from the dimension by the "±" symbol. The value is entered in the "Upper value"

Deviation – application of two limiting deviations. Dimension text is displayed with different upper and lower a dimension, a plus sign is put in front of the upper limit deviation and a minus sign in front of the lower or

Limits – displays dimension text as limit dimensions. The maximum size limit is above the minimum size lim adding the upper limit deviation to the nominal size; the smallest - by subtracting the lower limit deviation

Basic – displays the dimension text as a nominal boxed dimension.

Precission - setting the number of decimal places after the decimal point.

Upper value - setting the value of the upper limit deviation. When the "Symmetrical" method is turned on, both deviations are assigned this value.

Lower value - setting the value of the lower limit deviation.

Scaling for height - setting the current text height for deviations.

Vertical position - alignment of deviation texts:

- Bottom alignment of deviation and nominal size on the bottom. $|\frac{15 \cdot 5.1}{5.1}|$
- Middle aligning deviation and nominal size to the middle of the dimension text. $\frac{15^{+0.2}_{-0.1}}{1}$
- Top alignment of deviation and nominal size at the top. + -0,1

Zero suppression - control of suppression of leading and trailing zeros.

- Leading suppress leading zeros in all decimal sizes. Example: 0.3000 is written as .3000.
- *Trailing* suppress trailing zeros in all decimal sizes. Example: 11.5000 is represented as 11.5 and 30.0000 is represented as 30.

Alternate units tolerance

Alternative unit tolerance formatting.

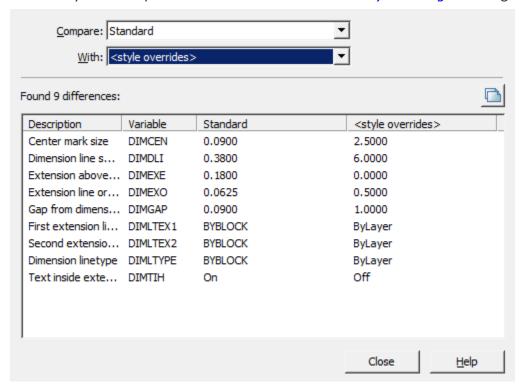
Precision - setting the number of decimal places after the decimal point.

Zero suppression - control of suppression of leading and trailing zeros.

- Leading suppress leading zeros in all decimal sizes. Example: 0.3000 is written as .3000.
- *Trailing* suppress trailing zeros in all decimal sizes. Example: 11.5000 is represented as 11.5 and 30.0000 is represented as 30.

Comparing Dimension Styles

The dialog for comparing two dimension styles or viewing a list of all style properties is invoked by the "Compare..." button in the "Dimension Style Manager" dialog.



[&]quot;Compare:" field - selects the first dimension style to compare.

Table columns:

- Description parameter name.
- Variable parameter system name.
- Variable value columns parameter values in compared styles.

Button "Copy to clipboard" - allows you to copy comparison results to the clipboard.

[&]quot;With:" field - selects the second dimension style for comparison.

[&]quot;Difference table" - the table contains data on non-matching properties.

Auto

Main menu: **Dimensions** > Auto.

Ribbon: Annotate - Dimensions > Auto.

Ribbon: Construction - Symbols > Dimensions.

Toolbar: **Dimensions** > Dimensions.

Command line: SPMDIM, MDIM.

When inserting dimensions, context menu commands are available to switch the dimension view:

- Auto
- Aligned
- Horizontal
- Vertical
- Radius
- Diameter
- Large arc radius
- Arc
- Ordinate
- Angle
- Chain
- Base
- Properties (Opens the size edit dialog)
- Group

Note: If you hold down the CTRL key while placing linear dimensions at the time you select the dimension line, you can skew the dimension extension lines.

If you hold down the SHIFT key while placing linear or angular dimensions while selecting the position of the dimension line, you can move the dimension text along the dimension line.

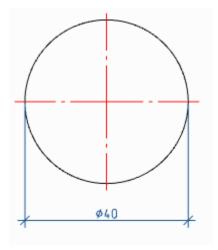
Linear dimensioning

To apply the dimension you need:

- 1. Select a segment;
- 2. Place the dimension number.

Dimensions can change to horizontal, vertical, or parallel, depending on the position of the drop point.

Dimensioning by selecting characteristic (anchor) points

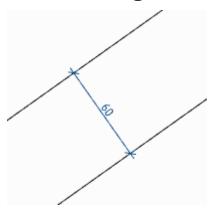


To apply dimensions, you must:

- 1. Select the first node;
- 2. Select the second node;
- 3. Place the dimension number.

When selecting anchor points of the circle, the diameter sign is automatically set.

Dimensioning between two parallel lines

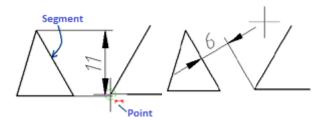


To apply the dimensions shown above, you must:

- 1. Select the first segment;
- 2. Select the second segment;

3. Place the dimension number.

Dimensioning through a point perpendicular to the selected line



To apply the dimensions shown above, you must:

- 1. Specify the segment, perpendicular to which the dimension will be applied;
- 2. Without interrupting the commands, point to the end point of the line segment (a circle of small diameter should appear around the point);
- 3. Place the dimension number.

Undo an erroneously inserted dimension without exiting the command

Dimensioning is performed in a cyclic mode, i.e. when applying one dimension, the team does not stop its work, but suggests setting the next dimension or choosing a different type of dimension. In some cases, the previous dimension may not be set correctly. To remove an erroneous dimension, there is the "Undo" context menu command. You can also call the command with the "Ctrl + Z" hotkeys. The command is available when setting the dimension after specifying the dimension number.

Auxiliary markers

Auxiliary autodimension markers appear when you hover over a drawing object and show what type of dimension will be built in this case:

- Indicates that the diametral dimension will be drawn.
- Shows what a linear dimension will be drawn (horizontal, vertical or parallel).
- Shows that the angular dimension will be drawn.
- Shows that the chain of dimensions will be built.

- Shows that the slanted dimension will be drawn.
- Indicates that the radial dimension will be drawn.

Linear dimensions

Aligned dimension

- Main menu: Dimensions > Aligned.
- Ribbon: Annotate Dimensions > Aligned.
- Toolbar: **Dimensions** > Aligned.
- Context menu: aLigned when calling any dimension.
- Command line: SPMDIMALI, MDIMALI.

Horizontal dimension

Context menu: Horizontal - when calling any dimension.

Command line: SPMDIMHOR, MDIMHOR.

Vertical dimension

Context menu: Vertical - when calling any dimension.

Command line: SPMDIMVER, MDIMVER.

Parallel, horizontal, vertical dimensions

To apply dimensions, you must:

- 1. Choose dimension;
- 2. Select the type of binding:
 - "nEarest snap gets object" dimensions the entire selected object;
 - "nEarest snap gets point" (default) sets dimension nodes at a selected location on an object.

- 3. Specify the end nodes of the dimension based on the selected snap type:
 - "nEarest snap gets object" specify an object, the end nodes of the dimension will be the end points of the object;
 - "nEarest snap gets point" specify the start and end nodes on the selected object.
- 4. Place the dimension number. The dimension will be built.

Auxiliary markers

Construction markers appear when you select a certain linear dimension:

- Parallel dimension is selected.
- Horizontal dimension is selected.
- Vertical dimension is selected.

Linear dimension

- Main menu: **Dimensions** > Linear.
- Ribbon: Annotate Dimensions > Linear.
- Toolbar: **Dimensions** > Linear.
- Command line: DIMLINEAR.

Linear dimensioning

To apply dimensions, you must:

- 1. Call the "Linear" command;
- 2. Specify the first node;
- 3. Indicate the second node;
- 4. Place the dimension number. Linear dimension will be created.

Radius

Main menu: **Dimensions** > Radius.

Ribbon: Annotate - Dimensions > Radius.

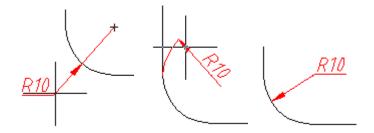
Ribbon: Construction - Symbols > Radius.

Toolbar: **Dimensions** > Radius .

Context menu: Radial - when calling any dimension.

Command line: SPMDIMRAD, MDIMRAD.

Procedure



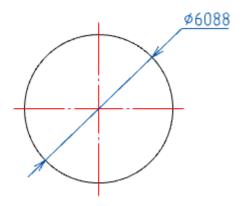
To apply a radial dimension, you must:

- 1. Select the "Radius" dimension;
- 2. Select an arc (circle), the dimension will snap to the arc;
- 3. Specify the insertion point.

Diameter

- Main menu: Dimensions > Diameter.
- Ribbon: Annotate Dimensions > Diameter.
- Ribbon: Construction Symbols > Diameter.
- Toolbar: **Dimensions** > **Diameter**.
- Context menu: Diametral when calling any dimension.
- Command line: SPMDIMDIA, MDIMDIA.

Procedure



To apply the dimension of the circle, you must:

- 1. Select the dimension "Diameter";
- 2. Select the circle, the dimension snaps to the circle;
- 3. Pick an insertion point.

Large arc radius

Main menu: **Dimensions** > + Large arc radius.

Ribbon: Annotate - Dimensions > + Large arc radius.

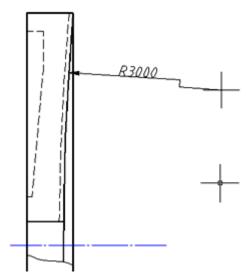
Ribbon: - Symbols > + Large arc radius.

Toolbar: Dimensions > 4Large arc radius.

Context menu: big RAdius - when calling any dimension.

Command line: SPDIMHRAD, DIMHRAD.

Procedure



To dimension a large arc radius, you need to:

- 1. Select the "Large arc radius" dimension;
- 2. Select an arc (circle), the dimension will snap to the arc;
- 3. Specify the insertion point of the arrow;
- 4. Specify the insertion point of the value on the arrow.

Arc length dimension

Main menu: **Dimensions** > Arc.

Ribbon: Annotate - Dimensions > Arc length.

Ribbon: - Symbols > Arc length dimension.

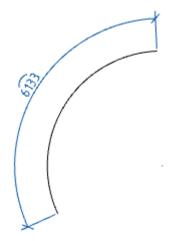
Toolbar: **Dimensions** > Arc length.

Context menu: arC - when calling any dimension.

Command line: SPMDIMARC, MDIMARC.

Procedure

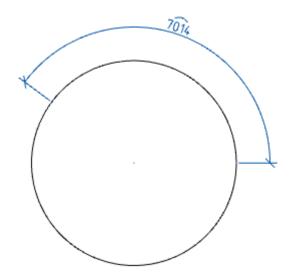
Arc dimension



To apply the dimension you need:

- 1. Select the arc dimension;
- 2. Select an arc (the arc dimension will snap to the arc);
- 3. Specify the insertion point.

Circle dimension



To apply the dimension you need:

- 1. Select the arc dimension;
- 2. Specify the starting point on the circle;
- 3. Specify the end point on the circle;
- 4. Specify the insertion point.

Ordinate dimension

Main menu: **Dimensions** > **□ Ordinate dimension**.

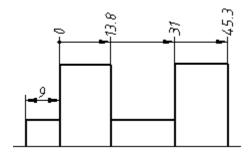
Ribbon: Annotate - Dimensions > Ordinate.

Ribbon: Construction - Symbols > → Ordinate dimension.

Toolbar: **Dimensions** > Ordinate dimension.

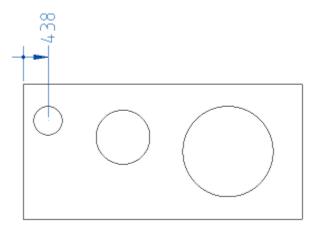
Context menu: Ordinate - when calling any dimension.

Command line: SPMDIMORD, MDIMORD.

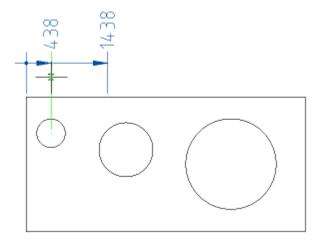


Procedure

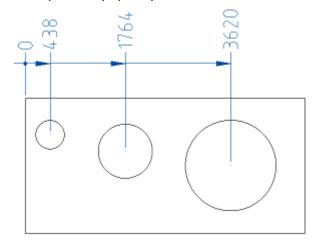
- 1. Call the "Ordinate dimension" command.
- 2. Pick the location of the first dimension of the ordinate chain.



3. Select the first dimension you set. All subsequent dimensions will be snapped to it. If for some reason dimensioning has been completed (after the first dimension has been added), select the ordinate dimension (or autosize) again and specify the dimensioned.



4. Sequentially specify the coordinates of the remaining dimensions.



5. Press the "Esc" key to end the command.

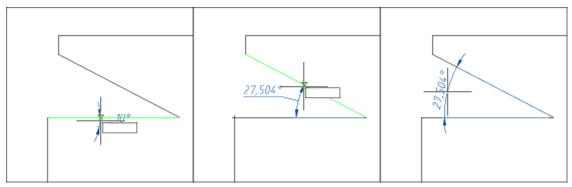
Angle dimension

- Main menu: Dimensions > 4Fill angle.

 Ribbon: Annotate Dimensions 4Angular.
- Ribbon: Construction Symbols > Angle dimension.
- Toolbar: **Dimensions** > 4 Angle dimension.
- Toolbar: Construction Dimensions> Angle dimension.
- Context menu: aNguLar when calling any dimension.
- Command line: SPMDIMANG, MDIMANG.

Procedure

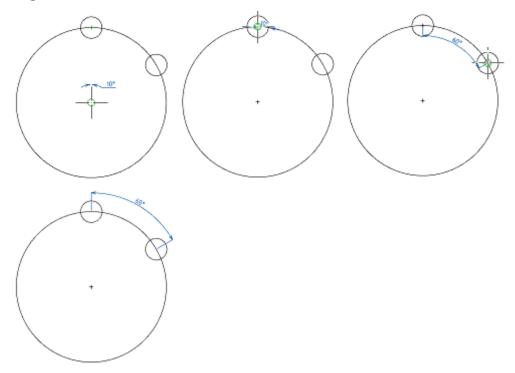
Create an angular dimension by specifying two line segments



To apply an angular dimension, you must:

- 1. Select an angular dimension;
- 2. Select the first segment;
- 3. Select the second segment;
- 4. Pick an insertion point.

Angular dimension of hole centers

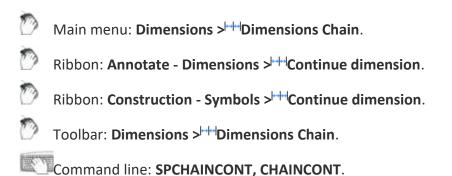


To apply the angular dimension with the indication of the centers, you must:

- 1. Select an angular dimension;
- 2. Specify the center of the axial circle (on which the holes lie);

- 3. Pick the center of the first hole;
- 4. Pick the center of the second hole;
- 5. Pick an insertion point.

Dimensions Chain



A chain of dimensions is a sequence of dimensions counted from the end of the previous dimension (the beginning of each new dimension coincides with the end of the previous one).

Dimension chains can be linear, ordinate, or angular. Before building the base dimensions, at least one linear, ordinate or angular dimension must be applied to the object.

Procedure

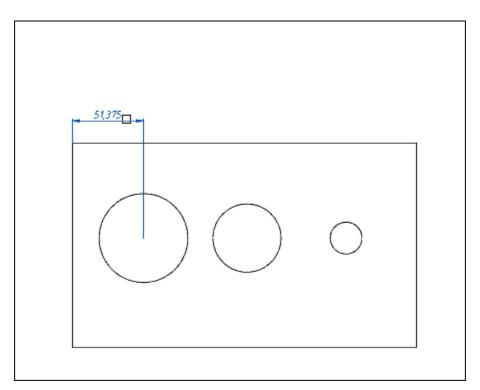
Ordinate chain of dimensions

Note: Constructing an ordinate chain of dimensions is similar to constructing <u>ordinate</u> <u>dimensions</u>.

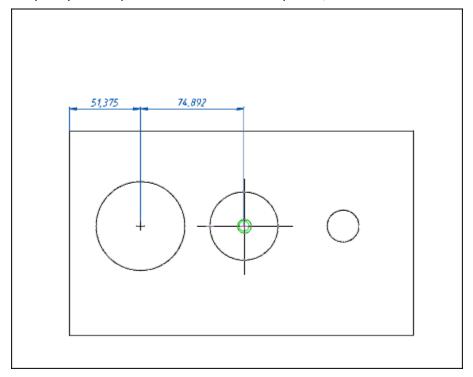
- 1. Call the command;
- 2. Select the set ordinate dimension (the dimension from which the ordinate sizes will begin to form);
- 3. Construct the ordinate dimensions in sequence;
- 4. Press the "Enter" key to complete the construction.

Linear dimension chain

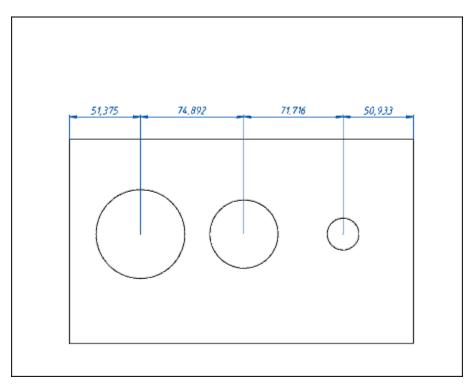
- 1. Call the command:
- 2. Select the set linear dimension (the dimension from which the chain of dimensions will begin to form);



3. Specify the required number of anchor points;

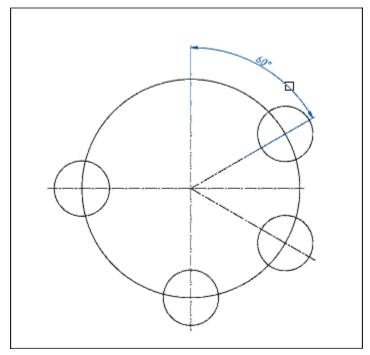


4. Press the "Enter" key to complete the construction.

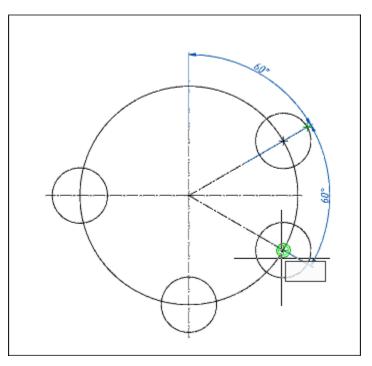


Angle chain dimensions

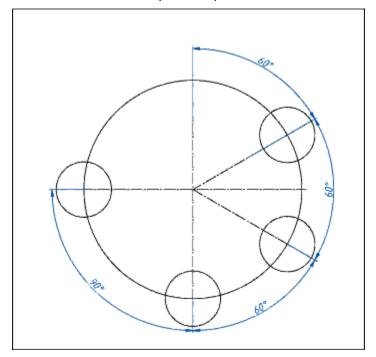
- 1. Call the command;
- 2. Select the preset angular dimension (the dimension from which the chain of dimensions will begin to form);



3. Specify the required number of anchor points;



4. Press the "Enter" key to complete the construction.



Baseline dimension



Main menu: **Dimensions** > Base dimension.



Ribbon: Annotate - Dimensions > Baseline dimension.

Ribbon: Construction - Symbols > Baseline dimension.

Toolbar: **Dimensions** > Base dimension.

Context menu: Base - when calling any dimension.

Command line: SPCHAINBASE, CHAINBASE.

Base dimensions are a sequence of dimensions measured from one base point.

Base dimensions can be linear, ordinate, or angular. Before building the base dimensions, at least one linear, ordinate or angular dimension must be applied to the object.

Procedure

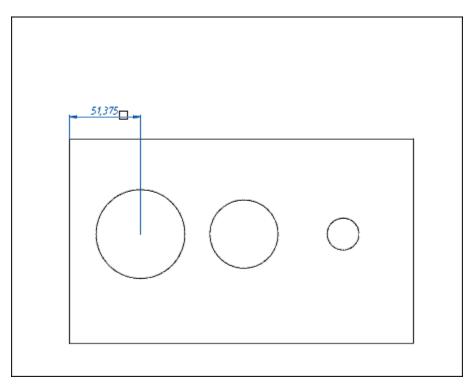
Ordinate chain of dimensions

Note: The construction of an ordinate chain of dimensions is similar to construction ordinate dimension.

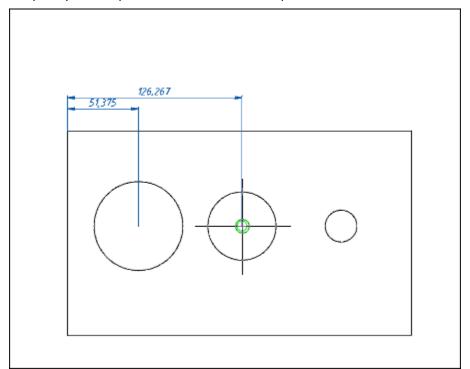
- 1. Call the command;
- 2. Select the set ordinate dimension (the dimension from which the ordinate sizes will begin to form);
- 3. Construct the ordinate dimensions in sequence;
- 4. Press the "Enter" key to complete the construction.

Linear base dimensions

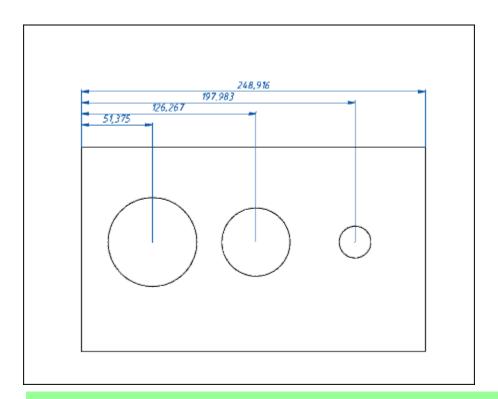
- 1. Call the command:
- 2. Select the set dimension as the base (the dimension from which the base sizes will begin to form);



3. Specify the required number of anchor points.



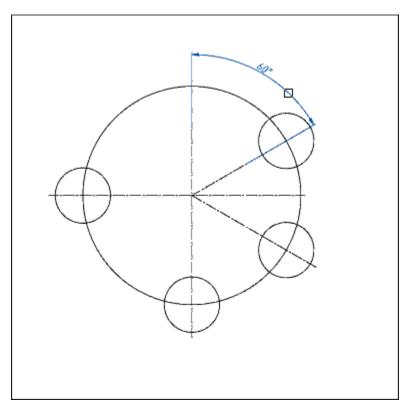
4. Press the "Enter" key to complete the construction.



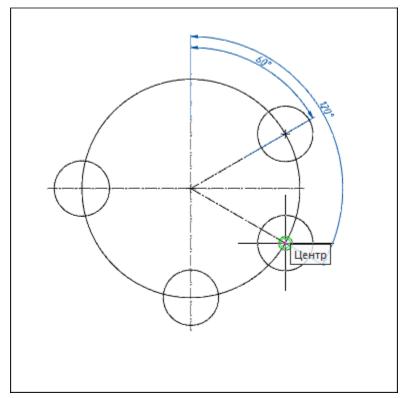
Note: Each new dimension is set at a specified distance from the previous one. The value of the offset of the dimensions is set by the "Step" parameter in the base dimensions in the "Lines" tab of the "Modify dimension style" dialog.

Corner base dimensions

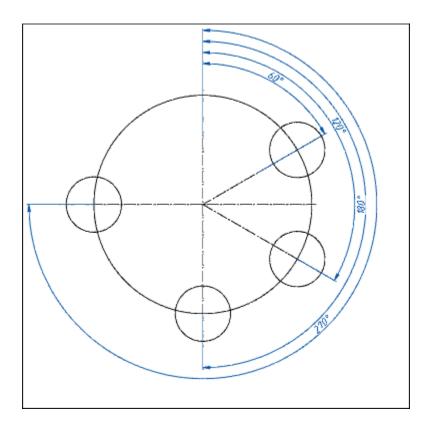
- 1. Call the command;
- 2. Select the preset angular dimension (the dimension from which the base dimensions will begin to form);



3. Specify the required number of anchor points;



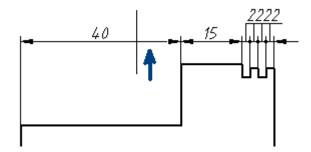
4. Press the "Enter" key to complete the construction.



Group dimension

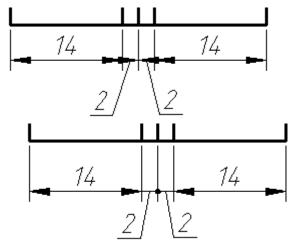
- Main menu: **Dimensions** > Group dimension.
- Ribbon: Annotate Dimensions > Group dimension.
- Ribbon: Symbols > Group dimension.
- Toolbar: Dimensions > Group dimension.
- Context menu: Grouped when calling any dimension.
- Command line: SPDIMGROUP, DIMGROUP.

Procedure



- 1. Call the command;
- 2. Select all the objects that will participate in creating the group dimension. To complete the selection press the "Enter" key;
- 3. Specify the location of the chain of dimensions.

If the setting "Arrows in chains" is set to "Point", then when dimensioning a chain of small numerical dimensions, intersecting arrows are automatically replaced by dots.



Offset dimension

Main menu: Dimensions > Offset dimension.

Ribbon: - Symbols > Offset dimension.

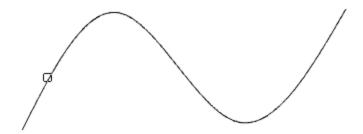
Toolbar: Dimensions> Offset dimension.

Command line: SPDIMOFFSET, DIMOFFSET.

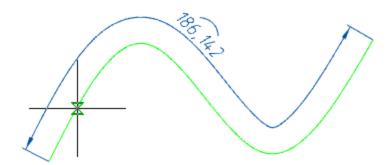
The command allows you to build a size similar to the contour of the selected object. Similarity size is indicated by an arc above the value.

Procedure

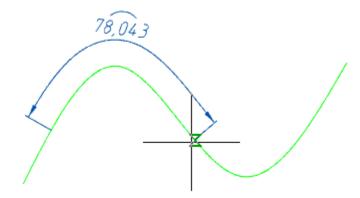
- 1. Call the command ""Offset dimension".
- 2. Select the method for specifying the object: "sElection" or "frEe". The "sElection" method is used in paper space when you need to dimension an object in an inactive viewport. In all other cases, the "frEe" method is used.
- 3. Specify the object from which the dimension will be built. The selected object can be specified: line, arc, spline, polyline, circle or ellipse.



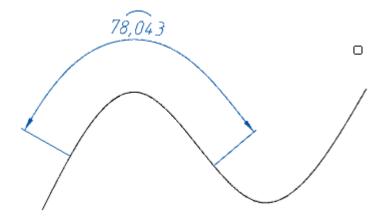
4. Specify the first insertion point (starting point of origin of the dimension) or press the "Space" (or RMB) to automatically add endpoints to the entire length of the object (does not work for closed objects).



5. Specify the second insertion point (end point of origin of the dimension), if you have not pressed the "Space" (or RMB) key.



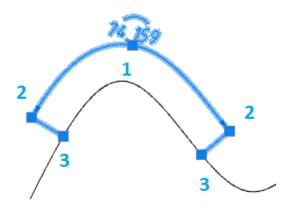
6. Place the dimension leader in the drawing.



7. Offset dimension will be built. The command will continue to work in a cyclic mode. Press the "Esc" key to exit cyclic mode.

Grips

- 1. Dimension value placement grip.
- 2. Extension line position grips.
- 3. Dimension endpoint grips.



Edit dimension

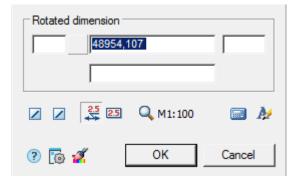
MB double click on the dimension.

Context menu: Properties - when calling any dimension.

Context menu: Edit - at the selected dimension.

Command line: SPFEDIT, FEDIT.

The dialog box looks like this:



The window is divided into an area of text input fields with the name of the dimension type and a set of dimension design commands.

Additional auxiliary commands are available in the context menu of the dialog box text fields:

- History the list contains the values previously entered in this field;
- Recent the list contains frequently used values when filling in this type of field;
- Insert division- allows you to insert a division;
- Pick from drawing allows you to copy values from drawing objects;
- Symbols allows you to insert symbols from a list or from a symbol table;

etc.

The presence of this or that command in the context menu depends on the purpose of the field.

The button in front of the dimension value input field allows you to add special characters to the dimension text.



Buttons \square "First arrow" and \square "Second arrow" allow you to select the type of arrows. When you click on them, a list with images of arrow options appears.



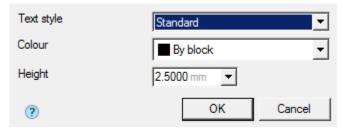
Button #"Test on leader" - toggles the display mode of the text on the leader.

Button Text in rectangle"- toggles the display mode of dimension text in a rectangle.

Button "Dimension value display scale"- provides a list of display scales for the size value. Default 1:100.

Button "Calculate value" - calls the calculator to calculate the value.

Button **Text style" - calls the text settings dialog box.



Button "Match properties" - allows you to copy properties from an existing dimension in the drawing.

Break and Restore dimension line

Break dimension line

0

Main menu: **Dimensions** > Break dimension.



Main menu: Construction - Breaks > Break dimension line.

Ribbon: Annotate - Dimensions - Break dimension line.

Ribbon: Construction - Symbols > Break dimension line.

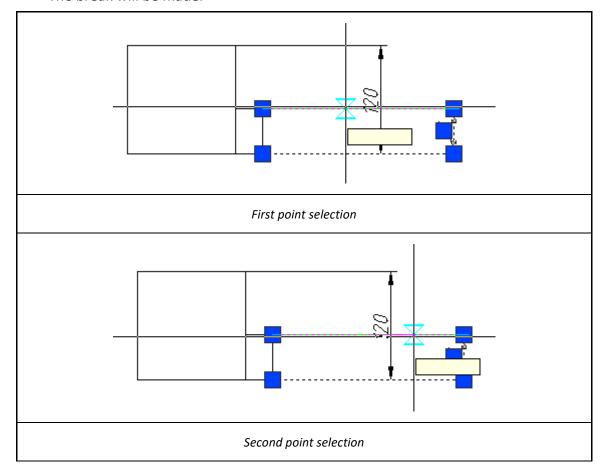
Toolbar: Dimensions > Break dimension line.

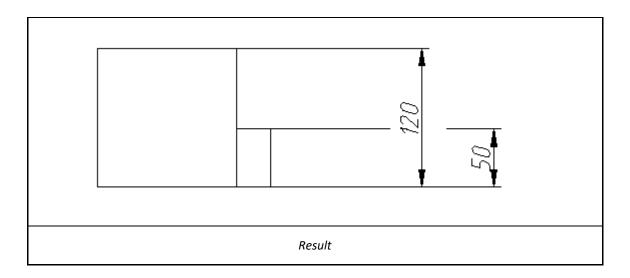
Toolbar: Construction Breaks> HBreak dimension line.

Command line: SPDIMBREAK, DIMBREAK.

To create a dimension line break, you must:

- Call the command;
- Select the dimension. If the size was selected before calling the command, you do not need to select it again;
- Select two points by specifying a section of the dimension line to create a break;
- The break will be made.





Restore dimension line



Main menu: Construction - Breaks > Hunbreak dimension line.

Ribbon: Unnotate - Dimensions > HOD Unbreak dimension line.

Ribbon: Construction - Symbols > ← Unbreak dimension line.

Toolbar: Dimensions > H-Unbreak dimension line.

Toolbar: Construction Breaks> Unbreak dimension line.

Command line: SPDIMUNBREAK, DIMUNBREAK.

To restore the dimension line, you must:

- Call the command;
- Select the dimension. If the size was selected before calling the command, you do not need to select it again;;
- The restoration will be done.

Oblique dimension

Main menu: .

Command line: SPDIMOBLIQUE, DIMOBLIQUE.

The command allows you to skew the dimension.

Procedure

- 1. Call the command ⊢ "Oblique Dimension".
- 2. Select the required dimensions. Press the "Enter" key to complete the selection.
- 3. Enter the angle of inclination and press the "Enter" key.
- 4. The selected dimensions will change the angle of inclination.

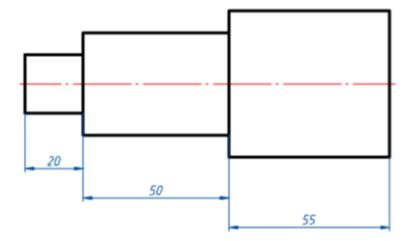
Arrange dimensions

Command line: SPDIMARRANGE.

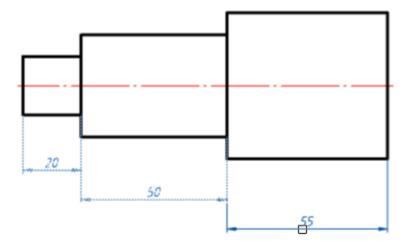
Procedure

To arrange, you need:

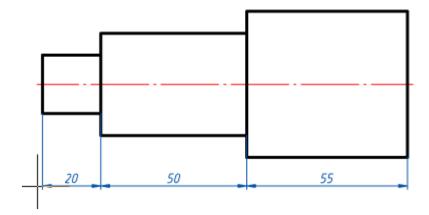
1. Call the command;



2. Indicate the dimensions to be aligned;



- 3. Confirm the selection with the "Enter" key;
- 4. Pick a new location for the dimension group.



Elevation marks

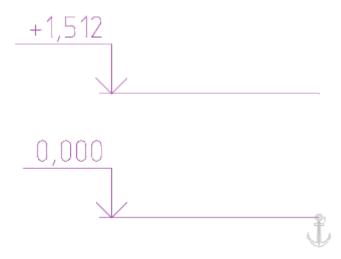
Elevation mark

Main menu: Construction - Level marks > √ Elevation mark.

Ribbon: Construction - Symbols >
 Level mark.

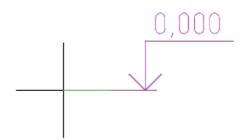
Toolbar: **Level marks** > **√ Elevation mark**.

Command line: SPLEVEL.



Procedure

- 1. Call the command $\sqrt{Elevation mark}$.
- 2. Pick an insertion point for the base elevation mark.



3. Select the position of the elevation mark text. The "Elevation mark" dialog will open.

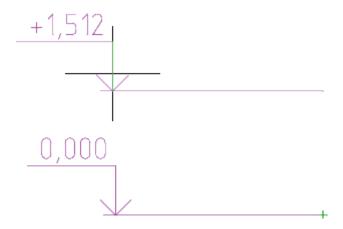


4. In the "Elevation mark" dialog box enter the required values.



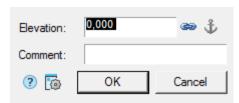
5. Click the "OK" button.

6. Specify the insertion points and text position for subsequent elevation marks. Subsequent elevation marks are associated with the baseline and their value is calculated automatically.



7. Press the "Enter" key or RMB to complete the construction of elevation marks.

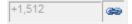
Dialog



The "Elevation" text box contains the numerical value of the level in meters. The default value that appears in the window is automatically calculated and is the Y-axis distance from the insertion point of the base elevation to the specified elevation point (for the base elevation, the default is 0). Marks above zero are displayed with a "+" prefix, and below zero with a "-" prefix. The 0.000 mark has no prefix.

In the "Comment" column, you can enter explanatory text for the mark.

The "Associative" button controls the association of the elevation mark with the base elevation. When editing associative elevations in the dialog box, the height value field is grayed out and the "Associative" button is shown when pressed.

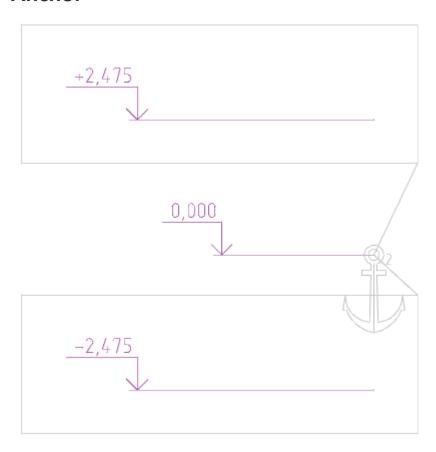


To turn off the associativity of the editable mark, turn off the ""Associative" button. If necessary, set associativity with a different elevation, click the ""Associative" button and select the desired elevation in the drawing as the base.

If, after inserting, you call the base mark for editing, the **Detach owned markers" (anchor) button will be highlighted in the dialog box. When you click on it, the base elevation mode is disabled and all associated elevations lose associativity. A level

elevation automatically becomes base if one or more other elevations are associated with it.

Anchor



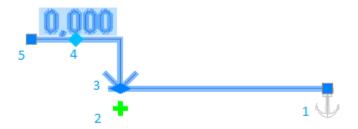
The "Anchor" object points to a base elevation mark to which other elevation marks are associated.

The number of associated level marks is indicated next to the anchor.

The display of associativity links is turned on / off by calling the "Edit" command: in the tooltip, in the context menu, RMB on the anchor.

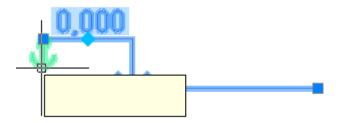
Grips

Elevation mark grips



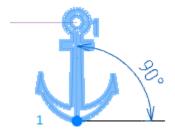
- 1. Grip for moving the base.
- 2. Grip for adding new level marks. Pressing the knob activates the command for adding new level marks. The new level marks will be associated with the edited level mark, which in turn will become the base mark.
- 3. Grip for moving the position of the arrow.
- 4. Grip for specifying the base mark. When you press the grip, you must select the level mark that is the base for the edited level mark.
- 5. Grip for moving the level mark shelf along the Y axis.

The base elevation in the drawing is highlighted with an "Anchor" icon. When you hover over the "Anchor", a tooltip appears with a link to edit. When you select the "Edit" command for the "Anchor" icon, the elevation marks associated with the selected base elevation mark are highlighted in the drawing. To turn off the highlight, re-invoke the "Edit" command for the "Anchor" icon.

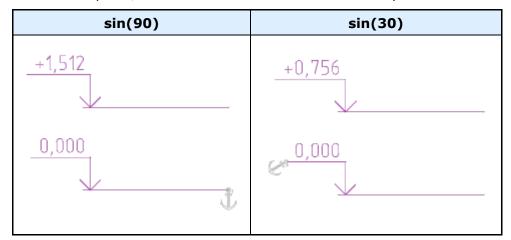


Note: Hints are included in "Construction - Settings... - Tab "Main options" - Notifications - Enable Hints"

Elevation mark anchor grips



1. A grip for changing the calculated angle (by default, the coefficient of distance between marks is $\sin (90) = 1$). The grip is used when calculations need to be performed not in the XY plane, but in some other custom coordinate system.



Linked elevation mark grips



- 1. Grip for aligning to baselines. X-aligns the insertion point of the level mark with the insertion point of the base level mark.
- 2. Grip for moving the base.
- 3. Grip for moving the position of the arrow.
- 4. Arrow alignment grip. Aligns the X axis of the insertion point of the level mark arrow with the insertion point of the base level mark arrow.
- 5. Grip for moving the level mark shelf along the Y axis.

Align level marks by baselines

Main menu: Construction - Level marks > Align level marks by baselines.

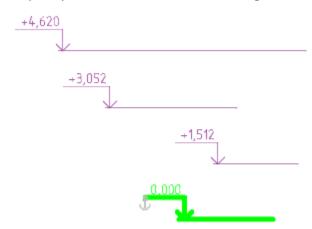
Ribbon: Construction - Symbols > Align level marks by baselines.

Toolbar: Level marks > ✓ Align level marks by baselines.

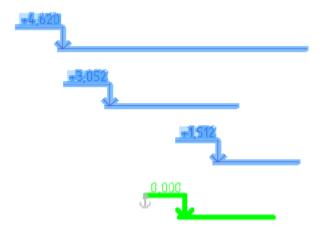
Command line: SPLVBASE.

Procedure

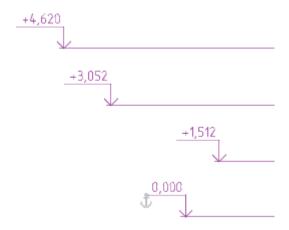
- 1. Call the command "Align level marks by baselines".
- 2. Specify the level mark in the drawing to which the alignment will be carried out.



3. Select the level marks you want to align (with a box or any other method).



4. Press the "Enter" key or RMB to complete the selection. The level marks will be aligned to the baselines.



Align level marks by arrows

Main menu: Construction - Level marks > Align level marks by arrows.

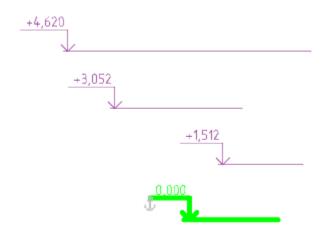
Ribbon: Construction - Symbols > Align level marks by arrows.

Toolbar: Level marks > Align level marks by arrows.

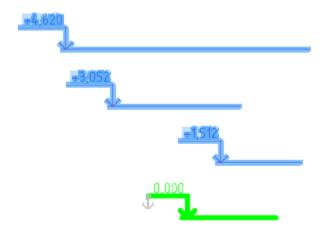
Command line: SPLVARROW.

Procedure

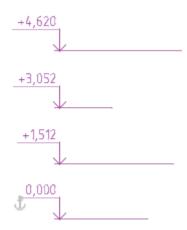
- 1. Call the command abla "Align level marks by arrows".
- 2. Specify the level mark in the drawing to which the alignment will be carried out.



3. Select the level marks you want to align (with a box or any other method).

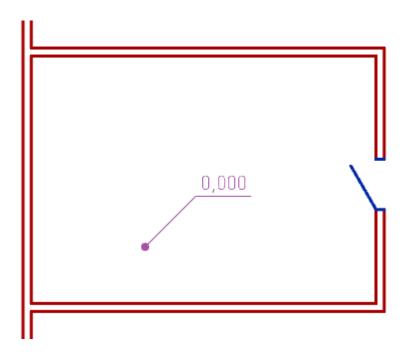


4. Press the "Enter" key or RMB to complete the selection. The level marks will be aligned with the arrows.



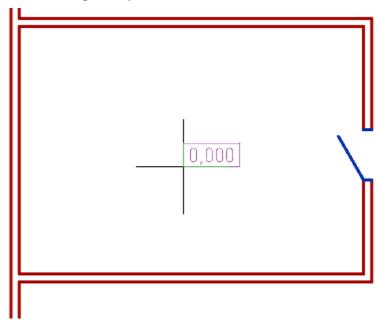
Level mark on plane

- Main menu: Construction Level marks > Level mark on plane.
- Ribbon: Construction Symbols > Level mark on plane.
- Toolbar: Level marks > Level mark on plane.
- Command line: SPPLLEVEL.

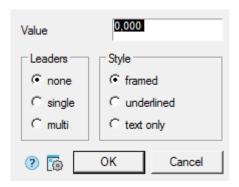


Procedure

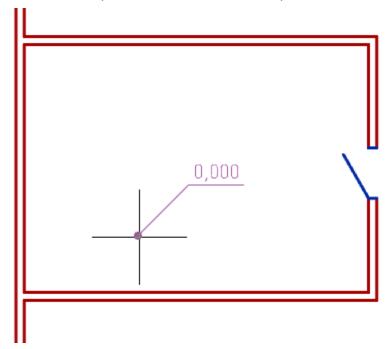
- 1. Call the command \square "Level mark on plane".
- 2. Specify the insertion point for the first level mark in the drawing. The "Plane elevation marks" dialog will open.



3. In the "Plane elevation marks" dialog box, enter a level value. Determine the number of extension lines. Select the appearance of the level mark: framed, underlined, or text only.

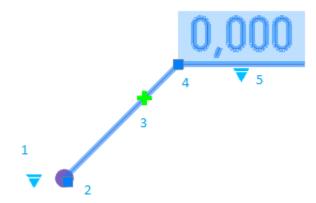


- 4. Confirm your selection with the "OK" button.
- 5. Specify the extension lines (if you selected the value of the extension lines "single" or "multi", to complete the selection of lines, press the "Esc" key).



6. The command works in cyclic insert mode. Insert the required number of level marks into the drawing. End the loop command with the "Esc" key.

Grips



- 1. Drop-down arrow type selection grip.
- 2. Leader line position grip.
- 3. Leader line grip.
- 4. Grip for changing the position of the shelf.
- 5. Drop-down grip for selecting the type of drawing.

Recalculate level marks

Main menu: Construction - Level marks > Recalculate level marks.

Ribbon: Construction - Symbols > Recalculate level marks.

Toolbar: Level marks

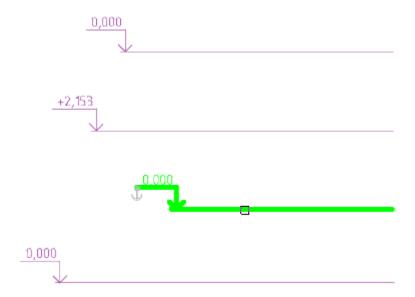
 X

 ✓ Recalculate level marks.

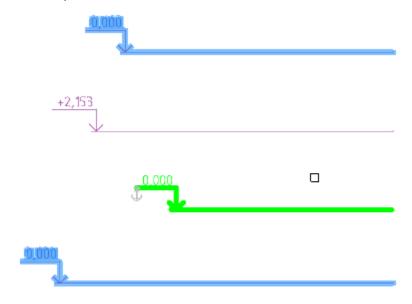
Command line: SPLVRENUM.

Procedure

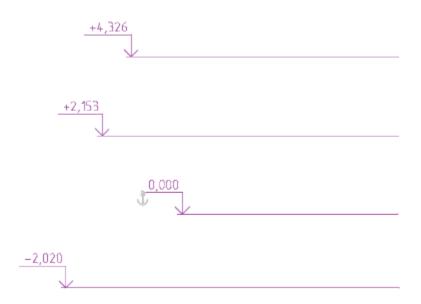
- 1. Call the command *** "Recalculate level marks".
- 2. Select the level mark to be the reference point.



2. Select the non-associative level marks to be recalculated (with a box or any other method).

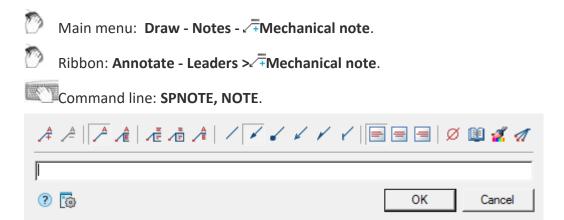


3. Press the "Enter" button. A recalculation will be performed.



Notes

Mechanical note



Procedure

- 1. Call the command.
- 2. If the option <u>"Show dialog before inserting objects"</u> is active, the *"Mechanical note"* dialog opens. In the *"Mechanical note"* dialog box, enter text and define the note options. Click *"OK"*.
- 3. Pick a point on the object (position of the leader arrow).
- 4. Place a note leader in the drawing.

- 5. If the "Show dialog before inserting objects" option is disabled, the "Mechanical note" dialog will open. In the "Mechanical note" dialog box, enter text and define the note options. Click "OK".
- 6. Note will be biuld.

Menu

- Add string command adds an extra input field;
- Remove string command deletes the input field where the cursor is located;
- Asimple note command toggles the display of the note;
- AMultiline note command toggles the display of the note;
- Image: Multi-line text the switch controls the display of multi-line text on the shelf;
- Interpretation
 Interpretation</l
- Type arrows:
 - None,
 - Arrow,
 - Point,
 - ✓ Open arrow,
 - Half-arrow,
 - 🖊 Oblique;
- Align text horizontally;
 - ■By left edge
 - By center
 - By right edge
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- Add extension line the command allows you to add an additional note line;
- Ioglobal options note settings;

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

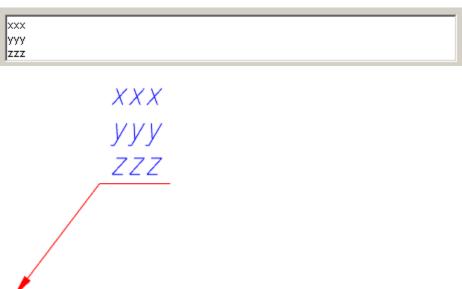
By default, "Mechanical note" contains one text box for the label above the leader flange.

Using the \wedge "Simple note" and \wedge "Multiline note" menu commands, you edit the presence of additional shelves.

Use the *\(\frac{1}{4}\)"Add string" and *\(\frac{1}{2}\)"Remove string" menu commands to edit the number of leader ledges. When using a simple note, these commands control the presence of text under the shelf.

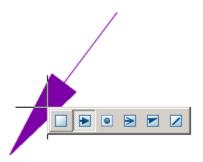
Note: Hotkeys are available for the A"Add string" command. "Ctrl + Enter" - adds a shelf below the selected shelf. "Shift + Enter" - adds a shelf above the selected shelf.

The **I"Multi-line text" option allows you to display multiline text on the shelf. When this parameter is enabled, the transition to another line is performed by the "Ctrl + Enter" key combination.

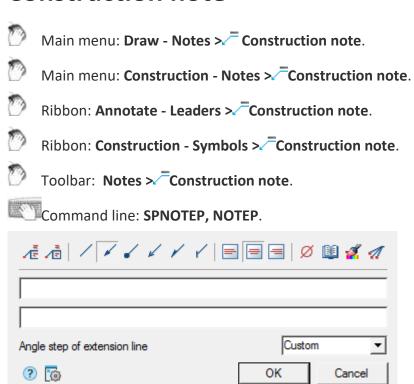


Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Construction note



Procedure

- 1. Call the command \(\bigcirc^{"}Construction note".
- 2. If <u>"Show dialog before inserting the object"</u> is active, the *"Construction Note"* dialog opens. In the *"Construction Note"* dialog box, enter text and define the leader options. Click the *"OK"* button.
- 3. Pick a point on the object (select the object) to which the leader arrow will point. To select an object, use the "Select" context menu command; to freely specify a point in the drawing, use the "Free" context menu command.

4. Place the leader shelf in the drawing.

Note: If the parameter "Angle step of extension line" is arbitrary, it is possible to place the leader ledge orthogonally in the ORTO mode (F8). When you turn on the ORTO mode via the "SHIFT" key, Object Snap (F3) must be turned on.

5. If the <u>"Show dialog before inserting the object"</u> option is disabled, the *"Construction Note"* dialog will open. In the *"Construction Note"* dialog box, enter text and define the leader options. Click the *"OK"* button.

6. The note is built.

Menu

- AMulti-line text the switch controls the display of multi-line text on the shelf;
- Interpretation of the shelf is framed;
- Type arrows:
 - None,
 - Arrow,
 - Point,
 - ✓ Open arrow,
 - Half-arrow.
 - / Oblique;
- Align text horizontally:
 - By left edge,
 - ■By center,
 - By right edge;
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Amatch properties command copies appearance parameters from another object;
- Add extension line the command allows you to add an additional note line;
- Global options note settings.

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

The default positional leader contains two input lines and a list for specifying the pitch of the bevel angle.

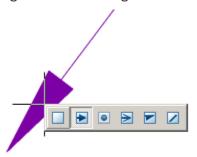
The first line is for the label above the leader shelf, the second is under the leader shelf.

In the "Angle step of extension line" list box, the slope angle of the leader lines is selected:

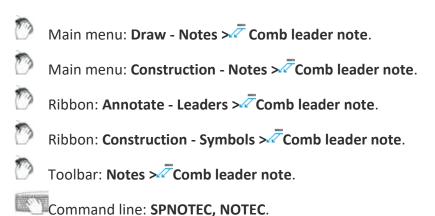
- Custom a leader line is placed arbitrarily (default);
- step 15° the leader line is put down with a step multiple 15°;
- step 30° the leader line is put down with a step multiple 30°;
- step 45° the leader line is put down with a step multiple 45°;
- step 90° the leader line is put down with a step multiple 90°.

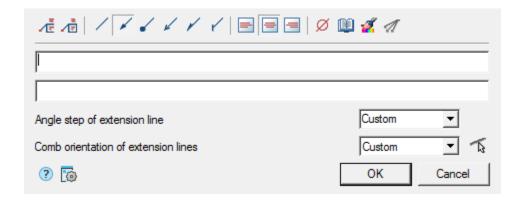
Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Comb leader note





Procedure

- 1. Call the command.
- 2. If the option <u>"Show dialog before inserting objects"</u> is active, the *"Comb leader note"* dialog opens. In the *"Comb leader note"* dialog box, enter text and define the note options. Click *"OK"*.
- 3. Insert the required number of leader lines. When you specify the location of the leader line, the specified line segment is highlighted. Press the "Enter" key to complete the paste.
- 4. Specify the slope of the leader lines. Commands for switching the ridge direction are available in the context menu: H horizontal, V vertical, P parallel (parallel to the selected line).
- 5. Place a note leader in the drawing.
- 6. If the "Show dialog before inserting objects" option is disabled, the "Comb leader note" dialog will open. In the "Comb leader note" dialog box, enter text and define the note options. Click "OK".
- 7. Note will be build.

Menu

- AMulti-line text the switch controls the display of multi-line text on the shelf;
- Interpretation of the shelf is framed;
- Type arrows:
 - / None,
 - Arrow,
 - Point.
 - ✓ Open arrow,
 - Half-arrow,

- / Oblique;
- Align text horizontally;
 - By left edge
 - ■By center
 - By right edge
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- Add extension line the command allows you to add an additional note line;
- In Global options note settings.

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

Comb leader note by default contains: two lines of input, a list for specifying the pitch of the angle of inclination and the orientation of the ridge.

The first line is for the label above the leader shelf, the second is under the leader shelf.

In the "Angle step of extension line" list box, the slope angle of the leader lines is selected:

- Custom a leader line is placed arbitrarily (default);
- step 15° the leader line is put down with a step multiple 15°;
- step 30° the leader line is put down with a step multiple 30°;
- step 45° the leader line is put down with a step multiple 45°;
- step 90° the leader line is put down with a step multiple 90°.

In the "Comb orientation of extension lines" list box, you can select the ridge orientation of the leader lines:

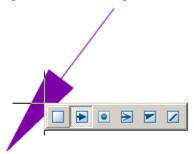
- Custom;
- Horizontal;
- Vertical.

The list is equipped with an additional button \[\begin{align*} \

The **I"Multi-line text" option allows you to display multiline text on the shelf. When this parameter is enabled, the transition to another line is performed by the "Ctrl + Enter" key combination.

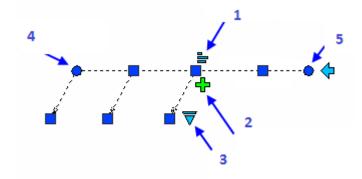
Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Grips

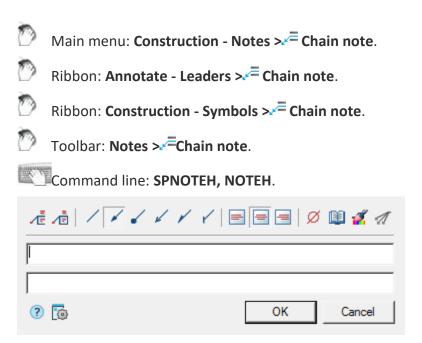
- 1. Text alignment toggle grip.
- 2. Leader lines grip.
- 3. Arrow type switch-grip.
- 4. Ridge line rotation grip.
- 5. Shelf rotation grip.



Chain note



Main menu: Draw - Notes > Chain note.



A chain note has several coaxial (collinear) series-connected pointers.

If the first node of the note is placed on a line segment, then the note will be located perpendicular to this segment.

Procedure

- 1. Call the command.
- 2. If the option <u>"Show dialog before inserting objects"</u> is active, the *"Chain note"* dialog opens. In the *"Chain note"* dialog box, enter text and define the note options. Click *"OK"*.
- 3. Specify note nodes, at least two. To complete the selection of nodes, press "Enter".
- 4. Specify the position of the leader where the text will go.
- 5. If the "Show dialog before inserting objects" option is disabled, the "Chain note" dialog will open. In the "Chain note" dialog box, enter text and define the note options. Click "OK".
- 6. Note will be build.

Menu

- AEMulti-line text the switch controls the display of multi-line text on the shelf;
- Frame text under the shelf is framed;
- Type arrows:
 - None,
 - Arrow,

- Point,
- ✓ Open arrow,
- Half-arrow,
- / Oblique;
- Align text horizontally;
 - ■By left edge
 - By center
 - By right edge
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- Add extension line the command allows you to add an additional note line;
- Ioglobal options note settings;

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

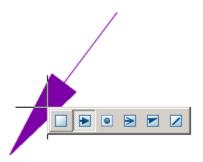
Chain note contains two lines of input by default.

The first line is for the label above the leader shelf, the second is under the leader shelf.

Input fields are expandable. Switching to another line of the input field is performed by the "Ctrl + Enter" key combination.

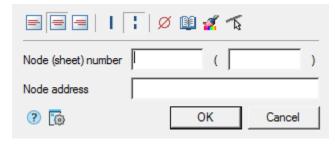
Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Section note

- Main menu: **Draw Notes > Fection note**.
- Main menu: Construction Notes >/ Section note.
- Ribbon: Annotate Leaders >/ Section note.
- Ribbon: Construction Symbols >/ Section note.
- Toolbar: Notes >√Section note.
- Command line: SPNOTES, NOTES.



Procedure

- 1. Call the command.
- 2. If the option <u>"Show dialog before inserting objects"</u> is active, the *"Section note"* dialog opens. In the *"Section note"* dialog box, enter text and define the note options. Click *"OK"*.
- 3. Select the insert mode "Free" or "Selection":
 - "Selection" you need to specify the first and second lines to place the note, the cursor is in the form of a square,

• "Free" - no lines are required, can be placed anywhere by 2 points, the cursor is in the form of a cross.

To switch from the "Selection" mode to the "Free" mode, press the RMB and select the "Enter" command in the context menu. To switch from the "Free" mode to the "Selection" mode, press the RMB. Also, switching modes is carried out with the "Space" key.

- 4. Pick the first point (select the first line) in the drawing.
- 5. Pick the second point (select the second line) in the drawing.
- 6. Specify the position of the leader.
- 7. If the <u>"Show dialog before inserting objects"</u> option is disabled, the *"Section note"* dialog will open. In the *"Section note"* dialog box, enter text and define the note options. Click "OK".
- 8. Section note will be build.

Menu

- Align text horizontally;
 - By left edge
 - By center
 - By right edge
- Lines;
 - Single-stroked line
 - Double-stroked line
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- **Select line the command allows you to relocate the location of the leader line by specifying a line in the drawing;
- ToGlobal options note settings.

Context menu

The context menu opens in the input field. View Context menu entry fields.

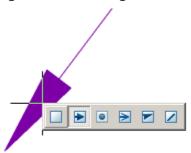
Fields

Section note contains two lines of input by default.

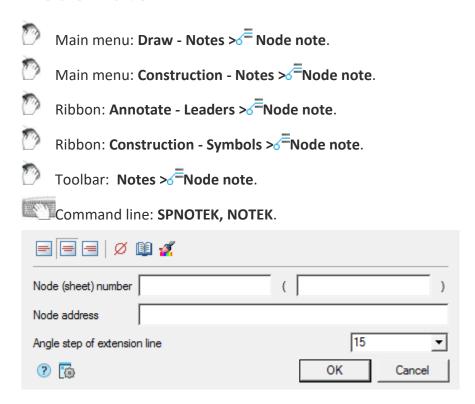
The first line of input consists of two fields for specifying the "Node (sheet) number". Second line of input for specifying the "Node address".

Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Node note



Procedure

- 1. Call the command.
- 2. If the option <u>"Show dialog before inserting objects"</u> is active, the *"Node note"* dialog opens. In the *"Node note"* dialog box, enter text and define the leader options. Click *"OK"*.
- 3. Pick the center of the leader oval (circle).
- 4. Specify the size of the leader oval (circle).
- 5. Show the position of the shelf or enter in advance in the command line the step of the angle of inclination of the leader line.
- 6. If the <u>"Show dialog before inserting objects"</u> option is disabled, the *"Node note"* dialog will open. In the *"Node note"* dialog box, enter text and define the leader options. Click *"OK"*.
- 7. Node note will be build.

Menu

- Align text horizontally;
 - By left edge
 - By center
 - By right edge
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- Global options note settings.

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

Node note by default contains: two input lines and a drop-down list for specifying the pitch of the slope.

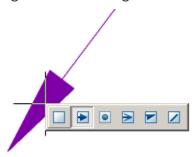
The first line of input consists of two fields for specifying the "Node (sheet) number". Second line of input for specifying the "Node address".

In the drop-down list "Angle step of extension line", the slope angle of the leader lines is selected:

- Custom a leader line is placed arbitrarily (default);
- step 15° the leader line is put down with a step multiple 15°;
- step 30° the leader line is put down with a step multiple 30°;
- step 45° the leader line is put down with a step multiple 45°;
- step 90° the leader line is put down with a step multiple 90°.

Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Note for multilayered constructions

Main menu: Draw - Notes > Note for multilayered constructions.

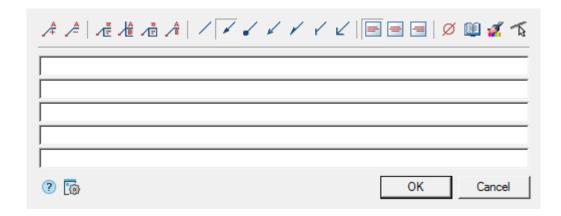
Main menu: Construction - Notes > Note for multilayered constructions.

Ribbon: Annotate - Leaders > Note for multilayered constructions.

Ribbon: Construction - Symbols > Note for multilayered constructions.

Toolbar: Notes > Note for multilayered constructions.

Command line: SPNOTEM, NOTEM.



Procedure

- 1. Call the command.
- 2. If the option <u>"Show dialog before inserting objects"</u> is active, the *"Note for multilayered constructions"* dialog opens. In the *"Note for multilayered constructions"* dialog box, enter text and define the leader options. Click *"OK"*.
- 3. Pick a point on an object (drawing).
- 4. Specify the position of the shelf.
- 5. If the "Show dialog before inserting objects" option is disabled, the "Note for multilayered constructions" dialog will open. In the "Note for multilayered constructions" dialog box, enter text and define the leader options. Click OK.
- 6. The note will be built.

Menu

- Add string command adds an extra input field;
- ARemove string command deletes the input field where the cursor is located;
- Africat line the command adds a border (vertical line before the line) for the first line;
- AMulti-line text the switch controls the display of multi-line text on the shelf;
- Interpretation is framed;
- Type arrows:
 - None,
 - Arrow
 - Point,
 - ✓ Open arrow,
 - Half-arrow,

- Oblique,
- · Align text horizontally;
 - By left edge
 - By center
 - By right edge
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- **Select line the command allows you to relocate the location of the leader line by specifying a line in the drawing;
- @Global options note settings.

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

By default, "Note for multilayered constructions" contains 5 input fields.

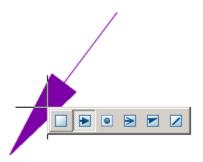
The number of fields is edited using the menu commands "Add string" and "Remove string".

With the help of the "First line" menu command, the presence of a border on the first line is edited.

Using the "Multi-line text" menu command, you edit the presence of shelves in multiline notes.

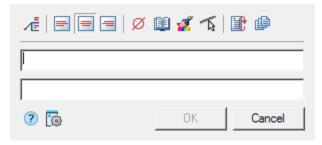
Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Linear aligned note

- Main menu: **Draw Notes >= Linear Aligned note**.
- Main menu: Construction Notes > = Linear Aligned note.
- Ribbon: Annotate Leaders > = Linear Aligned note.
- Ribbon: Construction Symbols > = Linear Aligned note.
- Toolbar: (Notes > =Linear Aligned note.
- Command line: SPLINM, LINM.



Procedure

- 1. Call the command. A dialogue will open "Linear aligned note"
- 2. In the "Linear aligned note" dialog box, enter text and define the leader options. Click the "OK" button.
- 3. Specify the subassembly line on which the line subassembly will be located.
- 4. Specify text position.
- 5. "Linear aligned note" will be build.

Menu

- AMulti-line text the switch controls the display of multi-line text on the shelf;
- Align text horizontally;
 - ■By left edge
 - By center
 - By right edge
- Minsert special symbol the command allows you to insert a special character into the input field;
- Wotebook the command allows you to insert data from a notebook into the field;
- Match properties command copies appearance parameters from another object;
- **Select line the command allows you to relocate the location of the leader line by specifying a line in the drawing;
- ** Auto repeat when the switch is on, the "Linear aligned note" command, upon completion of the previous command, is restarted;
- Global options note settings;
- *Multiple insert* when the switch is on, the insert is looped. To exit the cycle, press the "Enter" key.

Context menu

The context menu opens in the input field. View Context menu entry fields.

Fields

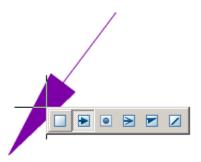
By default "Linear aligned note" contains 2 input fields.

The first field for the label is above the linear structure, the second - under the linear structure.

The Multi-line text parameter allows you to display multi-line text on the shelf. When this parameter is enabled, the transition to another line is performed by the "Ctrl + Enter" key combination.

Arrow type selection context menu

When you call the context menu on the note arrow (without selecting the note), a dialog box for selecting the arrow type will appear.



Distribution range

Main menu: Construction - Notes > Distribution range.

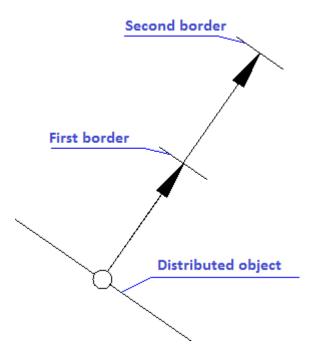
Ribbon: Construction - Symbols > Distribution range.

Command line: SPRANGE.

Procedure

- 1. Select the shared object.
- 2. Select the first point of the border.
- 3. Select the second point of the border.

The command to create a symbol distribution range recurring structural elements in the specified bounds. Arrow pointer automatically aligned perpendicular to the *shared object*. Beginning marker band (contour point) automatically closes the line on which is situated.



Editing Notes

There are 3 commands for editing leaders:

Append leader

- - Main menu: Construction Notes > + Append leader.

Ribbon: Construction - Symbols > + Append leader.

Toolbar: *-Append leader ("Notes").

- Command line: SPPLADD.
- 1. Call the team.
- 2. Pick a point on the object (point of arrow position).
- 3. Indicate the required number of intermediate points that form a break in the leader line.
- 4. Point to the desired leader inserted in the drawing to complete the command.

Detach leader



Main menu: Construction - Notes > - Detach leader.

Ribbon: Construction - Symbols > Detach leader.

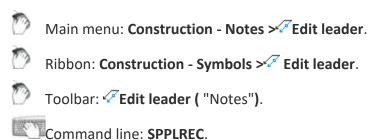
Toolbar: Detach leader ("Notes").

Command line: SPPLDEL.

1. Call the team.

2. In the drawing, select the leader line you want to delete.

Edit leader

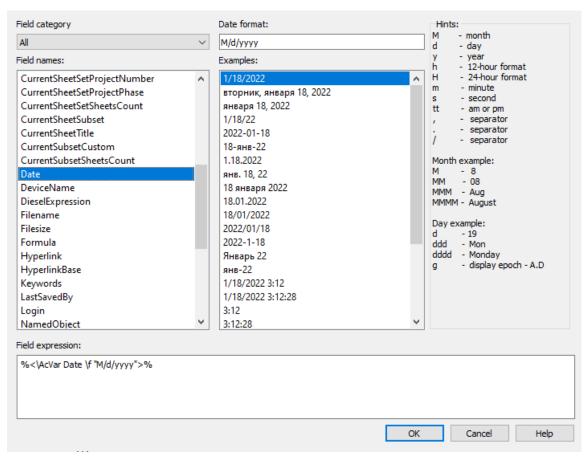


- 1. Call the team.
- 2. Highlight on the drawing a leader line that should be chained.
- 3. Pick a point on the desired leader in order to fix the new position of the leader line.

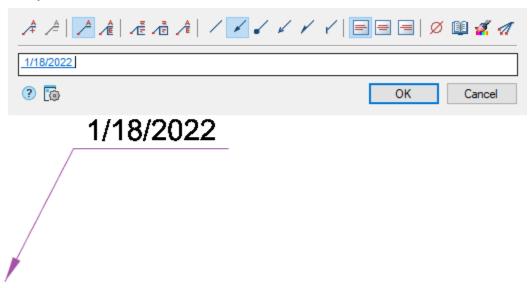
Adaptive note

nanoCAD Construction 25 allows you to use "Fields (Fields) drawing".

1. In the context menu of the callout input field, select the "Insert field..." command. The "Field" dialog will open.



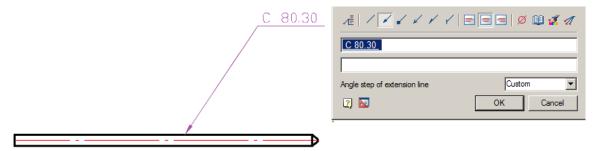
- 2. In the dialog box, link to the desired field and click the "OK" button.
- 3. The link will be created. When you click on a field link, the scope will move to the linked object.



Note: To update data in adaptive callouts, use the command "Regenerate".

Save template note

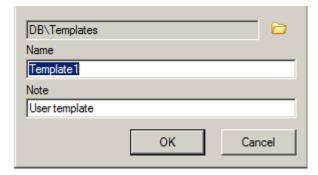
If necessary, save the callouts for later use, you need to create a balloon, defining it related parameters.



Further, by selecting it, specify the context menu - "Save object as template".

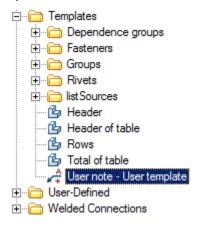
In the "Template wizard" press button "Create template".

In the dialog box "Create element" specify the storage folder in the base elements, Name and Note (if necessary). Press "OK". Again we return to the dialog box "Template wizard".



Press button "Update template" and close "Template wizard".

Update the tree base elements, the template will be created by the note.



Subsequently, this note can be inserted into a drawing for new objects. Adaptive communication with new objects and their settings will be saved.

Drawing symbols

Gradient symbol

Main menu: Construction - Symbols >←Gradient symbol.

Ribbon: Construction - Symbols >←Gradient symbol.

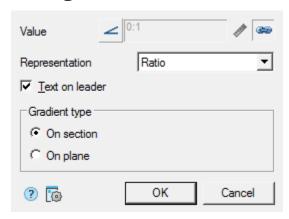
Toolbar: Symbols >←Gradient symbol.

Command line: SPGRAD.

Procedure

- 1. Call the command.
- 2. Using the "Properties" context menu command, open the "Gradient symbol" dialog box. Make the gradient symbol settings and confirm the changes with the "OK" button.
- 3. Select the line in the drawing for which you want to set the gradient symbol.
- 4. Place the gradient symbol on the selected line or leader flange.
- 5. The gradient symbol is drawn and associated associatively with the specified line.

Dialog



The editing dialog contains:

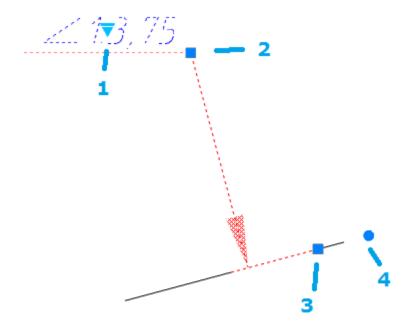
• Selection button type of designation: Gradient without designation, Left gradient and Left taper.



 Input field for gradient symbol value. The input field is active if the associativity mode is disabled. If necessary, turn off the associative connection mode by

- turning off the ""Associative" switch (when setting, the associativity mode is turned on automatically).
- **Pick from driwing" button. When the associativity mode is off, the button is active and allows you to measure the gradient symbol value in the drawing.
- Switch ** "Associative". Controls the display of the gradient symbol value. If the switch is on, the value is taken from the associated line, if it is off, it is entered manually.
- Drop-down list "Representation". Allows you to select how the slope units are represented:
 - As is
 - Ratio
 - Decimal
 - Percent
 - Permille
 - Degree
- "Text on leader" checkbox. Toggles whether the gradient symbol is on a shelf or on a line.
- "Gradient type" group. Allows you to select the type of gradient symbol:
 - On section
 - On plane

Grips



- 1. Grip for selecting the slope symbol representation.
- 2. Shelf movement grip.
- 3. Base move grip. When you move, the associativity with the line is lost and an additional fourth grip appears.
- 4. Grip for changing the angle of inclination of the base.

Node



Main menu: **Construction - Symbols - Node**.

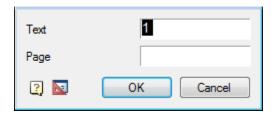


▼ Toolbar:

Node ("Symbols").

Command line: SPNODE.

- 1. Select location or type an index "properties".
- 2. In the dialog box that describes the node type the text. Click OK.



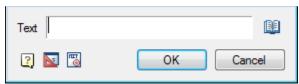
3. Insert the desired number of drawing markers. Subsequent node number is automatically incremented from the previous one.

Fragment mark

- Main menu: Construction Symbols "Fragment.
- Ribbon: Construction Symbols "Fragment.
- Toolbar: "Fragment ("Symbols").
- Command line: SPFR.
- 1. Select first point (1).
- 2. Select second point (2).



3. In the dialog box Fragment mark enter text. Click OK.



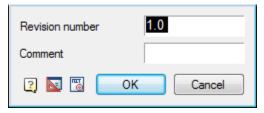
- 4. Select location.
- 5. Complete the cyclic command.

Correction Mark

- Main menu: Construction Symbols Correction mark.
- Ribbon: Construction Symbols Correction mark.
- Toolbar: **Correction mark (** "Construction").



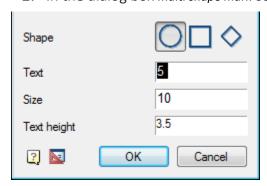
- 1. Select leader position.
- Select marker location or properties and call the context menu command "Pproperties."
- 3. In the dialog box change the marker type in the text. Click OK.



Position marker

- Main menu: Construction Symbols Marker.

 Ribbon: Construction Symbols Marker.
- Command line: SPMRKU.
 - 1. Select *location or type an index* for the first marker, or call the context menu command "P-properties".
 - 2. In the dialog box multi shape mark select the marker icon form, enter text. Click OK.



3. Insert the desired number of drawing markers. Item numbers subsequent token is automatically incremented from the previous one.

Position

Main menu: Construction - Symbols - Desition.



Toolbar: "Position (toolbar "Symbols").



Command line: SPPOS.

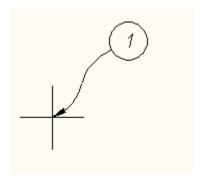
- 1. Specify the insertion point to the first marker position or call the context menu command "P-properties."
- 2. In the dialog box Tagging enter text.
- 3. Select an arrow. Click OK.
- 4. Insert the desired number of drawing markers. Subsequent node number is automatically incremented from the previous.

Fundamental rules

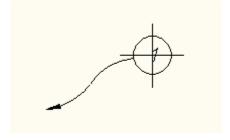
This command draws the drawing reference numerals used in the drawings.

Sequencing

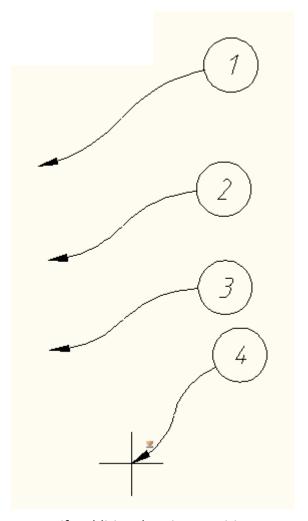
Insert position by specifying the datum marker



Next, mark the position statement of the position:



Inserted into a single command cycle positions are automatically numbered



To specify additional options position must call dialog "Position", where you can specify the text position display option arrows (switches below the text input field).



Stationing

Main menu: Construction - Symbols - Stationing.

Ribbon: Construction - Symbols - Stationing.

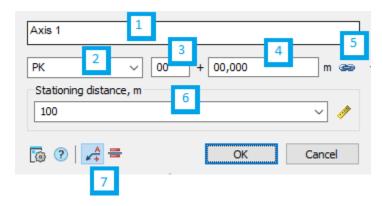
Toolbar: Construction symbols - Stationing.

Command line: SPSTATIONING.

Procedure

- 1. Call a command **₹**"Stationing". The "Stationing" dialog will open.
- 2. In the "Stationing" dialog box, set the parameters of the station and confirm the settings with the "OK" button.
- 3. Insert the first anchor leader or specify the polyline on which the stationing will be placed. When specifying a polyline, the first anchor leader will be set to the starting point of the polyline. The first designation of the station is the anchor, the report goes from it and the subsequent inserted station is connected with it.
- 4. Position the text of the first mark.
- 5. Insert the desired number of marks. If a polyline was specified, the leader arrow will be associated with the polyline. To finish inserting station symbols, press the "Enter" key.

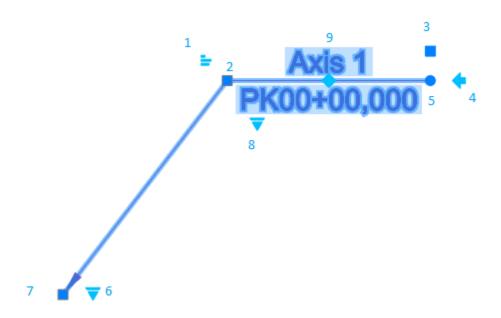
Edit



The edit dialog contains:

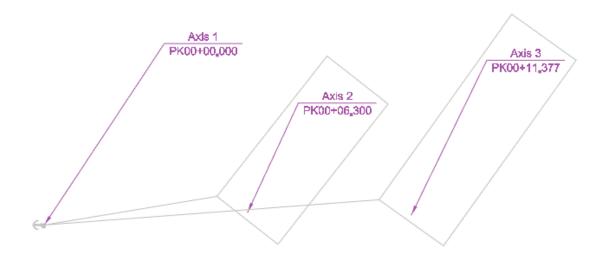
- 1. Text input field above the shelf.
- 2. Drop-down list of picket designation (mileage): PK or KM.
- 3. The field for the number of the initial station.
- 4. The field of the value of the distance of the initial station.
- 5. Button "Associative" allows you to link a new mark to existing marks. After binding, all fields except the text above the shelf will not be editable.
- 6. Drop-down list "Stationing distance, m" sets the distance between pickets. The value is selected from the list, entered manually or taken from the drawing. To specify a value from a drawing, use the \mathscr{O} "Measure" command.
- 7. Switch for selecting the type of mark: 🚅 "Positional mark" or 🗮 "Linear mark".

Grips



- 1. Text alignment knob above the shelf.
- 2. Handle for moving the shelf.
- 3. Text stretch/shrink handle.
- 4. Handle for changing the direction of the shelf location.
- 5. Handle for turning the shelf.
- 6. Handle for changing the view: PK or KM.
- 7. Moving the arrow.
- 8. Selecting the type of GCP naming.
- 9. Choice of base mark.

Double-clicking on the anchor on the first mark displays associative links.



Views and sections

Section



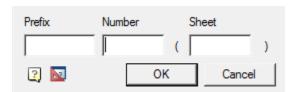


Toolbar: [♠]Sections (on toolbar "Views and Sections").

Command line: SPSECT.

Procedure

- 1. Call the team. A dialog box will open "Cut";
- 2. In the dialog box, enter the required parameters. Press the button "OK";

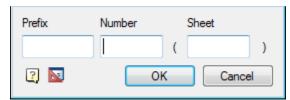


- 3. Select path type: Arc or Segment. For each type its own order of postorieniya;
 - Segment. Allows you to create a cut in the form of a broken line;
 - Pick the first cut point;
 - Pick the subsequent cut points. To finish entering points, press the key "Enter";

- Arc. Creates an arc section;
 - Select the desired arc construction method:Arc (3 points), Arc (2 points and bend), ARc (2 points and center);
 - Build an arc according to your choice.
- 4. Select the direction of the cut arrows.

View

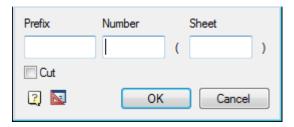
- Main menu: Construction -Views and Sections > View.
- Ribbon: Construction Symbols >[♠]View.
- Command line: SPVIEW.
 - 1. In the dialog box type the number and type of sheet. Click OK.



- 2. Select view insert point of the arrow type.
- 3. Select view angle.

View and Section Label

- Main menu: Construction Views and Sections > ** View and Sections label.
- Ribbon: Construction Symbols > AAView and Sections label.
- Toolbar: MView and Sections label (on toolbar "Views and Sections").
- Command line: SPVSDESC.
 - 1. In the dialog box "Designation of views, cuts..." enter the text notation. To denote the section or section select "Cut".



- 2. Click "Οκ".
- 3. Specify the insertion point notation.

Bound forms

Bound forms

Bounding hatch

- Main menu: Construction Bound forms Bounding hatch.
- Ribbon: Construction Symbols Bounding hatch.
- Toolbar: **Bounding hatch (** "Bound forms").
- Command line: SPBHATCH.

Ground border

- Main menu: Construction Bound forms "Ground border.
- Ribbon: Construction Symbols "Ground border.
- Toolbar: **""Ground border (** "Bound forms").
- Command line: SPGBORDER.

Heat isolation

- Main menu: Construction Bound forms ***Heat isolation.
- Ribbon: Construction Symbols ***Heat isolation.
- Toolbar: ***Heat isolation ("Bound forms").



Water isolation

Main menu: Construction - Bound forms - "Water isolation.

Ribbon: Construction - Symbols - "Water isolation.

Toolbar: ***Water isolation ("Bound forms").

Command line: SPWISOL.

Bar strip

Main menu: Construction - Bound forms - "Bar strip.

Ribbon: Construction - Symbols - "Bar strip.

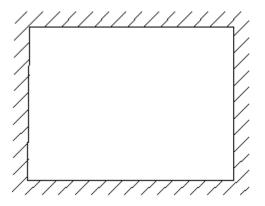
Toolbar: "Bar strip ("Bound forms").

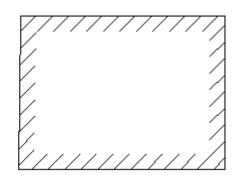
Command line: SPDBAND.

The special lines include: bounding hatch barstrip, heat isolation, water isolation, ground border. Lines have a wide range of applications. For example, the line-border soil formation on geological section.

Drawing bound forms

- To draw a bound form, select the desired Dialog box bounding hatch.
- You can immediately apply contour shading on the polyline using the command **Simple Polyline** context menu.
- To build a complex contour on the basis of the drawing objects you can use the command **M-magnet** context menu.
- If you want to create a new path, select the first point and then successively
 adding segments of the contour line, as is done when creating polylines. In the
 context menu commands are available for selecting the next segment (line
 segment or arc) and the method of construction.
- To complete the construction of the circuit, press Enter.
- In the next window *boundary forms* can change the type of boundary hatch. Button Hatch side is used to change the part of the overlay relative to the boundary contour shading:





To change the contour and side hatch overlay grips (Grips) can be used.

When drawing certain types of boundary forms (notation waterproofing, insulation and dashed lines) before building the circuit the values of hatching must be specified. The values given are based on the current scale nanoCAD Construction 25.

Editing the values of the parameters can be made through the Properties panel (Properties) nanoCAD. For example, the entered value corresponds to 4 400 mm on the standard scale M100.

Breaks

0

Main menu: Construction - Breaks > ₹ Break lines.

1

Ribbon: Construction - Symbols > 32 Break lines.

0

Toolbar: **ZBreak lines (** "Breaks").

WY.

Command line: SPBREAK.

Procedure

- 1. Select the first point to insert the break line.
- 2. In the context menu, select the type of break (break) (Linear, Two-lenear, Curved, tWo-curved, tuBular).
- 3. Pick the second break point.
- 4. In the context menu, select the type of cursor movement control (FreeOffset, OrthoOffset).
- 5. Specify the width of the cliff (break). A cliff (break) will be built.

Note: The whole clipped geometry between the break lines is not actually deleted and can be restored either by removing the break line or editing its contour with the grips nodal points.

Note: All objects nanoCAD Construction 25 have a so-called Z-Order. This value sets the level of the Z-coordinate in relation to other object-dependent details nanoCAD Construction 25. Editing the value of the order, you can control the mutual overlap of objects nanoCAD Construction 25.

Dialogue

The edit dialog is opened from the tooltip when you hover on a break (break) or when you double-click on a break (break).



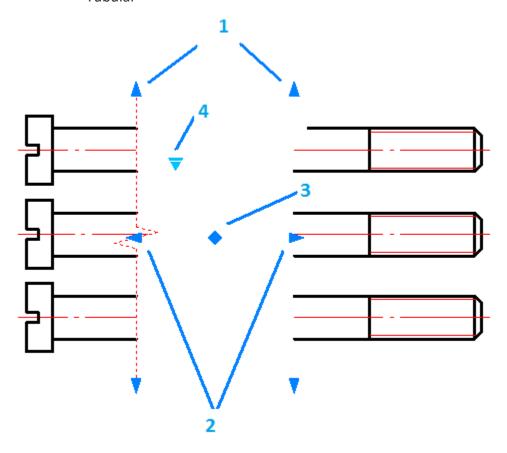
Editing dialog includes:

- · Graphic break type switch;
- Field "Length";
- Field "Width";
- Field "Offset". You can get the value using the offset command "Parallel to specified line".

Grips

- 1. Grips length setting
- 2. Grips break width settings
- 3. Break displacement grip
- 4. Drop-down type grip
 - Linear

- Two-linear
- Curve
- Two-curve
- Tubular



Linear break

Main menu: Construction - Breaks - 🕇 Linear break.

Ribbon: Construction- Symbols - 🕇 Linear break.

Toolbar: 🕇 Linear break ("Breaks").

Command line: SPBREAK_LINEAR.

Two-linear break

Main menu: Construction - Breaks - HTwo-linear break.

- Ribbon: Construction- Symbols + Two-linear break.
- Toolbar: ††Two-linear break ("Breaks").
- Command line: SPBREAK_TWOLINEAR.

Curved break

- Main menu: Construction Breaks \ Curved break.
- Ribbon: Construction Symbols \(\sqrt{Curved break}. \)
- Toolbar: \(\text{Curved break ("Breaks").} \)
- Command line: SPBREAK_CURVED.

Two-curved break

- Main menu: Construction Breaks 55 Two-curved break.
- Ribbon: Construction- Symbols 55 Two-curved break.
- Toolbar: "Two-curved break ("Breaks").
- Command line: SPBREAK_TWOCURVED.

Shaft break

- Main menu: Construction Breaks Shaft break.
- Ribbon: Construction- Symbols Shaft break.
- Toolbar: Shaft break ("Breaks").
- Command line: SPBREAK TUBULAR.

Welding

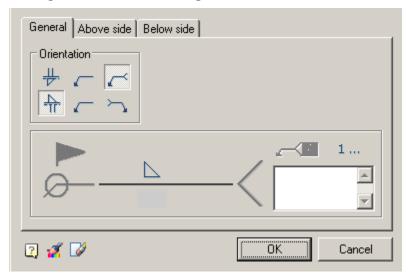
Welding...

Main menu: Construction - Weld > Welding....

Toolbar: "Weld">/ Welding....

Command line: SPISOWELD.

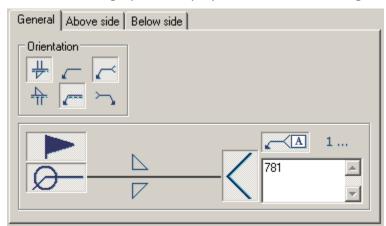
Setting notes refer to welding.



The dialog box consists of three tabs:

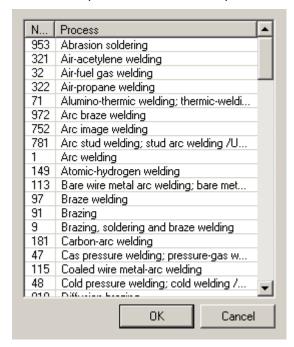
General

On the tab, the graphical display and fill in the drawing note.



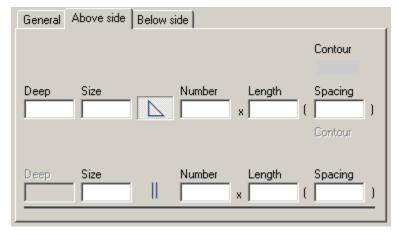
For convenient entry process, you can use Process list.

Process list poddrerzhivaet multiple selection processes.



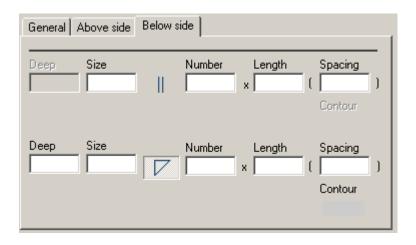
Above side

Tab necessary to fill in the values above the side
The type of weld and its parameters.



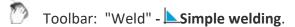
Below side

Tab necessary to fill in the values below the side The type of weld and its parameters.



Simple welding





Command line: SPWLEG.

This command is used to render the weld leg between two intersecting segments.

- 1. Enter the first rib.
- 2. Enter the second rib.
- 3. Press "Enter" or right mouse button to exit the cyclic command.

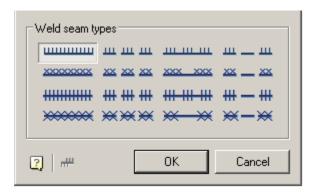
Weld seam







1. In the dialog box "Weld seam" press the button corresponding to the desired type of weld. Click OK.



- 2. Specify the first point of the circuit (or P polyline, C circle M magnet).
- 3. Specify the next point of the contour (or L line A arc, C close, U rollback, M a method for constructing the arc).
- 4. Press Enter or right mouse button to exit the cyclic command.

In the dialog box are available 16 types of welds. Each type of weld corresponds to the button with his picture. To select the desired type of seam, press the button and confirm with the OK button.

Construction of the circuit is made by the following methods:

L - via line: construction of straight segments of the weld points introduced;

A - by arc: construction of the weld arc segments in three points;

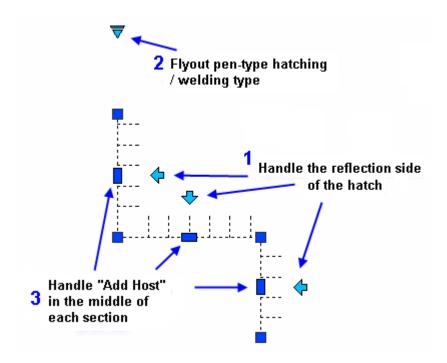
C - close: automatic generation of the last segment, closing the main line of the weld;

U - recoil: undo the last segment of the weld;

M - a method for constructing the arc: T - tangentially, S - by three points.

Button Side hatch allows you to select the direction of the hatch.

Change the direction of the hatch, you can select the "handle" the reflection side hatch:



Fixed joint

Main menu: Construction - Weld > Fixed joint.

Ribbon: Construction - Symbols > Fixed joint.

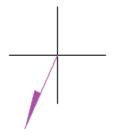
Toolbar: "Weld"> Fixed joint .

Command line: SPFIX.

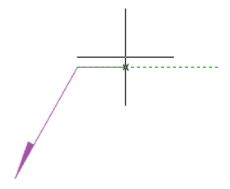
Procedure

1. Call the command **"Fixed joint".

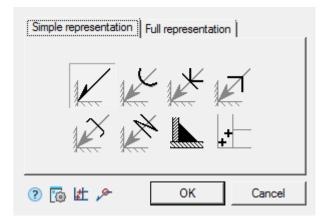
2. Indicate the place of the fixed joint.



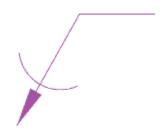
3. Pick a break point.



4. Specify the end point of the leader or press the "Enter" key, then the end point of the leader will be the break point. The "Joints" editing dialog will open.

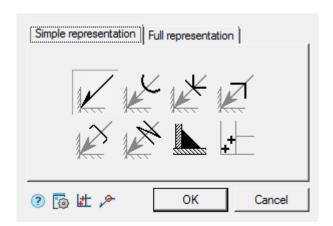


- 5. Set the type of joint in the "Joints" editing dialog and confirm the setting with the "OK" button.
- 6. The Fixed joint will be built.



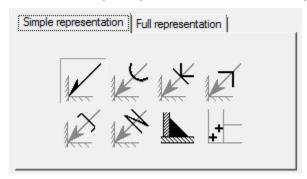
Dialog

Important! When you select the fixed joint "Soldired Joint Leg" or "Weld point", you cannot call the dialog from the object for editing.

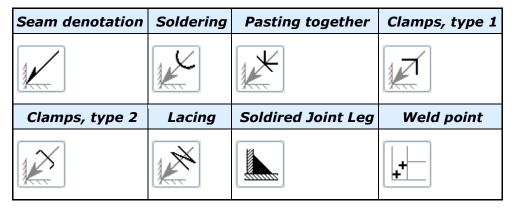


The editing dialog contains additional commands and two tabs: "Simple representation" and "Full representation".

- Let Place spot welds the command is intended for insertion of weld point elevations in the drawing.
- **Along closed contour the command is intended to add the symbol "Joint along closed contour" to the connection designation.
- The "Simple representation" tab allows you to select the type of fixed joint.

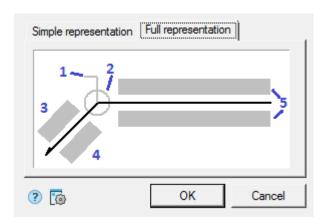


The following designations for fixed joints are available:



Depending on the selected type, the "Full representation" tab will be available.

• The "Full representation" tab allows you to customize the fixed joint symbol.



Input fields and graphic elements are edited on the tab. To edit input fields and turn on / off graphic elements, click LMB on them. When editing input fields, dialogs for editing fields appear, containing an input field and additional commands.

1. Graphic element "Field joint".



2. Graphic element "Joint along closed contour".



3. Number designation input field.



The editing dialog contains:

- Value input field.
- Command \sum "Sum" the number of welded seams with the same number is counted. Deleting or changing a seam number designation is automatically displayed in the full designation for that joint number.
- Command "Copy properties" allows you to copy properties from an existing dimension in the drawing.
- Command ✓ "OK" closes the dialog, saving changes.
- Command X"Cancel" closes the dialog without saving changes.
- 4. Input field for the designation of the control complex or the seam control category.



The editing dialog contains:

Value input field.

- Command "Copy properties" allows you to copy properties from an existing dimension in the drawing.
- Command ✓ "OK" closes the dialog, saving changes.
- Command X"Cancel" closes the dialog without saving changes.
- 5. Input fields for the symbol.



The editing dialog contains:

- · Value input field.
- Buttons for quick insertion of special symbols for fixed joint:
- △ Soldered leg;
- Remove weld reinforcement;
- ** Treat seam overflows and unevenness with graded junction to parent metal;
- Z Discrete double unfaced seam;
- Discrete double faced seam;
- Opened contour seam.
 - Command "Copy properties" allows you to copy properties from an existing dimension in the drawing.
 - Command ✓ "OK" closes the dialog, saving changes.
 - Command X "Cancel" closes the dialog without saving changes.

Properties

Seam denotation:

- · Text above self of leader
- Text under self of leader
- Text above leader
- · Text under leader
- Enable calculate joints
- Count of joints
- Field joint
- Joint along closed contour

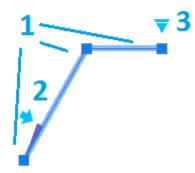
Soldering, Lacing, Clamps type 1, Clamps type 1, Pasting together:

- Joint along closed contour
- TR item number

Grips

Seam denotation:

- 1. Move grips Move the endpoints of the parts of the weld symbol.
- 2. "Mirror arrow side" grip changes the side of the arrow.
- 3. "Weld seam properties" grip opens a list of available graphic elements. In the list, you can enable or disable the display.

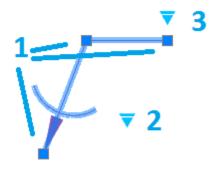


Soldering, Lacing, Clamps type 1, Clamps type 1, Pasting together:

- 1. Move grips Move the endpoints of the parts of the weld symbol.
- 2. Joint type selection grip opens a drop-down list for selecting a joint type.



3. "Weld seam properties" grip - opens a list of available graphic elements. In the list, you can enable or disable the display.



Soldered Joint Leg:

- 1. Move grip allows you to move the leg.
- 2. Grips "Change leg size" allow you to change the size of the leg.



Weld point:

1. Move grip - Allows you to move the weld point in the drawing.

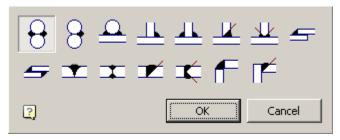


Simplified weld joint



Toolbar: "Weld" - Simplified weld joint.

Command line: SPWJ.



Important!

As the rods and plates can be used primitives nanoCAD: circle and polyline (a special case polylines: rectangles, and polygons).

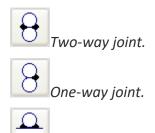
To use the unit as a plate or an object from the database, you must use when choosing an instrument <u>Magnet</u> plate for constructing the circuit plate.

Primitives must be tangent to each other.

Type: two rods overlap joints.

To add an overlap joint:

- 1. Call the command.
- 2. Select the drawing first rod.
- 3. Select the second rod.
- 4. To select the direction of one-way seam weld placement.



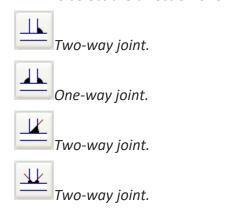
Type: T-connection between two rods..

To add a T-joints:

1. Call the command.

Two-way joint.

- 2. Select the drawing first plate.
- 3. Select the **second plate**.
- 4. To select the direction of one-way seam weld placement.



Type: two plates overlap joints.

To add an overlap joint:

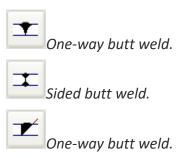
- 1. Call the command.
- 2. Select the drawing first plate.
- 3. Select the **second plate**.
- 4. To select the direction of one-way seam weld placement.



Type: Butt joint of two plates.

To add a butt joint:

- 1. Call the command.
- 2. Select the drawing first plate.
- 3. Select the **second plate**.
- 4. To select the direction of one-way seam weld placement.

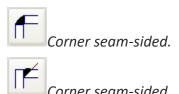


Sided butt weld.

Type: Angular connection of two plates.

To add a butt joint:

- 1. Call the command.
- 2. Select the drawing first plate.
- 3. Select the **second plate**.
- 4. To select the direction of one-way seam weld placement.

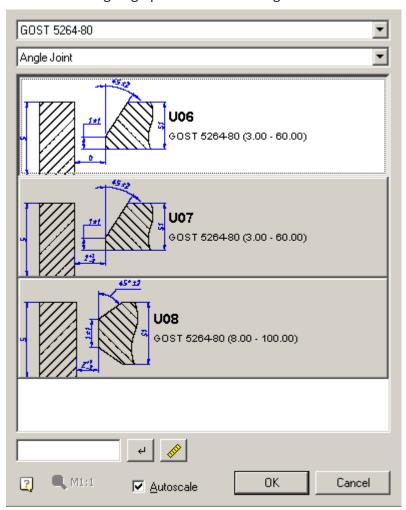


Edge preparation



Command line: SPEDGEPREPARATION.

Provides cutting edge parts in the drawing.



Elements of the dialogue:

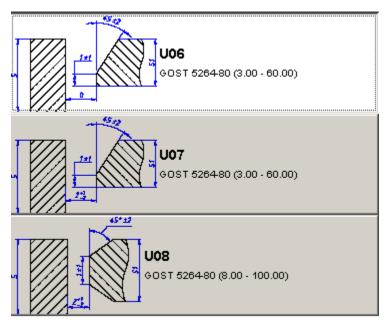
1)The list of standard cutting edges for welding;



2) List of types of connection plates welded: Butt, T-bar, angle;



3) List of connection options;



4) Filter the list by the thickness of the plates;



When you enter a numeric value thickness dialogue filters only those types of cutting edges, matching the thickness of the part. The filter is made by pressing the "Apply filter", or by pressing Enter. The value of the thickness in the filter can be measured by the meter to be launched on the "Measure".

5) Zoom menu created design elements



Menu is disabled if **Auto** is enabled check box. In this case, the scale created by the size and design elements set to the current scale decoration.

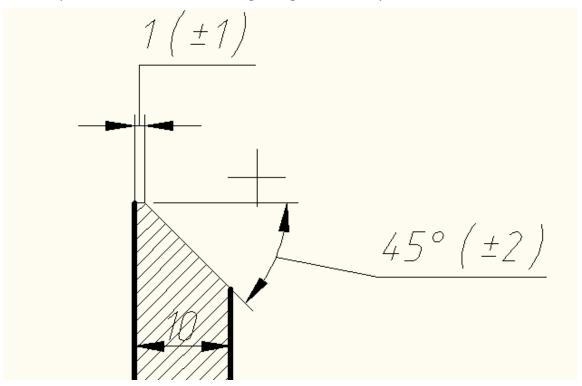
If you turn off **Auto** box, it will be possible to create a drawing cutting edges in arbitrary scale is selected in this dialog.

Operation

For the cutting edges must be vyponit following:

- 1. Select the type of connection: butt, T-bar or angle;
- If necessary, filter preparation method edges, depending on their thickness. This can be done directly by entering the minimum thickness of the edges, or by measuring the drawing;
- 3. Determine the scope of dimension lines;
- 4. Double-click method of preparing the edges;

5. Specify the edge of the weld joint. Depending on the method of preparation is required to select the left and right edges alternately.



When you create a cutting edge bevel one team will cycle to offer select sites for the creation of such ramps.

When you create a cutting edge bevel two team provides consistently indicate bevel for one, and then to other parts of the joint.

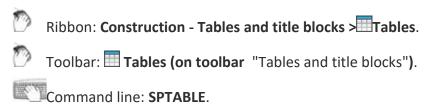
Important!	The plates can be used as primitives nanoCAD, as well as objects nanoCAD Construction. Turn inserted edge welded connection can hold down Shift. It is necessary to include the "Object Snap" mode and "nearest" or in the settings nanoCAD Construction against the item "Connections" Nearest "automatically when you insert objects"
	put "Yes".

Tables

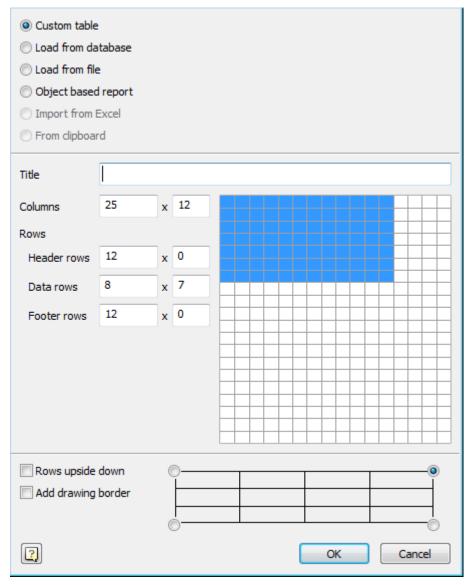
Tables



Main menu: Construction - Tables and title blocks > Tables.



Causes dialog box to insert a new table.



- To create a custom table, select *Custom*. In input fields specify the dimensions of the created table, or on the layout, drag the mouse to the right as many rows and cells as required. When subsequent editing the number of rows, columns, cell sizes can be changed.
- To insert a standard table, select *load from database*. You can insert a standard table of the base elements Building site. In the dialog box, select the table you want. Database elements Building site is available for all major types of standard tables.

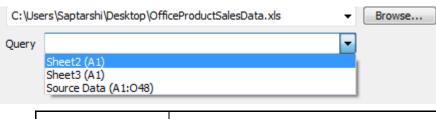
• To insert a table from a file, select Load from file.

Click Browse and select the file table.

Supported formats:

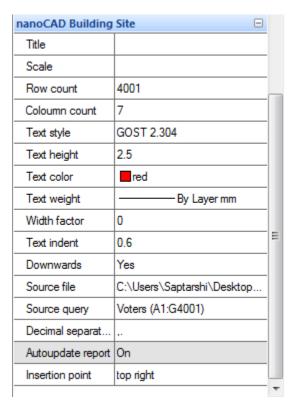
- tbl tables files
- dat data file or a text file
- mdb database Microsoft Access
- xls Spreadsheet Microsoft Office Excel
- xlsx spreadsheet Microsoft Office Excel 2007
- csv table cell separated by commas
- txt standard text file
- xml XML document
- odf OpenDocument Format.

When loading a table of xlsx, xls file, you must select the Excel document sheet.



Important! Select the sheet can be made after a table is loaded from the file.

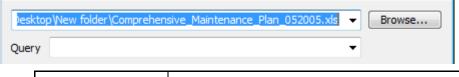
Source file	C:\Users\Saptarshi\Desktop	
Source query	Voters (A1:G4001)	
Decimal separat		



In the properties of a table row *source file* displays the path to the source file of the table.

Select line *Request* to enter the desired page of the document. Then in the Table Editor, click ***Update Table from an external source.

When loading a table from a file mdb drop-down list displays a list of database query.



To import tables from files, you can drag a file from Explorer to the dialog table.

When you drag a file from Windows Explorer in the imported table is added to the existing table.

When you drag a file from Windows Explorer dialog box replaces

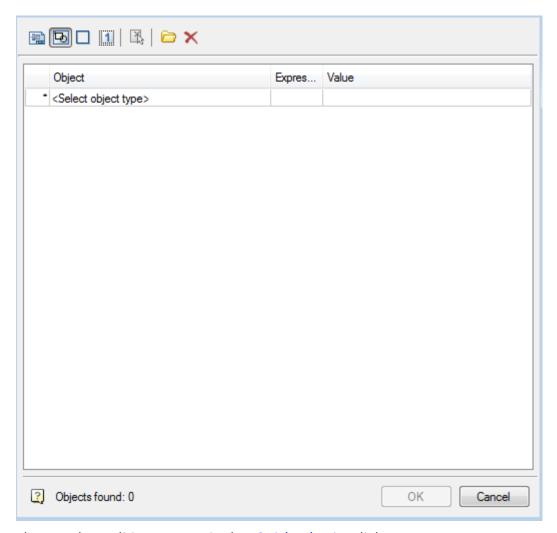
To generate a report based on a sample of objects, select the objects in the sample

the existing table to be imported.

To make a selection of items, click Select.

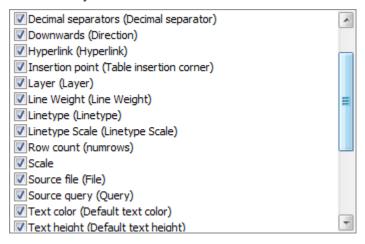
•

report.



The search conditions are set in the Quick selection dialog.

Further dialogue is given based on what the attributes are and creates a report on the selected objects.



Includ attributes for the report in the list by selecting flags

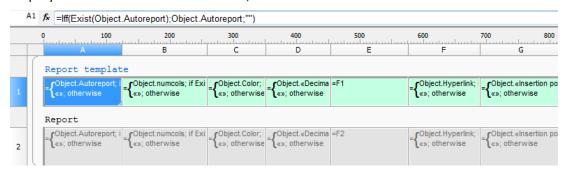


- All- selects all attributes
- None the choice is removed from all the attributes
- Invert inverted selection attributes

The table is created with a template report form

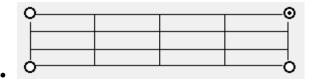
=Iff(Exist(Object."Autoreport");Object."Autoreport";"")

This formula checks whether there is a line for the attribute named *Autoreport*, and displays its value in a cell. Otherwise, leave the cell blank.



The number of columns in the table determined by the number of selected attributes.

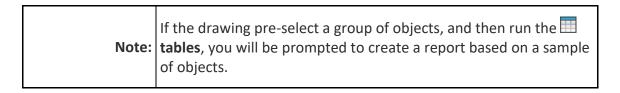
- To import a table from Excel, select *Import from Excel*. To activate this item, the document should be opened.
- Select the insertion point of the table.



- Select the numbering of rows in the table.
- Rows upside down

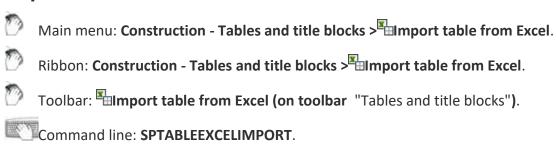
If the switch rows upside down is enabled, the line numbered in reverse order.

- When the checkbox Add drawing border after you insert the table will start a dialogue format.
- Click OK and the insertion point on the drawing table.



Import, export from Excel

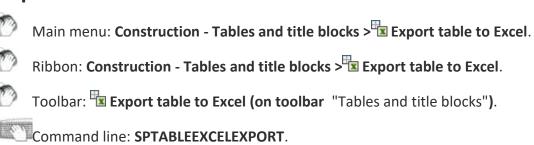
Import



Transmits data from an open book MS Excel.

- In an open Excel worksheet, select the cells whose data you want to import into a table nanoCAD Construction 25.
- Go to the nanoCAD, editor of the table, and then click Import tables from Excel.
- Data will be transmitted to the table.

Export



Designed to transmit tabular data in MS Excel. After clicking on the button opens a new Excel workbook and it migrates all the tabular data with formatting cells established in the table.

	The tables nanoCAD Construction 25 not to Excel the following data:
Important!	Blocks nanoCAD
	Formatted text
	Formulas that do not match the format of Excel

Table recognition

Main menu: Construction - Tables and title blocks > Table recognition.

Ribbon: Construction - Tables and title blocks > Table recognition.

Toolbar: Table recognition (on toolbar "Tables and title blocks").

Command line: SPRECTABLE.

Table recognition enables automatic search and replace tables created from individual primitives nanoCAD object "Table" nanoCAD Construction 25. Sources are primitives for drawing.

- 1. Use the command table recognition.
- 2. Specify the drawing point at the table.

The table is created in the current layer. Dimensions of the recognized table are rounded to integer values.

Text belongs to the workpiece table is recognized as the values of the respective cells of the table.

Real dimensions of the original graphics are multiplied by the scale design, so if it turns out the table with zero height lines, you need to change the scale clearance in accordance with the size of the original graphics.

Editing a table in the drawing

Main menu: Construction - Table and title blocks - Table edit > Edit table inplace.

Ribbon: Construction - Edit table in-place > Edit table in-place.

Toolbar: Tables > Edit table in-place.

Command line: SPIPEDITTBLIPEDITTBL.

Shortcut: CTRL+RBM on table frame.

When editing a table on-screen, the "Edit Table" toolbar appears.



The active cell is highlighted with a green frame. The text entered into the cell is automatically pre-pressed.

Menu

☐Group cells.

Serves to combine adjacent cells into one.

Procedure:

- Call command.
- Pick the first corner point of the selection.
- Pick second corner point of selection.
- Selected cells will merge.

 \square Ungroup cells.

Undoes the grouping of a previously merged cell from multiple cells.

Procedure:

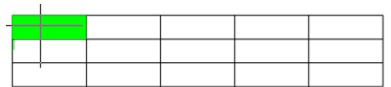
- · Call command.
- Pick the first corner point of the selection.
- Pick second corner point of selection.
- Selected grouped cells that fall within the selected area will ungroup.

■Split cells.

Serves to divide cells into several smaller cells.

Procedure:

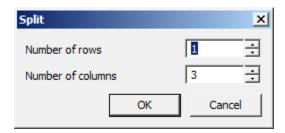
- · Call command.
- Pick the first corner point of the selection.



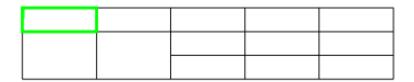
• Pick second corner point of selection.



• In the "Split" dialog box that appears, enter the required numerical values for repartitioning.



• This will result in a new breakdown.



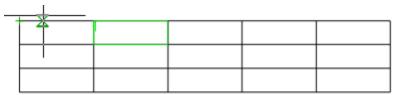
Note: When using the "Split" command, the height and width of adjacent cells may be lost.

⊞ Pencil.

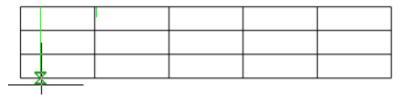
Serves for splitting cells into several by creating additional borders.

Procedure:

- Call command.
- Pick the first point of the dividing line on the table border.



• Pick the second point of the dividing line on the table border.



• The cells that the dividing line will pass through will be split into new cells. Each cell is independent.

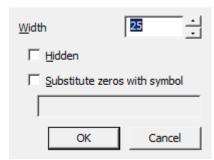


- Add row. Adds one row at the bottom of the table.
- Add column. Adds one column to the end of the table.
- Insert row. Adds one row to the current position of the table cursor.
- Insert column. Adds one column to the current position of the table cursor.
- Delete row. Deletes the row containing the selected cell.
- Delete column. Deletes the column that contains the selected cell.
- Row properties. Changes the height of the row containing the selected cell. A dialog box is called up in which to specify the line height in millimeters.



The "Start new page" parameter splits the table in an arbitrary place, i.e. where the cell is selected. Other pagination methods are available in the <u>full editor interface</u>.

Enter the column width in millimeters in the dialog box.



The "Hidden" option hides the selected column. You can return visibility to a column from the full editor interface.

The "Substitute zeros with symbol" parameter replaces the null values of the column cells with the row data. In this case, the format of the cells must be numeric.

Cell properties. Calls up the "Cell Properties" dialog box, which configures the properties of the selected table cell.

Cells properties. Setting properties of a group of table cells. Select the required cells and in the appearing "Cell Properties" dialog box set the parameters of the selected table cells.

\(\Sum\) Sum

Calculates the sum of the selected area.

Procedure:

- Select the result cell.
- Call the command.
- Pick the first point of the marquee.
- Pick the second point of the marquee.
- The formula will be entered into the result cell.

Σ⁺Selective sum

Calculates the sum of the selected cells.

Procedure:

- Select the result cell.
- Call the command.
- Specify cells. Press "Enter" to finish.
- The formula will be entered into the result cell.

■Notebook

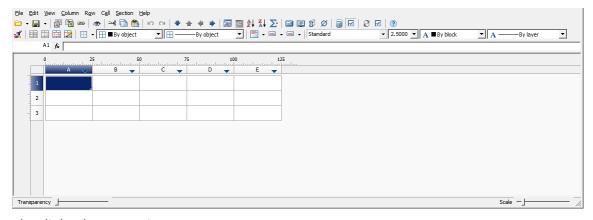
ECalculator

Ø Special symbols

Quit. Exits the table screen editor. You can also exit the on-screen table editor by right-clicking on an empty space in the drawing.

Table editor

The interface is opened by double-clicking on the table, or by selecting the "Edit" command from the context menu of the selected table.



The dialog box contains:

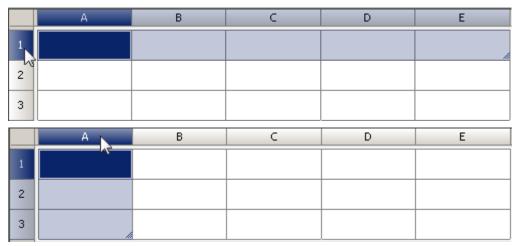
- main menu;
- toolbar;
- parted cells with names (addresses) of rows and columns;

• status bar with transparency and scale caret;

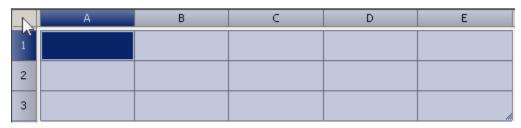
General Provisions

The names (addresses) of rows and columns are adopted similarly to the MS Excel spreadsheet editor. Vertical columns from left to right are named in alphabetical order in English letters (A, B, C, D,..., Z, AA, AB, etc.), horizontal rows are named in numbers in order.

When you click LMB on a row or column name, it is selected.

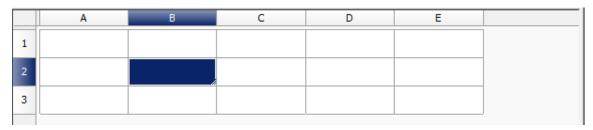


To select the entire table, select a rectangle at the intersection of the row and column names.



The shortcut "Ctrl + scrolling mouse wheel" allows you to change the scaling of the table

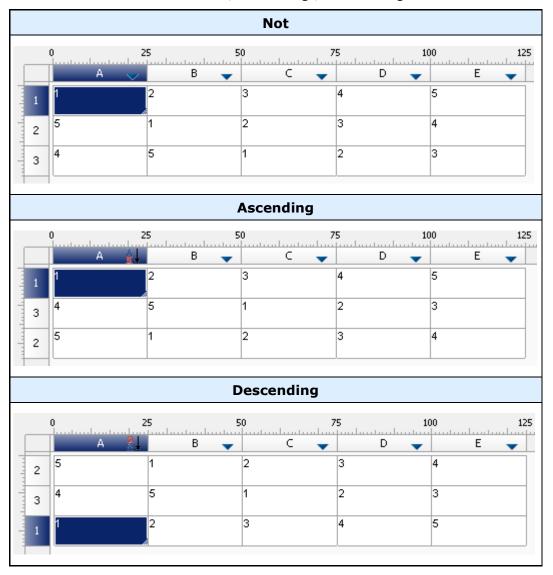
The shortcut "Ctrl + click mouse wheel" sets the default table scaling.





When "View sorting" is enabled, sort buttons appear on the right side of the column headings. This sorting is intended to improve the convenience of entering data in the spreadsheet editor and does not affect the state of the table in the drawing.

The button has three states: "Not", "Ascending", "Descending".

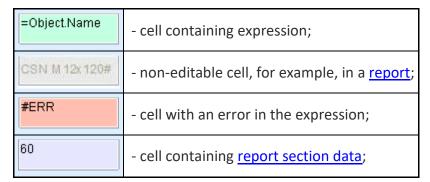


Sorting features:

- Enabling sorting on one column disables sorting on other columns.
- Rows are sorted whole, not just the column.

- Strings are sorted within a section.
- The merging of cells is not broken.
- After enabling view sorting, the vast majority of commands are blocked. Allowed: exit, edit single cells and change sort mode.

Cell color



Filling adjacent cells with data

To speed up data entry into the table, automatic data filling functions are used. The spreadsheet editor can automatically continue a series of numbers, combinations of numbers and text according to a given pattern. You can quickly fill in different types of data series by selecting multiple cells and dragging the fill handle.



Filling cells with a sequence of numbers or combinations of numbers and text according to a given pattern:

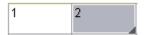
1. Select the first of the filled cells.



2. Enter an initial value for a range of values.



3. Enter a value in the next cell to set the fill pattern.



For example, if you want the sequence 1, 2, 3, 4, 5 ..., enter the values 1 and 2 in the first two cells. If you want the sequence 2, 4, 6, 8 ..., enter 2 and 4. If you need sequence 2, 2, 2, 2 ..., the second cell can be left blank.

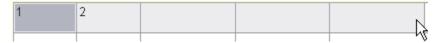
As the sequence is completed, it continues as shown in the table below.

Initial value	Continuation of the series	
1, 2, 3	4, 5, 6	
1st period, 2nd period	3rd period	
Product 1, Product 2	Product 3	

4. Highlight cell or cells containing seed values.



5. Drag the fill handle over the range you want to fill.



The cells will be filled with the specified sequence of numbers.



To fill in ascending order, drag the handle down or to the right. To fill in descending order, drag the handle up or left.

Basic tools

Main menu commands

File

- Open file... loads table data from a file. Files available for download: * .tbl, * .dat, * .mdb (only for 32-bit Windows), * .txt, * .csv, * .xml, * .xls, * .xlsx. When you select an Excel file, only the first sheet of the workbook is inserted.
- Open database... opens a dialog of library to select a table saved in the database.
- Save as file... writing a table to an external file *.dat, *.txt, *.cvs, *.xml, *.xls.
- Save to database... writing the table to the base of elements.
- Edit Form... opens the form editor. Using the form, you can filter data, control the composition and style of the table.
- Show Form... opens the table filter form.
- Imtort from Excel the command transfers the results of calculating tabular data from an open MS Excel workbook. The content of the active sheet or a selected range of cells is transferred.
- Export to Excel the command is designed to transfer tabular data to MS Excel.

 After clicking the button, the "Conversion options" dialog opens. After specifying

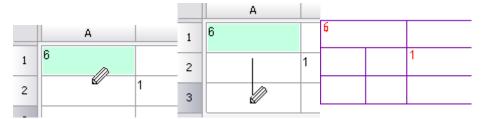
the options, a new Excel workbook is opened and all tabular data is transferred into it, while maintaining the cell formatting set in the table.

- Close saves changes and closes the editor.
- *Close without saving -* closes the editor without saving changes.

Edit

- Undo undo the last action.
- Redo redo the last undone action.
- Cut cuts data from selected cells to the clipboard.
- Copy copies data from the selected cells to the clipboard.
- Paste pastes data from the clipboard.

Pencil - serves for splitting cells into several by building additional borders.



- Select material... This tool is designed to insert into a table, technical requirements and technical characteristics of a formatted line-record for material and assortment. Clicking on the button brings up the "Material" dialog box.
- Auto calculate expressions controls the mode of automatic recalculation of values of table cells. By default, the auto-recalculation mode is on.
- Recalculate serves to recalculate data in a table after editing cell values or correcting formulas.
- Auto update reports controls the mode of automatic recalculation of the report. The mode is on by default.
- Reports update of the report.
- Synchronize updates the table with data from a linked file. Available if the table was loaded from a file. For correct synchronization, the data changed in the file must be previously saved.

View

• Show rulers - switch, controls the display of the ruler.



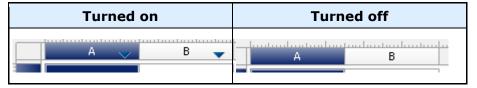
• Show expressions -switch manages the formula bar display.



• Formula visualization - switch, controls the display of the formulas in cells.

= Σ(^{B9} ¬, ⊢ _{B12})	5	
	4	
	2	
	3	
	-	_

- Zoom to objects centers the original report objects in the drawing.
- View sorting controls the display of the sort buttons of the view.



- Calculator... the command calls calculator.
- Notebook... the command calls notebook.

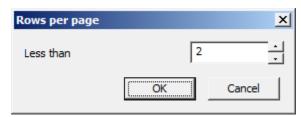
Column

- Add column adds a new empty column after the selected column.
- Insert column adds a new empty column before the selected column.
- Delete column deletes the selected column.
- *Hidden* switch, hides the column. The column appears in the editor but does not appear in the drawing.
- Properties... open properties of column.

Row

- Add row adds a line below the selected one.
- Delete row deletes the selected row.
- Hide row hides the line. The line is not visible in both the editor and the drawing.
- Show hidden rows shows hidden lines. To use the command, you must select several lines between which hidden lines are located.
- Sort ascending sorts the table in ascending order relative to the selected column.
- Sort descending sorts the table in descending order relative to the selected column.
- Custom sort... opens a dialogue "Collections editor".
- Merging and Grouping... opens a dialogue "Row grouping and merging".
- Start new page switch, controls the page break before the selected line.

• Limit rows per page... - opens the "Rows per page" dialog, which indicates the maximum number of lines per page. If there are more lines, a page break is inserted.



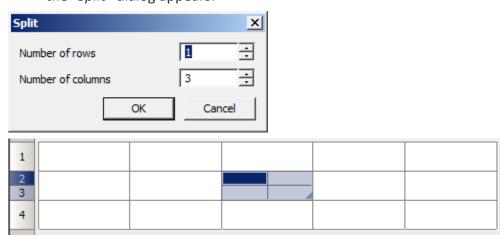
• Limit page height... - opens the "Page height" dialog in which the maximum page height is indicated. If the page height is greater than the specified height, a page break is inserted.



- Single page the command removes all created page breaks.
- *Up to down* switch, controls the data display sequence.
- *Properties...* opens <u>string properties</u>.

Cell

- Edit puts the cell into edit mode.
- Expression... opens a dialogue "Expression builder".
- Properties... opens a dialogue "Cell properties".
- Group merges the selected cells.
- *Ungroup* corrodes the selected cells.
- *Split...* splits a cell into multiple rows and columns. When the command is called, the "*Split*" dialog appears.



- Cut cuts data from the selected cells to the clipboard.
- Copy copies data from the selected cells to the clipboard.
- Paste pastes data from the clipboard.
- Clear clears the selected cells.
- Insert table pastes a range of cells copied from Excel.

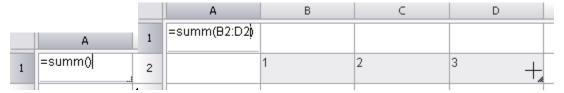
Section

- Header of first page adds a header for the first page.
- Header of following pages adds a header for pages.
- Header of last page add a header for the last page.
- *Insert Data section* inserts a data section. If the selected cell is in the data section, then an empty row is added.
- Insert Report section adds a report section. <u>Used when building reports.</u>
- Footer of first page adds a footer for the first page.
- Footer of following pages adds a footer for pages.
- Footer of last page add footer for the last page.

Toolbar commands

- Open allows you to choose one of two commands:
- Open file- loads table data from a file. Files available for download: * .tbl, * .dat, * .mdb (only for 32-bit Windows) * .txt, * .csv, * .xml, * .xls, * .xlsx. When you select an Excel file, only the first sheet of the workbook is inserted.
- Load from base- opens a dialog of standard elements to select a table saved in the database.
 - Save allows you to choose one of two commands:
- Save to base- writing the table to the base of elements.
- Save to file- writing a table to an external file * .dat, * .txt, * .cvs, * .xml, * .xls.
 - **Import table from Excel the command transfers the results of calculating tabular data from an open MS Excel workbook. The content of the active sheet or a selected range of cells is transferred.
 - Export table to Excel -the command is designed to transfer tabular data to MS Excel. After clicking the button, the "Conversion options" dialog opens. After specifying the options, a new Excel workbook is opened and all tabular data is transferred into it, while maintaining the cell formatting set in the table.
 - **Update table from external source updates the table with data from a linked file. Available if the table was loaded from a file. For correct synchronization, the data changed in the file must be previously saved.

- Pan and zoom view to show objects centers the original report objects in the drawing.
- Cut selection cuts data from the selected cells.
- Copy selection copies data from the selected cells.
- Paste from clipboard pastes data from the clipboard.
- Undo last change undo the last action.
- Predo last change redo the previously undone action.
- Move row down moves the selected line down.
- Move row up moves the selected line up.
- *Move column left moves the selected column to the left.
- Move column right moves the selected column to the right.
- Page division the tool is designed to split the table into separate parts, without losing integrity. With this function it is possible to split a large table in order to fit on the format, and still retain the ability to edit the table as a single object.
- **B**Open form opens the table filter form.
- \$\frac{1}{2}\$\int Sort ascend sorts the table in ascending order.
- *Sort descend sorts the table in descending order.
- **\(\sum_{Create}\)** Summary function sums the contents of the selected cells.



Procedure:

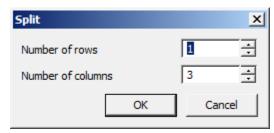
- 1. Select the cell in which you want to calculate the amount, press \sum "Create summary function".
- 2. Select the cells whose contents you want to summarize, press "Enter".

 - **Dominical States** The command calls notebook.
 - Insert material This tool is designed to insert into a table, technical requirements and technical characteristics of a formatted line-record for material and assortment. When you click on the button, a dialog box is called "Material".
 - ØSpecial symbols inserting a special character from the list.
 - Recalculate table serves to recalculate data in a table after editing cell values or correcting formulas.

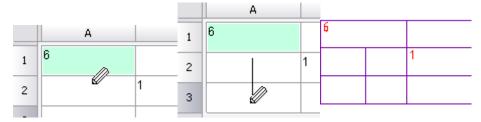
- Automatic calculation controls the mode of automatic recalculation of values of table cells. By default, the auto-recalculation mode is on.
- **€** Update reports update of the report.
- Automatic report update controls the mode of automatic recalculation of the report. The mode is on by default.
- EGroup selection serves to combine the selected table cells into one.
- Ungroup selected cells cancels the merge for the selected cells.
- Change number of rows and columns serves to change the number of rows and (or) columns in the selected range of cells.

Procedure:

- 1. Select one or more cells and call the command.
- 2. In the "Split" dialog box that appears, enter the desired numeric values to stake.



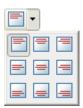
• Split table cell with pencil tool - serves for splitting cells into several by building additional borders.



To split a cell with the mouse cursor, specify the start and end points of the segment that will divide each cell it crosses into two.

Right-clicking on a cell border removes that border.

- Select cell style calls the window for applying the style to the selected cells.
- *Text alignment* serves to control the placement of text in selected cells. Additional buttons are available by pressing the black triangle. The purpose of the buttons is clear from the figure on each of them.



• Fitting text horizontally - controls the horizontal alignment of text in the cell. The following options are available in the drop-down list:

■No horizontal tolerance

Shrink horizontally

Word wrap

• Fitting text vertically - controls the vertical alignment of text in the cell. The following options are available in the drop-down list:

■No vertical tolerance

Shrink text height

■Expand row height

Add virtual rows

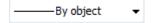
Borders - is designed to control the display of the borders of the selected cells.
 When you click on the black triangle, additional buttons for displaying borders become available. The purpose of the buttons is clear from the figure on each of them.



• Color of borders - drop-down list for choosing border colors. To set the border color, you must first select a color and then select the border (using the "Borders" command) to which you want to apply the specified parameters.



• Lineweight of borders -drop-down list of border thickness selection. To set the border thickness, you must first select the thickness and then select the border (using the "Borders" command) to which you want to apply the specified parameters.



- Text style drop-down list for choosing the text style of the cell.
- Text height drop-down list for selecting the height of the cell text.

20

- Text color drop-down list for choosing the color of the cell text.
- Text weight drop-down list for choosing the thickness of the lines of the cell text.



• Selected cell coordinate field - displays the coordinates of the selected cell (s) and allows you to enter them.



• Row expressions - formula input field. The line is displayed if the "Main menu - View - Show expressions" switch is active.

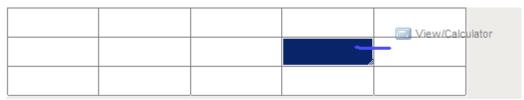


Using gestures for shortcuts

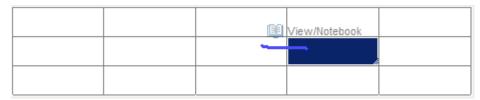
Gestures are designed for quick access to commands from the main menu of the table editor. Gestures made with pressed RMB in the table editor.

Note: If when the prompt appears gesture command being executed, you can omit the RMB.

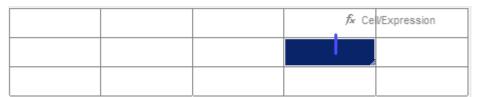
Right - Calculator



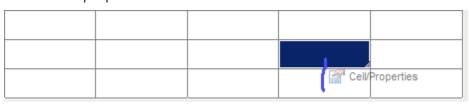
Left - Notebook



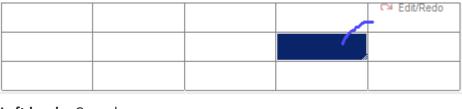
Up - Expression



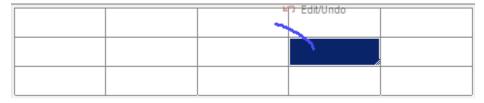
Down - Cell properties



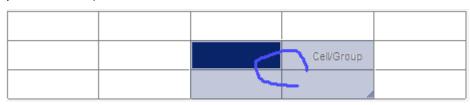
Right hook - Return



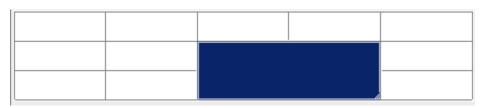
Left hook - Cancel



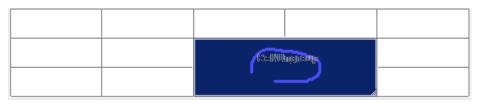
The closed area of the selected cells in a clockwise direction - Connection (merged cells pre-allocated)



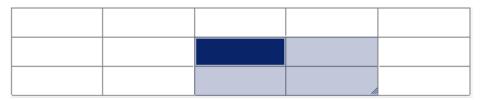
Result:



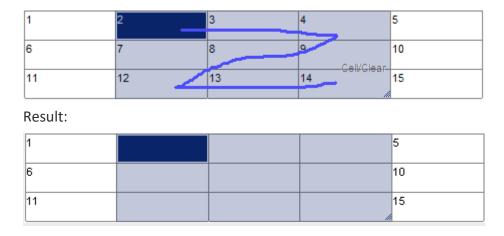
The closed area of the selected cells counterclockwise - Disconnection



Result:



Symbol "z" on select cells - Clear (pre-clean cell is released)

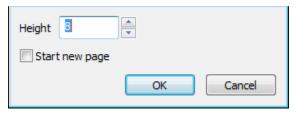


Editing the size of rows and columns

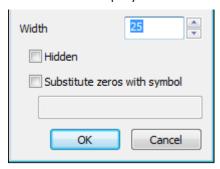
To modify the row height or column width, move your mouse to the border of the row or column. Click the left mouse button and holding the button down drag the border. The move will be highlighted by the current value of the row height or column width, as well as its new size.

Resize a row or column can also be done in the properties dialog box, selected by pressing the right mouse button on the header row or column.

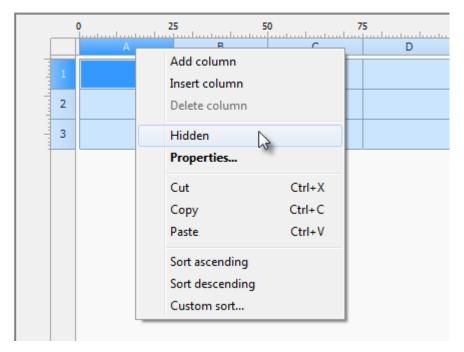
1. In the properties dialog box, specify the height (width) in millimeters.



2. In the Properties dialog box of the column switch is available *Hidden*. With it, you can disable the display of the selected column in the drawing, however, the Editor will be displayed.



You can also hide a column from the context menu for the column.



Command *string Replace null values* (for numeric cells with the value zero, the cell must be a numeric format), replaces the contents of the cells specified text.

Important! Format text in a cell value is set in the properties of the cell on the tab *Content* .

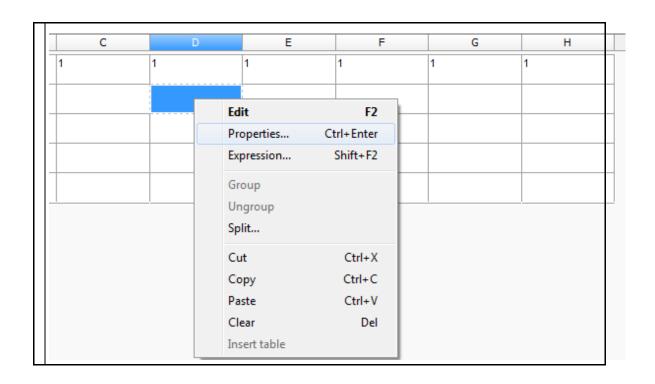
Close the dialog by clicking OK.

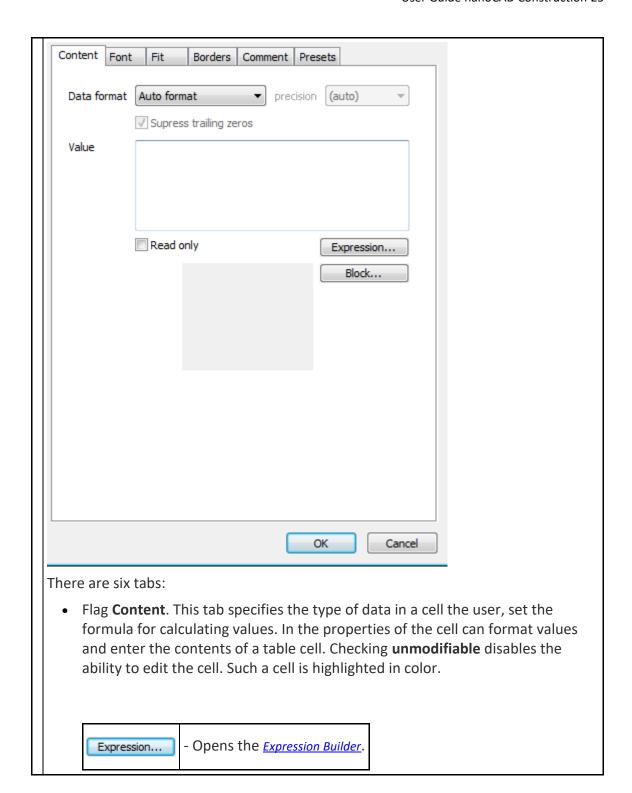
Cell Properties

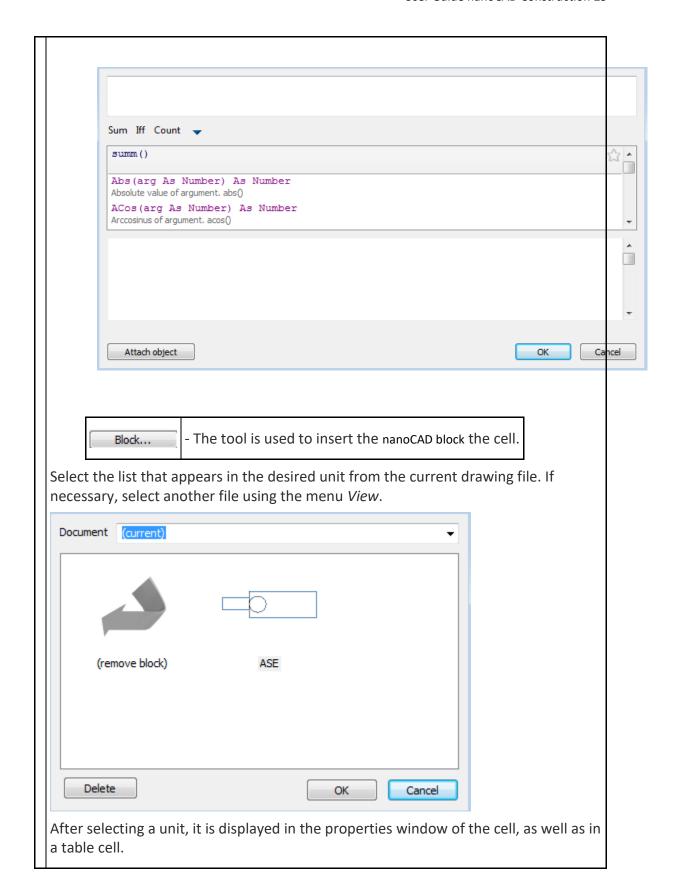
In the dialog box *Properties* parameters are set for table cells.

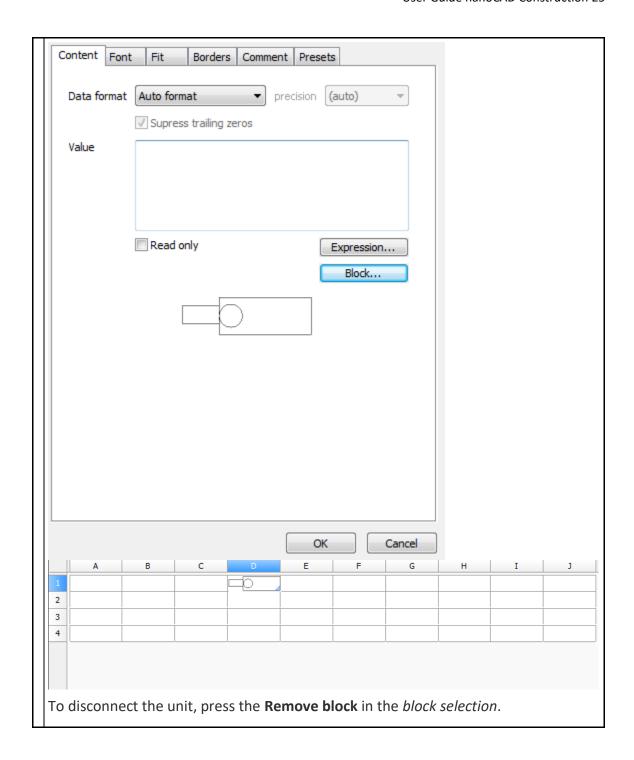
To edit the properties of a single cell in a table full editor, select the desired cell and issue *Properties* from the context menu or by pressing Ctrl + Enter, double click on the cell, as a gesture to "down" on the cell. The effect of this command is similar *Cell Properties* screen table editor.

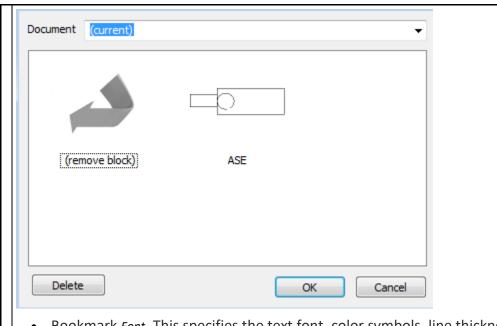
To edit multiple table cells in the full editor, select the desired cells and issue the *Properties* from the context menu. The effect of this command is the same action as *Properties* screen editor table.



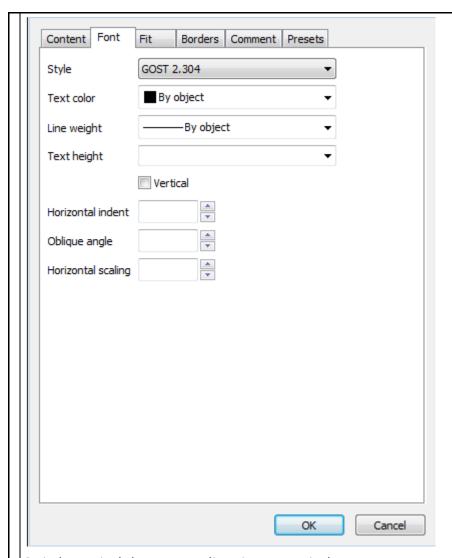








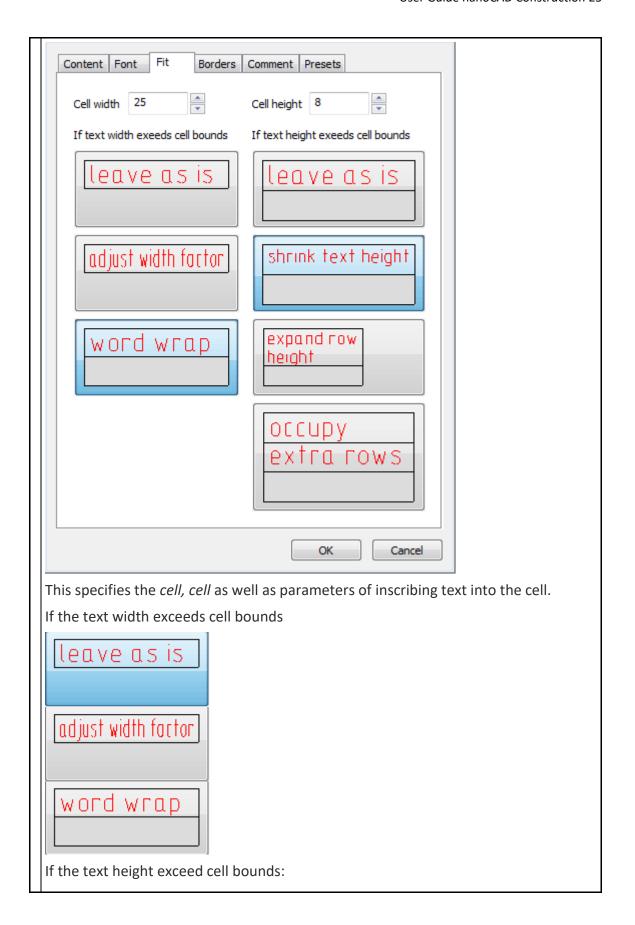
• Bookmark Font. This specifies the text font, color symbols, line thickness, font height, offset from the cell boundaries, the angle that defines the direction of the text, as well as the aspect ratio of the text.

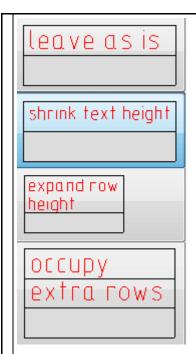


Switch Vertical change text direction to vertical.

Empty fields *oblique Angle* and *horizontal scaling* means that the values are taken from the text style and *horizontal indent* - that the value is taken from the table settings.

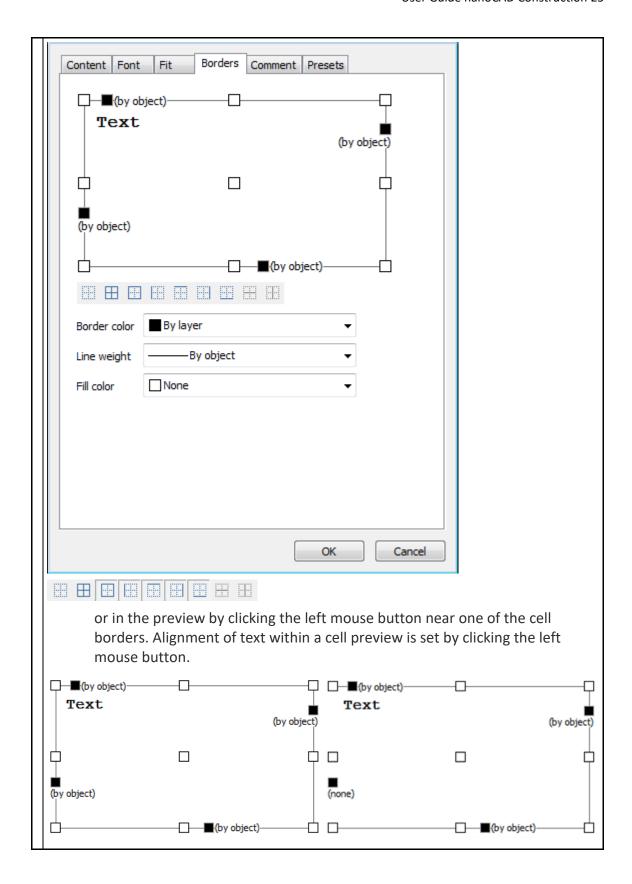
• Bookmark fit

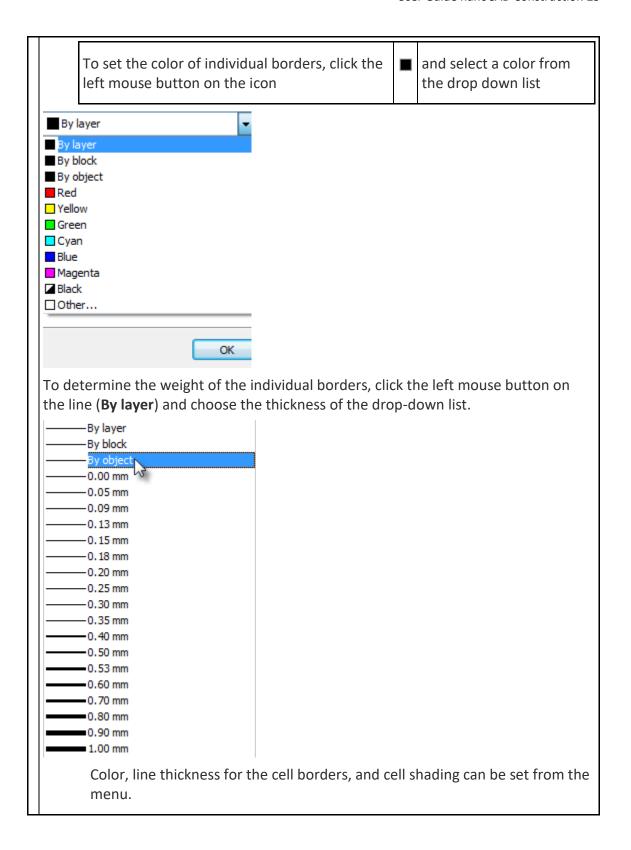


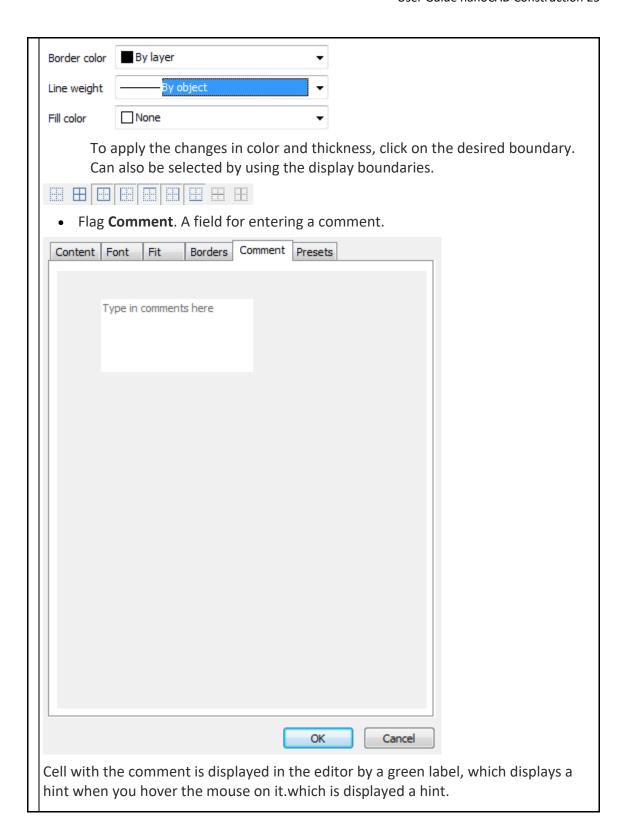


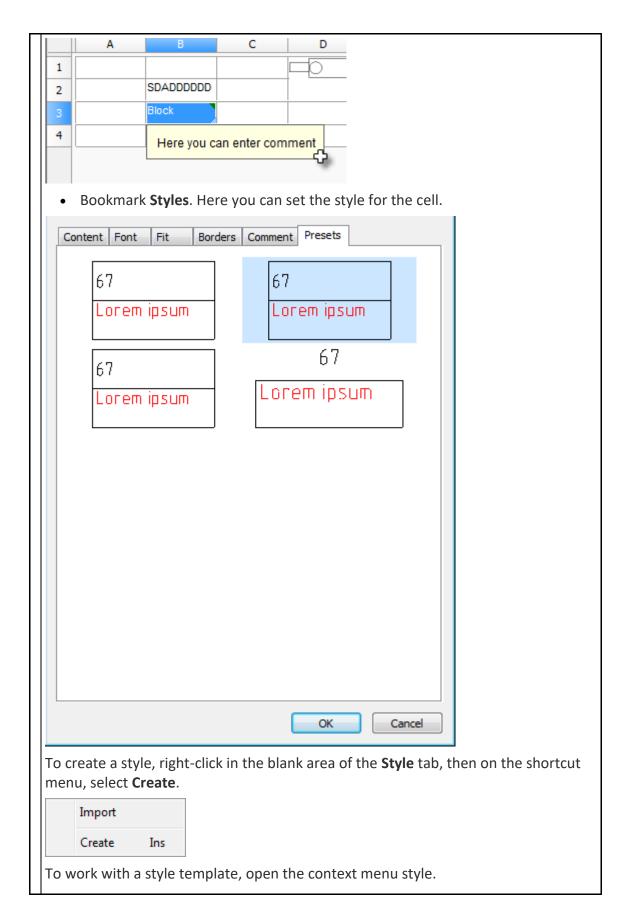
Mode *Occupy extra row* does not change the number of rows in the table, the desired row is made higher by the required number of times and line.

 Bookmark borders. Here you specify the type, color, thickness of the boundary line of the selected cell, you can manage the display of individual cell borders.
 Enable or disable the display of individual boundaries, you can use buttons











Using styles

Style assignment to table cells is performed by the command "Select cell style" in the toolbar of the table editor or tab "Fit" in dialogue "Cell properties". he choice of style is carried out in the graphics window. Also, styles can be created and edited using the context menu.

Context menu

- Apply the command applies the selected style on the cell (group of cells).
- *Update* the command replaces the selected style with the style of the selected cell.
- *Rename* command allows you to rename the name of the style. The name of the style is generated automatically during creation.
- *Delete* command removes the selected style from the list.
- Import command imports style in * .mcd format.
- Export command exports the style in * .mcd format.
- Create command allows you to create a new style.

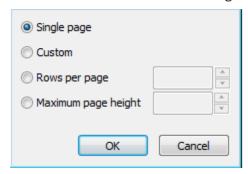
Creation order:

- 1. Set the cell style.
- 2. Open the style window
- 3. Select the "Create" context menu command.
- 4. A new style will be created. The name of the style is generated automatically during creation.

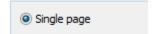
Division by page

Division by page. tool is designed to separate the table into separate parts, without losing its integrity. With this feature, you can split a large table in order to place a format, while preserving the ability to edit the table as a single object.

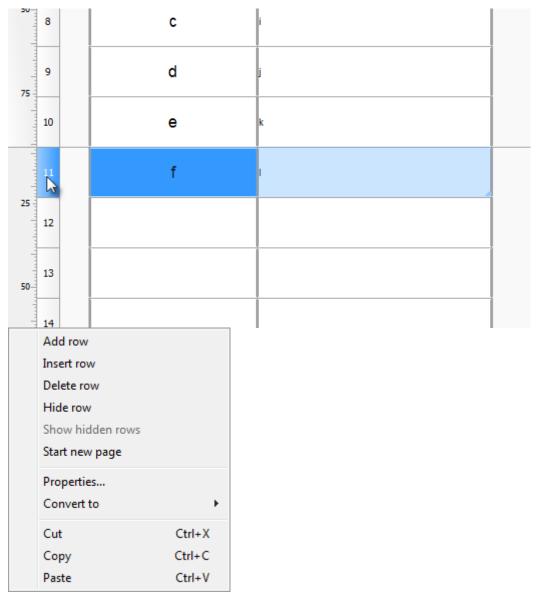
• When the command a dialog box appears page division.



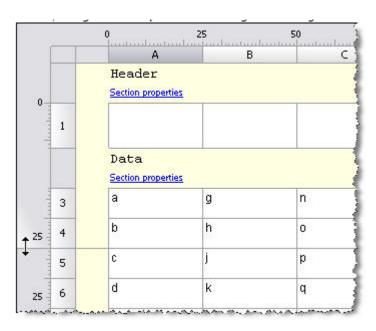
- Switch single page disables table division.
- Select the method of dividing the table:
 - 1. Custom- The table can divided into any parts.



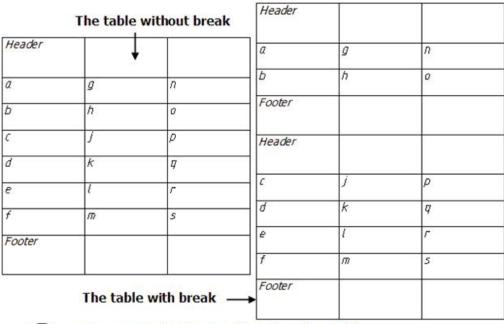
Page break before a row is set by start new command from the context menu.

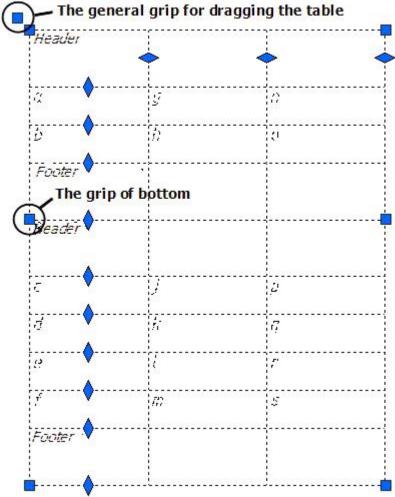


Close the dialog. The editor of the table indicate the boundaries of the gap, with the help of it, you can change the row height.

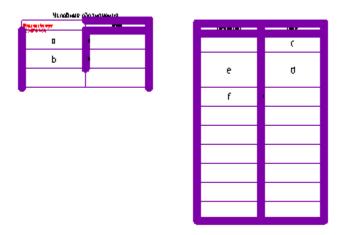


On the drawing table with a gap will be as follows:

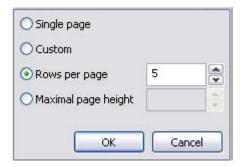




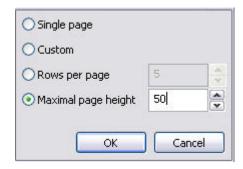
Side of the split table can be moved in the drawing independently, doubleclicking on any part of the full table editor opens.



2. By row count enter the desired number of rows in a fragment. Headers do not count.



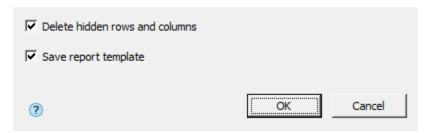
By table height enter the total height of a fragment, in millimeters, using the current scal.



Dividing the table into parts allows each part tobe moved independently:

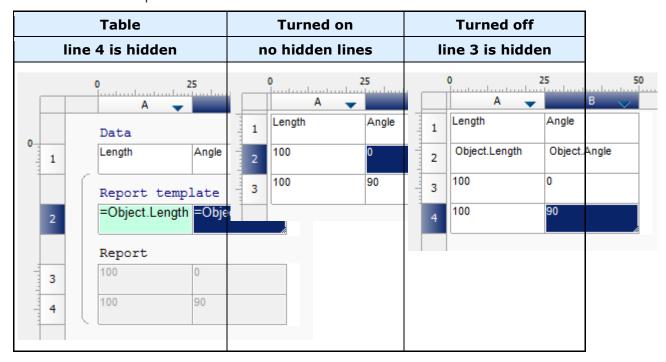
Conversion options

The "Conversion options" dialog is a filter that influences the set of transmitted data. Appears when converting a report to data and when exporting a table to Excel.



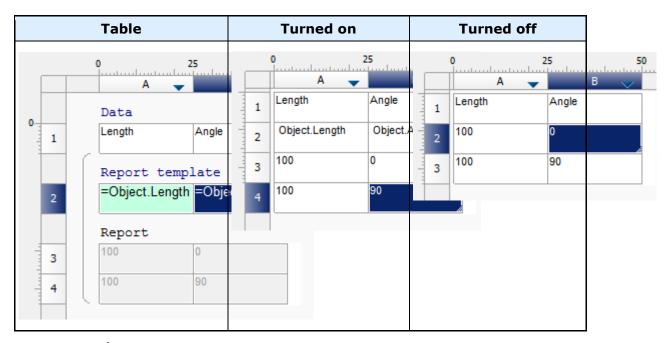
Converting a report to data

Delete hidden rows and columns - affects the conversion of hidden strings. If enabled, hidden rows are not passed to the data.



Note: The converted hidden lines remain hidden.

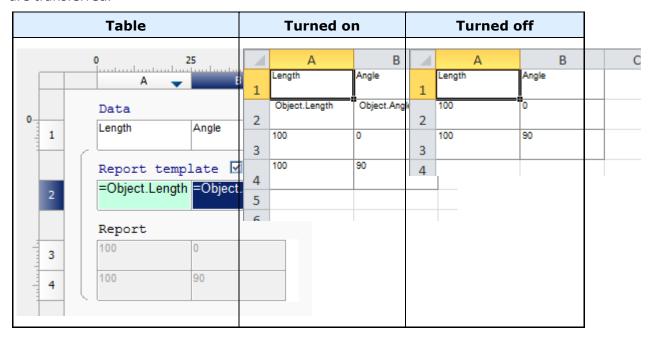
Save report template - affects the conversion of report template strings to data. If enabled, strings are transferred.



Export to Excel

Delete hidden rows and columns - the option does not affect the result, since hidden rows are not exported.

Save report template - affects the export of report template strings. If enabled, strings are transferred.



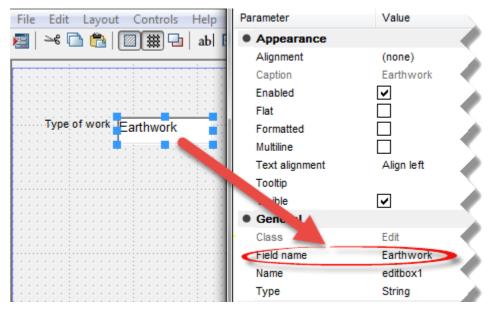
Using Variables

Important! This function is available only in vertical applications based nanoCAD

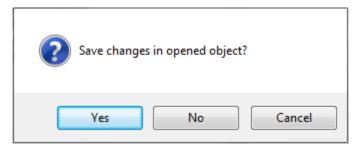
Tables BuildIndustry support the use of additional variables defined in a special dialog (form).

Procedure for creating a set of user-defined variables and their use in the table below:

- 1. In *full table editor* from the menu **Edit** invoke the command **Form Editor**.
- 2. Create a form with controls and bind each control to a field (variable). More information about the forms, see *Form Editor* .



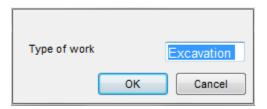
3. Close the form editor and save the form.



4. To set the variable, call the command **form**.



5. Open your form. Enter the desired values. Click **OK**.



6. Linking table cells with custom variables by using *formulas*.



Cell value will be associated with the variable.



Variables can also be used in complex formulations.

Create reports

Reports are necessary in order to organize the data of objects in the drawing.

Recommended report structure:

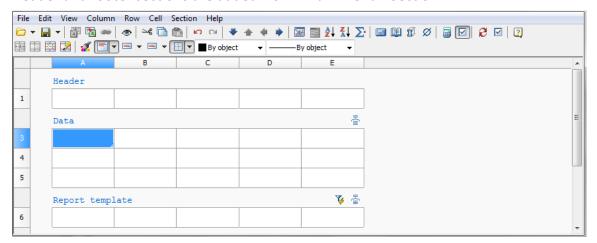
- Header of first page;
- Header of following page;
- Header of last page;
- · Report title;
- Report template;
- Report;
- Report summary;
- Footer of first page;
- Footer of following page;
- Footer of last page;

Generating a report

To create a report in the table editor, call the command from "Main menu - Section - Insert Report section". The command will create a subsection "Report template".

Additional subsections are added using the "Report template" menu: "Report title", "Report Summary".

Header and footer sections are added from "Main menu - Section".



Report template

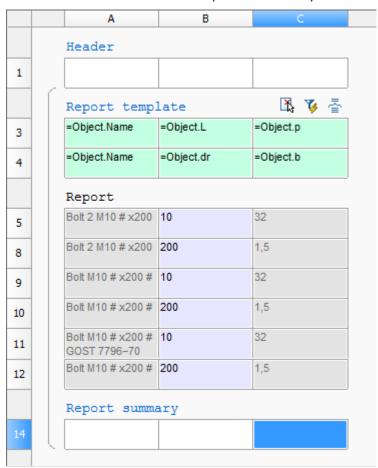
The report template defines the content and appearance of the report; it can consist of one or several lines. A separate copy of the report lines is created for each object. Formulas in the report are calculated using the properties of the selection objects.

The following commands are available in the "Report template" menu (click on the subsection name):

- "Object filter..." opens the "Quick Selection" dialog for forming a selection of drawing objects. The command is duplicated by the ♥"Select source objects" button on the right in the "Report template" section.
- "Merging and Grouping..." opens the "Row grouping and merging" dialog in which the parameters of grouping and merging table cells are configured. The command is duplicated by the "Group and merge" button on the right in the "Report template" section.
- "Freeze report" the switch controls the report refresh mode. If the checkbox is selected, the update is performed manually, and the "Update report" command becomes available.
- "Update report" refreshes the values of report objects, the command is available in manual refresh mode.
- "Report header" adds a "Report Title" subsection to the beginning of the report, displayed at the beginning of each part of the table.
- "Append Data section" adds a data section below the report. If the section already exists, an additional line is appended.
- "Append Report section" adds a new report below the current one.
- "Remove Report" deletes the report with all associated subsections.

- "Rebuild" completely rebuilds the report based on the report template. Data entered manually in the "Report" section will be overwritten.
- "Convert to Data section" the command converts sections of the report to data.
 Blank lines are not converted. Calling the command opens the <u>"Conversion options"</u> dialog.
- "Report footer" Adds the "Report Summary" subsection to the end of the report, displayed after each part of the table.

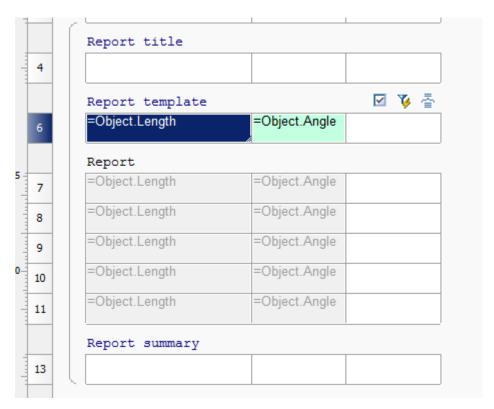
All related subsections of the report are visually combined with brackets.



Important! The report template has absolute priority over custom changes. After the refresh, the report colored by the user will become the same as the specified report template. Automatic report lines corresponding to the collected objects will be automatically formatted strictly according to the report template.

Report

The "Report" displays the values of the template variables.



The report contains cells (with a lilac background) containing object data, marked with a special color. Selecting cells highlights the corresponding objects in the drawing.

When editing such cells, the changes will be applied to the very object to which they refer. For instance:

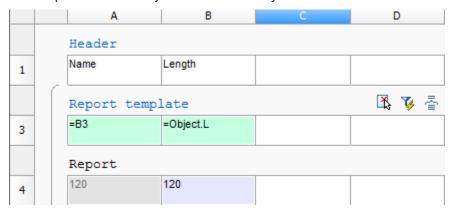
1. Take a Bolt GOST 7795-70 with a length of 50 mm and place a leader on it.



2. Create table, report template and tie to bolt (parametric object).



3. Add parameters: Object.Name and Object.L.



- 4. Enter the new length, for example 120. Close the table editor.
- 5. The length of the bolt in the drawing has changed.



Report title

The following commands are available in the "Report Title" menu (click on the subsection name):

• "Remove section" - deletes the "Report Title" section.

Report summary

The following commands are available in the "Report Summary" menu (click on the subsection name):

• "Remove section" - deletes the "Report Summary" section.

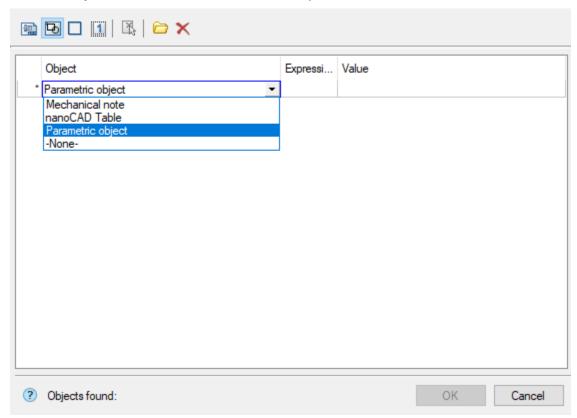
In the context menu of the "Report Summary" cells, there are the following additional commands: "Sum", "Average", "Minimum", "Maximum", "Count".

The commands insert into the selected cell corresponding to the name of the expression. The action is applied to a fragment of a column within one section.

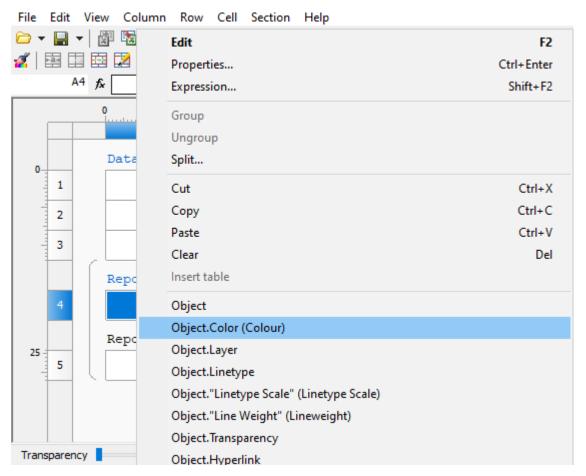


Report Template

- 1. Call up the "Quick Selection" dialog box. Use the "Filter Objects..." command of the "Report Template" menu or the "Select Source Objects" button on the right in the "Report Template" section.
- 2. Use the "Quick Selection" dialog to filter the objects and click the "OK" button. The selected objects will be associated with the report.

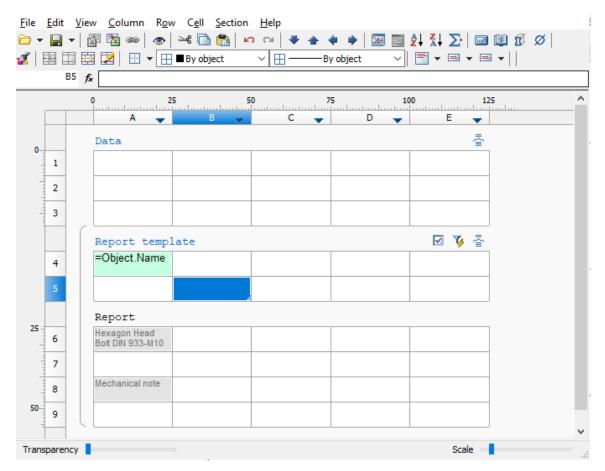


3. Select a cell in the "Report Template" section. In the context menu of the cell, the parameters of the related objects will be available for insertion.

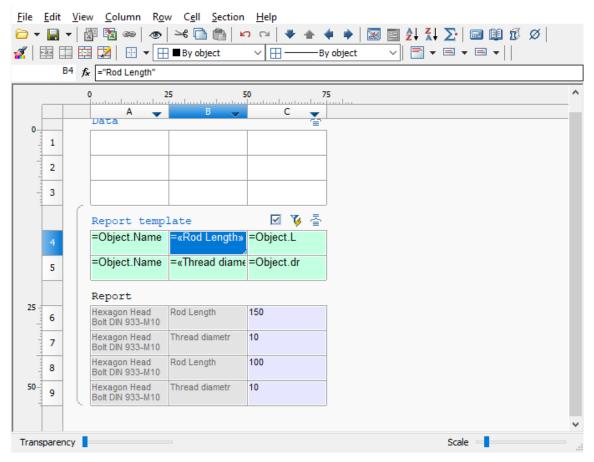


5. Select an option from the context menu. The "Report" subsection will be automatically created. The number of lines in the "Report" subsection corresponds to the product of the number of related objects and the number of template lines.

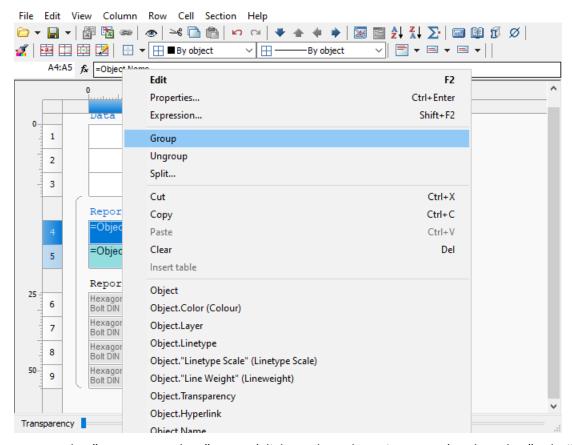
The report template can consist of several lines. To add rows in the context menu of the "Report Template" row, use the "Add Row" or "Insert Row" commands.



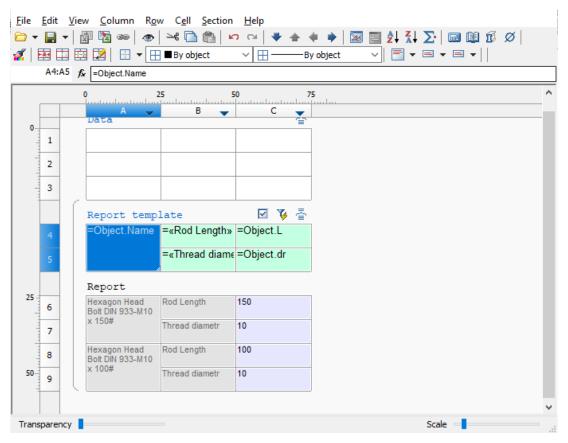
Rows in a report template can be combined. Changes will be displayed in the "Report" section. Let's consider a join using the example table below:



• Select cell A1:A2 and select the "Group" command from the context menu. The selected cells will be grouped.



• In the "Report template" menu (click on the subsection name), select the "Rebuild" command. The table will look like this:

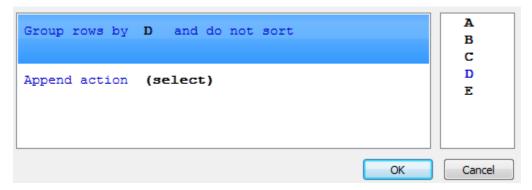


- 6. Fill in all the required cells of the "Report Template".
- 7. The sample is formed. Close the table editor. Changing the parameters of objects in the drawing will change the values in the report.

Grouping and merging cells

Button **Grouping and merging**. Report template.

In the *Grouping and merging* dialog you can specify settings for grouping and merging table cells. Grouping and merging are only applied to cells in the *report template*.

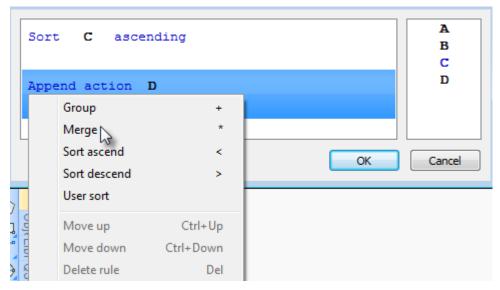


Study the example for how to merge cells.

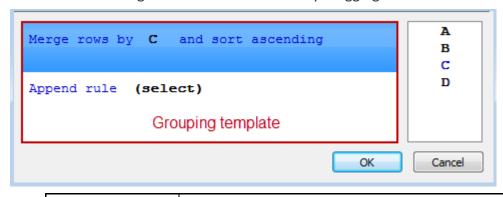
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	Data					
	Section prop	<u>erties</u>				
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4	GOST 12	205-72	Leg7034-018	5(40		20
5	GOST 12	204-71	Leg7034-060	0(80		20
6	GOST 12	205-71	Leg7034-017	40 12		10
7	GOST 12	205-72	Leg7034-018	3(25		20
8	GOST 12	204-71	Leg7034-059	4(40		14
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Merging

1. In the **Grouping and merging** dialog box select **Append rule** and select **Merge**.



2. Select the column name for the cells you want to merge. Selection is made by double clicking on the column name or by dragging it into the **Select** field.



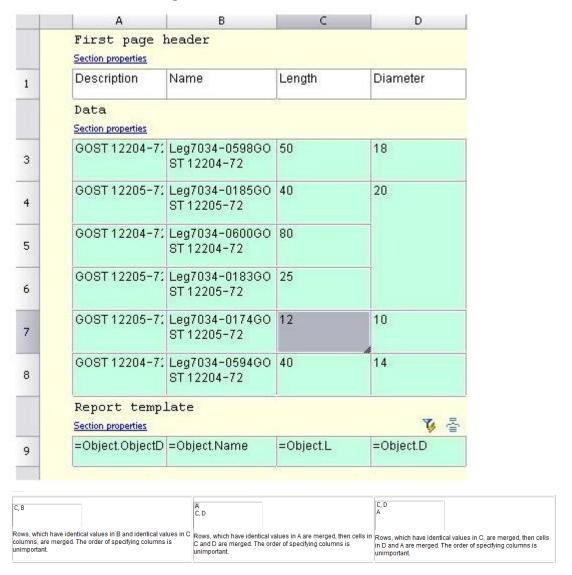
Note: To select another column, you must drag it into the column list and then select it. You can select several columns then place them in the required order.

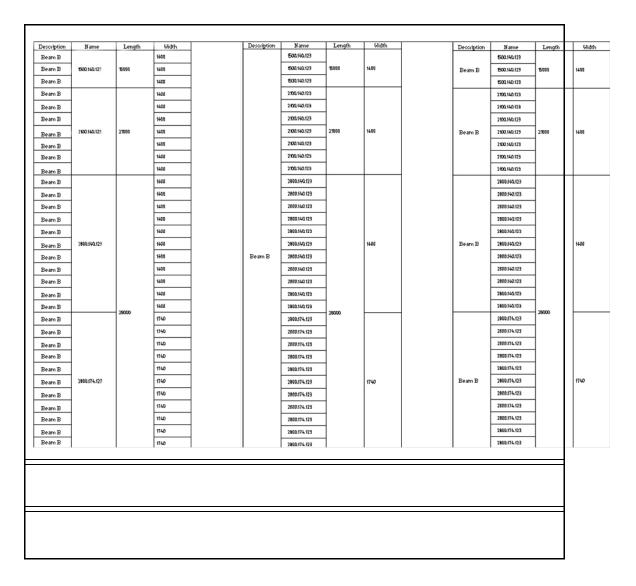
The columns are processed according to the rules of the **grouping remplate**.

3. If you want to sort, select and don't sortand sorting, and select sort type.



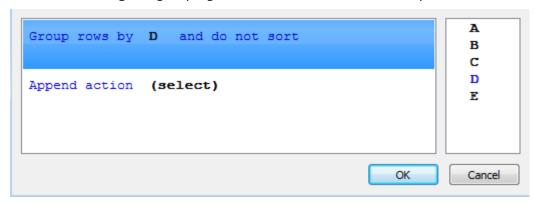
4. Click *OK* to check the result in the table editor. Cells having identical values in the D column will be merged.



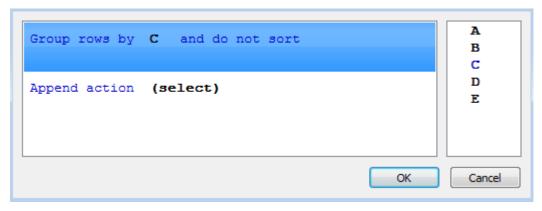


Grouping

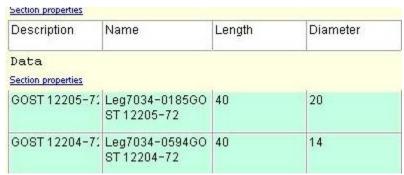
1. In the dialog box groupings and click Add Rule select Group.



2. Select the name of the column whose cells you want to group. Choice is either by double-clicking on the column name, or by dragging it into the *Select*.



- 3. If you want to sort, click on the link and sorting, and select the type of sort.
- 4. Click *OK* to view the results in the table editor. Table rows that contain the same values ??in column *C*, will be grouped.



Interface Expression Editor

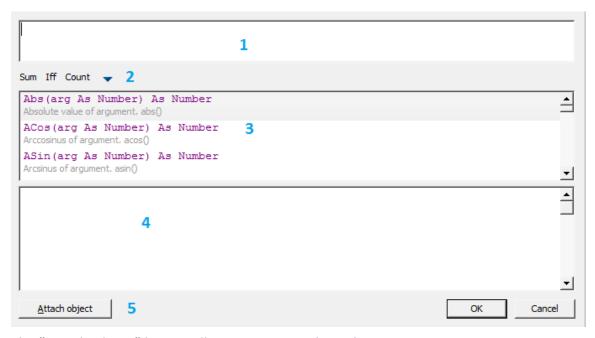
The Formula Editor (Expression Builder) allows you to set parameters, arithmetic expressions, and object property references for a selected table cell.

The formula editor is invoked:

- By clicking on the "fx" button in the formula bar;
- By pressing Shift + F2;
- · Right-click upward;
- From the context menu command "Expression ..".

Dialog

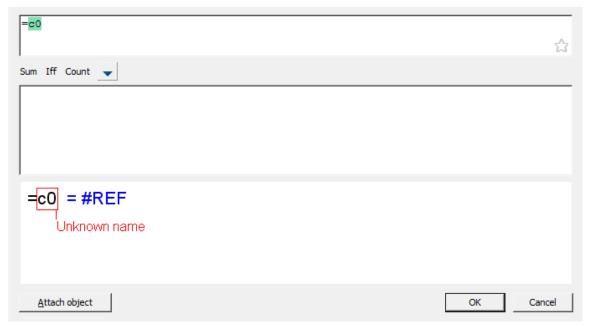
The dialog box consists of the "Expression Input Field", "Formula Templates", "List of Registered Functions", "Quick View Fields" and the "Attach object" button.



The "Attach Object" button allows you to attach to objects.

At the top of the dialog there is an expression input field, with which you can manually enter any arithmetic expressions, as well as use reserved variables and object properties.

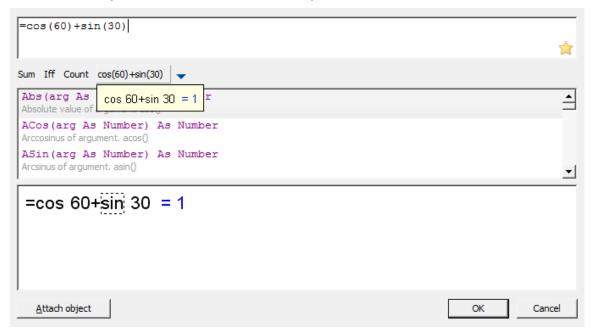
When entering manually, a list of functions and variables containing the word being entered appears in the list of reserved functions; syntax is also checked. If the formula is incorrect, an error warning or hint will appear in the Quick View.



In the quick view field, by clicking the mouse on an expression, the text in the input field related to this expression is selected.

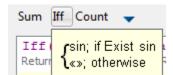


When you click on the putton in the "Expression input field", the entered expression is saved on the formula templates panel for quick recall. Pressing the button again removes the expression from the formula template.



The "Reserved Functions List" contains recently used expressions that are highlighted in yellow. When you click on the button, expressions are saved in the Formula Templates panel for quick recall. Expressions that are in the Formula Template Bar in the Reserved Functions list will be marked with an asterisk. Pressing the button again removes the expression from the formula template.

When you hover the cursor over the button of the saved template, a tooltip will appear with the contents of this template.



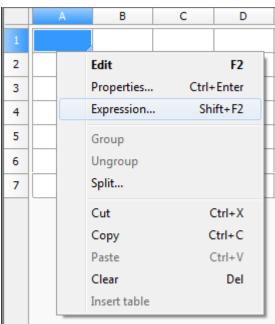
In order to insert an expression from the "Formula template", place the cursor in the required position, press the button with the template.

To delete an expression template, click the triangle button and uncheck the required template in the list that appears.

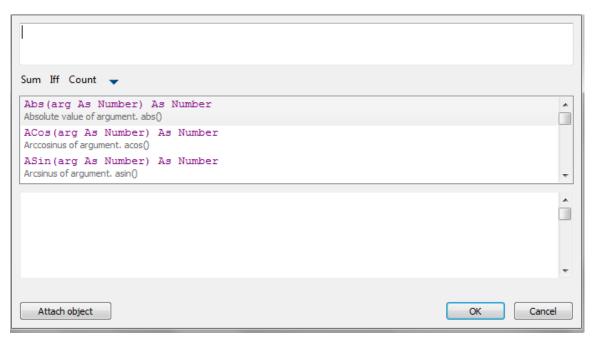
Binding to a table cell

In the formula, you can use any cell values of the properties of another object. If using automatic recalculation of the table, the formula object is automatically recalculated. Each cell can attach one or more objects. Objects are named Object1, Object2, and Object3, ... sequentially numbered in the table. If the object is not used in a formula, it will detach from the table at the next calculation, and the object references are renumbered.

Binding properties for drawing objects to a single cell then use the **expression** or the keys *Shift+F2*. Available in the context menu of the selected cell.

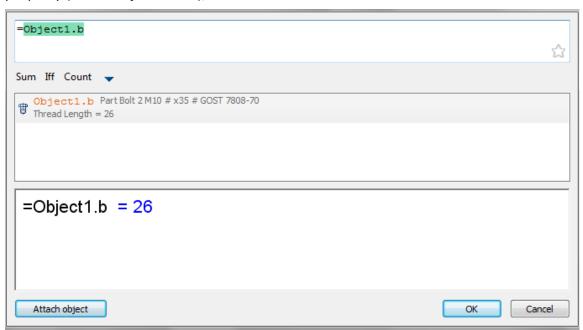


After selecting the command window opens the Expression Builder.



Click Attach it.

Select the object whose data you want to send to the table (eg, Bolt M52). Now the list of expressions appears in the properties of the selected object. Double-clicking on the property (select Object.Name), adds it to the text in a cell. Click **OK**.



After connection of the facility to the cell the cell color changes (it says that the formula in the cell) and it will display the calculated result, in this case the name of the object:



Functions in the Formula Editor

Mathematical operations:

+	Addition
-	Subtraction
*	Multiplication
/	Division
۸	Involution
sqrt()	Rootsquaring

Logical comparison and selection:

==	equally
>	more
<	less
!	not
I	or
!=	not equal
>=	not less
<=	no more
П	or
&&	and

Functions:

math:

Cos, Sin, Tg - trigonometric functions, the argument given in degrees.

Acos, Asin, Atg - inverse trigonometric functions, the result is given in degrees.

Abs - absolute value of (module).

Int - rounding to whole number.

Summ - returns the sum of the values of the variables in a grouped cells.

Note: When you type a function should pay attention to the opening and closing brackets.

For example:

Summ(Row) - returns the sum of the numbers of grouped rows..

Summ(Standartnaya_detal.L) - returns the sum of the values ??of the L parameter object "standard part" in the grouped rows.

data conversion:

Str - Data conversion to a string type.

Num - conversion of data into a numeric type.

Frm - convert a numeric value to a string formatted according to the <u>settings of a table</u> column.

For example:

Frm(0.001230) returns a string 0,0012, if the column containing the cell is set to zero suppression and accuracy of 0,0000

selection and comparison:

FmtText - Addition formatted strings.

FmtSub - the creation of a subscript.

FmtSuper - create superscript.

FmtDigit - transfer number in hard copy.

FmtRaw - text without formatting.

DmtDiv - creation of fractions.

If/Iff - The logical choice. Recording Format:

if (Logich Uslovie; Esli Istina; Esli Lozh)

where:

Logich_Uslovie - logical condition using logical comparisons (see above);

Esli_istina - the return value when the logical condition;

Esli_Lozh - return value at default logical condition.

For example:

if(object == Marker_universalny; Marker_universalny.position; "Undefined") . If an object type, which is connected with the cell column has Marker_universalny value, the function returns the position value of the referenced object. Another type of object it returns a string Undefined .

Exist - Checks whether there is a constant: =IF(EXIST(Object.Name);Object.Name;0)

Min/Max - returns the minimum / maximum value listed in parentheses

For example:

Min(maskimalnoe_znachenie; MinValue) - nourishes MinValue;

Max(maskimalnoe znachenie; MinValue) - returns maskimalnoe znachenie.

Count - returns the number of objects (for grouped rows in the table).

For example:

Count() - returns the number of objects associated with cells grouped rows.

Avg - Calculates the arithmetic mean of the arguments. Takes an arbitrary number of arguments understand ranges. Empty arguments are ignored.

Off - returns the value of the cell, given the relative index. The index is written in the format:

Off(string; column)

For example:

Off(-1;2) - returns the value of cell in the table on one line above (-1) and two columns to the right (2) of the current

Cell - the cell returns the value specified absolute index.

Merge (Cells, Expression) - brings together a range of Cells, if Expression is not equal to 0. Returns the value of Expression.

For example:

=merge(A5:C5; "Title") – integrates cell A5 to C5, in the summary displays the text "Title".

SetHeight() – reference line height. In brackets the height value.

Val() - computes the value of the argument.

For example:

=val("A"+"1") - calculates the "A1", and then uses it as another expression (obtained by the value in cell A1). If the argument - not a string, then he comes back, ie =val(10+2) - the same thing =10+2.

=val("summ(A"+Str(off(0;-1))+":D"+Str(off(0;-1))+")") - the amount of cells from rows A to D, the number which is introduced into the cell to the left of the current one. In most cases you can do without val. The classic example, when without it - no way: in a custom form, enter the cell address, then to take the value out of it. Create a variable Addr,

associate it with an input field on a form and in the table do so: = val (Addr) function allows recursion: = val (val ("A" + "1")) - to take the value of the cell whose address is recorded in cell A1. Nesting depth is limited to 64.

Geometry(Object) - works as **Implement object**. Height embedded object shrinks to the line height. Object is taken from the report, or attached to the cell.

SUMM(Section(-1)) - Sum of cells in the current column of the section next to the current.

COUNT(Section(A3)) - The number of rows in the section containing the cell A3.

Reserved variables:

Pi - pi.

Row - for each cell in the column it returns the number of rows (rows are numbered starting with 1, excluding the header lines).

Col - for all cells in a column returns the column number of the table (column "A" is number 1).

Object - returns the type of the object, which is associated with the cell line.

Object1, Object2, ... - objects attached to the cell.

Title - the name of the table.

RowCount - total number of rows.

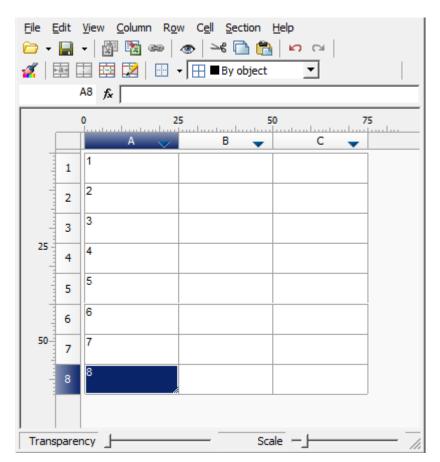
ColCount - the total number of columns.

Split the table by pages

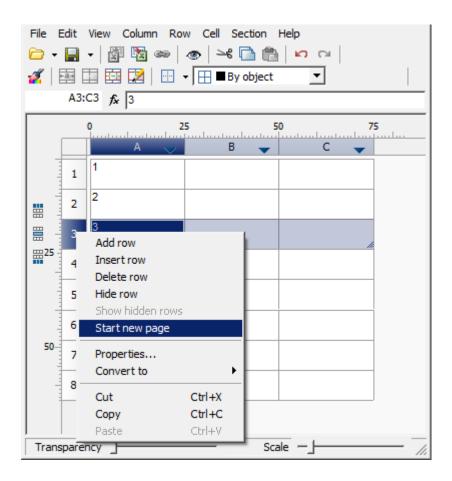
The "Split the table by pages" tool is similar to the "Division by page" editor tool, but the result is not a split single table, but several separate tables.

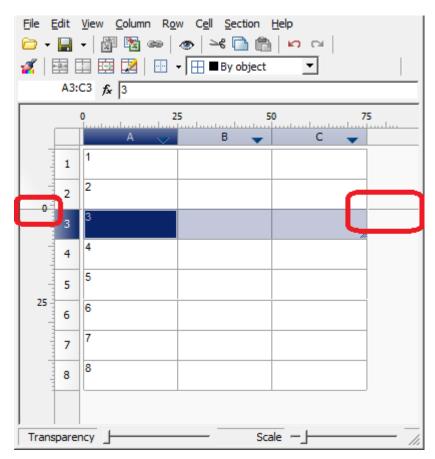
Procedure

1. Open the table for editing.

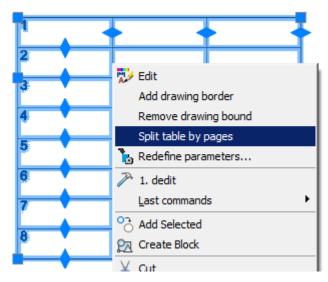


2. In the places where the break will be, set the break with the command "Start new page".





- 3. Close the editor.
- 4. Select a table.
- 5. From the context menu, select the "Split table by pages" command.



6. The table will be split into separate tables. The separation will occur at the places of the established breaks.

	+	-	
2			
4			
5			
6			
7			
8			

1	
2	

3	
4	
5	
б	
7	
8	

Note: If the command is applied to a report, the following destructive actions are performed:

- 1. The report is converted into static tables.
- 2. All connections with objects are broken.
- 3. All formulas are removed, and the cells begin to display the previously formed text.
- 4. Rows with report titles are hidden so that the display of the table in the drawing is not changed.

Recalculation all tables in the drawing

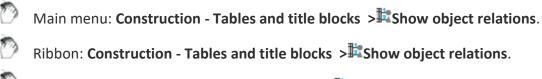
Command line:SPRECALCTABLES.

The command recalculates data in all tables on the drawing. When recalculating, autorecalculation locks and report freezes are ignored. The "Reports" and "Recalculate" options are used during recalculation.

Procedure

- 1. Call command TRecalculation all tables in the drawing".
- 2. The recalculation will be carried out.

Show object relations



Toolbar: Construction Tables and title blocks> Show object relations.

Command line: SPREFSHOW, .

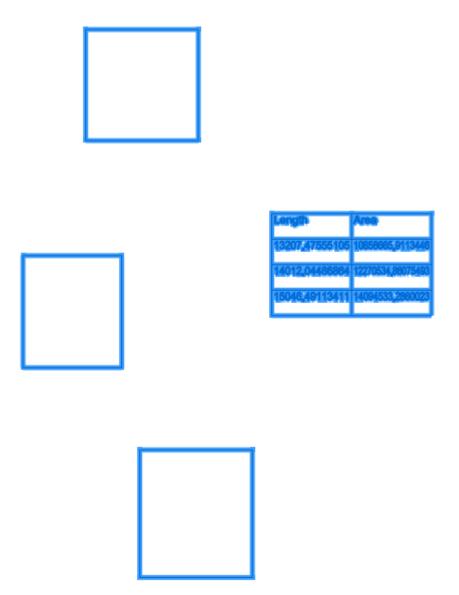
The command visualizes relations between objects.

Procedure

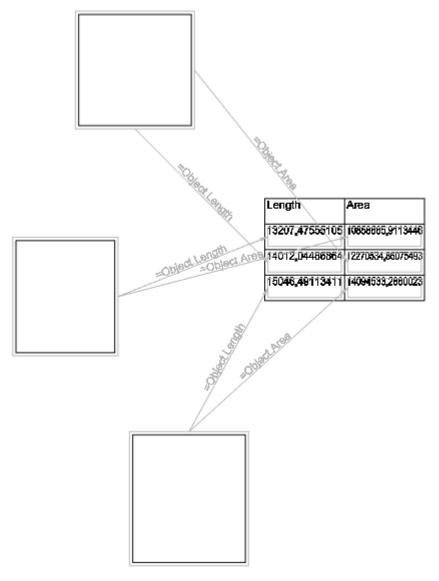
1. Call command **Show object relations**.

	"	Area 10858885,9113446
		12270534,86075493
	15046,49113411	14094533,2880023

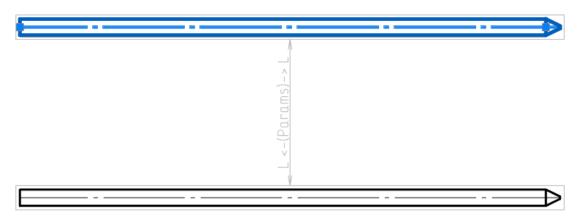
2. Specify the objects whose relationships you want to display.



3. Press " ${\it Enter}$ " to confirm your selection. The relations will be displayed.



Linked objects are framed with a frame. Objects are connected to each other with an arrow and a caption. The arrow can be two-sided if the link is bidirectional. The caption above the arrow contains an expression that is passed from one object to another.



An example of bidirectional relation.

Drawing borders

Working with standard formats

Main menu: Construction - Tables and title block - 🖫 Drawing title/borders.

ॐToolbar: □Drawing title/borders ("Tables and title block").

Command line: SPFORMAT, FORMAT.

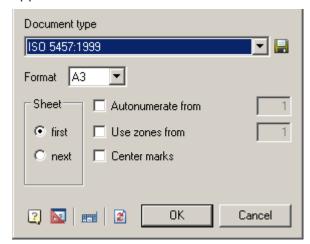
- Filling in the fields of the title block
- Drawing title/borders recognition

Fundamental rules

Each format type is an element of the database nanoCAD Construction 25, which is located in the folder "Drawing border templates" library nanoCAD Construction 25.

emplates major labels and additional fields are located in the subfolder formats "Title block templates". Renaming or deleting existing items in the folder "Drawing border templates" would make it impossible to insert existing formats.

Insert the format by clicking on the icon Drawing title/borders. This dialog box appears *Format*:



This window is defined by:

- Format.
- · Sheet.
- · Autonumerate from.

- Use zones from.
- · Center marks.

After selecting the type of document, as well as the size and orientation of the sheet is inserted into the selected format.

- To edit the frame size, double-click the left mouse button on the contour of the frame.
- To edit the text in the title block, double-click on the text of the left mouse button.
- To edit entries in the title block, double-click the left mouse button on any line of the title block.

If you remove the first sheet of the scope of its information from the title block is automatically transferred to the second sheet.

To save the settings template attached stamps and their parameters in the database, click on the button , then enter the path stored in the database and the template name.

General Principles

To change the line frames the template files, edit the frames and other fields.

"Document Type" - Select the document type from the list format template in section database. Depending on the document type is changed appearance and availability of individual dialog items "Format".

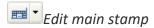
"Format" - the choice of the size of the sheet on the basis of standard size and multiplicity (not available for the types of documents based on the standard ISO, because the multiplicity inherent in the choice of format).

"Leaf" - the choice of template title block for the first or subsequent sheets.

"Orientation" - select page orientation (vertical or horizontal).

"Autonumerate from" - Automatic Numbering sheets. It lets you specify the number of the first sheet.

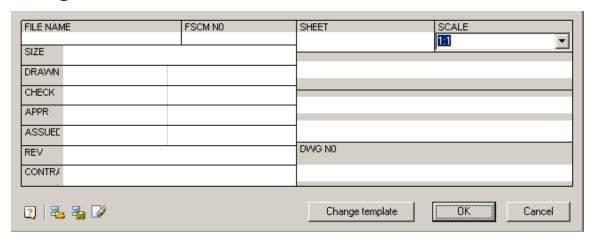
"Use zones from" - avtoprostanovka zones. It lets you specify the number of the first zone.



After you select the document type and size under the proposed set the insertion point of the frame. If you press Enter or right mouse button, the lower left corner of the frame is aligned with the coordinate 0,0.

Set default stamps - restores the template format those stamps which were overwritten while maintaining format template database.

Filling in the fields of the title block



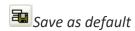
To fill the title block fields and additional graph, double-click on any line of the title block.

The main inscription is filled directly into the dialog box, "Stamp"

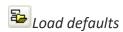
While filling in the title block previously entered information stored in the section "History" menu. To open the context menu, place the cursor in an editable field and click the right mouse button.

Recent values can be saved in the section "Recent" menu.

Automatically fill fields of the title block



The command saves the current filling of the stamp in the memory. In the following fields will be filled automatically stamp



The command loads the stored filling.



The team clears stamp field



The command opens a drop-down menu to change the pattern of the stamp.

Drawing title/borders recognition

Main menu: Construction - Tables and title blocks > □Drawing title/borders recognition.

Toolbar: Drawing title/borders recognition ("Recognition").

Command line: SPRECF.

Master recognition format enables automatic search and replace formats created from individual primitives nanoCAD, transforming them into an object of the "Format" nanoCAD Construction 25. Initial primitives are in the drawing.

Recognition takes place in two phases: the first searches for the formats in their dimensions, the second selected title block. Selection is made by comparing the serial patterns of stamps from the library with the existing geometric objects in the drawing. The remaining seals are installed by default. After the successful recognition format graphs stamps are automatically filled with values from the drawing, and the format is placed on the current layer.

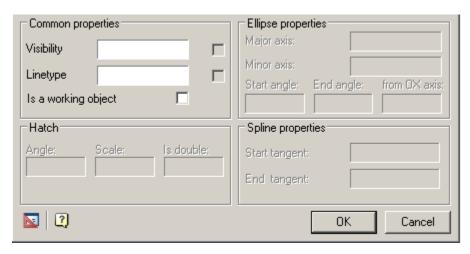
Creating custom formats and stamps

Before you create a custom size or stamp is necessary to draw a pattern nanoCAD means in accordance with the required desired view object being created. When drawing templates should adhere to the following rules:

- The template can contain lines, arcs, and circles, text (single-line and multi-line), the objects of the library of standard parts nanoCAD Construction 25, blocks nanoCAD;
- the thickness of the lines that are assigned to the template thickness is not equal to zero, and not "layer" to be adopted in accordance with the thickness of the closest standard value;
- the color lines and text included in the template will be saved according to the selected values;
- multiline text (mtext) is inscribed in the boundaries of the rectangular area of text is selected when you create it.

You can use overhead lines and graphic objects, which are not drawn when inserting format or stamp in the drawing.

To install a drawing object as a service, use the button "Set parameter" toolbar MechWizard, select the object, and in the dialog "Object properties" check the box "Is a working object":



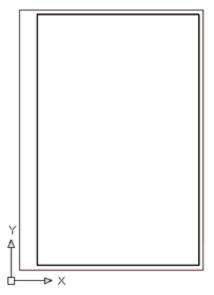
- Use the links in the templates
- New border wizard
- New title wizard

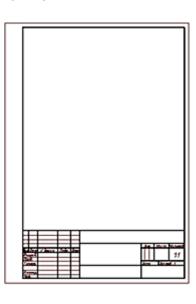
Use the links in the templates

Stamps in the format template

Custom format may contain links to templates stamps available in the library. To add a stamp in the format used by the relevant rules.

Stamp Position and orientation when you insert a drawing format will be determined by the insertion point and orientation of text links:





the figure shows the format template added referring to stamp basic inscription. When you insert a drawing format drawn stamp recorded in the library under the specified name.

the format can be added to any number of references to the stamps from the library.

Using text fields

In the pattern of the stamp may be used special signage text fields.

Text added to the template and starting with the single character "\$", is recognized as a reference pointer on the field (the Count) input. In the input field of the dialog box, you can edit the stamp to record the text (for example, the name of the developer or check). Name field can contain characters of the Latin alphabet and the national or spaces. Dimensions of the input fields are defined primitives surrounding the insertion point, the reference index. If you found another symbol "\$", the text after it considered the description field:

\$Field name [\$field definitions].

the contents of the text box will be displayed in the list of object properties.

To limit the size of the input field or eliminate overlapping fields in the dialog, you can use the service line.

To create a stamp based on an existing base in the sample, the sample to be inserted into the drawing by setting in the dialog box "Stamp" mode "Display field names" .

After insertion into the drawing die can be used as the layout of the new stamp.

Standard fields stamps have a description in Russian (GOST), English (ISO) or German (DIN) language, the values of the fields available in the list of object properties.

Name	Description	Contact with the properties of the document Inventor	Note:
\$Designation	Description	+	
\$DrawingName	Name	+	
\$Drawing type	Drawing View		
\$Material	Material	+	
\$Litera 1	Letter 1		
\$Litera 2	Letter 2		
\$Litera 3	Letter 3		
\$Mass	Weight		

Name	Description	Contact with the properties of the document Inventor	Note:
\$DimScale	Scale	+	Sets the size of generated within the format
\$Sheet	Sheet	+	Changes in the automatic numbering
\$SheetCount	Sheets	+	Changes in the automatic numbering
\$Add.text	Position the additional inspection		
\$Author	Developed	+	
\$Control	checked	+	
\$TechControl	Technical control	+	
\$Add.subject	Last additionally checked	+	
\$NormControl	the Regulatory Control	+	
\$Approve	Approved	+	
\$Author (sign)	Developer Signature		
\$Control (sign)	the signature checking		
\$TechControl (sign)	Signature of the technical control		

Name	Description	Contact with the properties of the document Inventor	Note:
\$Add.subject (sign)	Signature additional inspection		
\$NormControl (sign)	Text regulatory control		
\$Approve (sign)	the signature approving		
\$Author (date)	the date of	+	
\$Control (date)	Date of Inspection	+	
\$TechControl (date)	Date engineering controls	+	
\$Add.subject (date)	Date further verification	+	
\$NormControl (date)	Date of regulatory control	+	
\$Approve (date)	Approval Date	+	
\$Original #	Part Number script		
\$Sign & date 1	Signed and dated		
\$Instead #	Instead, inventory number		
\$Duplicate #	Inventory number duplicate		

Name	Description	Contact with the properties of the document Inventor	Note:
\$Sign \$date 2	Signed and dated 2		
\$Reference #	the reference number	+	
\$First use	the primary use	+	
\$Format	Format	+	
\$Enterprise	Enterprise	+	

In the pattern of the stamp can be used table nanoCAD Construction 25. Included in the stamp table when you insert a drawing can be edited as regular tables nanoCAD Construction 25 (except that the die table can not be modified in the editing mode screen).

Additional features

Converting from previous versions - In file defined fields for name mapping formats of old and new versions. If an entity applies the custom stamps of previous versions, the names of the fields, you can add them into the appropriate section of this file.

Integration with other objects nanoCAD Construction 25

Tables - Format allows you to use tables as stamps. This preserves virtually all the functionality built-in table.

Universal marker - The values of any fields format can be used in a universal marker.

Dimensions - When you create within the format size, the size takes out set in the title block of the format.

Legend roughness - The format may be associated with the designation of a roughness surfaces unspecified. Icon roughness is automatically transferred to the upper right corner of the format.

Property document - The value of the standard field format is synchronized with the attributes of the file in which it was created.

Technical conditions - Format calculates the coordinates of the columns to accommodate the technical requirements.

Attribute documents TechnologiCS - Exchange values between the fields and the format of the document attributes. You can set the matching fields automatically (by

the same name), and then specify manually. Establishing appropriate stored for later use.

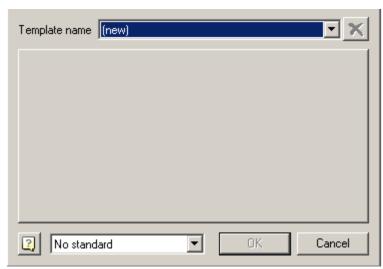
Zone format - The format can be calculated, is there any point in it. If so, you can receive the designation area containing the point.

New border wizard

Main menu: Construction - Tables and title block > Mew border wizard.

Toolbar: In New border wizard (" Tables and title block").

Command line: SPFORMATWIZ.



To change the existing format, select it from the drop-down list of templates. The field, located in the center of the panel will be a general view of the selected format.

To add a new format, select the drop down list "Template name" paragraph (new).

Click the left mouse button on the center field, select the drawing created by pre-layout format template, and confirm the selection click OK.

In the dialog box "Format creation" will be recognized image format.

If you create a new format after closing the dialog box by pressing OK, a dialog "Create element", which follows the format and select the name of the folder in the library of standard parts, which will save the created format:



By default the path "DB \ Drawing borders template". If you want to keep the format in another folder, press and select the folder that appears in your browser.

Creating a template format is similar to creating templates stamps. Embedded tables are not supported. The texts, starting with the single "#" character, determine the type and position of the stamp format. When you insert the size of the database will be loaded stamped with the name specified in the text (the symbol '#' is ignored and the text "main message" will be replaced with the box on a stamp with the name of "Title Block"), if it is in base. If the name starts with "\$" and contains only hexadecimal digits, it is interpreted as UID template stamp in the database. Coordinates, direction and alignment of the text will be applied to the stamp.

See stamp UID by inserting the drawing title block of the database **Note:** manager nanoCAD Construction 25.At the command prompt displays the hexadecimal object UID

Predefined templates are stored in the formats "DB \ Drawing borders template". It is recommended that the new template is stored in the same folder, but when loading the template can be seen the whole base.

Frame custom format has a fixed size - the one set in the template. There is a special recognition mode that allows the use of standard scalable framework with their stamps. To enable this mode, select from the list in the dialog master the standard by which the frame will be built. In this mode, all of the graphics in the template are ignored, except for text and bounding box. The frame can be of any size - in the final format it replaced with standard frame. All texts are considered names stamps. There are two variants of binding stamps:

- If the text begins with the "#" symbol, it is stored offset from the insertion point to the nearest corner of the bounding box.
- If the symbol "#" no stored offset from the text insertion point to the bottom left corner of the bounding box.

Note:

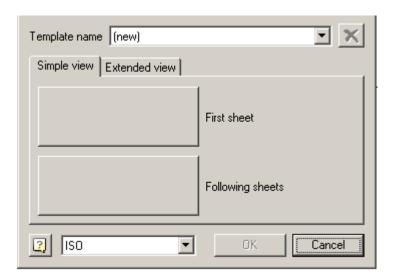
Standard sizes have patterns in the database - their patterns are embedded in the program code.

New title wizard

Main menu: Construction - Tables and title block > New title wizard.

Toolbar: New title wizard (" Drawing Title/Borders").

Command line: SPSTAMPWIZ.



To change an existing stamp, select it from the drop-down list of templates.

To add a new format, select the drop down list "Template name (new)".

A template stamp can have up to four different graphical representations: simple and full (advanced) type, including the form of the first sheet and the view for subsequent sheets.

Select one of the tabs: "Simple view" or "Extended view". Click the left mouse button on one of the fields marked with a stamp type, and select the drawing template you created earlier mock punch. Confirm the selection click OK.

In the dialog box "Create stamp" will be recognized image of the stamp.

If you create a new stamp, after closing the dialog box by pressing OK, a dialog "Create element", where you must enter the name of the stamp, and choose a library of standard parts folder in which to save the template created by the stamp:



New templates stamps recommend that you save to the folder "DB \ Drawing borders template \ Title block templates".

If the layout for the die table to use, it will retain its editing capabilities even being introduced to the format. For these tables are only supported editing in place.

The pattern die may be up to four types:

· the main type of the first sheet,

- he main type of follow-up sheets,
- an expanded view of the first sheet,
- an expanded view of the next sheet.

The texts, starting with the single character "\$" are recognized as the names of the fields. The editing dialog stamp they will be displayed in the form input fields. Name field can contain spaces and extended characters. Dimensions of the field defined primitives surrounding the point of its insertion. If you found another symbol "\$", the text after it considered the description field. This text will be displayed in the list of properties:

\$<name_field>[\$<description_field>]

To limit the size of the field or eliminate overlapping fields in the dialog, you can use the service line. This is a primitive with zero thickness or line marked as the utility from mcWizParam. Set the parameter.

If you set daw "Work object", then stamped on tobrazhatsya these primitives will not.

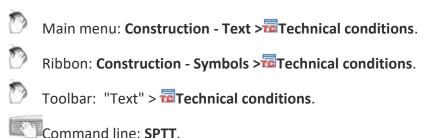
To create a stamp based on an existing base in the sample, the sample to be inserted into the drawing, and in his dialogue press "Show Field Names". View selected stamp button "View".

After that, the object can be divided (explode), edited and used as the layout.

The dialogue is a choice of the standard, which is taken from a stamp. This standard is used for the selection of the frame formats in recognition of the primitives.

Text

Technical conditions



A distinctive feature of nanoCAD Const

A distinctive feature of nanoCAD Construction 25 is the possibility of linking the designation of textual information on the drawing with the text in the technical requirements.

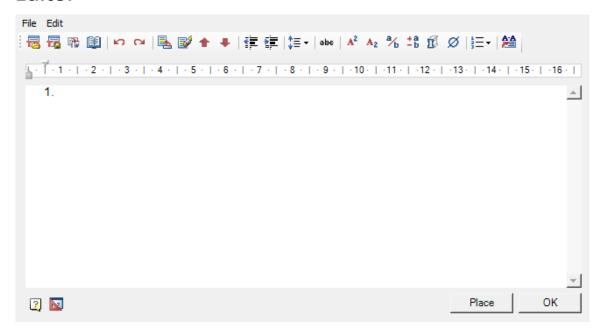
When writing paragraphs of technical requirements (hereinafter TC), you can make reference within the proposal of the paragraph of technical requirements to any position or affixed view.

The textual information is the tolerances and dimensions, drawing zones, designations of types, cuts, sections, marking signs, marking of welded joints, position.

A change in the value of the textual information (for example, a part position number) will result in an automatic change in the TC text. If this position has been deleted, a warning will appear about the need to check a particular item of requirements.

The relationship between the TC and the designation works in the opposite direction. Changing the order of the points of the requirements (their numbering) is automatically reflected in the designation on the drawing (for example, a marking mark, the designation of which contains the item number from the technical requirements).

Editor



Main menu

- File
 - Clear clear TC.
 - Open file the command opens the TC from a previously saved file.
 - Save file command saves TC to * .rtf file.
 - Close without save the command closes the TC editing dialog box without saving.
- Edit
 - Undo command cancels last action.

- Redo the command repeats the previously canceled action.
- Insert title command inserts a title in front of TC items.
- Delete title command removes TC title.

Toolbar

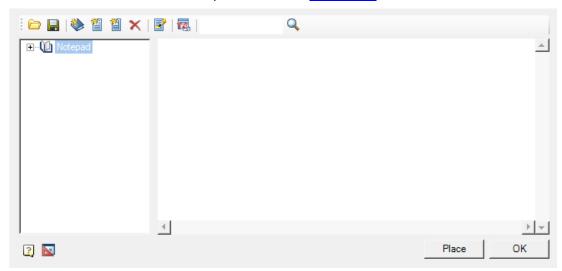
- Gopen file the command opens the TC from a previously saved file.
- Gave file command saves TC to * .rtf file.

Important! The special characters used in the editor are lost when they are transferred to an external file.

• Fill in MSWord - the command opens a new document in MSWord and inserts the text TC.

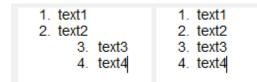
Important! The special characters used in the editor are lost when they are transferred to an external file.

• Wotebook - command opens interface notebook.



- Undo command cancels last action.
- ™Redo the command repeats the previously canceled action.
- Add paragraph (CTRL+ENTER) command adds a new TC item.
- **Delete** paragraph (CTRL+DEL) command deletes TC item.
- *Replace paragraph up the command moves the TC item at which the cursor is located, higher up in the list.
- *Replace paragraph down the command moves the TC item at which the cursor is located, down the list.

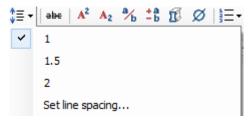
• #Decrease Indent - the command reduces the indent of selected items.



• **Increase** indent - command increases the indent of selected items.



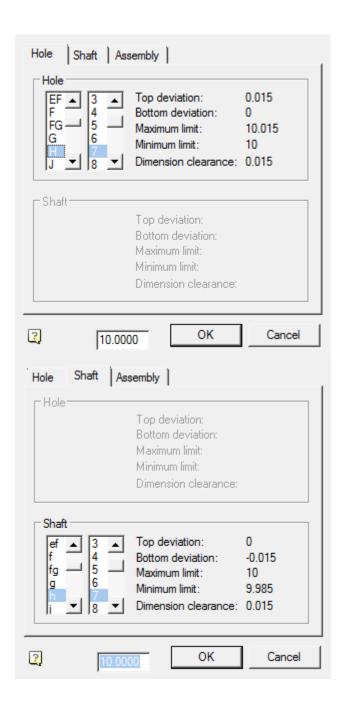
• *\subseteq Line Spacing - the command opens the list for setting the line spacing. Adjust line spacing of selected items.

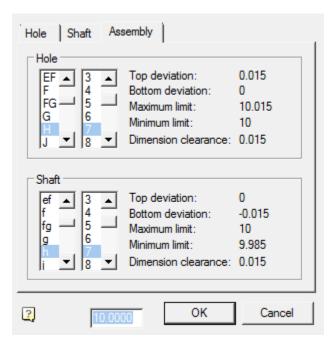


- 1 set 1 leading (unit for measuring line spacing). Line spacing is added after the TC item.
- 1.5 set 1.5 leading. Line spacing is added after the TC item.
- 2 set 2 leading. Line spacing is added after the TC item.
- Set line spacing... the command allows you to specify your own line spacing. Line spacing is added after the TC item.
- A Superscript translates the selected text into superscript.
- 1. text¹¹22
- * Subscript translates the selected portion of the text into a subscript.
- *Insert fraction the command calls the "Fraction" dialog box in which the numerator and denominator are specified. The fraction is inserted into the text TC.

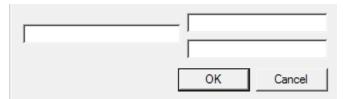


• -BInsert tolerance - provides the ability to insert a tolerance. When called, the "Tolerances" dialog box opens.





• Insert material - provides the ability to insert material. When called, opens the "Material" dialog.



- ØInsert spec symbol allows you to insert special characters in the text TC.
- = Numeration the command allows you to select the design option for TC items.



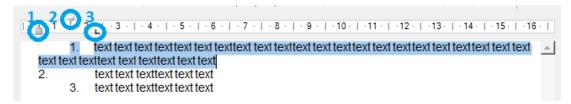
Note: To create a hierarchical list it is necessary to press the "Tab" key on an empty item. A new child level has been created. To return to the previous level, press the "Enter" key on an empty item.

• Minsert view/cuts - the command associates text fragments in TC with a graphical representation of views, sections and sections in the drawing.

To insert a link in the TC editor, place the cursor on the insertion point of the associated symbol and click on the "Insert view / cuts" button, select the view, section or section.

Related information is displayed in blue in the TC editor. When you click on a link, the application will display the associated graphical representation.

• Ruler. The ruler is used to position the lines relative to the entire TC document. Sliders are used to position the lines.



- 1. The bottom slider adjusts the indentation of all paragraph lines except the first line.
- 2. The top slider adjusts the indent of the first paragraph line.
- 3. The angle slider adjusts the text indent from the numbered list marker.

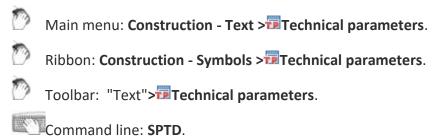
Context menu

The context menu uses standard commands for text fields.

Setting text options

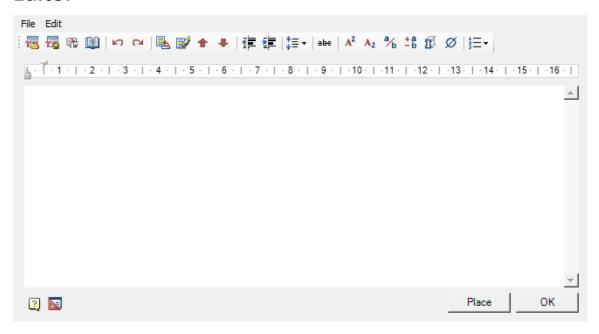
To set the TC text parameters (font height and slope, indent from the title block, etc.) open the dialog box "Settings".

Technical parameters



Working with the technical description editor is similar to working with the TC editor. The main difference is that the typed text can be placed anywhere in the drawing.

Editor



Main menu

- File
 - Clear clear TP.
 - Open file the command opens the TP from a previously saved file.
 - Save file command saves TP to * .rtf file.
 - Close without save the command closes the TP editing dialog box without saving.
- Edit
 - Undo command cancels last action.
 - Redo the command repeats the previously canceled action.
 - Insert title command inserts a title in front of TP items.
 - Delete title command removes TP title.

Toolbar

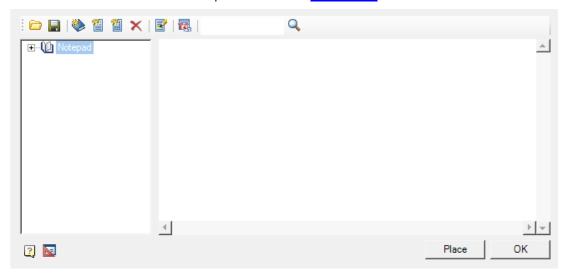
- Gopen file the command opens the TP from a previously saved file.
- Gave file command saves TP to * .rtf file.

Important! The special characters used in the editor are lost when they are transferred to an external file.

• Fill in MSWord - the command opens a new document in MSWord and inserts the text TP.

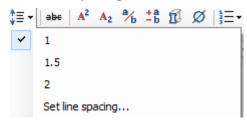
Important! The special characters used in the editor are lost when they are transferred to an external file.

• Wotebook - command opens interface notebook.



- Undo command cancels last action.
- ™Redo the command repeats the previously canceled action.
- Add paragraph (CTRL+ENTER) command adds a new TP item.
- Delete paragraph (CTRL+DEL) command deletes TP item.
- *Replace paragraph up the command moves the TP item at which the cursor is located, higher up in the list.
- **Replace paragraph down the command moves the TP item at which the cursor is located, down the list.
- **Decrease Indent the command reduces the indent of selected items.
- - Fincrease indent command increases the indent of selected items.

• *\subseteq Line Spacing - the command opens the list for setting the line spacing. Adjust line spacing of selected items.



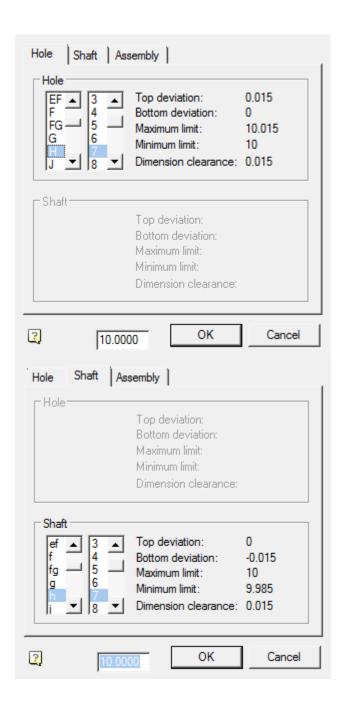
- 1 set 1 leading (unit for measuring line spacing). Line spacing is added after the TP item.
- 1.5 set 1.5 leading. Line spacing is added after the TP item.
- 2 set 2 leading. Line spacing is added after the TP item.
- Set line spacing... the command allows you to specify your own line spacing. Line spacing is added after the TP item.
- A² Superscript translates the selected text into superscript.

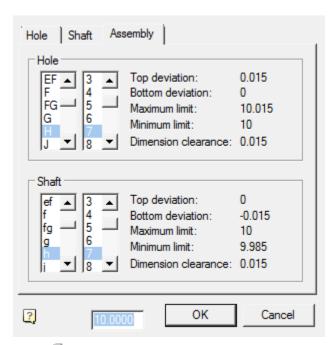
text¹¹₂₂

- A Subscript translates the selected portion of the text into a subscript.
- *Insert fraction the command calls the "Fraction" dialog box in which the numerator and denominator are specified. The fraction is inserted into the text TP.

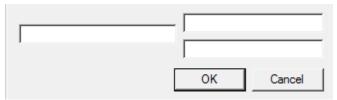


• † Insert tolerance - provides the ability to insert a tolerance. When called, the "Tolerances" dialog box opens.





• Insert material - provides the ability to insert material. When called, opens the "Material" dialog.



- ØInsert spec symbol allows you to insert special characters in the text TP.
- = Numeration the command allows you to select the design option for TP items.



Note: To create a hierarchical list it is necessary to press the "Tab" key on an empty item. A new child level has been created. To return to the previous level, press the "Enter" key on an empty item.

• Ruler. The ruler is used to position the lines relative to the entire TP document. Sliders are used to position the lines.



1. The bottom slider adjusts the indentation of all lines of the paragraph except the first line.

2. The top slider adjusts the indentation of the first line of the paragraph.

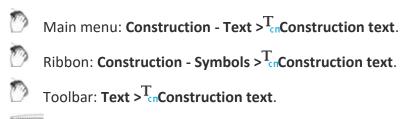
Context menu

The context menu uses standard commands for text fields.

Setting text options

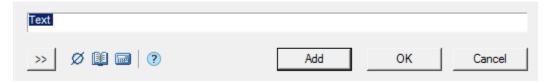
To set the TP text parameters (font height and slope, indent from the title block, eTP.) open the dialog box "Settings".

Construction text

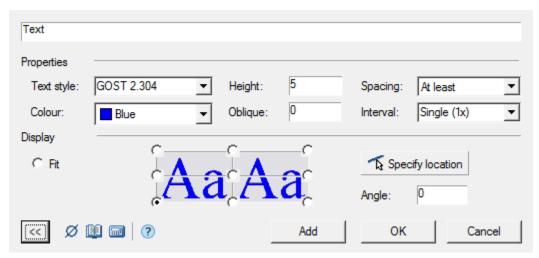


Command line: SPDTEXT.

Dialog



An expanded view of the dialog box with text adjustment tools is enabled by clicking the button >> .



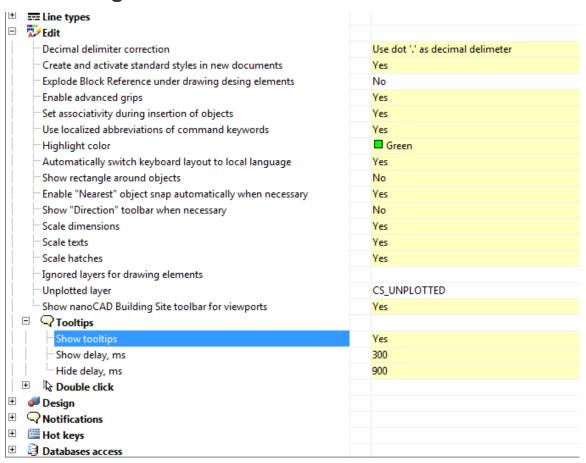
Procedure

- 1. Enter the required text in the input field.
- 2. To insert special characters, use the \(\varphi \) "Insert special symbol" button.
- 3. To insert text from a notebook, use the 4"Notebook" button.
- 4. To insert the calculation result, use the Image of Calculator button.
- 5. In the "Properties" toolset, choose a text style and options.
 - Text style text style.
 - *Height* text height.
 - Colour text color
 - Oblique gradient of text in degrees.
 - *Spacing* serves to control the intercharacter spacing during automatic text compression, if the "Fit" switch is set.
 - At least compresses the text, respecting the exact value of the spacing between the characters set for the selected text style.
 - Exactly shrinks the text, automatically decreasing or increasing the character spacing to fit the line exactly within the specified input area.
 - Interval determines the spacing between adjacent lines of text, inserted one by one using the "Add" button.
- 6. In the "Display" toolset, set the text alignment and position options.
 - Fit the text is placed inside the selected area in the drawing. If the line length exceeds the size of the input area, the text is automatically compressed.
 - Align to point the text is aligned to the point specified by the user. Click on the appropriate radio button in the graphics area:

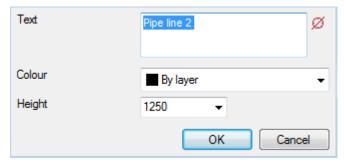


- Button Specify location is intended to indicate in the drawing the insertion point of the text line and the angle of rotation. If the "Fit" radio button is selected, then after specifying the insertion point, you must also select the width of the text input area.
- Angle the value of the angle of rotation of the text in degrees.
- 7. Click the "Add" button to insert a text string. Click "OK" or "Cancel" to exit the looping command.

Text editing



If it's set multiline text editing with tools nanoCAD Construction 25, then clicks on the test will be called dialogue editing.



In this dialog may ask, besides the text, its color, and the Height, and add special symbols.

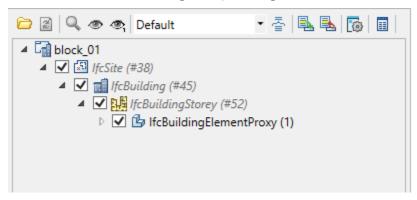
BIM

IFC viewer



Functional panel:**IFC**.

File viewer IFC (Industry Foundation Classes). IFC is used as the format for the information model building BIM (Building Information Modeling).

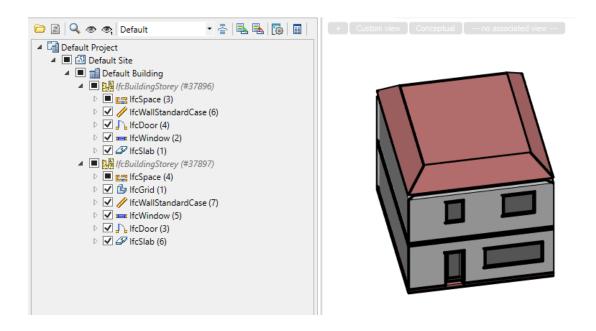


Import models

- 1. Run the import command:
 - Button "Import" in the main function bar menu "IFC".
 - Button "Import" in the tree.
 - Command line: IFCVIEW3D.
- 2. Select the IFC file and confirm.

Begin analysis and file import nanoCAD environment. Download time depends on the capacity of the computer and the complexity of the file.

3. After importing the tree items will be available. When you import multiple serial models, the tree will be displayed several projects.



View models

Viewing patterns by using wood elements.

When selecting a tree node (object), its attributes are displayed on the "IFC properties" functional panel. Each object type has its own set of attributes.



Each type of object is located on its own layer and has its own color. Layer and color for objects is configured in the design settings.

The name of the objects is taken from the Name and LongName properties. If the object does not have the Name or LongName parameters, the name will be composed of IfcType and IfcId and displayed in gray italics.

Objects are controlled using menu commands.

The model is rotated using standard means nanoCAD.

IFC model transformation

After importing the model, an additional special object "IFC Project" appears in the drawing to display the path to the IFC file, the properties of the root node of the project and the transformation of the model in the drawing using the "grips".



- 1. Drag grip in XY plane.
- 2. ▼ Scale selection grip.
- 3. Rotary grip.

You can also transform the IFC model via the IFC properties panel. To do this, select the root node of the model in the "IFC" panel and switch to the "IFC properties" panel. This panel allows you to set the model offset along the oZ axis.

C Attributes	
Description	
FileName	\\fileserver\Storage\ifc samples\house.ifc
Globalld	1SWMx8Jx558u2pFEwry6HC
$If c File Last Modificatio \dots \\$	02.12.2013 4:19:04
IfcId	36393
IfcType	IfcProject
LongName	
Name	Default Project
ObjectType	
Offset along axis oX	0
Offset along axis oY	0
Offset along axis oZ	0
Phase	
Rotation around axis	0
Scale	1

The parameters of the transformed model together with the configured visibility and color of the IFC objects can be imported using the "Information model export" button, and then imported into another drawing using the "Information model import" button located on the "IFC" panel.

Main menu of the functional panel

Depending on the selected element in the tree, the following commands become available:

- Dimport opens a dialog for selecting a file to import.
- XDelete removes the selected element and all its descendants from the model.
- Default Drop-down list for selecting a grouping.
- Grouping opens the "Grouping" dialog for setting up the grouping of objects in the tree of elements.
- Information model import imports an object's information model (position, rotation, scale, visibility, colors, etc.) from a JSON file.
- Information model export exports the object's information model (position, rotation, scale, visibility, colors, etc.) to a JSON file.
- Show/Hide in model controls the display of the selected element and all its descendants. You can also control the display using the switch to the left of the element's name.
- **Show/Hide only this toggles the display between the selected element and elements of the same parent.
- Show on drawing focuses and selects an object in the drawing (in model space).
- To IFC import settings opens the "IFC import settings" dialog.
- IFC properties opens the "IFC Properties" functional panel.

Note: The commands of the context menu of the tree of elements duplicate the commands of the main menu of the functional panel.

Grouping

By default, elements in the tree are grouped in the following sequence: Project - Plot - Building - Floor - Object type - Object.

It is possible to select another grouping method (from the grouping selection list) or assign a custom one.

Standard groupings: Default, Type, Floor, Layer.

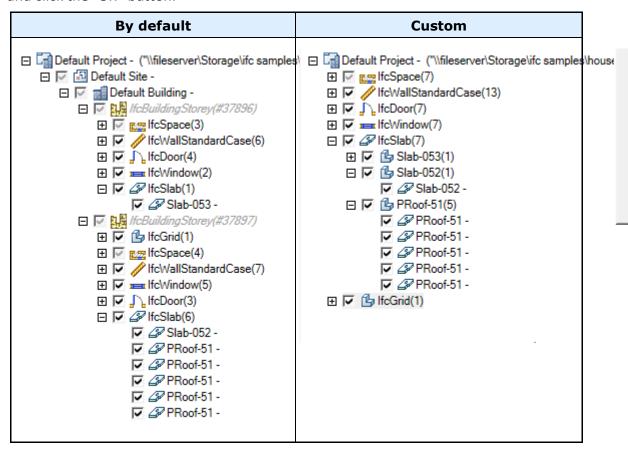
To view the composition of a grouping, select the required grouping and click the $\stackrel{\sim}{=}$ "Grouping" button. In the "Grouping" dialog, the fields will display the parameters of the

IfcProject

IfcType

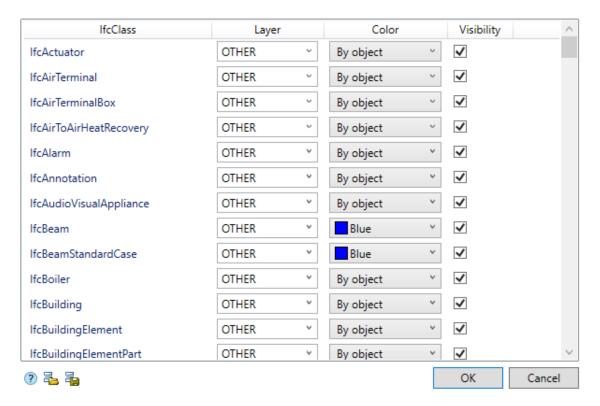
IfcName

selected grouping. To create a custom grouping, change the composition of the fields and click the "OK" button.



Note: When creating a custom grouping, elements are additionally grouped by the title of the name. The title of the name is the text of the name from the first character to the first space (or end of line).

IFC import settings



The settings dialog consists of a list and an Import/Export toolbar.

List

The list consists of a set of IFC classes. The name of the class is in the first column "IfcClass". It is not possible to add a new class or remove it.

The "Layer", "Color" and "Visibility" columns are configured.

Layer - the name of the layer on which the graphics of this class will be placed.

Color - the color of the graphic.

Visibility - controls the display of graphics in the drawing.

Toolbar

➡Import settings - the command allows you to import settings from an XML file.

Export settings - the command allows you to export settings to an XML file.

Model check

Functional panel: Model check.



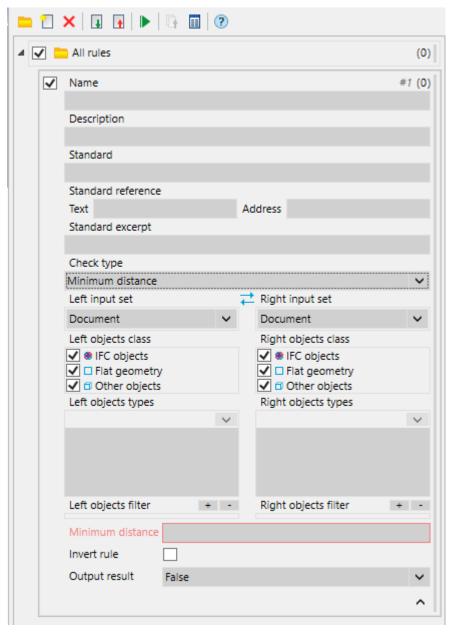
Functional panel: Model check report.

This tool allows you to check your drawing for errors and non-compliance with standards.

The "Model check" functional panel allows you to check IFC models, primitives and other objects for collisions (errors in rules). The report is displayed in the "Model check report" functional panel.

Panel "Model check"

The panel is used to configure rules and run checks of these rules. It consists of the main menu and the rules tree. Each rule has its own unique number, value with the symbol *"#"*.



Main menu

- Add folder adds a folder to the rules tree. The root folder is "All rules".
- Add rule adds a rule to the rule tree.
- X Delete deletes the selected folder or rule.
- Import rules imports rules from an external JSON file.
- **Export rules** exports rules to an external JSON file.
- ▶ Start checks launch checks of selected rules.
- Export reports export reports to JSON files.
- Model check report opens the "Model check report" panel.

Objects filter

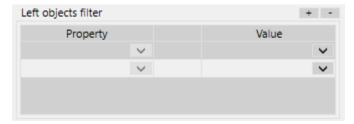
The object filter is a set of filter lists. The lists are managed using the "+" and "-" buttons. To add a list, you must click the "+" button. To delete a list, you must select it and click the "-" button.

Filter lists interact with each other via the logical function "OR". That is, objects corresponding to the filters of the first OR any subsequent list are taken for checking.

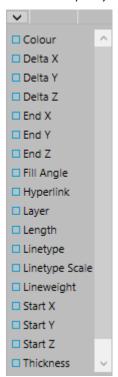
Each filter list is a table with three columns: Property, Check Method, Value.

When adding one filter line, an empty line is automatically added. To delete a line, select the line and press the "Del" key.

The lines in the list interact with each other via the logical function "AND". That is, AND the first, AND the second, AND the subsequent conditions must be met.



In the "Property" column, select the properties available for filtering from the list.



В колонке *"Способ проверки"* выбирается из списка способ проверки значения: =, <, <=, >, >=, Список, Regex, Формула.

In the "Check Method" column, select the method for checking the value from the list: =, <, <=, >, >=, List, Regex, Formula.

В колонке "Значение" указывается числовое значение, список через точку с запятой, выражение Regex или формула, в зависимости от выбранного способа проверки. Для удобства в выпадающем списке перечислены все варианты значений выбранного свойства объектов.

The "Value" column specifies a numeric value, a semicolon-separated list, a Regex expression, or a formula, depending on the selected verification method. For convenience, the drop-down list lists all the value options for the selected object property.

Formula

The formula is one of the comparators. Formulas can be used in object filters by properties and as a comparison mode in numeric checks.

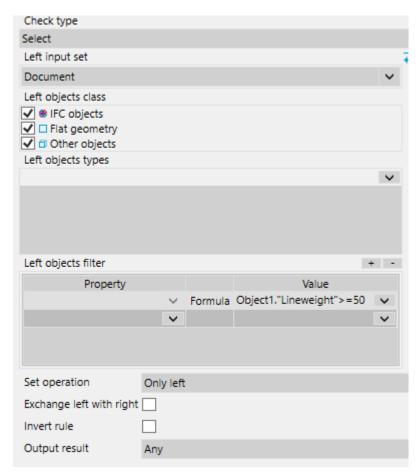
In order to use the value of the property of the left object in the formula, the prefix is required Object1."Name of the property of the object". When accessing the property of the right object, the prefix must be used Object2."Name of the property of the object". The properties of both the left and right objects can be used in the formula simultaneously and an unlimited number of times.

The decimal separator in formulas is a period - this is due to the fact that the use of functions is allowed in formulas, for example min(0.01, Object1."Name of the object property").

Example of using a formula in a filter by properties:

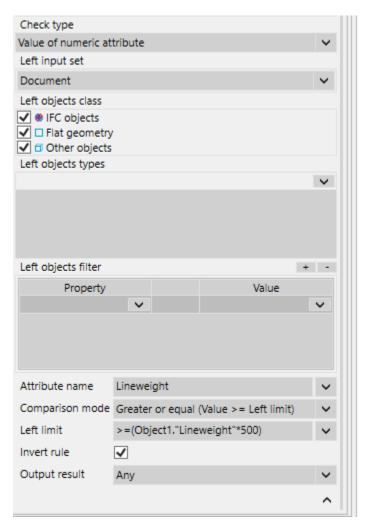
Object1."Lineweight">=50

If the filtered object does not have the property specified in the formula, the object is considered to not meet the filtering conditions.



Example of using a formula as a comparison mode in numeric checks:

Length >=(Object1."Lineweight"*500)



In numeric tests, the formula always begins with a comparison operator.

The value of the attribute being checked is compared with the formula value. The formula value is entered into the "Formula result" report column.

If the object does not have the property specified in the formula, or an error occurs when calculating the formula, the text "Error" is written to the "Formula result" column.

Add rule

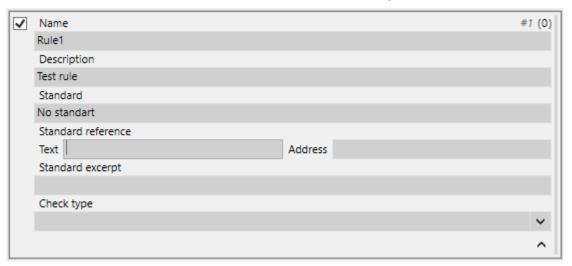
1. Select a folder to create a rule.



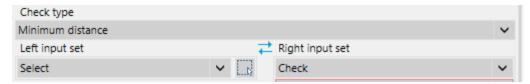
2. Click the "Add rule" button. An empty rule will be added to the selected folder.



3. Enter information about the rule. Fill in the fields "Name", "Description", "Standard", link to the standard: "Text" and "Address", "Standard excerpt".



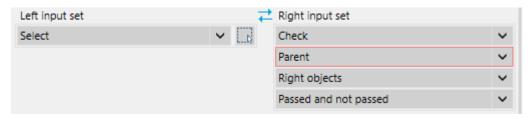
4. Select "Check type". Each verification type has its own additional fields.



Depending on the type of check, one (left) or two (left and right) sets of objects can be used. Each set has its own: input set, objects class, objects types, objects filter.

You can swap sets using the *****"Exchange" button.

5. For each set, select the data source: Document, Select, Check.



Document - all objects in the drawing are used.

Select - the selected objects on the drawing are used. To select, you need to click the "Select objects" button, then select the objects on the drawing and press the "Enter" key. The number of selected objects will be displayed on the button.

Check - objects from the selected check are selected. In addition to the number of the original check, you must select a set (left, right, both) and a check result (True, False, Any).

6. For each set, specify the classes of objects involved in the check: IFC objects, Flat geometry (primitives), Other objects (BIM solution objects, symbols, designations, etc.).

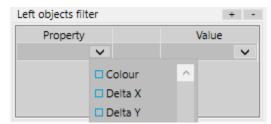


7. For each set, add an object type. The object type selection list is generated automatically depending on the selected object classes and the presence of these objects in the drawing.



8. For each set, use the filter of objects by parameters. The list of parameters is generated automatically depending on the selected classes of objects, the type and presence of these objects in the drawing. The values can be: constant, list, Regex (regular expressions) or formula.

Using the "+" and "-" buttons you can control the number of filters.



- 9. Set the rule parameters.
- Parameters of the selected rule the parameters of the selected rule can be specified by a constant or a formula.

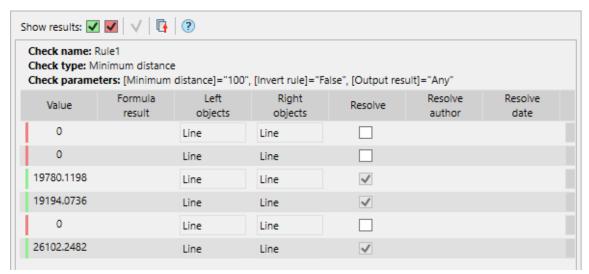
- Metric accuracy accuracy in calculating numerical parameters.
- Invert rule the parameter indicates that the rule can be inverted.
- Output result determines what result to output: positive (True), negative (False) or any.



10. Done. You can run the scan and view the report.

Panel "Model check report"

The panel is used to view and audit the results of checks. It consists of the main menu and tables with the results of rules.



Main menu

- ☑ Display positive results display rows with positive result.
- ☑ Display negative results display rows with negative result.
- ✓ Allow selected resolve the value of the selected row.
- Export reports export reports to JSON files.

Columns

Value - the desired value between objects.

Formula result - the result of the formula calculation.

Left objects - left object type.

Right objects - right object type.

Resolve - value resolution.

Resolve author - the author who gave resolve.

Resolve date - resolve date.

Note - note on the test result.

Check and report

- 1. In the rules tree, select the rules to run the check.
- 2. Start checking the selected rules by clicking on the "Start checks" button.
- 3. Go to the "Model check report" panel. The panel will display reports on the selected rules.
- 4. Conduct a report audit. When you select a report line, objects on the drawing are highlighted for visual inspection. If the results are within the standards, check the box in the "Resolve" column and, if necessary, create a note. Resolution is set automatically for positive results.



- 5. При необходимости экспортируйте отчет в формате JSON нажатием на кнопку **ч**"Экспортировать отчет".
- 5. If necessary, export the report in JSON format by clicking the **IExport reports** button.

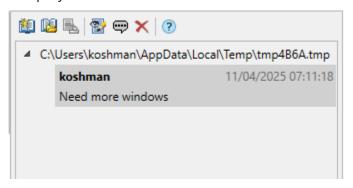
BCF



Functional panel: BCF.

BIM Collaboration Format (BCF) — is a structured file format suitable for tracking issues with a building information model. BCF is primarily designed to define views of a building model and the associated information about collisions and errors associated with specific objects in the view. The BCF file format allows users to collaborate on project issues.

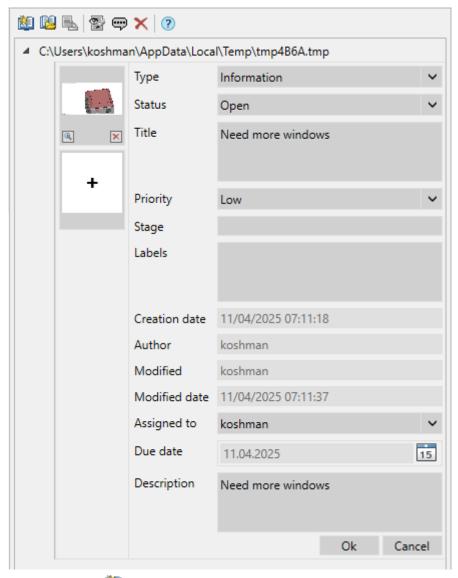
The BCF panel allows you to create a BCF project that includes a collection of topics. The BCF project is stored inside the document.



Toolbar

- Create BCF creates a topic linked to a document. The number of topics per document is unlimited.
- Import BCF imports a BCF file into a document.
- Export BCF exports the selected topic from the document to a BCF file. When exporting, the BCF standard version is selected.
- Wiew/Edit opens a topic or comments to it for viewing and editing. The command is duplicated by double-clicking the left mouse button.
- Add comment adds a comment to the topic.
- XDelete deletes the selected object in the tree along with its descendants.

Adding a topic



- 1. Click button Create BCF. A new empty topic will be added. When creating and editing, the topic is placed in a temporary local file (*.tmp).
- 2. Create one or more viewpoints (scenes) if necessary. To do this:
 - Hover over the desired graphic in the workspace.
 - Click on the plus button



• The viewpoint will be added and the image will be photographed. The viewpoint can be viewed or deleted.

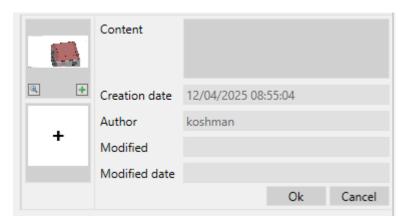
Note: By clicking on the image, you can play the scene in model space, taking into account the selection and visibility of objects.

Important! BCF viewpoints (scenes) are tied to the names of the sheets (spaces) they were created on, so changing the name of a sheet (space) may result in the viewpoint (scene) not being able to activate the corresponding sheet (space) when applied, in which case the model sheet (space) is activated and the viewpoint (scene) is applied on it.

3. Fill in the subject fields:

- *Type* type of topic: Information, Warning, Error, Request.
- Status status of topic: Open, Closed, Reopened.
- Title -topic title.
- Priority priority consideration: Normal, Medium, High.
- Stage text description of the stage of work on the topic.
- Labels auxiliary words (tags).
- Creation date topic creation date, non-editable field.
- Author topic author, non-editable field.
- Modified last user who edited the topic, not an editable field.
- Modified date last date the topic was modified, not an editable field.
- Assigned to who is this topic intended for.
- Due date deadline for submitting comments on the topic.
- Description text description of the topic.
- 4. Click the "OK" button to save the theme.
- 5. Save the document.

Adding a comment



- 1. Select a topic.
- 2. Click the "Add Comment". A new empty comment will be added.
- 3. Create a vantage point if necessary.
- 4. Fill in the comment fields:
 - Content text description of the comment.
 - Creation date date of comment creation, non-editable field.
 - Author comment author, non-editable field.
 - Modified last user, edit comment, non-editable field.
 - Modified date last date the comment was modified, not an editable field.
- 5. Click the "OK" button to save the comment.
- 6. Save the document.

Utilities

Creating a hatch

Main menu: Construction - Utilities > Create hatch.

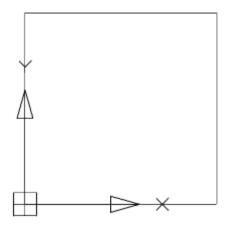
Toolbar: Utilities > Create hatch.

Command line: SPHPATTERN.

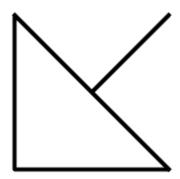
In nanoCAD Construction 25 it is possible to create hatches according to a given pattern - a sketch using the "Create hatch" tool. The hatch pattern created with it is written as an independent * .pat file and can be used in other projects or by other users.

Procedure

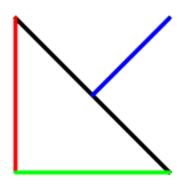
1.Create a border for the hatch sketch. Construct a 300x300mm rectangle and place its bottom-left corner at the origin of coordinate system 0,0,0. The sketch area must be at the origin of the coordinate system. Overall dimensions of the sketch area should not be more than 300x300mm.



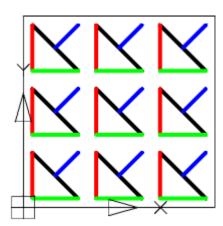
2. Sketch one element of the future hatch. The sketch needs to be done within the created rectangle. The sketch should only be done with lines. It is not allowed to sketch with arcs, circles. It is recommended to approximate curved objects in polylines without arc segments. Sketch polylines must be exploded into line segments.



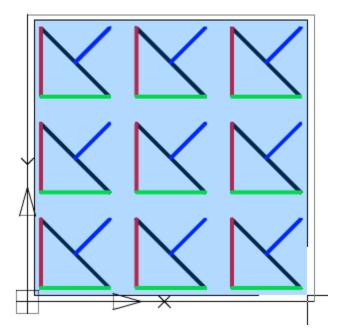
3. Assign a different color to each section of the sketch. The sketch should be done with segments of different colors. The hatch tool recognizes the periodicity in the sketch by the color of the lines.



4. Create an array of sketches within a rectangle. The sketch must follow an explicit periodicity. The sketch must include at least three repeating fragments of the future hatching.



- 5. Call the command "Create hatch".
- 6. Create an array of sketches within a rectangle. The sketch must follow an explicit periodicity. The sketch must include at least three repeating fragments of the future hatching.



- 7. Press the "Enter" key. The process of object recognition and analysis will begin. During recognition, gaps in sketch lines are automatically determined, if in the selected pattern the line break is outside the selection boundary, the line will be defined in the hatch as continuous. If the sketch does not meet the conditions, a message box will appear, otherwise the file save dialog.
- 8. Correct the errors indicated in the message. Repeat step 5 step 7.
- 9. In the file save dialog specify the path to the hatch file.

Important! You cannot use the names "Acad.pat", "Acadiso.pat" as the name of the sample file. It is recommended to save in C:\ProgramData\Nanosoft\nanoCAD Construction 25\SHX

10. The custom hatch will be created. The hatch created with the ""Create hatch" tool fully accepts all the properties of the nanoCAD hatch: associativity, the ability to change the scale, the angle of inclination, overlay with a closed tolerance.

Important! A drawing file * .dwg that used a unique hatch must be transferred to another user along with the * .pat file of the hatch pattern. For a successful translation, use the (eTransmit) "Generate Set" command.

Objects numeration



Main menu: Construction - Utilities > \ Objects numeration.

Ribbon: Construction - Utilities > Gobjects numeration.

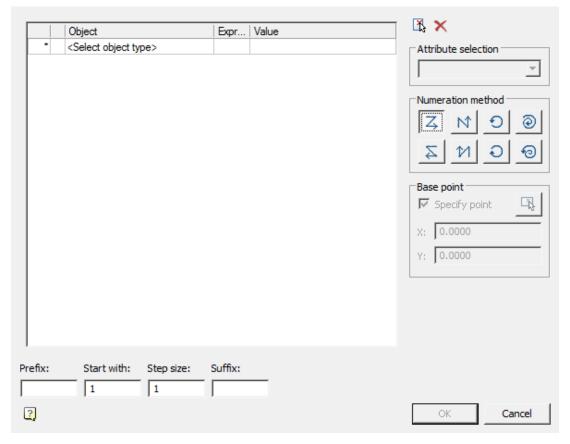
Toolbar: Gobjects numeration (on toolbar "Utilities").

Command line: SPNUMOBJ.

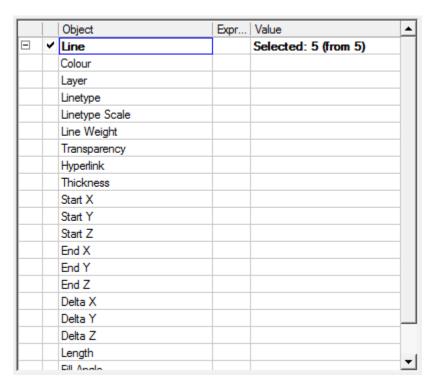
The command finds all specified objects with attributes and numbers it according to a given algorithm.

Procedure

1. Call the team. The "Object Numbering" dialog opens.



2. Select objects. Select an object using the quick selection. All objects that have text editable attributes (block, database object, universal marker, etc.) can be selected.



After selecting an object, a list of attributes common to the selected objects and available for editing is formed.

Additional list management commands:

Set selection - the command allows you to specify objects in the drawing.

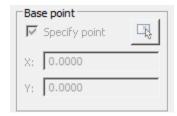
Reset conditions - command clears the list of conditions.

3. Select the attribute in which the result of numbering will be recorded.



- 4. Select the numbering method:
- 3- from left to rigth, from top to bottom. When choosing this method, the command compares the coordinates of points X and Y, respectively, starts numbering from the highest and leftmost objects to the lowest and right relative to the base point.
- N- from bottom to top, from left to right. When choosing this method, the command compares the coordinates of points X and Y, respectively, starts numbering from the lowest and leftmost of the entire object to the highest and right relative to the base point.
- Σ from rigth to left, from top to bottom. When choosing this method, the team compares the coordinates of points X and Y, respectively, starts numbering from the topmost and to the right of the entire object to the lowest and leftmost relative to the base point.

- 11- from bottom to top, from right to left. When choosing this method, the command compares the coordinates of points X and Y, respectively, starts numbering from the lowest and most right of the entire object to the highest and left relative to the base point.
- O- radial anticlockwise. When choosing this method, the command compares the coordinates of points in the polar coordinate system, the distance from the center (specified by the user base point) and the angle between the zero direction (positive X-axis direction). Numbering is counterclockwise. When this method is selected, the selection of the base point becomes available.
- O- radial clockwise. When choosing this method, the command compares the coordinates of points in the polar coordinate system, the distance from the center (specified by the user base point) and the angle between the zero direction (positive X-axis direction). Priority in comparison has an angle. Numbering is clockwise. When this method is selected, the selection of the base point becomes available.
- spiral anticlockwise from center. When choosing this method, the command compares the coordinates of points in the polar coordinate system, the distance from the center (specified by the user base point) and the angle between the zero direction (positive X-axis direction). Priority when comparing has distance from the center. The numbering is counterclockwise from the center. When this method is selected, the selection of the base point becomes available.
- ②- spiral clockwise to center. When choosing this method, the command compares the coordinates of points in the polar coordinate system, the distance from the center (specified by the user base point) and the angle between the zero direction (positive X-axis direction). Priority when comparing has distance from the center. Numbering is clockwise to the center. When this method is selected, the selection of the base point becomes available.
 - 5. Indicate a base point if necessary. The base point is indicated either by entering the X and Y coordinates, or by pointing to the screen. When cocking the "Specify point" checkbox, the point is indicated after pressing the "OK" button.

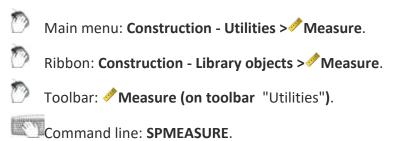


6. Customize the brand. The formation of the brand comes from three parts. The prefix and suffix is specified in the editable field. And the brand value itself is calculated based on the initial value entered by the user and the step between subsequent values.



- 7. Click "OK."
- 8. If the "Specify point" checkbox has been set, specify the base point in the drawing.
- 9. Numbering will be made.

Measurements



Measurements or tool with Mark drawing is designed to extract various properties of objects in the drawing.

After selecting the command a dialog box value picker opens.



Measure distance. Measures the distance between two points, radius or diameter. Switching the measurement method is via the context menu.

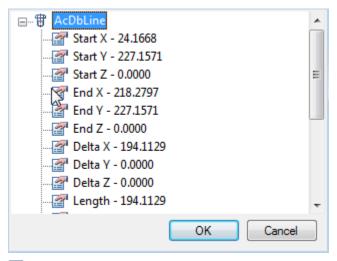
△Measure angle. Measures the angle.

Measure Perimeter. Measure the perimeter of the closed area, the length of a closed polyline or circle.

Measure area. Measures the area of the closed area. Select an area in two ways: 1 - Click inside the closed loop, 2 - Click on the closed polyline or circle.

Complex area. Measures the area of several loops. Selecting the area is carried out: 1 - Click to specify the first closed loop, 2 - Click to specify the second closed loop 3 - Press Enter to complete the command.

Take from property. Allows you to get the value of the parameter selected in the drawing object nanoCAD Construction 25.



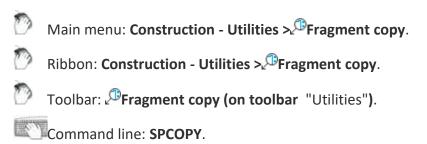
Take from text. Returns the value of the selected single-line or multi-line text.

- **Calculate**. Opens <u>calculator</u>.
- Take from notes. Opens the notebook.

The measured values are displayed in the dialog box.

If universal measuring time was part of a command (for example, the dialog box nanoCAD Construction 25 text context menu command), the measured value is transmitted to the command being executed.

Fragment Copy



The command is used to create remote views of the drawing.

- 1. Select the drawing center point for the detail view.
- 2. Select the area of the drawing. In the context menu, you can choose a certain kind of marquee circle or rounded rectangle. Secure selection click.
- 3. Specify the drawing *center remote fragment*. available in the context menu command "0-cut" to remove the original objects from the drawing.

Plate Array

Main menu: Construction - Utilities > . Plate array.

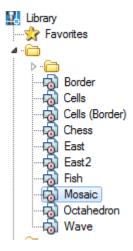
Ribbon: Construction - Utilities > Plate array.

Toolbar: **& Plate array (on toolbar** "Utilities"**)**.

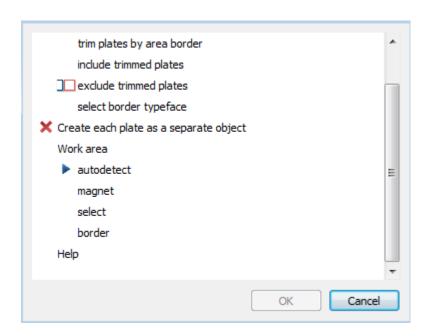
Command line: SPPLTARRAY.

Command to tile layouts for a given circuit.

1. Choose from a base tile pattern and place it on the drawing.

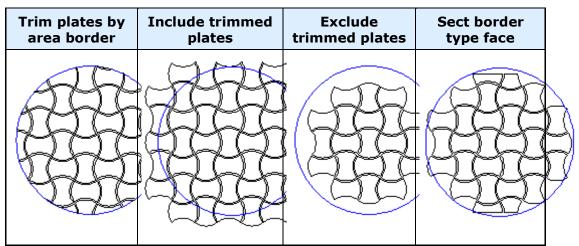


- 2. Press the splate array.
- 3. In the opened window, click the plate shema and specify the token group.



4. Select Trim mode extreme tiles .

- Trim plates by area border tiles clipped to the boundary of the layout.
 Circuit tile becomes open. This tile is taken into account in property "Cut".
 This mode is not available if you enable the check box "Make each tile a separate."
- Include trimmed plates extreme tiles stacked atop circuit layout.
- Exclude trimmed plates tiles, overlapping circuit layouts do not fit.
- Sect border type face- if tiles have execution end elements will be selected most podhodyaeschee. When the layout of the area selected by the execution system names: Whole, Left, Right, Top, Bottom. When the layout along the border all versions checked sequentially, regardless of names.



5. Create each plate as a separate object.

If the box is checked, the result will be a group of independent layout objects - copies of the original objects. This mode does not support cutting elements on the boundaries of the area, but allows more flexibility to edit the result.

When the check box is created off a single object that includes all geometry. In the properties of this object will be information on the number, weight and costs of each type of tiles, as well as the total weight (based on the whole tiles) and cost. You can delete individual tiles by clicking on them with the right. In this case the total amount will be adjusted, weight and cost.

- 6. Determine the work area tiles.
 - auto detect layout area defined contour, which is located inside the tile pattern. In the inner islands stacked tiles will not.
 - magnet loop selection tool "magnet".
 - select area layout is selected in the drawing indicating one or more loops.
 - border tiles splits along the perimeter or primitives nanoCAD. Cropping mode in this case will simulate laying curbs.
- 7. To complete the command, press OK.

Note: Creating a template tile layouts can be done using Object Wizard.

Creating an array of objects

- Main menu: Construction Utilities > Array.

 Ribbon: Construction Utilities > Array.
- Toolbar: ##Array (on toolbar "Utilities").
- Command line: SPARRAY.

Replication called ordered distribution of copies of objects by step and quantity. Duplication of graphics in the nanoCAD Construction 25 is performed using a dialog box arrays.

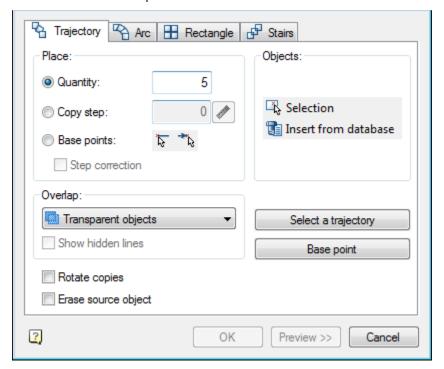
Four tabs in the Arrays dialog box define four (4) different object replications.

- Arrays along an arbitrary path
- Arrays for arc trajectory
- Rectangular array
- An array of step

For the distribution of objects within a specified area used for an array field.

Arrays along an arbitrary path(Trajectory)

- 1. Tab Path enter the governing parameters.
- 2. Follow The selection object (object selection).
- 3. Specify the base point.
- 4. Select trajectory.
- 5. Follow View.
- 6. Click OK to complete the command.



At the top of the window is a group of controls *placement*, which allows you to select:

- Quantity;
- Copy step;
- · Base point;
- Step correction;

In the drop-down list make a choice of Overlap:

- Transparent objects;
- · Next under preceding;
- · Next Over preceding;
- Interleave.

Button *pick from drawing* step allows you to select copies of the objects in the drawing.

Switch *Show hidden line* controls the display of hidden lines in the drawing. If the switch is on the hidden lines are displayed in the drawing.

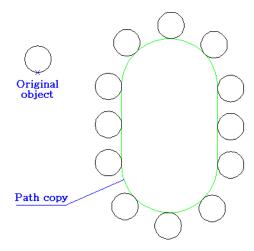
Switch *Rotate copies* controls the orientation of the copied object. If the switch is on when copying objects are rotated so that the vector Y was directed perpendicularly to the path (as shown in the figure).

Button Selection to select the replication object in the drawing.

Button Insert from database from the base to select the object from the database replication of standard elements.

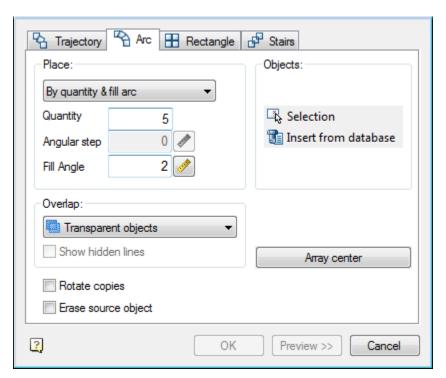
Button *Base point* lets you choose the base point of duplicated object (normally it should be expressed in the center or corner of the object).

Button *select a trajectory* to select a graphic object, along which you will be replicating. As the trajectory can be used lines, polylines, arcs, circles.



Arrays for arc trajectory

- 1. Tab Arc enter the governing parameters.
- 2. Follow The selection object (object selection).
- 3. Select *Center array*.
- 4. Follow Preview.
- 5. Click *OK* to complete the command.



At the top of the window is a control group *accommodation*, which lets you choose placing of replicated objects:

- By number and step;
- By number and angle;
- By step and corner;

In the input field *Number* specify the number of replicated objects.

In the entry field Step Angle enter the angle between the replicable elements.

In the input field angle specify the angle required.

Button with Mark drawing step allows you to select the corner or angle with the drawing.

In the drop-down list make a choice of Overlap:

- Transparent objects;
- Next under preceding;
- Next over preceding;
- Interleave.

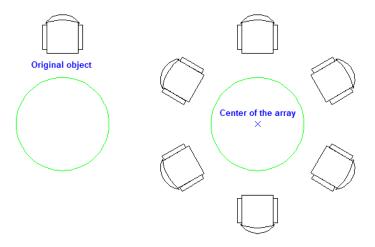
Switch *Show hidden line* controls the display of hidden lines in the drawing. If the switch is on the hidden lines are displayed in the drawing.

Button Selection to select the replication object in the drawing.

Button Insert from database insert from database used for selecting a center point which the objects will be replicated.

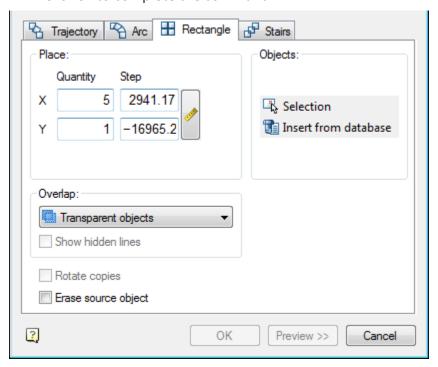
Button *array center* used for selecting a center point which the objects will be replicated.

Switch *Rotate copies* controls the orientation of the copied object. If the switch is on the turn when copying objects are shown in the figure.



Rectangular array

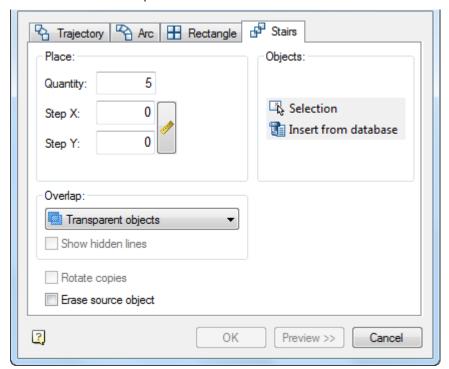
- 1. Command Rectangle enter key parameters.
- 2. Follow The selection object (object selection).
- 3. Follow Preview.
- 4. Click OK to complete the command.



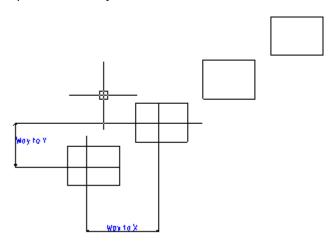
Enter the number of objects in the array horizontally and vertically, to specify the amount of horizontal and vertical steps between objects.

Steps of an array

- 1. Tab steps enter the governing parameters.
- 2. Follow The selection object (object selection).
- 3. Follow > View.
- 4. Click *ok* to complete the command.



Enter the number of objects in the array, specify the amount of horizontal and vertical step between objects.



Area array



Ribbon: Construction - Utilities > Area array.

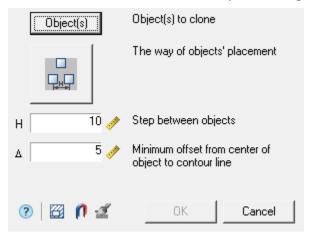
Toolbar: Utilities > ♣ Area array.

Command line: SPARDARRAY.

The tool is designed to replicate objects within a given area.

Procedure

1. Call the command "Area array". A dialogue will open "Area array".



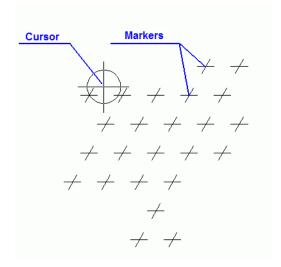
- 2. Click the "Object(s)" button and select the original objects to copy in the drawing. Press the "Enter" key to complete the selection.
- 3. Select the method of placing the copied objects using the graphic switch:



- Triangle.
- 4. Specify the spacing (H) between adjacent copies. The <u>✓ "Pick from drawing"</u> button allows you to select a step from the drawing.
- 5. Specify the minimum indent (?) from the edge of the area. The <u>Pick from drawing</u> button allows you to select an indent from the drawing.

- 6. Set the area of the array in one of three ways:
 - "Select an area by the point". The construction area is formed from a set of closed areas. The command allows you to add closed areas to the set by clicking the LMB inside a closed contour in the drawing. Clicking again inside the contour removes the selected area from the set. To complete the selection, press the "Enter" key.
 - *N* "Select contour with the magnet". The contour of the array area is set using the utility "Magnet".
 - "Paint area". The command allows you to specify an arbitrary placement of copied objects, providing a set step between adjacent copies. This command is available only after selecting the source objects to copy.

The construction of the area is carried out by moving the mouse cursor over the drawing (construction must be started from the location of the original objects). As you move the cursor, markers will appear on the screen to indicate where the copied objects are inserted.



To remove insertion markers, press and hold the "Shift" key. When you hover over a marker, the marker will be deleted.

To temporarily disable the placement of markers, press and hold the "Ctrl" key.

Finish drawing the area by clicking LMB. An array by area will be built.

7. Click the "OK" button. An array by area will be built.

Centerlines



Main menu: Construction - Utilities > Centerlines.

Ribbon: Construction - Symbols > Centerlines.

Toolbar: Utilities > Centerlines.

Command line: SPAXIS.

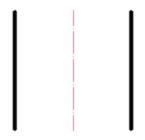
The command is designed to draw centerlines.

Procedure

The construction method depends on the selected objects:

- Parallel lines. The centerline will be drawn in the middle between these segments.
- 1. Call the command \(\sqrt{"Centerlines"}\).
- 2. Select the first line.
- 3. Select the second line.
- 4. Specify manually the first point of the centerline or press the "Enter" key. When you press the "Enter" key, the centerline is drawn automatically with a protrusion specified in the settings (by default 2mm).
- 5. Specify manually the second point of the centerline or press the "Enter" key. When you press the "Enter" key, the centerline will stop drawing, the second point will be in the calculated center between the lines.

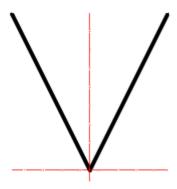
In the case of manual selection of the start / end point of the centerline, the amount of the protrusion is controlled by the user.



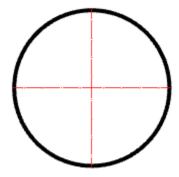
- *Non-parallel line segments*. The centerline will be drawn along the bisector of the angle between the line segments.
- 1. Call the command \(\textit{\alpha}\)"Centerlines".
- 2. Select the first line.
- 3. Select the second line.
- 4. Select the direction of the centerline. Using the "Rotate" context menu command, you change the direction of the centerline drawing (available only for intersecting line segments).

- 5. Specify manually the first point of the centerline or press the "Enter" key. When you press the "Enter" key, the centerline is drawn automatically with a protrusion specified in the settings (by default 2mm).
- 6. Specify manually the second point of the centerline or press the "Enter" key. When you press the "Enter" key, the centerline will stop drawing, the second point will be in the calculated center between the lines.

In the case of manual selection of the start / end point of the centerline, the amount of the protrusion is controlled by the user.

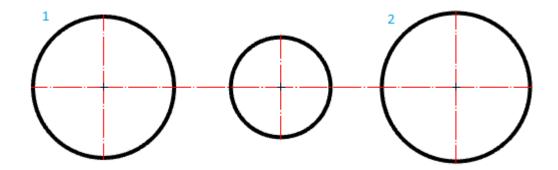


- One circle. Draws centerline centerlines on the selected circle.
- 1. Call the command "Centerlines".
- 2. Pick a circle.
- 3. Press the "Enter" key.

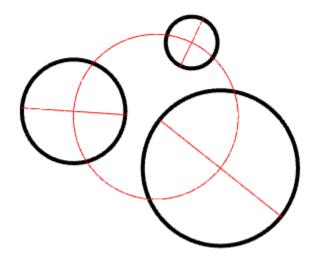


- *Two or more circles*. Draws centerline centerlines on selected circles with one common centerline.
- 1. Call the command \(\sqrt{\text{\centerlines}}\)"Centerlines".
- 2. Select the first circle.
- 3. Select the second circle.

4. Press the "Enter" key. If on the line between the centers of the two selected circles there are also centers of other circles, then for such circles, axial ones will also be built.



- Three mismatched circles. Creates a circle of centers passing through the centers of the selected circles. Center axes are automatically added to all circles whose centers coincide with the constructed center circle.
- 1. Call the command \(\sqrt{\text{\textit{"Centerlines"}}}\).
- 2. Select the first circle.
- 3. Select the second circle.
- 4. Select the third circle.



Fillet

0

Main menu: Construction - Utilities > Fillet.

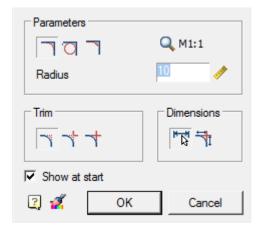
0

Ribbon: Construction - Utilities > Fillet.

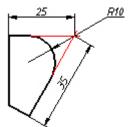
Toolbar: Fillet (on toolbar "Utilities").

Command line: SPFILLET.

Command Options

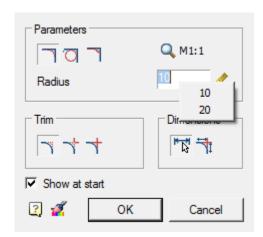


- Pick from drawing
- Mode full trim contour lines
- Mode partial trim lines to their intersection
- ↑ Mode without cutting
- **Copying** properties
- Measure fillet. Tabulated fillet radius and the number
- TExtra measurement. Stamped dimensions of the original geometry. Active only when the button "dimensioned pairing"



☐Insert circle as fillet.

Double click the left mouse button or click the right mouse button in the input fields of values, a context menu will open with a list of the last entry:



When a command from the context menu, the following options::



properties - Open the dialogue to change the chamfer .

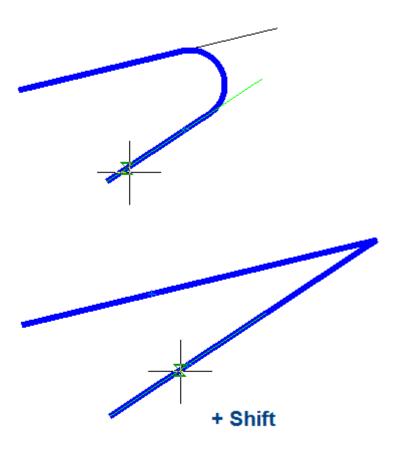
new - Completion of a group of facets and the beginning of another. This command is used when you need to, for example, several facets of the same size on the same site, and then with the same dimensions - on the other:

Chamfer - Switch to build <u>Circle</u>. After you select the shortcut menu command opens this dialog Pairing parameter setting interface.

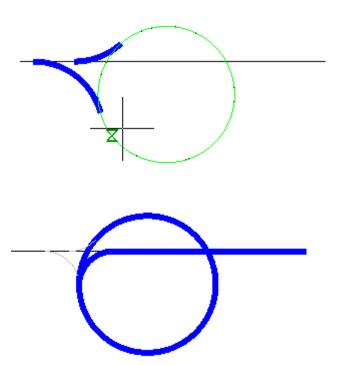
polyline - Switching to chamfering along the selected polyline. This option is available if you have selected the type of symmetric Circle: one length or two identical length. In operation, the cut-off modes are ignored and dimensioning.

Features of the Command

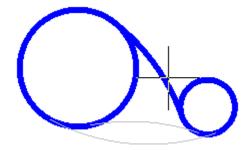
Command works in 3D. To execute the command source primitives must lie in one plane If you select the second object, press and hold SHIFT, then the angle will be formed (at the intersection of the closure and isolation).



For a pair of ARC-ARC additionally available pairing, combining internal and external touch.

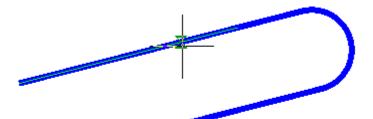


For a pair of ARC-ARC additionally available pairing, combining internal and external touch.

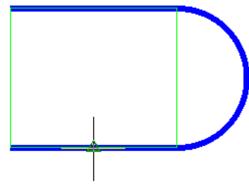


Availability of different types of interfaces depends on the fillet radius. To the outside and combining the radii need greater magnitude than the inner.

When two parallel lines will be constructed pairing radius equal to half the distance between them (regardless of the specified length). Automatically aligns the sides to the longest segment. When two parallel lines will be constructed pairing radius equal to half the distance between them (regardless of the specified length). Automatically aligns the sides to the longest segment.



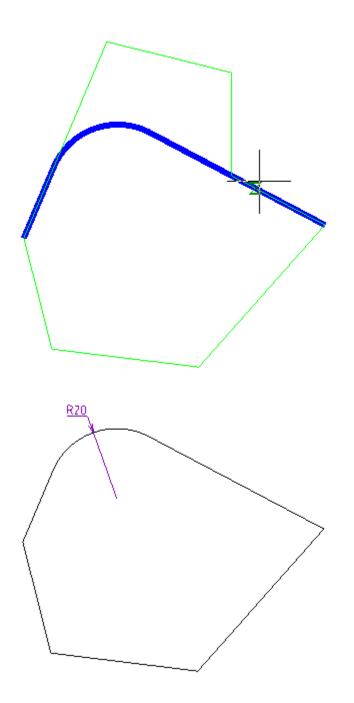
Pairing works parallel segments and regions of the same polyline.



Side interface depends on the position of the mouse cursor when the second object When you insert a polyline retains its integrity.

If the team is formed of two polylines one, it will be object of a single polyline.

If you select one polyline segments separated by other sites, all the intermediate portions are removed.



Chamfer

Main menu: Construction - Utilities > Chamfer.

Ribbon: Construction - Utilities > Chamfer.

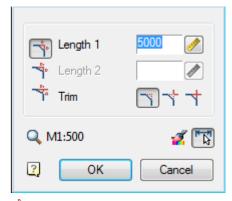
Toolbar: Chamfer (on toolbar "Utilities").

Command line: SPCHAMFER.

Command Options

This command is used for automatic and semi-automatic placement of face on the details with the various versions and with the possibility of automatic dimensioning.

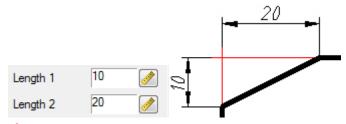
After clicking the command, it opens a dialog box settings Circle:



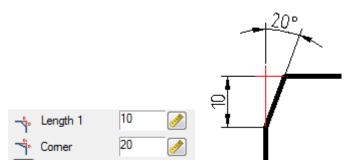
Mode chamfering parts with two different sizes



Mode chamfering parts with two different sizes

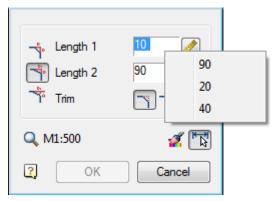


Mode Chamfer length and angle in this mode instead of the length 2 displays the setting angle.



- Mode full cutting contour lines
- *Mode partial cutting lines to their intersection
- ↑ Mode without cutting
- Measure Chamfer
- Copy properties surrounding face
- Pick from drawing

Double click the left mouse button or click the right mouse button in the input fields of values, context menu will open with a list of the last entry:



When a command from the context menu, the following options:



Propertise - Opening the dialogue to change the chamfer chamfer.

New - Completion of a group of facets and the beginning of another. This command is used when you need to, for example, several facets of the same size on the same site, and then with the same dimensions - on the other:

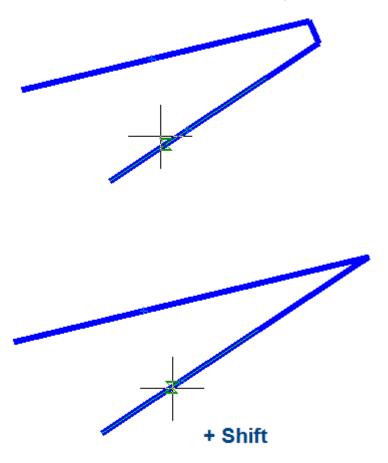
Fillet - Switch to build <u>pairings</u>. After you select the shortcut menu command opens this dialog **Pairing** parameter setting interface.

Polyline - Switching to chamfering along the selected polyline. This option is available if you have selected the type of symmetric Circle: one length or two identical length. In operation, the cut-off modes are ignored and dimensioning.

Features of the command

The command works in 3D. To execute the command source primitives must lie in one plane.

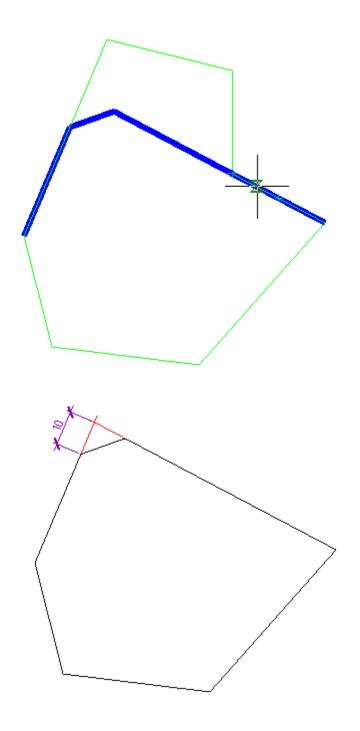
If you select the second object, press and hold SHIFT, then the angle will be formed (at the intersection of the closure and isolation).



When you insert a polyline retains its integrity.

If the team is formed of two polylines one, it will be object to a single polyline.

If you select one polyline segments separated by other sites, all the intermediate portions are removed.



Anchor

0

Main menu: Construction - Utilities > Anchor.

0

Ribbon: **Construction - Symbols >** → **Anchor**.



Toolbar: **Utilities** > **⊇Anchor**.

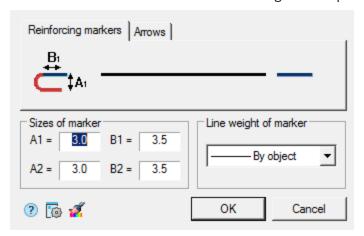


Command line: **SPANCHOR**.

The command is intended for drawing end markers on line segments.

Procedure

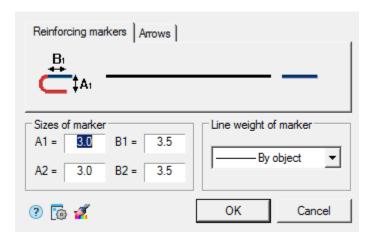
1. Call the command ∃"Anchor". A dialogue will open "End markers of lines".



- 2. In the "End markers of lines" dialog select the type of end markers and set their parameters. Click the "OK" button.
- 3. Specify the necessary lines or polylines in the drawing. "End markers" objects are created from from. Press the "Esc" key to end the circular mode for specifying objects.



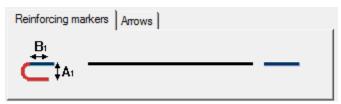
Dialog



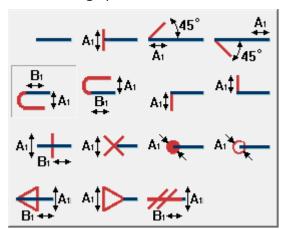
The "End markers of lines" editing dialog contains:

The panel of tabs for selecting marker types.

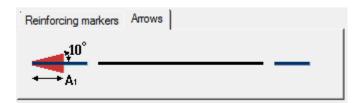
The "Reinforcing markers" tab allows you to define reinforcement markers.



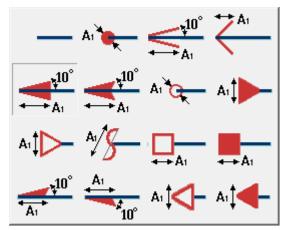
To change, select a marker for the first or second end of the segment by clicking on the graphics field (the button with the reinforcement marker image) and selecting one of the following options:



The "Arrows" tab allows you to define arrows.



To change, select the arrow for the first or second end of the line segment by clicking on the graphic field (the button with the arrow) and choosing one of the following options:



"Size of marker" group

Input fields "A1", "A2", "B1", "B2" - allow you to specify the corresponding sizes of markers in the current scale nanoCAD Construction 25. The fields used are indicated on the image of the markers.

Group "Line weight of marker"

Drop-down list "Line weight" - allows you to select the line weight of markers.

Additional commands

The "Copy Properties" button - allows you to copy the appearance of end markers and their dimensions from a line with reinforcement or arrow markers in the drawing.

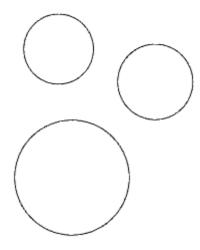
Hole group



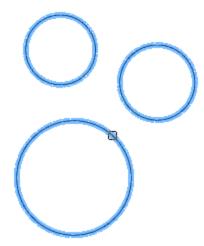
Universal command for drawing holes. With its help, you can draw a new hole with centerlines, or by specifying a group of holes to assign them general properties with filling of a sector.

Procedure

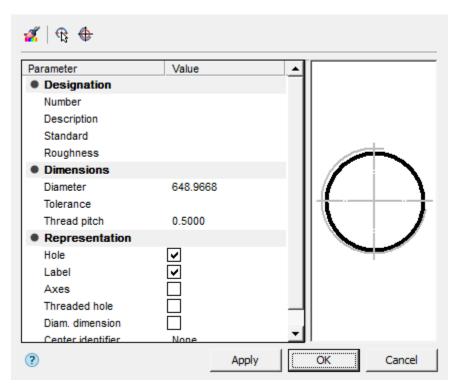
1. Draw holes from circles.



2. Call the command %"Hole group".



3. Select the required circles. Press the "Enter" key to complete the selection. The "Holes" dialog will open.

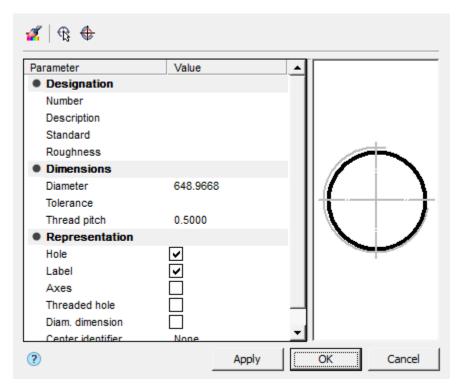


4. Adjust the hole settings and click "OK". The parameters will be applied to the holes. The holes will be created.



Dialog

The "Holes" editing dialog is opened by double-clicking. The dialog consists of: Toolbar, Parameter List, Graphics Window.



Toolbar

Match properties - this command allows you to copy parameters from holes already installed in the drawing.

 \P Select holes - the command allows you to select additional holes from the drawing.

Create holes - the command creates holes of the specified diameter. To dynamically set the radius on the screen, hold down the left mouse button and move the cursor.

Parameter List

Designation

- Number specifies the number of the hole in the group.
- Description specifies the hole table description field.
- Standard sets the field to the standard of the hole table.
- Roughness allows you to specify the roughness of the hole (displayed in the hole table).

Dimensions

- Diameter hole diameter.
- Tolerance the "..." button opens the "Tolerances" dialog, from which you can select a tolerance.
- Thread pitch hole thread pitch.

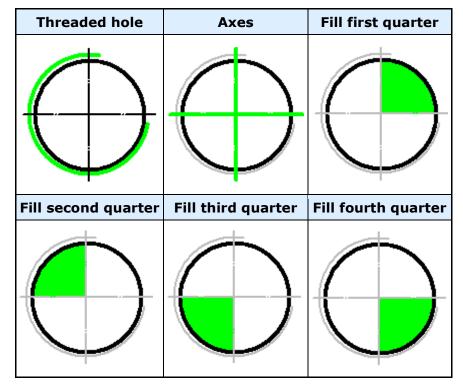
Representation

- Hole hole display switch.
- Label label display switch.
- Axes axis display switch.
- Threaded hole thread display switch.
- Diam. dimension diametrical dimension display switch.
- Center identifier drop-down list for selecting the hole center designation.

Note: Also, the parameters of the "Representation" section can be configured through the graphics window.

Graphics Window

The graphics window allows you to see the resulting hole representation and customize the representation by directly specifying elements.

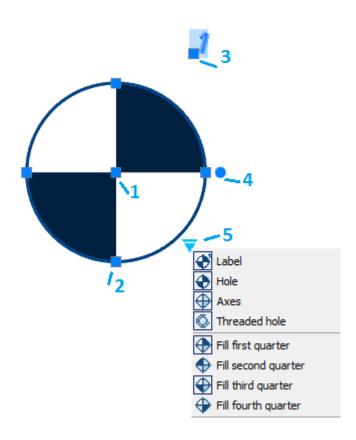


Properties

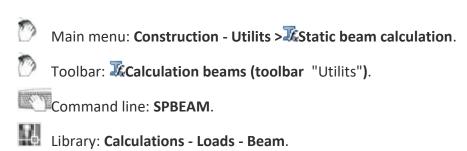
The parameters on the "Properties" functional panel are similar to the parameters from the list of parameters of the "Holes" dialog.

Grips

- 1. Hole position change grip.
- 2. Diameter change grips.
- 3. Grip for changing the position of the hole number.
- 4. Hole rotation grip.
- 5. View adjustment grip.



Static beam calculation



Library: Calculations - Loads - Calculations - Beam calculation (applied to the finished beam affixed to the supports, loads and moments, see. Calculation).

This command is used to calculate the strength of the direct beam of constant crosssection.

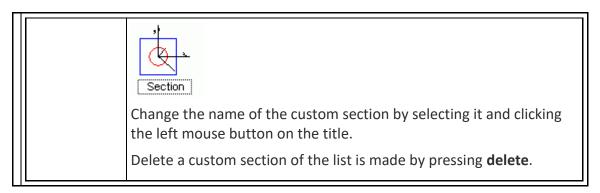
After selecting the command a dialog box opens beam calculation.

- 1. On the left side of the dialog box, select the **cross-section of the beam**.
- 2. Right set **sectional dimensions** and **length L beams**. For visual selection of the beam length, click **!+Dynamic input** at the bottom of the dialog box.
- 3. Enter the physical characteristics of the material and the cut rotation.
- 4. Specify moment and the loads acting on the beam.

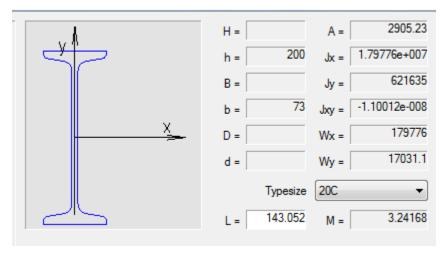
Setting section

There are three ways to specify the section:

< Triangle >	Standard geometric cross section (e.g., triangle).
GO ST8239-89	Rolled metal base elements of nanoCAD Construction 25 (e.g, I-beam GOST 8239-89). To use the base when calculating the beams need to set a Class 725.
< New Selection >	 Arbitrary section defined by the user. Sizing is carried out in several ways: Click inside the closed area. Automatically determined by the outer contour of the closed area and the region is added to the set. Clicking on a closed polyline or circle. Added to the area bounded by a circle or polyline Reselection area removes it from the set for the calculation of the cross section. After selection of the drawing section in the dialog box Beam calculation appears custom cross-section:

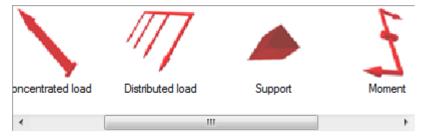


For the standard section of the database items, choose **Type size** from the dropdown list.



Beam Load and moments

1. In the dialog box, double-click the desired **type of load** or **moment**.



2. Select **insertion point** or the load bearing on the beam. At the time of selecting the insertion point move the cursor to the beam to install dependencies.



- 3. Set the parameters or load bearing in the dialog box.
 - Support

Point - the distance from the starting point to the point of insertion beam bearing in millimeters. Use keys to select the type of support.

Concentrated load

Position - the distance from the starting point to the point of insertion beam load, mm.

Value - the value component of the load in the selected direction, H.

Point - the distance from the insertion point to the point of load application of the load in the selected direction, mm.

Diagram on the left side of the dialog box explains the meaning of the input parameter.

Tabs on the top of the window are used to select the coordinate system in which the values are set:

- **☐** Rectangular
- Spherical
- Cylindrical

Distributed load

Position - the distance from the starting point to the point of insertion beam load, mm.

Length - length of the section, which is attached to a distributed force, KN/mm.

In input fields, set the value component of the load in the selected direction, H.

Diagram on the left side of the dialog box explains the meaning of the input parameter.

Tabs on the top of the window are used to select the coordinate system in which the values are set:

- **☐** Rectangular
- Spherical
- Cylindrical

Moments

Diagram on the left side of the dialog box explains the meaning of the parameters.

X, Y, Z - the components of the bending moment, KN*m.

C - distance from the starting point to the point of insertion beams torque, mm.

Calculation

Click ***Calculate beam** at the bottom of the dialog box to perform the calculation.

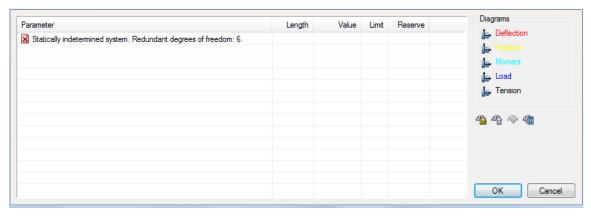
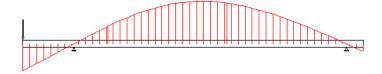


Table of results of calculating comprises calculating the maximum deflection and stress values as well as the distance from the starting point of the beam to a point at which the maximum of each parameter.

To insert a drawing graphs strain and effort to select the desired type of graph for each feature:

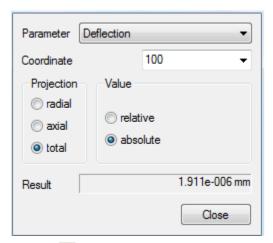


Button **Apply** adds graphics drawing.



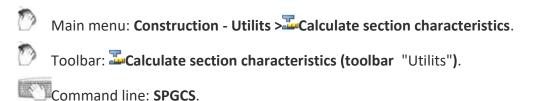
Button Save Report. Stores the results of the calculation of the beam to an external file.

Button **Calculate value**. Opens **Meaning**, in which parameters are calculated at an arbitrary point of the beam.



Button **Export diagrams**. Sell calculation results in a table in Construction Site 25. After selecting the command, specify the insertion point on the drawing table.

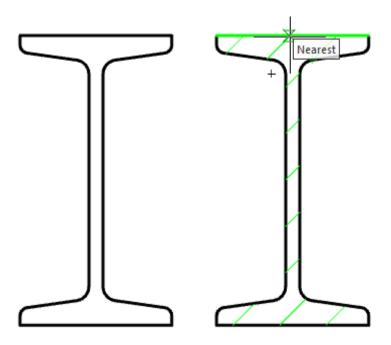
Calculate section characteristics



This command is used to calculate the geometric characteristics of the complex cross-sections with respect to arbitrary axes.

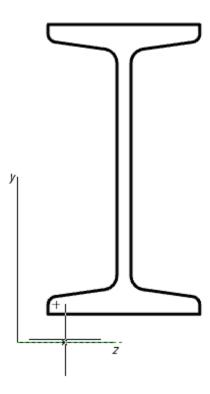
Calculation procedure

- 1. Call command.
- 2. In the drawing, then click the area closed by one of the ways:
 - Clicking inside a closed area. Automatically determined by the outer loop of the closed area, and the area is added to the set.
 - Clicking on a closed polyline or circle. Adds the area bounded by polyline or circle.

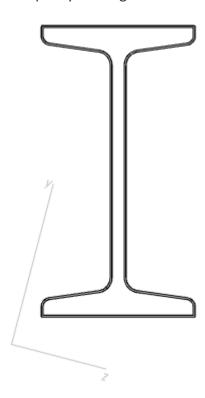


Note: Repeated selection of the field deletes it from the set to calculate the cross-section.

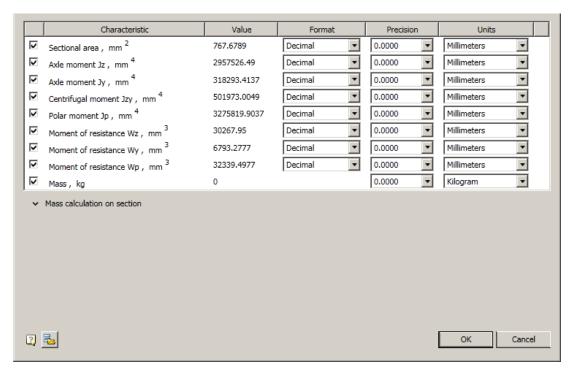
- 3. Complete the selection by clicking the right mouse button or the Enter key.
- 4. Specify the origin point or [central axis]. If you select the "central axis", the point of origin is automatically set in the center of mass of the cross section with an angle of rotation equal to 0 (step 5 is skipped).



5. Specify the angle of rotation of the coordinate system.



6. In the dialog box "Geometric section properties" Adjust the characteristics included in the summary table of the results.



For each characteristic, you can customize your format (except weight), and the accuracy of the unit.



To calculate the weight you need to open an additional menu "Mass calculation on section", which indicate the product density and length. When you specify the length of the need to expose the units. When you specify the density, you can use the-base materials, by clicking on the button Image: Material selection".

Customized settings display characteristics (size, precision, units) stored for later calculations sectional characteristics. To return to the default settings, press the button Load default settings.

7. Click "OK" in the dialog box and enter the drawing an insertion point of the table with the calculated parameters.



Parameter	Value	Units
Sectional area	767.6789	mm²
Axle moment Jz	2957526.49	mm ⁴
Axle moment Jy	318293.4137	mm ⁴
Centrifugal moment Jzy	501973.0049	mm ⁴
Polar moment Jp	3275819.9037	mm ⁴
Moment of resistance Wz	30267.95	ww3
Mament of resistance Wy	6793.2777	mm ³
Moment of resistance Wp	32339.4977	mm ³
Mass	0	кg

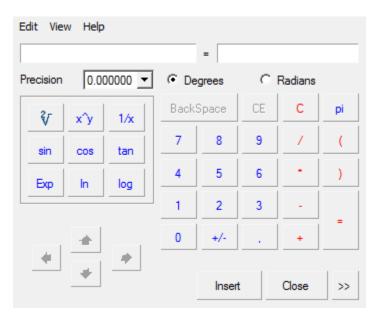
After the calculation is added to the drawing object nanoCAD Construction 25, comprising a cross-section schematic outline and the main central axis. The lengths of the axes are proportional to the values of the corresponding axial moments of inertia.

Calculator

The calculator is designed for complex mathematical calculations. The capabilities of the table and text editor are significantly expanded using the powerful functionality of the calculator.

The calculator is available in the table editor, text editor, when using the "Inquiry" utility in the "Value picker" dialog.

The "Calculator" dialog consists of a main menu and a set of grouped commands.



Main menu

- Edit
 - Copy Ctrl+C the command copies data from the input field.
 - Paste Ctrl+V the command pastes the copied data into the input field.
- View
 - NoteBook command opens the notebook panel.
 - Degrees the command switches the mode of calculating angles in degrees.
 - Radians the command switches the mode of calculating angles in radians.
 - Expression the command turns on the formula calculation mode. The input field is divided into two: on the left is the formula, on the right is the result.



Commands

Drop-down list "Precision" - sets the rounding digit of the calculation result.



Switch "Degrees - Radians" - switches the angle calculation mode.



Group of buttons "Mathematical operations".



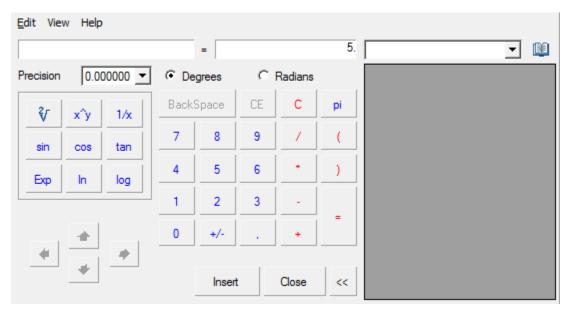
The main group of calculator buttons. The composition of the buttons is similar to all standard calculators.



Buttons for navigating table cells. Available when editing a table cell. It also shows the name of the currently edited cell.



Button to open the "Notebook" sidebar. It is possible to connect the spreadsheet editor of the "Notebook" tool. The additional sidebar lists tables from the notebook in a drop-down list. After selecting a table, its composition will be displayed. Double-clicking on a value from the table adds this value to the input field. This tool is useful when you need to perform routine calculation activities frequently.



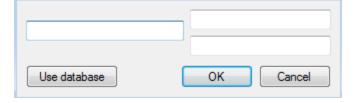
The "Insert" button is designed to insert the result of calculations from the calculator into an editable cell, a text entry field or the "Value picker" dialog.

The "Close" button closes the calculator dialog without transferring the value.

Insert material designation to the table

Button **I**material designation.

This tool is designed to be inserted into the table, the technical requirements and specifications of the formatted string records on material and product mix. By pressing the button, a dialog box appears called material designation.

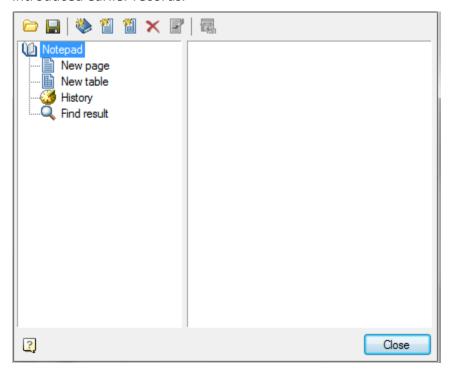


Notebook

Button III Notebook

To enter recurring standard text expressions (abbreviations, symbols, etc.) used tool Notebook. This is a versatile tool for some editing tools nanoCAD Construction 25, which is necessary to enter text. Notebook combines the functions of: storing a set of expressions and the structure of their placement in a separate file, input and placement

of text expressions, input and placement of small tables, searching and editing tools introduced earlier records.



Dialog *Notebook* divided into two parts. On the left side there is a tree structure of the notebook where the user selects the **sections** and **pages** notebook. In the upper part of the window control buttons notebook.



Load from file. Opens the notebook file stored on disk.

■Save. Saves the changes to the file in your notebook.

Important! Recommended that you save a new notebook in a separate file in the first call to the tool Notebook using the button **Save**.

To search for a text string in a notebook has a special search tool, Right-click on any section or page of the section and in the context menu, call the command **Find**. Found links are placed in the section **results

To accelerate the search procedure provided for viewing the latest expressions used in section *history*.

Management structure for the notebook with the buttons:

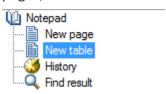
Add a partition

Add this page

Add a table

XDelete tree item

In the notebook is allowed to create an unlimited number of sections and subsections, pages, and tables.

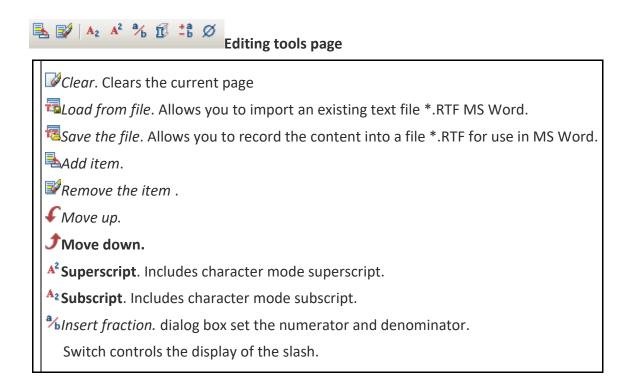


Moving sections, pages, and tables for structural wood can produce a drag and drop (drag and drop).

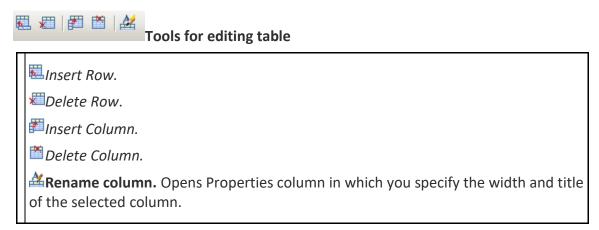
Rename the selected section or page using the command Rename the shortcut menu.

Select / Copy the selected text. Transmits the selected piece of text pages into editable table cell. If the tree structure of the selected page or table in your notebook, the contents displayed on the right side of the dialog. Highlight the desired entry cursor, and turn the Select / Copy the selected text.

Edit Page. This button is used to activate the edit pages and style notebook. It becomes active only if the tree structure is selected page element or table. In edit mode, the tree structure becomes inactive, and the right side activates the Edit toolbar.







After editing, when you exit the notebook dialog appears - prompted to save the changes in a notebook.



Magnet

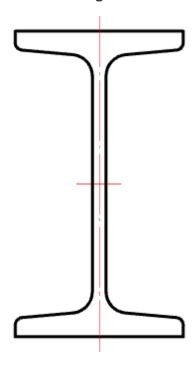
Magnet used to draw complex paths based on existing graphics. The contour can be constructed by points or by sequential indication of adjacent segments or arcs.

Called by:

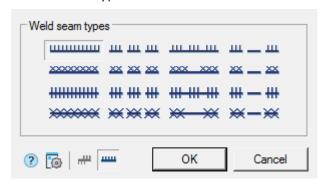
• from the context menu (Weld seam, Simplified weld joint, Bound forms)

• button T'select contour with the magnet" in the dialog (Area array).

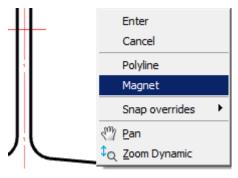
An example of constructing a weld seam contour, based on an I-beam image inserted into the drawing



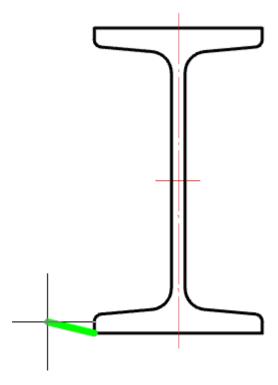
- 1. We call the command "Weld seam". A dialogue will open "Weld seam".
- 2. Select the type of seam and click "OK".



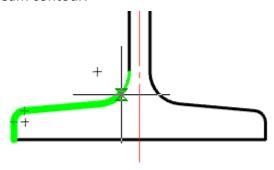
3. In the context menu, select the command "Magnet".



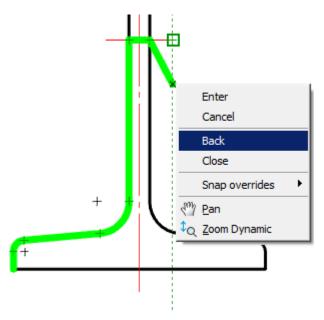
4. We indicate the starting point of the contour.



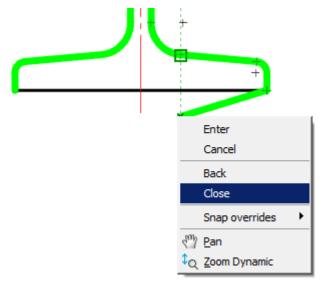
5. Sequentially move the cursor over the end points of the linear and arc sections of the l-beam contour.



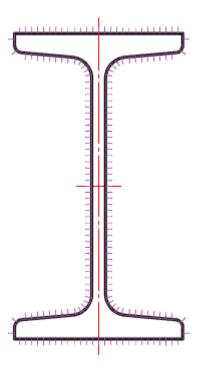
Deselection of the previous segment is made by re-pointing the cursor to the starting point of this segment or by the "Back" command from the context menu.



6. Use the "Close" command from the context menu to complete the construction of the closed contour.



7. The weld will be built along the specified contour.



Add selected

Command line: SPADDCOPY.

The command allows you to create a new object nanoCAD Construction based on the type and general properties of the selected object nanoCAD Construction .

Procedure

- 1. Call the command "Add selected" ADDCOPY.
- 2. Press the "Space" key (the <Multiple> option will turn on) if you want to insert the object in a cyclic mode.
- 3. Select an object to serve as a template. The paste command for the selected object type will run. The properties of the new object will match the template object.

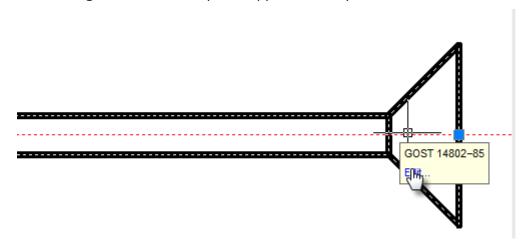
Editing

Editing

- Main menu: Construction Edit AEcdit....
- Ribbon: Construction Utilities "A"Edit....
- Toolbar: "A"Edit... ("Edit").
- Context menu: Edit (on select object).
- Command line: SPEDIT, EDIT.

Editing Building Ground25 - objects can be made in the following ways:

- right-clicking and selecting Edit Edit from the context menu;
- double-clicking the left mouse button on the nanoCAD Construction 25 object.
 This method is specified in the <u>settings</u>;
- with "grips";
- calling on the Edit tooltip that appears when you hover the cursor over an object:



- properties dialog box (properties);
- standard commands Erase (ERASE), Move (MOVE), Copy (COPY), Rotate (ROTATE), Stretch (STRETCH).

Edit in-place

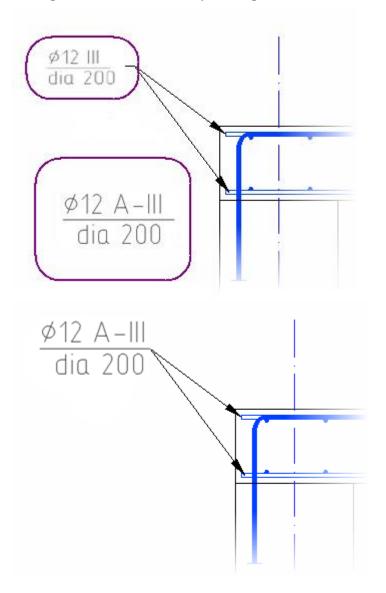
Main menu: Construction - Edit > \mathcal{I} In-place edit.

Ribbon: Construction - Utilities > $\sqrt{1}$ In-place edit.

Toolbar: In-place edit ("Edit").

Command line: SPIPEDIT, IPEDIT.

Command allows you to edit the drawing objects Construction site containing text. Editing can be done on site by clicking the left mouse button while pressing Ctrl.



Group Edit



Ribbon: Construction - Utilities 📽 Group edit.

р Toolbar: 🕍 **Group edit (** "Edit").

Command line: SPEDITGROUPS.

The command allows you to edit bolted or riveted connections.

- Click on the button for Group edit;
- Select any item in the drawing either a bolted or riveted joint;

In the window that opens, make the necessary changes.

Furthermore, editing group nanoCAD Construction 25 - objects can be produced by double-clicking the left mouse button on the axis of the assembly.

Regenerate

Main menu: Construction - Edit > Regenerate.

Ribbon: Construction - Utilities > Regenerate.

Toolbar: ORegenerate ("Edit").

Command line: SPREGEN, REGEN.

- Updates the object's nanoCAD Construction
- · Recalculates the table
- Updates overlapping objects
- Automatically updates the calculated values of the attributes

Explode all

Main menu: Construction - Edit > Explode all objects.

Ribbon: Construction - Utilities > Explode all objects.



Command line: SPEXPLODEALL, EXPLODEPDEALL.

Explodes all objects of nanoCAD Construction into drawing primitives.

Explode primitives

Main menu: Construction - Edit > Explode All Primitives.

Ribbon: Construction - Utilities > Explode All Primitives.

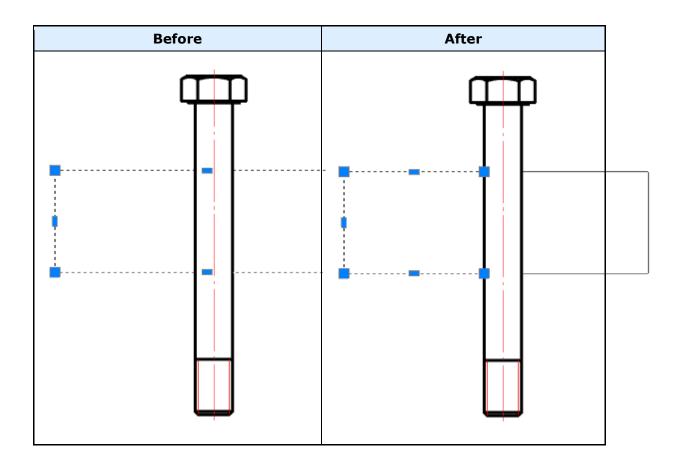
Toolbar: Edit> Explode All Primitives.

Command line: SPEXPLODEPSEUDO, EXPLODEPSEUDO.

Explodes Primitives and Pseudo-Primitives that are generated when nanoCAD graphics are overlapped by objects nanoCAD Construction .

Procedure

- 1. Call the command.
- 2. Confirm the layout of the primitives.
- 3. The primitives will be broken.



Export drawing file

- Main menu: Construction Edit > Export to file.
- Ribbon: Construction Utilities > Export to file.
- Toolbar: Export to file ("Edit").
- Command line: SPEXPORTTOFILE.

Saves selected objects in the drawing file.

- 1. Click Export to file
- 2. Select the drawing objects
- 3. In the dialog box, type the required settings drawing
- 4. Click OK
- 5. In the dialog box, specify a name for the drawing, and then click Save

Parameters Redefinitions

Main menu: Construction - Edit > aParameters redefinition.

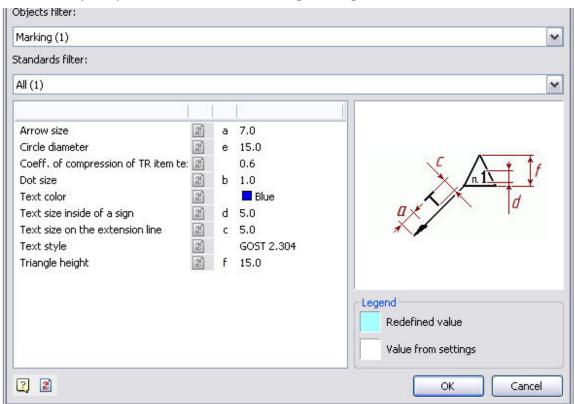
Ribbon: Construction - Utilities > Parameters redefinition.

Toolbar: Edit - aParameters redefinition.

Command line: SPPR, PR.

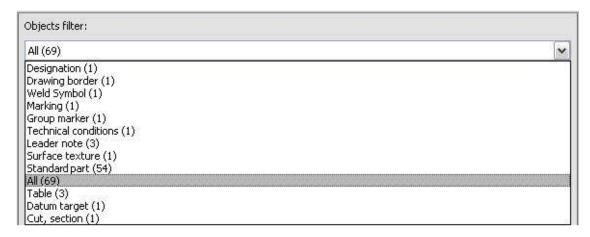
The basic rules

This command is used to define the variations of the nanoCAD Construction design objects settings in the current drawing.nanoCAD Construction 25 The redefinition is controlled by the parameters set in the setting of design elements.



The objects are grouped by types in the dialog. The objects parameters are grouped by name.

To set the parameters or Redefinition removal filter lists are:



If any type is selected in the parameters table , the parameters list concerning the given type is displayed.

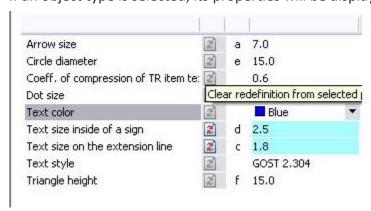
The standard filter list allows specifying different settings for single objects created by a different design standard.



If you select "All" standards - the changes will be applied to all objects if you select only one of the standards (eg GOST), the changes will only be used for objects belonging to the chosen standard.

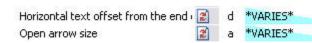
Command Options

If an object type is selected, its properties will be displayed in the parameters table.



Redefined parameters are shown in blue. To remove the overriding need to press the opposite setting.

In addition, you can manually specify a new value for the selected parameter. If the new value is the same default, the blue light will not be displayed. If the selected object group only some entries have the override, the backlight will override the diagonal.



To remove the override all objects need to click on the lab bottom left of the dialog.

Action sequence

To change the settings of one or more design elements, you must:

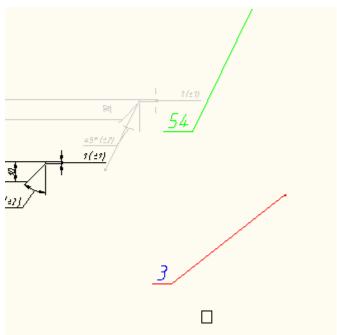
Select objects

Next, in the dialog box to specify the new settings data display objects. Changes apply only to the selected objects.

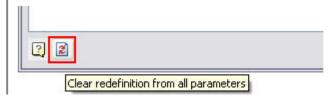
Change the parameters of objects can also be by a separate command **Parameters** redefinitions.

Checking the settings of design elements

To verify the design elements specify the settings, you must run the **Parameters redefinition. It is proposed to select the objects that will be exposed to the command.



When you press the Enter will select all elements of design Construction Site 4. When you press the Enter will select all elements of design Construction Site 4. Next, press the button Clear redefinition from all parameters



The result is a document issued in accordance with the settings specified in the enterprise (in terms of elements nanoCAD Construction 25).

Find and Replace

Main menu: Edit > Find and Replace....

Main menu: Construction - Edit > Find and Replace....

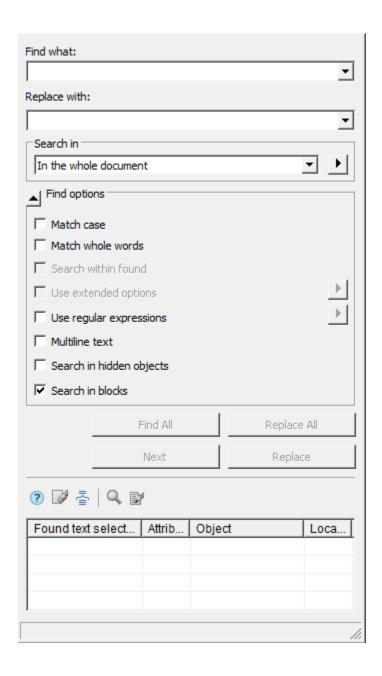
Ribbon: Construction - Utilities > Find and Replace....

Toolbar: Edit > Find and Replace....

Command line: SPFIND, FIND.

Shortcut: Ctrl+F.

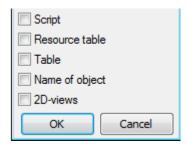
The "Find and Replace" tool is used to find and replace string values in nanoCAD Construction 25 objects in a drawing or in an object base.



Search

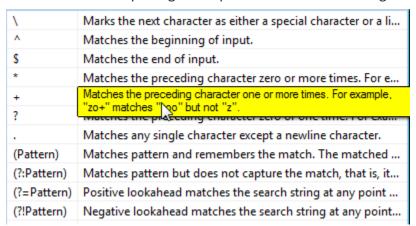
- 1. Call the command. A dialogue will open "Find and Replace".
- 2. In the "Find what:" field, enter the search phrase.
- 3. Select "Search in" from the list, or by using the additional button that defines the search area. The button action depends on the context of the "Find and Replace" command call. If the command is called from the object manager, the "Quick selection" window opens.
- 4. Select search parameters:

- *Match case*. If the flag is set, the search is case-sensitive.
- *Match whole words*. If the flag is set, the search is performed for individual words, that is, combinations of characters separated by punctuation marks or spaces.
- Search within found. The switch is available after the string has been searched and limits the search range.
- *Use extended options*. The switch is available when searching in the object database. Click the button opposite the parameter and in the window that appears, select the advanced search areas.



• Use regular expressions. Enables search mode with additional selection conditions.

Click the button opposite the parameter and select the required expression from the list that appears. When you hover over a list item, a tooltip appears with a detailed explanation. The choice of expression is made with the left mouse button. Multiple regular expressions can be used together.



- Multiline text. Turns on the search mode for multi-line text.
- Search in hidden objects. Turns on the mode when both visible and hidden objects are searched.
- Search in blocks. Turns on the mode when the search is carried out inside the blocks.
- 5. Click the "Find all" button, the search process will start.
- 6. The search result will be displayed in the table.

Search result

The search result is displayed in the table. Data is sorted by mouse click in the column header. The "Next" button allows you to move the active row in the table.

Found text chunk	Attribute	Object	1
electrode, additional wire	String 1	Leader note	
1. electrode, additional wire	Text1	Technical conditions	

The table has additional commands:

- WClear all clears the search result list.
- Froup results by objects displays results for objects.
- Show object shows the object corresponding to the selected row in the drawing. The object is shown even if it is on an inactive sheet.
- Edit object opens a dialog box for the object corresponding to the selected row.

Replace

- 1. Search for objects to replace.
- 2. In the "Replace with" input field, enter the text string to replace the found lines with.
- 3. Click the "Replace" or "Replace All" button:
 - The "Replace All" button replaces all found fragments with a new value.
 - The "Replace" button starts the process of successive replacement of the found fragments. To replace all found fragments, press the "Replace" button each time, while the active line will move through the table below. The "Next" button allows you to move the active row through the table, skipping the next found fragment in the list without replacing it with a new value.

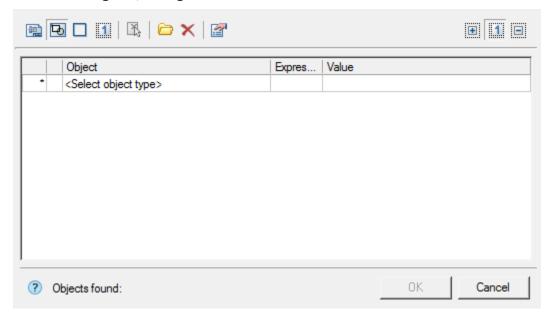
Quick selection



The "Quick selection" tool is used to select the nanoCAD Construction 25 objects inserted into the drawing according to certain conditions.

Procedure

- 1. Call the command.
- 2. In the dialog box, configure the search conditions.



3. Confirm the setting with the "OK" button. The objects in the drawing are selected according to the search conditions.

Dialog

The dialog box consists of a toolbar and a list of search conditions. At the bottom left of the dialog, the number of objects found according to the specified search conditions is displayed.

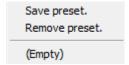
Toolbar

- Selecting an object search area. The choice of the search area is carried out using the modes:
 - In the whole document selection of objects is carried out in the column of the list of conditions "Object", the list of objects is taken from the entire drawing;
 - In the current space selection of objects is carried out in the column of the list of conditions "Object", the list of objects is taken from the current sheet;
 - In bounding box objects are selected by specifying a rectangular area in the drawing, to redefine the area, use the command Set selection;

- In current selection objects are selected by specifying a set of objects in the drawing, to redefine a set of objects, use the command set selection;
- Selecting a method for adding found objects. The choice of the method of adding is carried out using the modes:
 - Liset result to new selection objects matching the search conditions will be selected in the drawing, and all other objects will be deselected;
 - **Add result to selection the found objects will be added to the objects already selected in the drawing;
 - Subtruct result from selection found objects will be deselected if they were selected.
- **a** QS Params. Opens a dropdown menu:

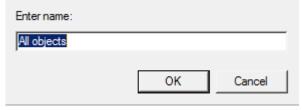
Include Frozen and Invisible layers - the switch determines whether to search for objects on frozen and hidden layers. Does not search by default.

- Set selection. The command allows you to override a set of objects or a rectangular area. Available for "In bounding box" or "In current selection" modes.
- Presets. Opens a dropdown menu. Using the set of tools included in this command, you can select objects according to previously established and saved conditions:



Save preset

Opens a dialog box in which the name of the template is entered, after which the template is added to the list of templates.



Remove preset

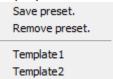
Opens a dialog box in which a template is selected to be removed from the list, or the entire list is cleared.



• List preset

The list displays all saved templates. If the list is empty, "(Empty)" is

displayed.

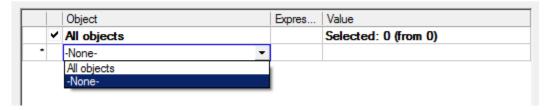


• **Reset conditions. The command clears the list of conditions.

List of conditions

The list of conditions consists of three main columns:

• "Object" - displays objects and their parameters. If you selected the search area "In the whole document" or "In the current space" you must add objects yourself. In the "Object" column, select the desired type of object from the drop-down list of the cell. To deselect or remove an object from the table, select the "-None-" value.



• "Expression type" - a comparison operator is assigned to object parameters. Each type of object has its own parameters for which conditions are set.

	Object	Expression type	Value
- /	All objects		Selected: 4 (from 4)
	Colour		
	Hyperlink		
	Layer		
	Line Weight	•	
	Linetype	=	
	Linetype Scale	!=	
	Thickness	<	
	Transparency	>=	
•	<select object="" type=""></select>	<= idea	
		Like UnLike	

Possible operators:

- = equally;
- != not equal;
- <, > less more;
- >=, <= no less, no more;
- Like substring search. According to this condition, all objects are selected for which the parameter value contains the substring indicated in the "Value" column.

- *Unlike* substring search. According to this condition, all objects are selected for which the parameter value does NOT contain the substring indicated in the "Value" column.
- "Value" indicates the value by which the selection will be made. The value can be text, numeric, or selected from the drop-down list.

Viewport context toolbar

Context menu viewport appears when you right-click in the space of Layout.



Activate the form. Opens in model space viewport.

Update dimensions. Sets the scale size of the form in accordance with the layout space.

Example Cut viewport. Overrides viewscreen on existing polyline or build a new one when you select the context menu option *Polygon*.

*Fix view. Commits scale and position relative to the model space viewport.

 \P *Fit all.* fits into the viewport model space objects.

Q M1.724... Select scale. Opens the context menu to select the viewport scale.

MechWizard

ScriptMaster

Main menu: Construction - Library objects - MechWizard > ScriptMaster.

Ribbon: Construction - MechWizard > ScriptMaster.

Toolbar: MechWizard > ScriptMaster.

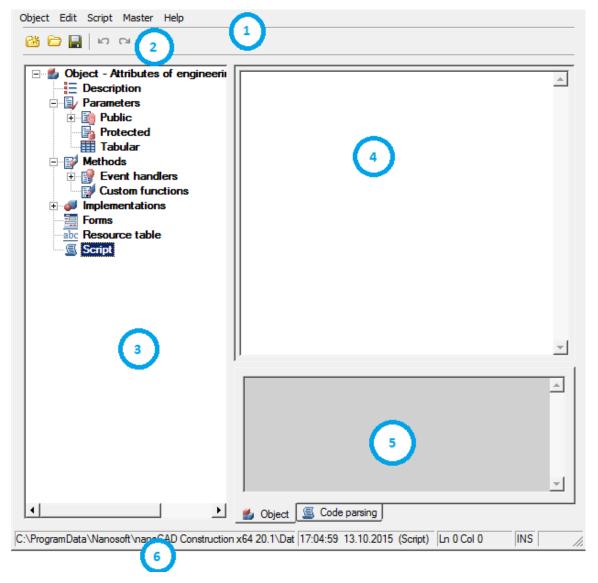
Library: Context menu command "Open with ScriptMaster" on any element library.

Command line: SPSMASTER.

The command opens "ScriptMaster" for creating and editing a database object.

Dialog

The title of the current element is indicated in the headers of the "ScriptMaster" dialog. An "*" signifies that unsaved changes were made to the item.



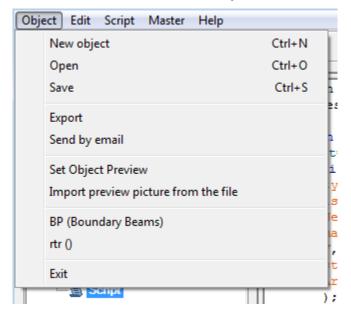
- 1. Main menu. Contains all commands for creating and editing objects and scripts. Contains sections:
 - Object
 - Edit
 - Script
 - Master
- 2. Toolbar. Contains basic commands for creating and editing objects.
 - "New object". The command opens a dialog for creating a new base element.
 - "Open". The command is designed to select another element from the base.
 - \blacksquare "Save". The command saves changes to the current object.
 - ""Undo". The command cancels the previous action.

- "Redo". The command redo the last undone action.
- 3. <u>Object tree</u>. In the object tree, you can navigate through the object properties and manage them through the context menu.
- 4. Workspace. The script and table, as well as other properties of the object are edited in the work area.
- 5. Notification area. The results of the script check and search / replacement are displayed in the notification area.
- 6. Status bar. The status bar displays the current state of work with the object:
 - Setting the path to the current database;
 - Current cursor position;
 - Edit state insert or replace;
 - Script sign for reading or editing.

The menu bar

Object

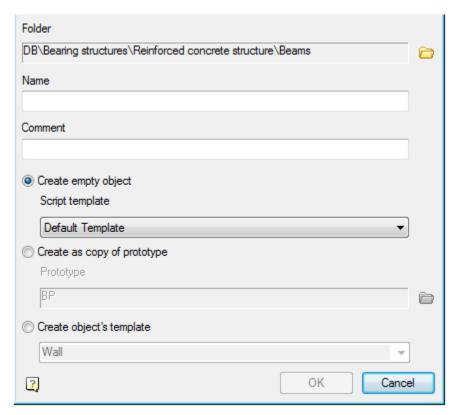
Menu item *object* allows it to work with database objects in nanoCAD Construction 25:



Object - creates a new element base (By pressing keys Ctrl+N or clicking on the icon Create on the toolbar).



After issuing this command, a dialog box appears to New object



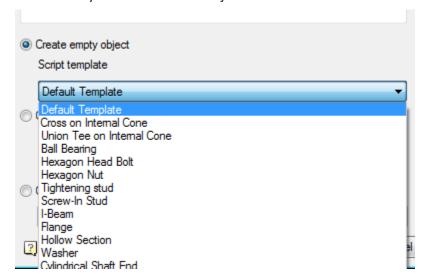
To create a new object, you must specify:

Folder in which to save the new object

Name (will be displayed in the browser)

Comment (will be displayed in the tooltip)

Select a way to create a new object



Create an empty object - creates a table and designs without having one script selected from the template.

Default template - empty script.

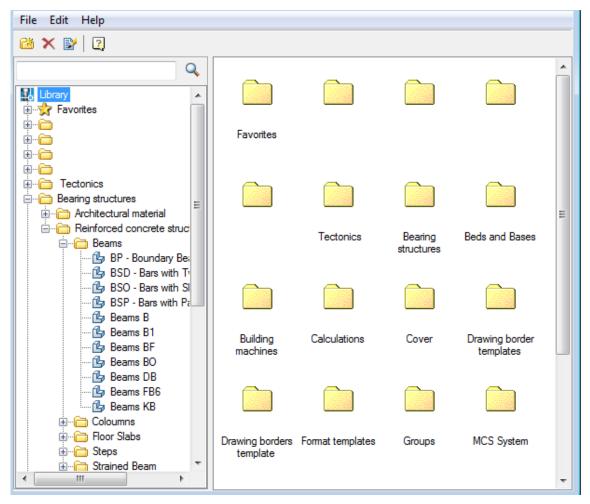
Create as copy of prototype - creates an object by copying the entire prototype object (along with the script, tables, performances and three-dimensional models.



Use the button to select an object to create a prototype object.

Open - Open an existing part (keyboard shortcut *Ctrl+O* or icon *Open* on the toolbar).

After selecting the command, a dialog box appears *Select the details* allowing you to select or find the item in the current database in Construction Site 4.



Save - save changes to the current member base (keyboard shortcut Ctrl+S or icon Save on the toolbar).

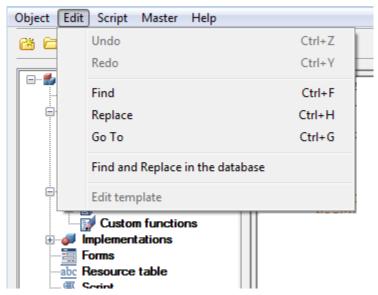
Set object preview - allows you to set as a preview for the object in the browser database objects nanoCAD.

Exit - close Master objects

In paragraph object available list of recently used items.

Editing

Menu item *Edit* allows you to work with the current database nanoCAD Construction 25:

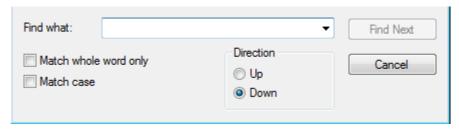


Undo - cancel the last action (promptness pressing keys *Ctrl+Z* or clicking on the icon *Undo* on the toolbar).

Redo - undo the last action (promptness pressing keys *Ctrl+Y* or clicking on the icon *Repeat* on the toolbar).

Find - search for a given string on the script of the current element (promptness keys Ctrl+F).

Calling this command opens a dialog box Find



Looking provided an opportunity to take into account only whole words and case search string using by appropriate switches.

Also have the opportunity to select the search direction.

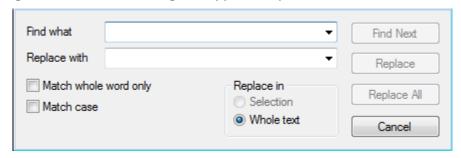
Go to the next matched string by pressing find Next.

After you click *Cancel*, you return to the previous menu.

Speas dropdown input field allows you to select the last used values.

Replace - search for a given string with a new one.

After calling this command, a dialog box appears Replace



When replacing provides an opportunity to consider only whole words and case search string using by appropriate switches. It is also possible to carry out replacement in the selected area or throughout the text.

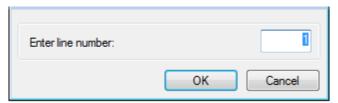
Daylight without replacing the matched string to the next by pressing find Next.

When you click Replace matched string is replaced by a new one at the current position.

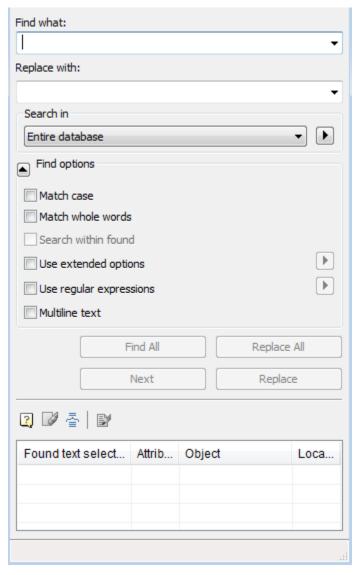
After you click *Replace All* all found strings will be replaced.

Button to return to the previous menu, press Cancel.

Go to - command allows you to go to a specific line (promptness keys Ctrl+G).



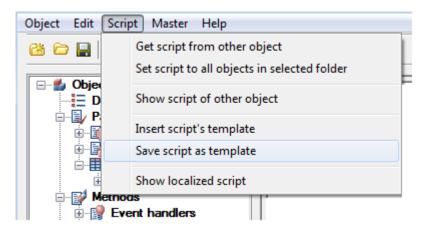
Find and replace on the database - allows you to search and replace strings in the base.



There are opportunities to search the entire database or in a folder, the search is case sensitive, whole words, as well as multi-line test, the search for the script, table, table name resources and facilities (*Use advanced options*)

Script

Menu *script* allows you to work with the current script object database nanoCAD Construction 25:



Get script from other object - command allows you to copy the script from another object.

Set script to all objects in selected folder - script command sets the current object to all objects in the selected folder database elements nanoCAD Construction 25.

Show script of other object - you can view the script of another object without changing it.

Insert script template - command allows you to take in the script as the current object previously saved template.

Save script as template - allows you to save the current script object as a template for future use.

Show localized script - command allows you to view localized script based on the data of the resource table.

Script Master

In general, writing the script for the majority of standard parts is not required. Just open the script details, like on purpose, and copy it. However, it must be remembered that the parameters in the model (figure) must strictly match the prototype.

nanoCAD Construction 25 is a convenient mechanism for self-compilation step algorithms that control the behavior of the items in the time of insertion and editing object - *Master browser*.

Call Master browser via the menu item Master / Script wizard

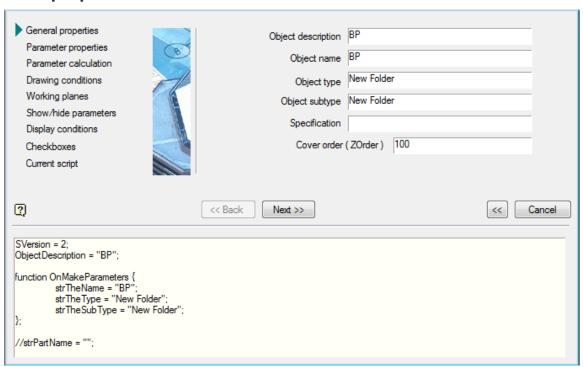
- General properties
- Parameter Properties
- Calculation parameter
- Drawing Conditions

- working planes
- show / Hide parameters
- Display conditions
- Check boxes
- Current script

At any step of the script wizard may move buttons << Back and Next >> .

Button Cancel exits the wizard.

Basic properties



Object description (Property Description). This parameter is optional, it describes the common name of the object. For example, nut, bolt, etc.

Object type (type). This parameter is required, it is advisable to fill it in Latin characters. Serves to identify the object as belonging to a group. For example, StdArborParts - standard parts shaft, StdJointParts - fastenings.

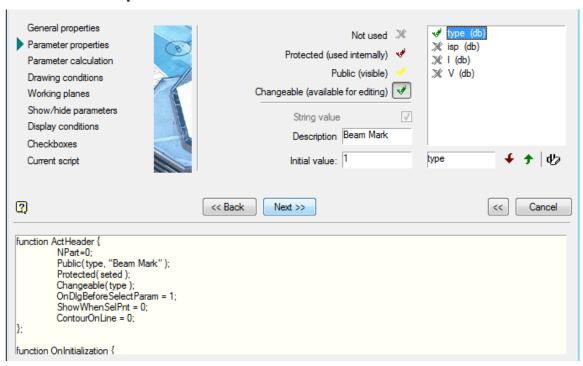
Object Name (Name of facility). This parameter is required, it is advisable to fill it in Latin characters. Defines elements within the group, given strTheType. For example, a screw bolt - Screw, for nuts - Nut, for washers - Washer etc.

Object subtype (subtype). Additional parameter, it is desirable to fill it in Latin characters. Defines a specific subtype of GOST. For example, if the name of the object - Nut (Nut), then simple nuts subtype is Simple, from crown - Castle etc.

These parameters set by the user, based on its project object interaction, and can be arbitrary. Hard list is not, and they can be changed at any time. They will only be used in scripts to automatically establish dependencies (details - in the description of scripts).

Specification. Description line items for transmission specification.

Parameter Properties



Not used

All parameters specified in the table, are automatically available for operations over them from the program during the insert or edit the object. If a variable is used only in the process of creating a graphic image, then use it in the script is not necessary.

Protected (used internally)

If necessary, display the parameter dialog during insertion.

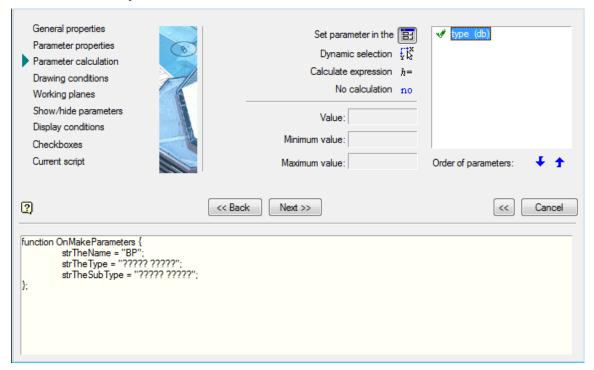
Public (visible)

Used to transfer parameters during insertion and editing of other objects.

Changeable (available for editing)

Available to change other objects in the editing process. Variable of the property, will pick up from the table and the necessary parameters on the basis of the obtained values to reconstruct the details of the model.

Calculation of parameters



Set parameter in the dialogue

Variable for which this flag is set to be available for editing of dialogue insert details.

Dynamic selection

Processed when the position of the cursor relative to the insertion point of the object according to the formulas in the designated parameter value in the range of "minimum value" - "Maximum".

Calculate after dialouge is shown using dynamic selection by expression

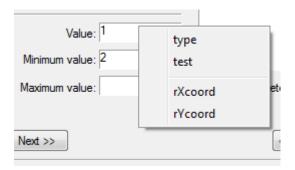
Calculated after the call dialogue and visual selection as expression in the Parameter Value.

Dont calculate parameter

Defines the minimum value. Can be expressed as a function of other parameters. Determination of the value of the parameter as a function of the cursor or other parameters. Available functions may be called from the context menu or manually entered into the appropriate input box.

Minimum value

Defines the minimum value. Can be expressed as a function of other parameters.



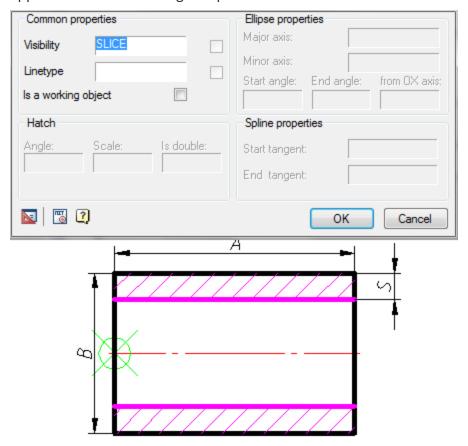
Context menu is available in the input field.

Maximum

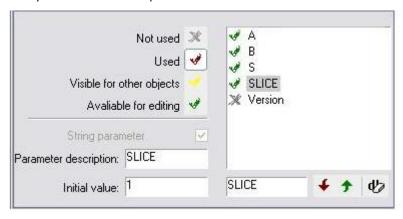
Defines the maximum value. Can be expressed as a function of other parameters. Context menu is available in the input field.

Conditions rendering

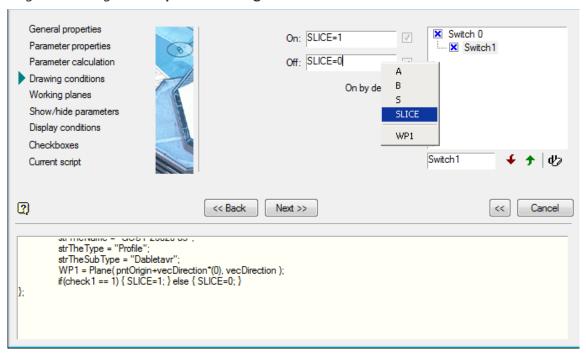
Add a line in the drawing model, rendering which we will operate from the dialog during the insertion of parts (for example, they will be highlighted *Magenta*). Pressing the button will open a dialog box *object properties* and assign as a condition of their appearance in the drawing text parameter. In this case **SLICE**.



Size "S", necessary for proper recognition, automatically appears in the parameter list, but you must enter a parameter draw.

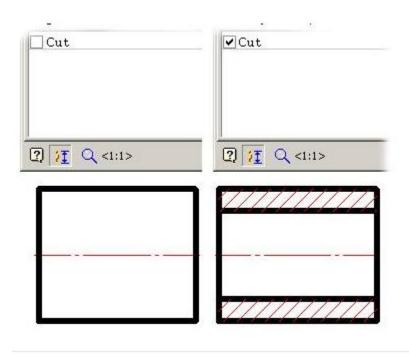


Fragment dialog box Properties settings



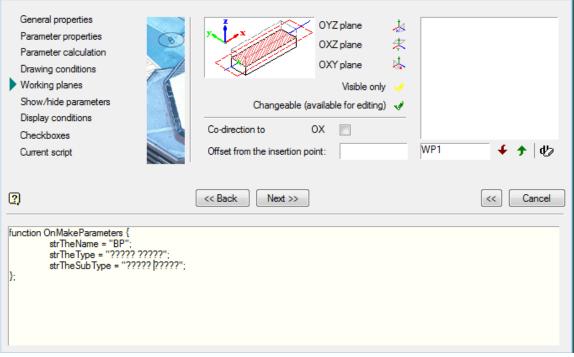
In the name field switch is set "Cut". The parameter rendering paste from the context menu variable "SLICE".

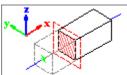
After the completion of the script retain the item and exit the editor. Of the database tree select our item and insert it into the model. In the editing dialog parts we have a switch incision through which we can control the rendering of relevant lines.



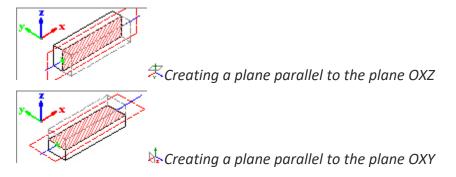
Working planes

Workplanes determine the position of the items in the time of insertion and editing. Determination of working planes dialog box to the work plane.



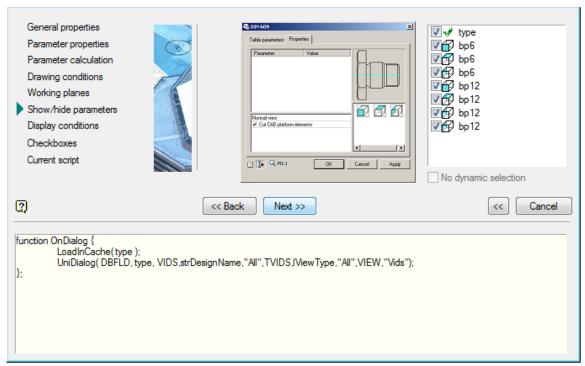


**Creating a plane parallel to the plane OYZ



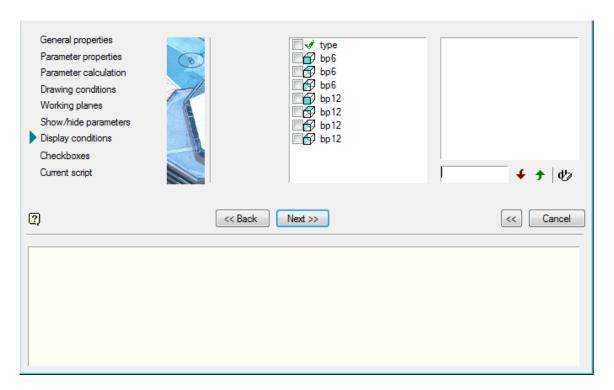
Show / Hide parameters

In this step, you must identify the available options in the menu items. The selection is made by setting a checkmark APPLICABLE parameter



Display conditions

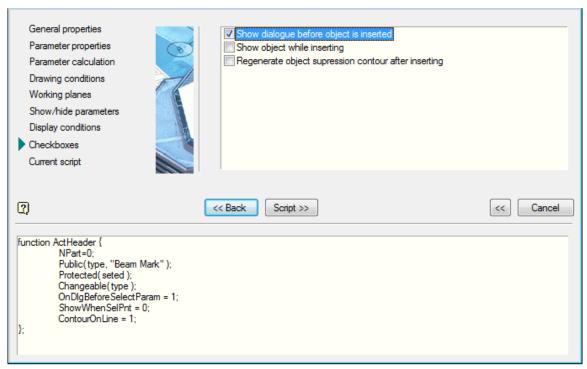
In this step, display conditions defined species . The selection is made by setting a checkmark APPLICABLE parameter and determining the conditions of his hiding



Check boxes

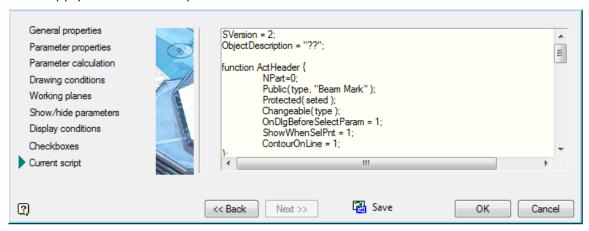
In this step, there are the following settings:

- Show dialogue before object is inserted
- · Show object while inserting
- · Regenerate object suppression contour after inserting



Current script

In this step, you can view and edit the resulting script. Clicking on the button *Save* and OK to apply the current script items



This is the final step.

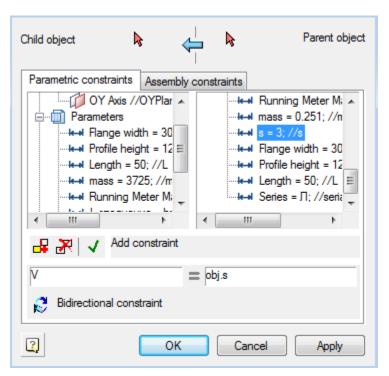
Master dependencies

Creating dependencies for interaction with other items going online.

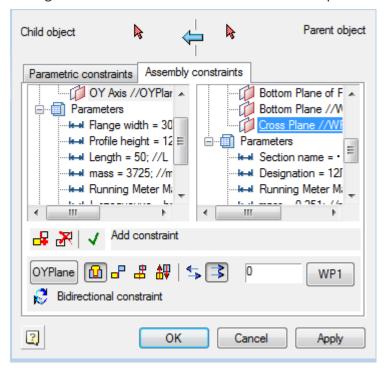
Call Master dependencies via menu Master / Master Dependency .

Further, following the screen prompts on the command line, place the drawing model details and select the items with which it must interact.

After placing the parts in the drawing, a dialog box *Managing Dependencies*. Functionally, the dialog box is divided into two parts bookmarks. Bookmark this *Parametric dependence* and Assembly constraints.



Definition of parametric relationships occurs directly in the dialog box. It's enough to double-click on the option to specify the details of the child (it will automatically appear in the left-hand side) and bring it into line with the parameter of the parent object. In the right-hand side can be used mathematical expressions.



Types of assembly and parametric relationships are defined in the dialog box. Parameters can serve as table settings objects and definable expression.

- Axial and surface alignment

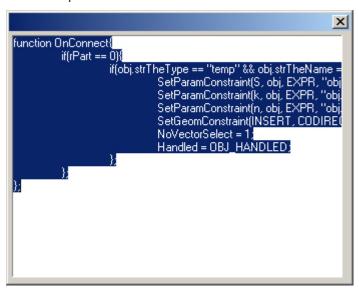
 Surface alignment

 Axial alignment

 Direction
- Sets the direction for the dependencies (Counter directional / Co-directional)

Once all the dependencies are installed, you can click OK, successively pass through the dialog boxes and set the options you want.

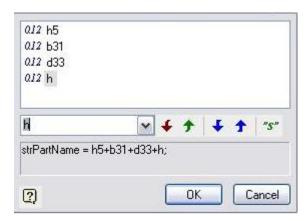
Eventually, an automatically generated string specifications necessary to automatically detect dependencies.



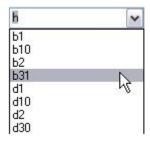
Master of string of specification

Formation data for transmission to the specification can be done in automatic and semiautomatic modes. Some information can be inserted on the basis of the table of parameters associated with the geometry of the figure, the part can be entered manually in the editing dialog standard parts.

Call Master BOM line via menu Master / Master BOM line .



In the drop-down list are tabulated parameters involved in drawing details.

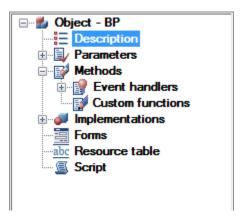


For a complete description of information on standard parts must be able to adjust or supplement information. For example, cover screws or the class thread. In this case, just add a "#".

The editor position will be able to insert text between the two lattices, and then save.



Object tree



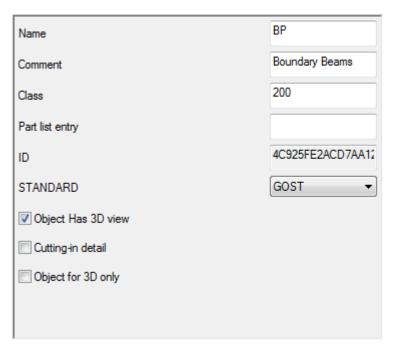
Tree object contains the following sections:

- Description;
- Parameters;
- Methods;
- Function;
- Forms;
- Resources table;
- Script.

If the open file has been modified, its wood properties can be irrelevant. To actualize the properties tree to choose the context menu to update the object tree.

Description

When you click on the section *Description* of the workspace displays the following properties.



Property name - the name of the object to be displayed in the browser database.

Comment is displayed in the tooltip to the object.

Standard product allows you to set the standard (GOST, DIN, ISO, etc.).

Part list entry, is usually not be filled in the properties, and the variable defined in a script.

You can also put a tick:

Object have 3D view.

Cutting in detail

Object for 3D only.

In addition, the properties of the unique identifier for the object.

Parameters

Section Parameters contains three subsections:

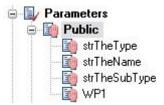
- public,
- protected,
- tabular.



The public section *Upcoming* shows a table of open (public) parameters along with their comments.

	Name	Comment
1	strTheType	Object's type
2	strTheName	Object's name
3	strTheSubType	Object's subtype
4	WP1	Work Plane 1

Furthermore, the parameters are displayed in a tree branch.



Section *Protected* contains a list of protected (protected) parameters, which are also displayed in a table and drop-down list of branches in the tree object.



Section Table includes a list of tables detail

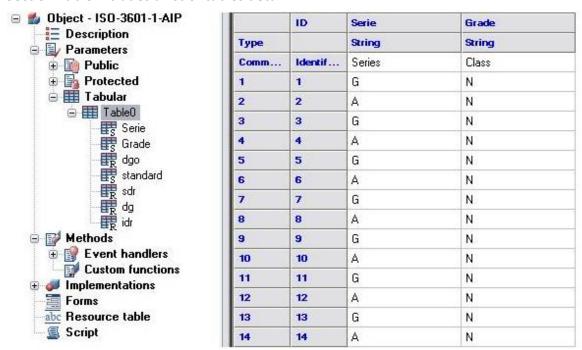
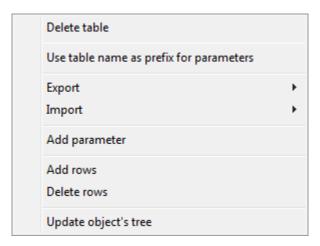


Table and column of the table in the current workspace synchronized depending on the position of the cursor in the object tree. Tables in the object may be a few, while the identification is made on behalf of the table. Popup menu when the cursor position on the table includes the following tools:

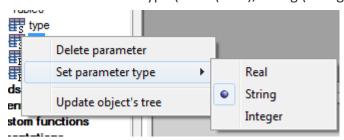


When you select table name as a prefix to the parameters of an appeal to the names of variables are prefixed with the table name. For example, Table 0.dr.

You can add / delete rows from a table and add a parameter to a table.

There is also exported to Excel, text format and import from them.

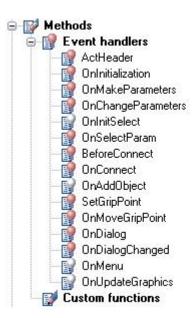
Whenever the context menu on a separate parameter tables are available options remove a single parameter and set the type (Valid (Real), String (String) or a (Integer).



To rename a table parameter, select it and click on his name left mouse button, or press F2. If the parameter name has changed, it will automatically run search and replace in the script to a new name parameter correctly processed by the script.

Methods

Section Methods includes event handlers and custom functions.



When selecting a specific function in the script is its description (synchronized current line).

Red light icon in the function indicates the presence of a function in the script is present, white - about lack. When you double clicking on the corresponding function in the script created by its pattern.

Implementation

Section Versions list includes 2D and 3D versions

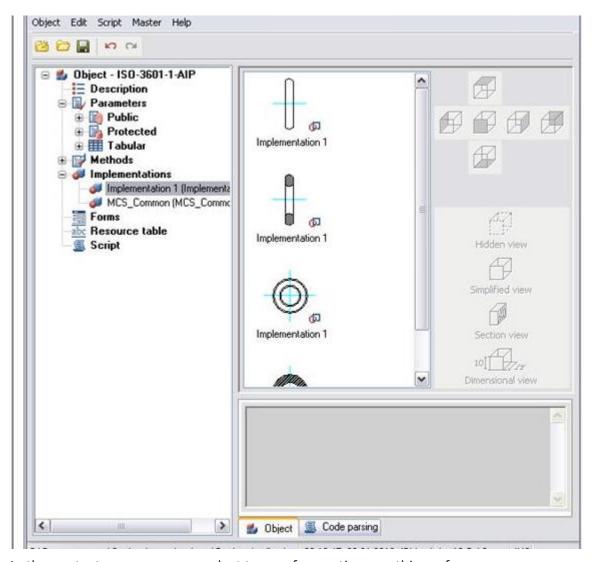
When selecting the root partition *versions* are all the performance, and the choice of a particular (for example, *Version 1*) - displays the filtered views of this execution. To create a two-dimensional view of a new version should be specified in the context menu *Add performance - automatically create 2D views.*

To create this kind of performance you need to select the required performance and the shortcut menu - Add 2D view.

- 2D view parametric graphic nanoCAD
- 3D view of the Construction Site 25 script to create a solid model (opening section of the shaft, etc.)

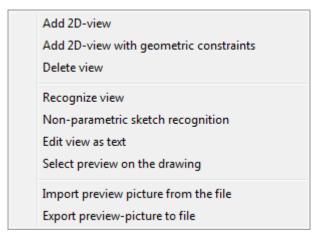
Deleted when you delete all kinds of performance of this version.

To set the parameters of the form, select it, and the right side of the workspace to set view orientation (*Front*, *Left*, *Top*, etc.) and the type of form (*cut*, *cut C*, *C size* etc.).



In the context menu, you can select types of operations on this performance.

These options add \ remove kinds of current version:



The following context menu options are designed to work with the selected view of the current execution.

Add 2D-view
Add 2D-view with geometric constraints
Delete view
Recognize view
Non-parametric sketch recognition
Edit view as text
Select preview on the drawing
Import preview picture from the file
Export preview-picture to file

Recognize view - parametric recognition graphics nanoCAD.

Nonparametric recognize view - simple nonparametric reference charts, graphics taken from the object as it is.

Edit view as text - description of species opens in a text editor.

Set preview from objects - objects selection nanoCAD to create a preview of this species.

Import preview picture from file - creating thumbs on the basis of the previously saved file.

Export preview picture to file - Saves the preview in a file.

Form editor

Form Editor

Database objects nanoCAD Construction 25 supports the use of custom dialogs for inserting and editing. Creating such dialogues (forms) is made in Form Editor, which can be accessed from the dialog boxes *Create Group*, *Create marker* and *Object Wizard*.

Button Form editor.

Menu

File

- Test. Opens the form for viewing and testing.
- Output. Closes the form editor.

Correction

- Cancel. Cancels the previous execution of operations.
- Cut, copy, paste ** Command working with the clipboard.
- Select all. Selects all the controls on the panel shape.
- Remove. Deletes the selected controls from the form.
- Group. Group the selected controls.

• Ungroup. Cancels the grouping selected controls.

View

- By ... edge. Alignment commands selected controls along one edge.
- Align dimensions. Aligns the selected controls dimensions.
- Above and below. Reverses the order of the tab selected control by moving it up a level or down
- Forward, backward. Changes the tab order of the selected control by moving it to the first or the last level.
- Tab order 🖳 Includes display serial numbers tab controls.
 - To set the tab order to be pressed sequentially controls on the left mouse button. Tab order will be set according to the sequence control option.
- Properties. Enables and disables the additional window Properties.
- Variables, Enables and disables the additional window variables.
- Grid ##. Turns on and off the grid and snap to grid.
- Indents . Enables or disables the frame shape

Insert

There are commands insert controls

- abl Input field ...
- Checkbox ..
- Switch.
- IIList.
- List from the database.
- Combo box.
- Combo box from the database .
- A <u>Text.</u>
- ☐Group.
- <u>MFigure.</u>
- ■ Panel.
- <u>Button.</u>
- <u>mathemath</u>
 Table with filtering.
- Table.
- Types and performance.

Wiewing.

Forms panel

On the forms produced occupancy controls.

In the context menu of the forms are available editing commands: *cut, copy, paste, group, ungroup*.

To add a control to the form by one of the following ways:

• Select the desired control from the menu *Insert* or toolbar. Specify the insertion point and set the dimensions of the control panel on the form.

After adding the control you want to bind it to a field in the *Properties*.

• In the open window, *Variables*, select the variable for which you want to add a control. Left-click on the variable in the list, and holding down the mouse button, move the cursor to the panel shape. Release the mouse button. Panel forms added group controls - *text* and *input field*.

If you insert a control from the window *variables* hold down Control, then it is possible to select the type of control.

Selection of the control panel forms can be accomplished in several ways:

- Single click of the left mouse button. Selected one control.
- Single click of the left mouse button while pressing Control. If the control is not selected, it is added to the current set. If a control is selected, it is removed from the current set.
- Choosing a crossing. Click the left mouse button in the space bar form. Holding the button down and dragging a selection box set. Selected controls that are fully or partially captured by the selection frame.

Editing the size of the control is done by using the "grips". When the grid is resized with a certain step.

Changing the position of the selected controls performed with the left mouse button on one of the selected items. When the grid movement occurs incrementally.

Align controls

In the menu View available commands align controls on edge and size.

Controls aligned to the left, and then by size.

Grouping controls

Working with multiple controls may need to be fixing their relative position. If grouping is fixed relative position of the controls, and when you move one of the other grouped elements also move.

Select panel forms controls and issue the Group. Selected controls will be grouped.

Removing Controls made the command Delete.

Test the form

Before completing the form creation is recommended to execute the test to view the form.

Variables window

In the Variables are parameters of the object (marker , database object , group).

Icon ✓ marked parameters that are associated with controls editable form

Properties window

In the Properties lists the properties of the selected controls on the form. At the bottom there is a line prompt with a brief description of the selected property

Interaction of the form with the script

Interaction of the form with the script

The form and the design elements located on it interact with the script using properties and events.

Properties

All form properties start with a prefix "Form."

Control properties (design elements) start with a prefix "Form.\$\$\$", where \$\$\$ — name of the control on the properties panel of the form editor, case-sensitive.

Example:

```
Form.editbox.Value = "";
```

When accessing the control value (design element), the ".Value" parameter can be skipped.

Example:

```
Form.editbox = "";
```

For controls associated with script variables, the value can be passed through a variable.

Example:

```
// Bind the variable
Form.editbox.Field = "strType";
//...
OnDialogChanged {
// The next three lines do same.
// If values conflict,
// priority is taken into account.
// Priority decreases from top to bottom:
Form.editbox.Value = "";
Form.editbox = "";
strType = "";
}
```

While the form is active, you can work with its properties and the properties of its controls as with ordinary variables. In this case, the changes made in the script will be applied to the form after exiting the reactor function.

```
function OnDialogChanged
{
   if (Mode == 1) {
      Form.groupbox.Visible = FALSE;
      Form.Lable1.Left = 50;
   } else {
      Form.groupbox.Visible = TRUE;
      Form.Lable1.Left = 10;
   }
   Form.editbox.Left = Form.Label1.Left + 40;
   Form.Label1.Right = Form.Label1.Right + 38;
}
```

Property	Access	Note
Form.Count	read	The number of controls on the form.
Form.Width	read	The width of the form's client area.
Form.Height	read	The height of the form's client area.
Form.Help	full	Link to the reference manual. If the path is relative, it is padded relative to the path to the project's Help folder.
		May be:
		- the path to the chm-file with or without the chapter (don't specify the protocol).
		- link to file
		NormaCS page or document: http://help.spds.ru (Protocol is obligatory).
		- help index
Form.\$\$\$	full	The value of the control.
Form.\$\$\$.Value	full	The value of the control.
Form.\$\$\$.Enabled	full	Control enabled/disabled.

Property	Access	Note
Form.\$\$\$.Visible	full	Control visible/invisible.
Form.\$\$\$.Field	full	The name of the script variable associated with the control.
Form.\$\$\$.Tooltip	full	Hint text.
Form.\$\$\$.Left	full	Control size - indent on the left. If a binding was set in the form editor, after changing the dimensions, the coordinates of all controls will be recalculated taking into account these changes.
Form.\$\$\$.Top	full	Control size - indent from above.
Form.\$\$\$.Right	full	Control size - indent on the right.
Form.\$\$\$.Bottom	full	Control size - indent from below.
Form.\$\$\$.Count	full	The number of items in the list or dropdown list.
Form.\$\$\$.Items[#]	full	The #-th element of the list or dropdown list.

Eventы

An event handler in this context is a script function that is called in response to an event on the form. Events will be called form properties that store the names of event handlers. There are events of the form itself and events of its controls. You can work with them as with normal form properties.

Example:

//Assign the OnChange event to the OnEditChange function Form.editbox.OnChange = "OnEditChange";

Event	When called
Form.OnShow	Before showing the form. All form properties are already defined.
Form.OnClose	Before closing the form.

Event	When called
Form.\$\$\$.OnChange	After changing the value of the control by the user. Changing a control from a script does not generate this event.
Form.\$\$\$.OnEnter	When the control receives input focus.
Form.\$\$\$.OnLeave	When the control loses input focus.

Switches

The logic of the switches is somewhat different from other design elements. Multiple radio buttons are bound to the same script variable. Each of them is set to some value. The variable is set to the value of the enabled switch. The value is of type string. If "-1" is set, the value is assigned automatically, starting from 1, in TAB order. In this case, the value type will be numeric.

Radio buttons associated with a single variable are considered a group. Only one radio button can be enabled in a group. If the variable is not assigned, radio buttons located inside the same control are grouped. This is usually a Group or Panel.

Examples

}

Event handling. In the script code, bind the Edit control to the script variable d. When the Edit value changes, update the text in the Static label.

• Solution 1. When the EditBox value changes from the form, the OnDialogChanged function will be called. Assign EditBox control Field name = d. The EditBox control will automatically synchronize its value with the d variable.

```
function OnDialogChanged
{
   Form1.editbox1.Field = "d";
   Form1.static1 = "Hole diameter: " + d + "mm";
}
   • Solution 2. Assign an OnChange event handler to the EditBox control.
function OnDialogChanged
{
   Form1.editbox1.OnChange = "OnEditChanged";
   Form1.editbox1 = d;
}
function OnEditChanged
{
   d = Form1.editbox1;
   Form1.static1 = "Hole diameter: " + d + "mm";
```

• Solution 3. Let's combine both previous solutions. The d variable will be synchronized with the EditBox control automatically, and the text of the Static label will be updated from the OnChange event handler.

```
function OnDialogChanged
Form1.editbox1.OnChange = "OnEditChanged";
Form1.editbox1.Field = "d";
function OnEditChanged
Form.Label = "Hole diameter:" + d + "mm";
List management. Build a list of values in a combo dropdown list.
function OnDialogChanged
// You can set the number after the values, but before the values - somehow clearer.
Form.Combo.Count = 5;
// Elements are numbered from 1.
Form.Combo.Items[1] = "(HeT)";
Form.Combo.Items[2] = "Item1";
Form.Combo.Items[3] = "Item2";
Form.Combo.Items[4] = "Item3";
Form.Combo.Items[5] = "Item4";
// This command will fail because there are only 5 items in the list.
Form.Combo.Items[6] = "Item5";
}
```

Form properties

General		
Help URL		
Caption		
Editor		
Top margin	8	
Height	400	
Left margin	8	
Bottom margin	8	

General		
Margin	Y	
Right margins	8	
Grid	Y	
Grid step	8	
Width	400	

Note: In the "Help" parameter, the path to the user help is entered. User help will be invoked if the focus is on form control. If the focus is on the "Cancel" or "OK" buttons, the help of standard elements will open.

Input field. The input field is used to enter numeric or symbolic expressions for further processing.

Properties command:

View	
Visible	V
Alignment	On the edge
Multiline	
Flat	
Tip	
Linking	(None)
Enable	V
Text	None
Formatting	

editbox1		
After entering		
Line		
56		
56		
176		
112		
232		
56		
Ŋ		
Auto		
Developments		

Checkbox. Allows you to monitor on/off.

Properties command:

View		
Visible	V	
Tip		
Linking	(None)	
Allowed	V	
Text	Flag	
Basic	1	
Enabled		
Name	checkbox	
Class	Flag	
Variable		
Position		
Upper limit	8	
Height	16	
Left boundary	8	
Lower limit	24	
Right boundary	72	
Width	64	
Developments		

by clicking	

Switch .Switches to monitor the status on/off. Several individual switches interconnected to form a "group switch" to track more states. Example of use of the group switch.

Description:

Several switches are associated with the same variable script. Each of them set any value. Variable is set to the included switch. Value is of type string. If set to "-1" value is assigned automatically starting with 1, in the tab order for TAB. In this case, the value type is numeric. Switches associated with a single variable group are considered. In the group may be included in only one switch. If a variable is assigned, grouped switches located inside one of the control. Usually this group or panel.

Properties command:

View		
Visible	v	
Tip		
Linking	(None)	
enabled	Y	
Text	Switch	
Basic		
Included		
Value	-1	
Name	radiobutton	
Class	Switch	
Variable		
Position		

Upper limit	24
Height	24
left boundary	8
Lower limit	48
Right boundary	112
Width	104
Developments	
by pressing	

Example of using.

Switches allow you to choose between discrete values, the result is displayed in the input field



List. Used to select one value from a specified list.

View	
Visible	Y
Tip	
Linking	(None)
Enable	Y
Text	-1
Basic	

Data	"Element 1"
Name	Listbox
Class	List
Variable	
Current	-1
Position	
Upper limit	48
Height	40
Left boundary	8
Lower limit	88
Right boundary	104
Width	96
Developments	
Activation	
Deactivation	
To change	

List from the database. Used to select one value from a pre-<u>specified list</u> in the database.

View	
Visible	V

Тір	
Linking	(None)
Enable	V
Text	
Basic	
Data	
Name	Listbox1
Class	List of base
Variable	
Current	
Position	
Upper limit	96
Height	60
Left boundary	8
Lower limit	156
Right boundary	104
Width	96
Developments	
Activation	
Deactivation	

To change	
-----------	--

Combo box. Designed to select from the specified list or enter an arbitrary value.

View			
Visible	Y		
Tip			
Linking	(None)		
enabled	Y		
Text	Combo box		
Basic			
Data			
Name	combobox		
Class	combobox		
Variable			
Editable	Y		
Position	Position		
upper limit	168		
Height	76		
left boundary	8		
Lower limit	244		
Right boundary	104		

Width	96
Developments	
activation	
deactivation	
to change	

Combo box from the database. Designed to select from the <u>specified list</u> or enter an arbitrary value.

View		
Visible	v	
Tip		
Linking	(None)	
Enabled	Y	
Text		
Basic		
Data		
Name	combobox1	
Class	combobox	
Variable		
Editable	V	
Position		

Upper limit	208	
Height	64	
Left boundary	8	
Lower limit	272	
Right boundary	104	
Width	96	
Developments		
Activation		
Deactivation		
To change		

A Text . Static (non-editable) text formatting support. Specify the formatting is applied to the entire text.

View	
Visible	Ŋ
Headset	(Info)
Tip	
Linking	(None)
Transparent	Y
Text	Text
Background	

Basic		
Name	static	
Class	Text	
Label		
Variable		
Position		
Upper limit	280	
Height	32	
Left boundary	8	
Lower limit	312	
Right boundary	104	
Width	96	

Group. Decorative element, designed to visually group several controls on the form. Properties command:

View	
Visible	Y
Tip	
Linking	(None)
Enabled	>
Text	
Basic	

groupbox1	
Group	
Position	
320	
38	
8	
358	
104	
96	
Developments	

 \blacksquare Figure. Insert a simple bitmap to the form.

Basic	
Name	Image
Class	Drawing
Variable	
View	

Visible	Y
Data	(Info)
Tip	
Linking	(None)
Transparent	
Proportionally	Y
Stretch	>
Position	
Upper limit	360
Height	57
Lleft boundary	8
Lower limit	417
Right boundary	105
Width	97

 $oxed{ extstyle {\sf Panel}}$. Designed for grouping and align multiple controls on the form.

Basic	
Name	panel
Class	Panel
View	
Linking	(None)

Position	
Upper limit	16
Height	49
Left boundary	112
Lower limit	65
Right boundary	185
Width	73

[■] Button. Control "button." Response by pressing the left mouse button.

-	
View	
Visible	>
Tooltip	
Linking	(None)
Allowed	>
Text	Button
Main	
Icon	-1
Name	button
Class	Button
Variable	
Position	

72	
32	
112	
104	
184	
72	
Developments	

Table with filtering. Table variables to restrict the number of columns, and automatic filtering of the list columns.

Basic	
Name	Control
Class	Table with filtering
Variable	
View	
Visible	V
Tip	
Linking	(None)
Enable	V
Position	

Upper limit	112
Height	32
Left boundary	112
Lower limit	144
Right boundary	184
Width	72

 $[\]blacksquare \textbf{Table}$. Table variables with the ability to view and select a row.

Basic	
Name	Control1
Class	Table with filtering
Variable	
View	
Visible	V
Tip	
Linking	(None)
Enable	>
Position	
Upper boundary	152
Height	40
Left boundary	112

Lower limit	192
Right boundary	184
Width	72

Views and performance. Table for selection and execution of standard projection of the object from the database.

View		
Visible	v	
Tip		
Linking	(None)	
Enable	v	
Basic		
Name	Control2	
Class	Views and performance	
Execution		
Show performance	v	
Types		
B	v	
5	v	
5		
6	v	

Ø	
3	
Display Types	>
Shows the type form	
Position	
Upper limit	200
Height	32
Left boundary	112
Lower limit	232
Right boundary	184
Width	72

Preview. Preview box of the selected object from the database.

View	
Visible	v
Tip	
Linking	(None)
Enabled	v
Text	PreViewControl
Basic	
Name	control3

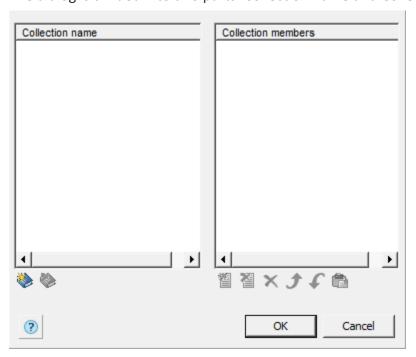
Class	Review
Position	
Upper limit	240
Height	40
Left boundary	112
Lower limit	280
Right boundary	184
Width	72

Collection Editor

Serves for quick creation of lists and their subsequent use in form controls and custom sorting in tables.

Dialog

The dialog is divided into two parts: Collection name and Collection members.



Collection management tools

- Add new collection.
- Delete collection.

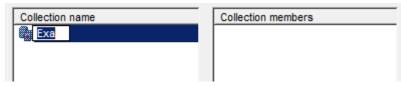
Collection members management tools

- Add new collection member.
- Delete collection member.
- XDelete all collection members.
- **→**Move collection member upper.
- Paste from clipboard.

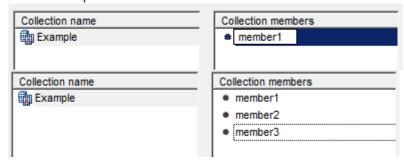
Create and assign a collection while editing a form

In order to create a collection you need to:

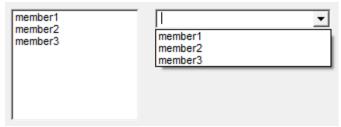
- 1. Click the "Data" option in the DB-Listbox or DB-combobox. A dialog box will appear.
- 2. In the list of collections, call the **Add new collection" command and enter a name for the collection.



3. Set the composition of the collection.



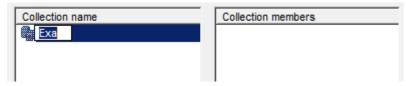
- 4. Select a collection and click "ΟΚ" in the Collection Editor dialog box.
- 5. he created collection will look like this:



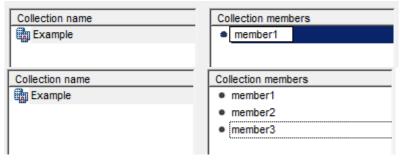
Creating custom filtering on a table

In order to create a collection you need to:

- 1. Go to Edit Table Dialog "Main Menu Rows Custom Sort...".
- 2. In the list of collections, run the **Add new collection" command and enter a name for the collection.



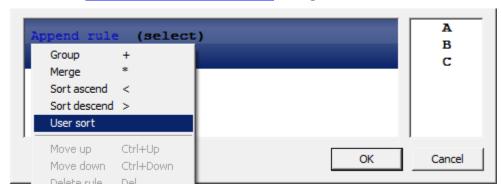
3. Set the composition of the collection.



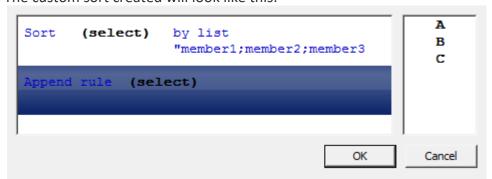
4. Click "OK" in the Collection Editor window.

Purpose of custom filtering in a table

1. In the "Row grouping and merging" dialog box add a "User Sort" rule.



- 2. Select a collection and click "Οκ".
- 3. The custom sort created will look like this:



Important! Collections are saved to the database, they can be used in other objects nanoCAD Construction 25.

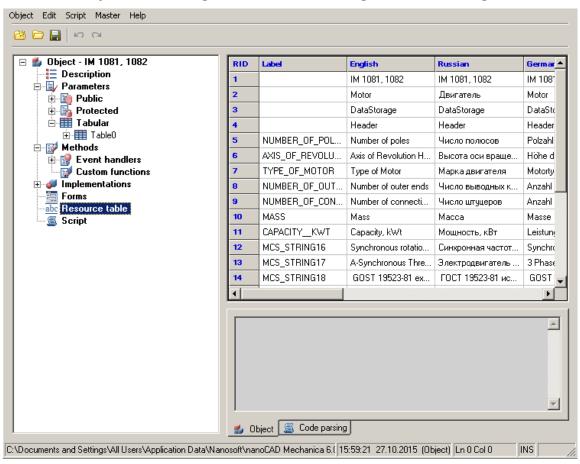
Forms and tables have separate stores.

Collections created by editors or administrators are available to everyone and cannot be edited by the user (the collection editing buttons will be grayed out).

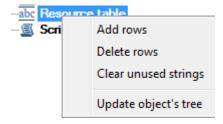
User-created collections are only accessible to the user.

Table resources

Section Table of resources designed to create a multilingual resource strings details.



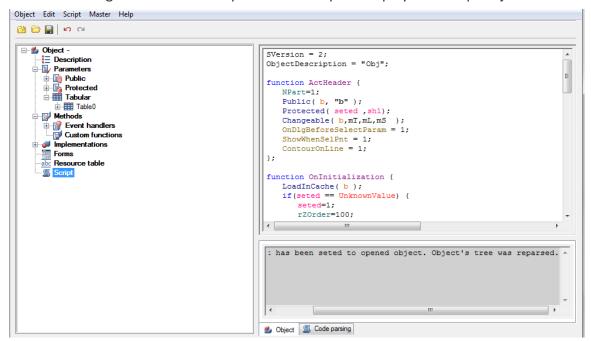
In the context menu section, there are options to add and delete rows.



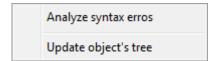
Each resource can have a name (*Label*), by which it will be referenced from the script (by writing the *@Resource Name*). The property is selected, the row that corresponds to the name of the resource (or its ID) and the column corresponding to the application language. Thus, we can ensure the correct operation of applications of different locations on the same database. Of course, the current local line must be completed, otherwise for non-Russian locale is selected resource corresponding to the English language.

Script

When switching to the section *script* in the workspace displays the script object.



In the context menu of the *script* contains option parsing script.



While parsing the functions performed consistently script object and passed to the notification system error messages. By double-clicking on a line in the notification area on the transition line of the script that contains the error.

Managing Dependencies

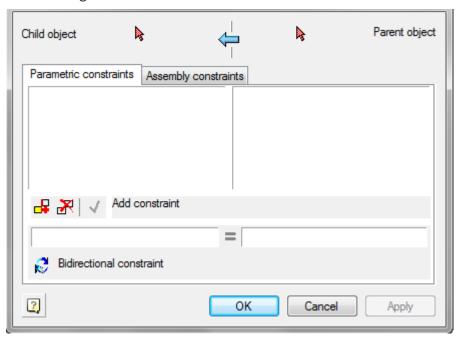
Main menu: Construction - Library objects - MechWizard > Add constraint.

Ribbon: Construction - MechWizard > Add constraint.

Toolbar: Add constraint ("MechWizard").

Command line: SPCONSTRAINT.

In the dialog box Constraints:



In the dialog box set parametric and assembly (geometric) dependencies between database objects.

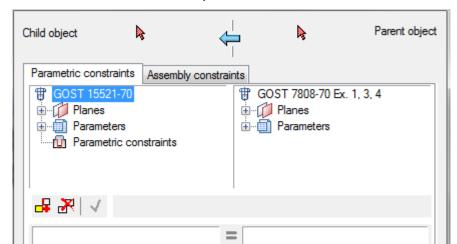
The window is divided into two parts:

Left - The child

Right - The parent object

Use 1-selected object and 2 were selected to the choice made in the drawing, respectively subsidiary and parent objects. After selecting an object in the corresponding half of the window, a list of parameters of the object, which includes:

- · Property name
- List surfaces (work surfaces)
- The list object's parameters
- List of installed parametric relationships



• List of installed assembly constraints

On two tabs **depending Parametric** and **Assembly constraints** established relationship between parent and child objects.

Cancel

Apply

Parametric dependence connects the parameters of objects.

Assembly dependence binds workplanes objects.

Bidirectional constraint

?

Button Rew dependency. Allows you to create a new dependency

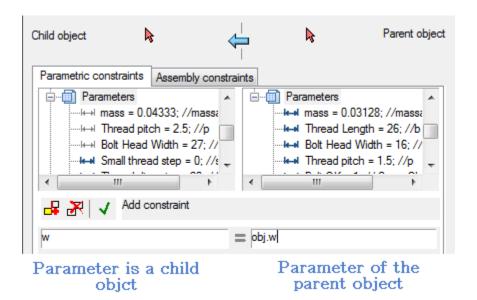
OK

Button Delete dependency. Deletes the selected list dependence

When adding or editing button is activated depending **Save dependence**, which allows you to save your changes.

Installing the parametric dependence

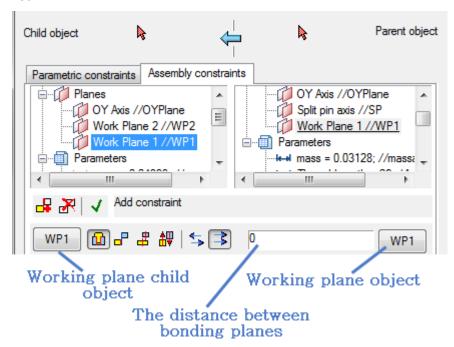
When installing the parametric constraints is associated parameters are recorded in the corresponding input fields located below the list object's parameters. Selecting the link parameters by double-clicking on the corresponding parameters in the list.



Installing assembly according

To install the switch assembly according to the tab **Assembly constraints**.

Choose binding surface by double-clicking on the appropriate working plane from the list.



Selecting the plane can also be done visually in the drawing by clicking labelled plane and the linked marker indicating the working plane of the object.



The choice of method depends overlay using the buttons at the bottom:

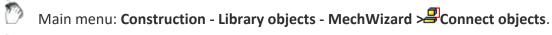
- Axial and surface alignment
- **□**Surface alignment
- Combination axis
- Direction

Choose mutual orientation related planes using the buttons:

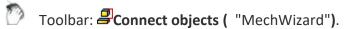
- **⇒**Counter-directional
- **➡** Codirectional

Button Bidirectional constraint. Enables two-way relationship in which a related parameter or surface of the parent object changes with appropriate changes to the child object.

Compound objects







Command line: SPCONNECTTO.

This command is used to overlay preset assembly and parametric dependencies on objects in the drawing.

After running the command must specify.

- 1. Child object an object that will be joining.
- 2. Parent object the object to which you will attach the child object.

Upon completion of the command will be imposed on the details of parametric and geometric constraints defined in their script..

Symmetry axis

Main menu: Construction - Library objects - MechWizard > Library axis.

Ribbon: Construction - MechWizard > \Box Symmetry axis.

Toolbar: ASymmetry axis ("MechWizard").

Command line: SPWIZSYM.

Select the segment to set it as the axis of symmetry. Drawing can contain multiple axes of symmetry. Symmetrical layout sketch relating to a particular axis is determined automatically by the recognition of a parametric model.

Set Parameter

Main menu: Construction - Library objects - MechWizard >—Set Parameter.

Ribbon: Construction - MechWizard > Fet Parameter.

Command line: SPWIZPARAM.

Button **Set parameter** is used for setting targets sketch. Press the button and select the object (sketch element). This will bring up a dialog box, the form of which depends on which object was selected.

Setting size

When setting the size of the dialog box will look like:



Enter a *parameter* expression to control the size. The parameter can be set by a variable name or expression that is allowed to use the number and names of the variables related to mathematical and logical functions.

	Object parameter names should not coincide with the names of
Important!	the teams nanoCAD (for example, can not be assigned to the
	parameter name HATCH or LINE)

Expressions can be used the following functions:

- arithmetic operators +, -, *, /
- trigonometric functions sin(), cos(), tg() (the function argument is given in degrees)
- inverse trigonometric functions asin(), acos(), atg()
- taking the square root function sqrt()
- exponentiation function^ (recording format: x ^ y x raising y)
- absolute value abs()
- rounded to an integer value int().

Logical operations:

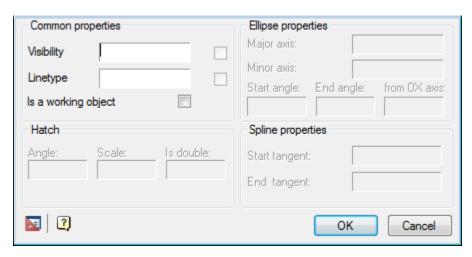
- Min(x,y) returns the minimum value of the argument;
- Max(x,y) returns the greatest value.
- Iff (boolean, x, y) returns the value of the argument x if the logical expression is true, or the value of y if the logical expression is false. Example of using the function, the result of which is similar to the function Min (x, y): Iff(x < y, x, y).

Valid logical conditions: >, <, == (equal), ! = (Not equal), > = (not less than), <= (not more).

Function within an expression can be nested.

Setting the graphic element

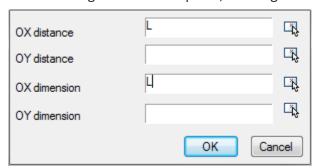
When you set a graphic element sketch (segment, circle arc, circle, spline or shading) dialog box will look like:



Work items are supporting the construction of a thumbnail and are not displayed when you insert a model from the database. Performance object can be any graphic sketch element: line, arc of a circle, etc.

Setting the insertion point

When setting the insertion point, a dialog box will look like:



Distance along the axes OX and OY determines the position of the handle in the object. Distance can be set expression or numeric value.

Parameter on the x-axis and OX and OY is the name of the script variable whose value will change when stretching the handle.

Button specify parameter lets take a parameter or drawing away.

Enter additional values

In the sketch may include additional expressions for calculation of parameters. These expressions should be written a single line text entry format each line of text as follows:

X = EXPR

where X - the variable name;

EXPR - an expression that contains the names of variables, mathematical or logical functions.

Examples of additional rows of values:

- a = b*2 assigning the result of an arithmetic operation;
- alpha = asin(b/c) the use of trigonometric functions;
- k = iff(a>b, 1, 0) assign a value to the condition;
- d = min(m1, 100) the assignment of the smallest of the two values;
- g10 = sin(alpha*2) + sqrt(b^2 c^3) / min(sin(a), cos(b)) nested functions.

Sequence computing additional rows values - from left to right and top to bottom. Additional values values recognizing parametric form must be selected along with other sketch entities.

Insert point

9	Main menu: Construction - Library objects - MechWizard > \signapsilon Insert point.





Command line: SPWIZINS.

The insertion point should always be shown on the sketch of the parametric model. Click to choose its position on the sketch.

If you try to check the model or recognize the form of a sketch in which the insertion point is not specified on the command line, you are prompted to "Select insert point". Then you need to specify the sketch position of the insertion point.

In the case of several insertion points in the sketch, recognition will be considered only of the one that has been specified later, and all others will be ignored.

Suppression contour

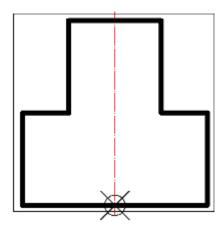


Important! The command prepares the sketch for recognizing the execution type of the base object.

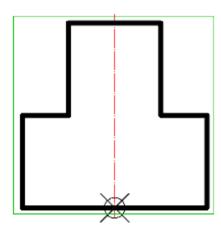
A suppression contour limits the area that the object overlaps with other graphics in the drawing. If the suppression contour is not specified, it is created automatically when the model is recognized by the external outlines of the part, and service objects are not taken into account.

Procedure

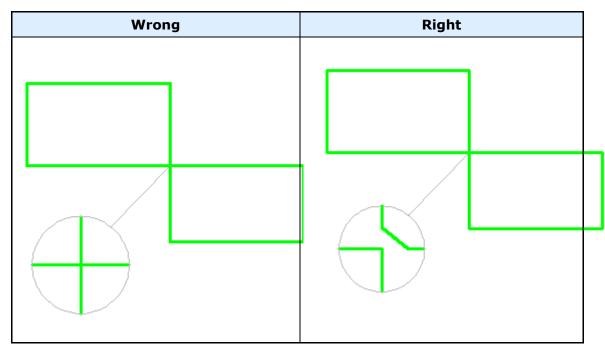
1. Draw a closed polyline on the sketch that matches the shape and size of the required suppression contour (in the figure, a rectangle around the sketch).



- 2. Call the command <a>"Supression contour".
- 3. Specify the constructed polyline. The contour is highlighted in green in the sketch.



A prerequisite for the contour is the absence of self-intersections. To avoid self-intersections for a compound contour, create the contour manually, leaving a minimum "isthmus" between the areas:



If the suppression contour cannot be created automatically (the outer boundaries of the object do not form a closed contour), then when the object is inserted into the drawing, a corresponding warning message will be displayed. However, errors in the suppression contour do not affect the applicability of the recognized object, and can only appear in the wrong overlap of other objects in the drawing.

Hatch contour

Main menu: Construction - Library objects - MechWizard > Hatch contour.

Ribbon: Construction - MechWizard > Hatch contour.

Toolbar: MechWizard > Hatch contour.

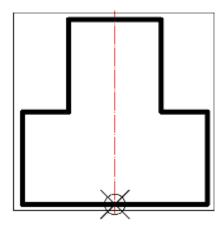
Command line: SPWIZSECTCONTOUR.

Important! The command prepares the sketch for recognizing the execution type of the base object.

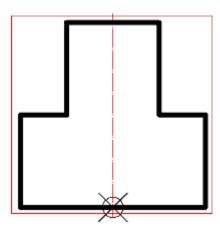
A hatch contour defines the shaded area of an object in the drawing.

Procedure

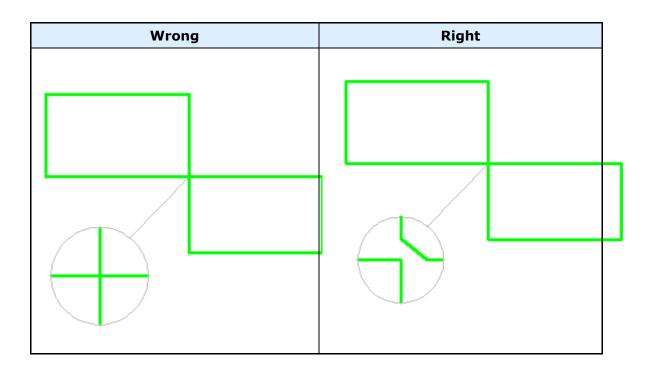
1. Draw a closed polyline in the sketch that matches the shape and size of the required hatch contour (in the figure, a rectangle around the sketch).



- 2. Call the command <a>"Hatch contour".
- 3. Select the constructed polyline. The outline will be highlighted in red in the sketch.



A prerequisite for the contour is the absence of self-intersections. To avoid self-intersections on a compound contour, create the contour manually, leaving a minimum "isthmus" between the areas.



Array

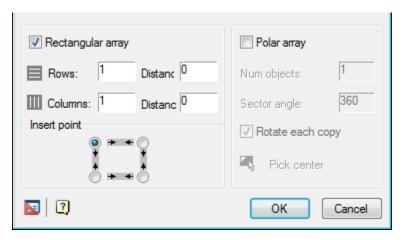




Toolbar: ******Parametric model (** "MechWizard").

Command line: SPWIZARR.

- 1. Create primitives of nanoCAD block and select the required dimensions in the sketch to determine its size and location.
- 2. Press the **array** and selected block in the drawing.
- 3. In the dialog box, select an array type and parameters that control the construction of the array. Parameters can be assigned to both numeric and non-numeric values (variable names and expressions).



Every single unit with a unique name that is inserted into a sketch can be used only in a single array.

Test Model



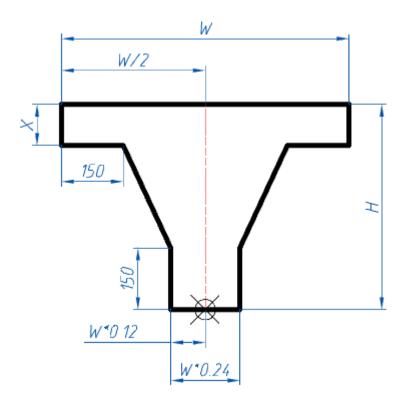
Checks sketch of a parametric model.

Highlight crossing window thumbnail and press Enter. If the sketch contains no errors, a message appears

If the sketch is not large enough, a message appears warning of an error.

Create sketch

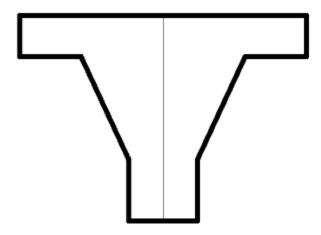
The sketch is the original model of the parametric view of the object.



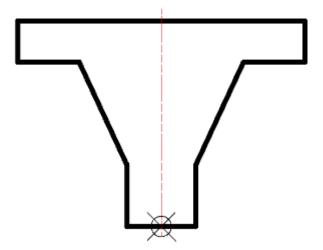
When creating parametric objects, the commands of the "MechWizard" toolbar are used.

Procedure

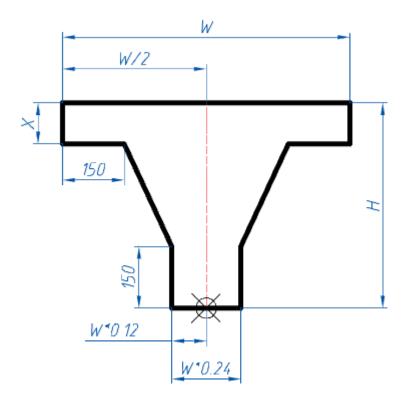
1. Prepare a sketch. For correct recognition, all graphic elements of the sketch (including hatching) must be drawn with the appropriate linetype. Similar types (solid thick and thin, dash-dotted thin and thick) should be distinguished by the color set in the nanoCAD Construction settings.



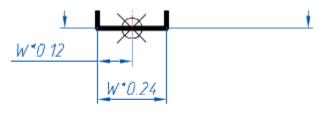
2. Set the <u>insertion point</u>, optionally specify the <u>axis of symmetry</u>, <u>sketch element</u> <u>options</u>, <u>suppression contour</u>, <u>hatch contour</u> and <u>paramentric array</u>.



3. Dimension and assign variables and expressions to them.

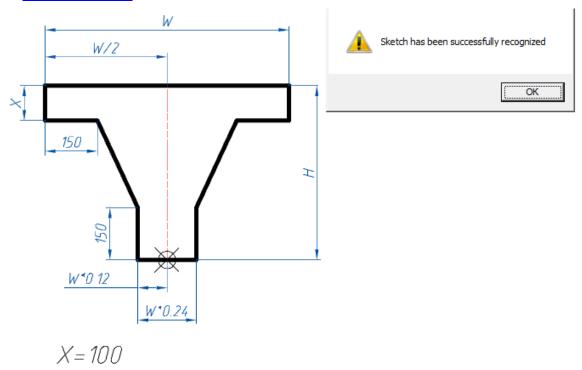


4. Enter <u>additional parameters</u> as needed.



$$X = 100$$

5. Check the sketch and make sure there are no errors.



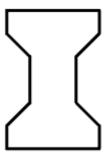
Examples

Creating a template layout tiles

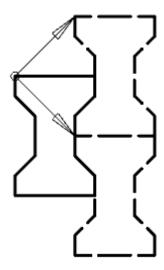
Example of creating a template layout tiles.

1. Create a sketch of the object. If the size of the tiles will not change, then the sketch is not required to specify the size.

Terms and method of creating a sketch of the parametric object described in section *Rules for creating sketches*.



- Create an object and save it to the database. In a script, you must set the variable "type" (strTheType = "Plate")
- 3. Position the **Bone** in the drawing, insert the base of the two vectors and create a group. (see. Create user group). These vectors determine the pace and direction of replication of the original group. The basic point of the vector must coincide with the insertion point of the object.



If only one vector will create one line layout in any mode selection area.

Developer's Guide Database

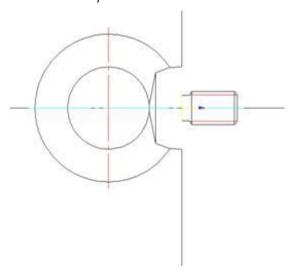
Terms

Functions of the standard objects

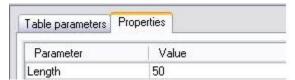
The database of the standard details was created to help a constructor to create graphics. Use the details from the database to create graphics. The standard details behave intelligently in the drawing so that the number of additional actions in the development environment are decreased.

What can the standard details do

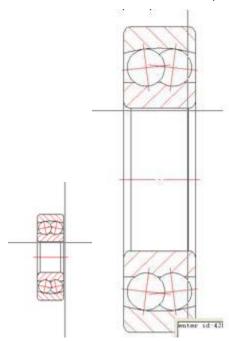
Insertion from the database. The database is organized as a hierarchical structure of objects having similar functions. (For example, the details of arbors, pipelines etc. are grouped). There are also different types of objects: the groups and the markers of the objects. You can search for the required standard in the database. When inserting a detail, specify the insertion point and the direction of the detail's local X axis (position and orientation of the detail). The details can be fully displayed or displayed as a representation of the base plane. The position of the detail is specified by a click, the orientation by a double-click.



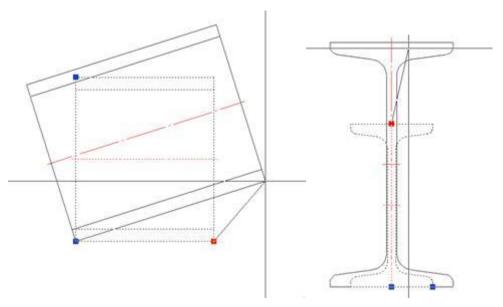
If GOST of the detail contains the table of the parameters, it is recommended to limit the dimension values for the elements of the construction. One detail can have several tables. (For example, if the parameters of one element of the construction do not depend on the parameters of the other elements). If the parameters of the object's graphic are not specified by GOST, the user specifies their values during insertion. Such parameters are displayed in the second tab of the insertion dialog. Such property is the length of the I-Profile.



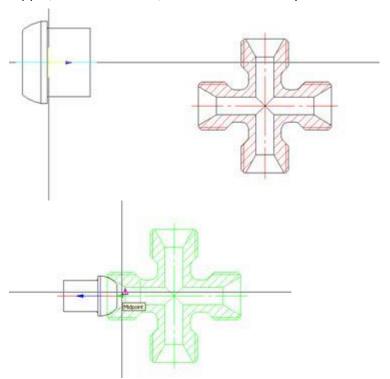
Sometimes it is convenient to specify the parameters in the drawing according to the parameters of other details. In this case, dynamical selection of the detail's parameters is used. This mode is selected with the *Selecting parameters dynamically* button. The parameters are selected towards the insertion point, after the insertion point is specified. Dynamical selection can be executed from the table or by using other parameters. The values, selected dynamically, sometimes set additional constraints (the maximum and minimum values) to provide correct drawing.



The grips are very useful tools to edit objects, and if the object has grips, they add additional functionality to the object. You can move, rotate and mirror the object, using the grips; you can also change the standard size of the detail, visually set the detail's parameters and define the direction of the drawing.

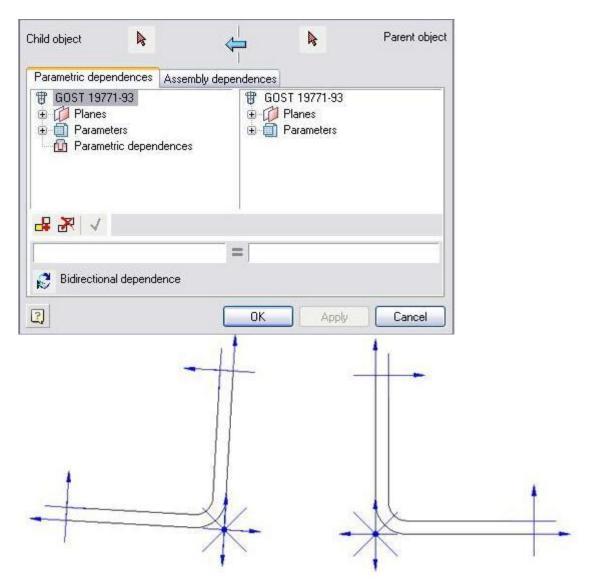


The standard database of the program behaves intelligently towards the other objects in the drawing. For example, when the pipe fitting with the internal cone is inserted, the nipple, inserted after it, will be automatically connected with the fitting.



It is achieved by specifying parametric and geometric dependences between the details. The dependences for the details should be set according to the standards.

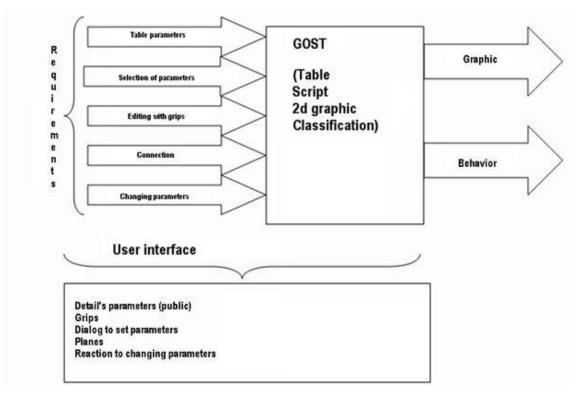
The user can set the dependences for the objects already placed in the drawing (for example, if the automatic connection is not specified). These dependences are custom and are stored in the drawing.



The standard databases can also have additional functions that are used in the other tools.

Abstract model of the detail

A detail should be a black box for the user.



To specify a nominal size and graphic of the detail, use its parameters. It is necessary to specify these parameters, and not all parameters should be available for the user, but they should be known for graphic recognition. There are the public parameters, which the user can see, and the protected parameters, which define graphic, but the user cannot see them. These parameters can have values, defined by GOST, or the user can set their values.

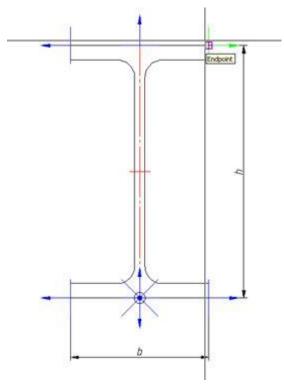
When editing the detail with grips, you should define their number and the parameters they specify; define grips to specify the insertion point and the detail's orientation.

The view of the insertion dialog (or its data form) is also added to the user interface of the detail. Its view and behaviour is the black box of the detail, the form and the dialog should be convenient for the user to specify the nominal size and the parameters of the detail.

The geometric dependences are set by the detail's planes, which are a vector and a point together. The number and the position of these planes should be defined to set the dependences. The planes can be changed if they specify the detail's position according to the dependence with another detail, and unchanged (if another detail is linked to this plane); they do not change the insertion point of the detail according to the dependences.

The planes are defined according to the local coordinate system. The insertion point is its origin (pntOrigin). The direction vector (vecDirection) and vector in the drawing's plane (vecPlane), orthogonal to it, are X and Y axes.

The mathematically highlighted plane will be in the b/2 horizontal and in the h vertical distance from the insertion point. The Vector of the plane will be collinear to the vecDirection direction vector. It is enough to specify the new position of the detail if the plane is changed according to the dependence.



When changing a detail's parameters (when there are parametric dependences or when specifying the values of the parameter in the dialog), it is necessary to define new values for the parameters, select new values from the table, change the planes etc.

To define discrete values of the parameters, select them from the table. The table is organized in such a way that one row corresponds with one nominal size and the columns of the table contain the detail's parameters. The parameters can have String, Integer and Real types. The parameters have a comment, which is used in the insertion dialog. Columns and rows have unique identifiers, saved during the import and export processes of the table to provide the correspondence of the nominal sizes and already existing details in the drawing (selected rows and parameters in the table when editing the object).

Object's graphic

To display the object in the drawing, the orthogonal views are used. The views have different types: general, views with cuts and simple views with dimensions. The views with dimensions are system and hidden. Their graphic is realized when the dimensional view is inserted from the context menu.

The local coordinate system in 2D views is set that the X-axis is directed to the right and the Y-axis is directed up in the frontal view. The direction of the coordinate axes is defined by the projective dependence in the other views.

The parametric recognition defines the parameters and the relative position (horizontality, verticality, perpendicularity and parallelism) of the graphic primitives and their interaction with each other (intersection points, tangents etc.). It is necessary to specify the insertion point of the detail (origin of the local coordinate system). It is necessary to describe a view as a text (graphic parameterization).

Recommendations for creating 2D views.

- Use the object snap for endpoints and intersections.
- Use the polar tracking and ortho modes.
- Arc segments and tangent arcs should be dimensioned.
- Use the helping geometry for recognition (circles in the centres of the tangent arcs).
- Dimension should be clearly set.
- Sometimes to create a difficult graphic, the view is separated into parts, and null distance is set between the parts.

The purpose of the recognition is to define the position of all primitives towards the insertion point. The parameters and dimensions are set from it.

The requirements to graphic are specified in the particular recommendations.

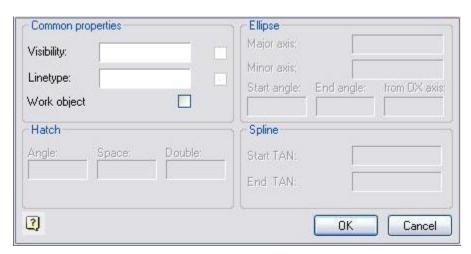
To make a 2D graphic parametrically controlled, set the detail's geometric parameters as dimensions instead of the nominal sizes. Some parameters are related to graphics.

Common properties: "Visibility" - is a logic expression or variable, defining whether or not to draw the primitive.

Linetype:

- 0 main.
- 2 thin.
- 4 dashed.

"Work object" - an object that is used in the recognition, but is not added to the end graphic. It is a helping drawing.



Parameters of hatch - the angle of slope, hatch space and double hatch feature (logical condition)

Parameters of ellipse - the major axis of the ellipse and the minor axis of the ellipse. The start angle and end angle of the ellipse - if the elliptic arc is drawn. The sloping angle to the OX axis is an angle, on which the local coordinate system of the ellipse is relatively rotated to the coordinate system of the object's view.

Parameters of spline - the start and end tangent angle. All points of the spline should be dimensioned.

If the **hatch contour** does not follow the required contour, a closed polyline is created with the parameter - hatch contour.

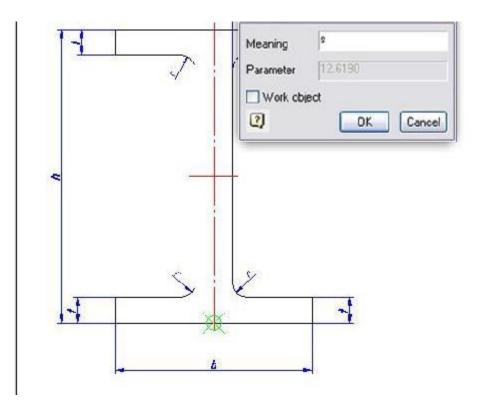
Sometimes it is necessary to set a **contour of suppression** for the detail (if the automatically created contour does not follow the requirements of the detail). In this case, the parameter of the suppression contour is also set for the closed polyline.

Creating the dimensional views of the standard details

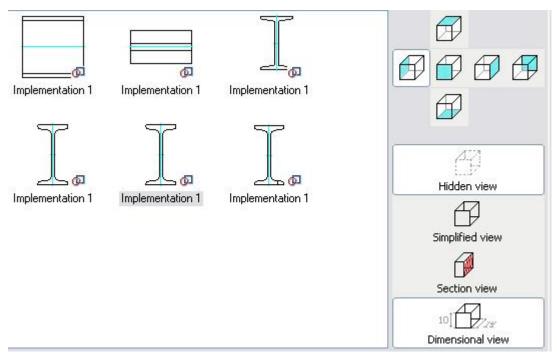
The same graphic is used to create the dimensional views of the standard details, as is used to recognize the main view.

Add only the required elements to the graphic of the dimensional view.

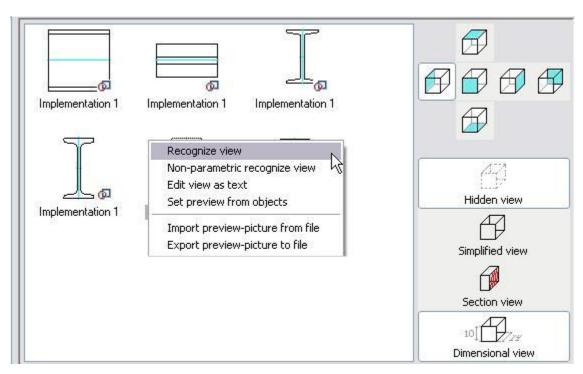
To recognize the dimensions as constructive objects, switch off the *Work object* checkbox in the **Parameter** dialog.



After that, specify the required view of the object and select *Hidden view* and *Dimensional view* for it.

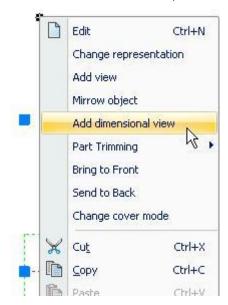


Select the *Recognize view* from the context menu.

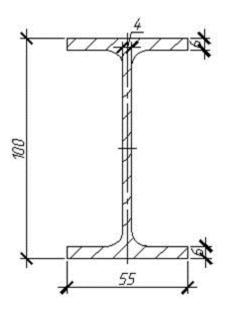


Specify the graphic in the drawing and confirm the selection. Save the object.

To test the dimensional view, insert the object with the created direction of view. From the context menu of this view, select the *Add dimensional view*.



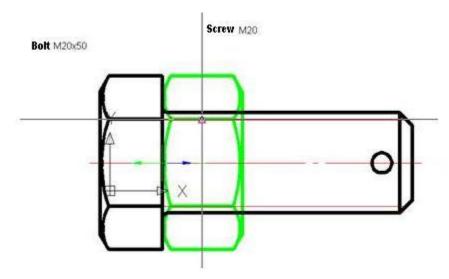
Specify the insertion point of the dimensional view.



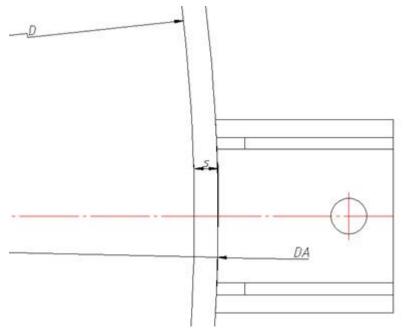
Note: Dimensional views are inserted with the current dimension style and symbol scale.

Details in the database. Dependences

The details can be connected with each other. How does it happen By setting the parametric and geometric dependences. The parametric dependence - an expression meaning that one parameter of one object equals one parameter or the arithmetic expression of the parameters of another object. For example: the diameter of the bolt thread should be equal to the diameter of the screw thread which it is connected with.



The thread diameter parameter (dr) of the screw is equal to the thread diameter parameter (dr) of the bolt (dr=dr).



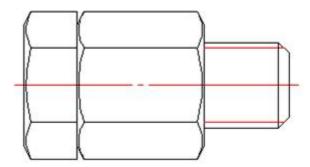
When setting the support for the shell, the dependence of the parameters' arithmetic expression is set: the diameter of the support is equal to the sum of two shell widths and the inner diameter of the shell. DA=D+2*s.

When setting the dependences there are a child and parent objects, the dependences can be one-directed and two-directed. The one-directed dependences affect only the child object (change of the parent object affects the child object, but change of the child object does not affect the parent object), the two-directed dependences affect two objects, change of one object affects the other object.

The geometric dependence between the objects is realized by movement and reorientation of the objects. The new position of the object is calculated according to the new position of the object's planes.

The views of geometric dependences:

INSERT - the combination of the insertion points and planes' vectors. The function has a parameter - offset - the distance between planes' points of the detail along the OX axis.



MATE - the collinearity of the direction vectors if the abscissae of the details are relatively equal. There is a parameter - distance along the OX axis.

AXIS - the combination of the direction vectors with the unfixed coordinates along the OX axis. The parameter of the dependence - distance along OY axis.

The combination along direction (angular dependence) - the collinearity of the direction vectors with the unfixed relative coordinates.

The geometric dependences can be codirectional and opposite directional according to the orientation of the local vector of the OX axis.

There is no need to connect all objects with all objects and that is why it is necessary to set the dependences automatically. The classification of the objects is set to define what details should connect with each other. The classification is made according to the number class (used in the program tools) and the public parameters of the object. These are strTheName, strTheType and strTheSubType variables. To connect a bolt and a screw there is a check of these variables and, if they coincide, the dependence is set. Fasteners are connected only with fasteners, not with pipe fittings, but both types have the thread diameter parameter. Every object has a unique identifier, used for the insertion from the browser.

Suppression contour and display order

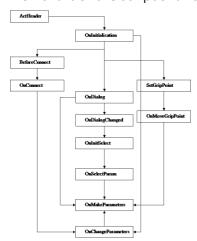
Graphics, like the standard details from the database, have a suppression contour - a closed area, hiding the graphical primitives and other details. (For example, the contour of the screw overlaps a line of the bolt.).

Display order is set by the rZOrder variable. Details with an rZOrder value greater than the rZOrder value of other details will overlap them. This property works with the intervals divisible by 2000. The object from the database can have a suppression

contour formed with its outer boundary, a specified suppression contour or have no contour at all.

Eventive Object's model

Flowchart of the script's functions.



ActHeader - the description of the object's parameters. It includes the description of the public and protected parameters, specification of the reserved variables and description of the subobjects.

During every activation of the object, the OnInitialization function is executed. Using set variable the single setting of the object's parameters needs to be checked.

The OnDialog function is activated after specifying the insertion point and direction from the context menu during the dynamical selection of the parameters.

The OnDialogChanged allows you to add interactivity in the insertion dialog of the object. It is executed every time the parameters are changed in the dialog. In the function's body, it is possible to hide the controls to provide the correct selection of the object's parameters.

The OnInitSelect is executed before the dynamical selection of the parameters. There is a tooltip string (for example, the current value of the length).

The OnSelectParam is executed during the dynamical selection of the parameters. It defines what and how parameters should be selected. It usually contains checks of request number for the selection of the parameters and checks of the current view.

The OnMakeParameters function is final. All final calculations of the parameters are executed and the classifiers and planes are specified. As this function is executed after all object events, the constraints for the parameters and the relative selection of implementations are added.

The SetGripPoint function sets grips for the object. Their number and position are set there.

The OnMoveGripPoint function receives the number of the edited the NMovingGrip grip, the relative position of the grips is processed and the object's parameters are changed according to it.

The BeforeConnect is executed before the dependences are set. The previous dependences are reset and a tooltip string is specified when selecting the object to connect.

The OnConnect function is executed when one object is connected to another object. It contains a check of the object's classifiers and operators for setting the dependences according to this check.

As the result of the OnConnect is a new value for the connected object, this is received as a new object. The OnChangeParameters function is executed when the object's parameters are changed according to another object's parameters using the parameters toolbar. This function determines the object's reaction to changing its parameters.

Localization mechanism

The following is a mechanism of localization:

The object's implementations are activated by their system names, which can be changed in the context menu of the Master of Objects.



Activation of the implementation in the script:

```
if (strDesignName == "Implementation 1") {
   strPartName = @BOLT_M+dr+step+" # x"+L+@___GOST_7798_70;
};
```

If the use of the string values in the local coding is required in the script, change them with the resources.

The resource is a reference to the table row containing the list of the string values according to the current application language.

RID	Label	English	Russian	German	Polish	Czech
8	ROD_LENGTH	Rod length	Длина стержня	Länge	Długość trzpienia	Délka dříku
9	THREAD_DIAMET	Thread diameter	Диаметр резьбы	Gewindedurchmesser	Średnica gwintu	Průměr závi
10	WORK_PLANE_1	Work Plane 1	Рабочая плоскость 1	Arbeitsebene 1	Płaszczyzna konstru	Pracovní ro
11	SMALL_THREAD	Small thread step	Мелкий шаг резьбы	Feingewinde	Maky skok gwintu	Krátký závit
12	BOLT_OK	Bolt OK	Form Ok	Bolzen OK	Śruba OK	Šroub OK
13	BOLT_HEAD_WID	Bolt Head Width	Размер под ключ	Schlüsselweite	Szerokość łba śruby	Šířka hlavy
14	THREAD_LENGTH	Thread Length	Длина резьбы	Gewindelänge	Segment gwintowany	Délka záviti
15	MASS	Mass	Macca	Masse	Masa	Hmotnost
16	SELECT_LENGTH	Select length	Выберите длину	Länge auswählen	Wybierz długość	Vyberte déll
17	BOLT_M	Bolt M	Болт М	Bolzen M	Śruba M	Šroub M
18	GOST_7798_70	# GOST 7798-70	# FOCT 7798-70	#GOST 7798-70	# GOST 7798-70	# GOST 77
19	BOLT_3_M	Bolt 3 M	Болт 3 М	Bolzen 3 M	Śruba 3 M	Šroub 3 M
20	BOLT_4_M	Bolt 4 M	Болт 4 М	Bolzen 4 M	Śruba 4 M	Šroub 4 M
21		Thread diameter	Диаметр резьбы	Gewindedurchmesser	Średnica gwintu	Průměr závi
22		Detail length	Длина детали	Detaillänge	Długość	Délka
23		Thread Length	Длина резьбы	Gewindelänge	Segment gwintowany	Délka závit

To use the local resource in the table, call its name (Label) with "@" prefix.

```
Public(
L, @ROD_LENGTH,
dr, @THREAD_DIAMETER,
WP1, @WORK_PLANE_1,
swTr, @SMALL_THREAD_STEP,
rScrewOk, @BOLT_OK,
s, @BOLT_HEAD_WIDTH,
b, @THREAD_LENGTH,
massa, @MASS
);
```

When the script is executed in the specified location, the required values will be selected instead of the @<resource name> references:

```
Public(
L, "ROD_LENGTH",
dr, "THREAD_DIAMETER",
WP1, "WORK_PLANE_1",
swTr, "SMALL_THREAD_STEP",
rScrewOk, "BOLT_OK",
s, "BOLT_HEAD_WIDTH",
b, "THREAD_LENGTH",
massa, "MASS"
);
```

Requirements of the objects

Requirements of the standard details

The required functionality means that the objects can be inserted from the database, their parameters can be specified, changed, the details can be connected with each other etc.

The details should *satisfy the standards* (GOST, ISO, etc.) and engineering practice. It is required to follow not only the table parameters but also ESKD, Construction etc. requirements. The details should not break the rules of design and product documentation.

Standardization. To make the creation and classification process of the standard details easier, use similar graphics for the details that have similar functions.

As the database is used in multilingual applications, it can be *localized*; the names should be correctly displayed in English or in Russian.

The situation, where several people have developed ONE GOST, is very common. The standardization helps to transfer the product from the developers to the users. Everybody should understand how the scripts are created.

Requirements of the objects. List of the requirements. Graphic and script creation of the objects from the database using MechWizard

The requirements should be applied for the newly created and edited objects from the database.

Object's properties

The name of the object should contain the name and number of its standard (for example, "GOST 7798-70", "ISO 657/16").

The comments attached to the name should contain the object's name according to the standard (for example, "Hot-Rolled I-Shape with Sloped Flange").

The specification string should be specified by the strPartName variable.

All the comment fields of the table parameters from the DBFLD and DBINF sections of the UniDialog function should be filled in with the descriptions. All the comment fields of the table should be filled in.

It is recommended to group the table fields so that they have the main parameters grouped to the left.

By default, the name of an implementation is "Implementation1" (without space), if another name is not specified by the standard.

If the Russian standard is used, GOST is set in the properties (if the detail was made by OST, TU or ATK).

Parameters

When creating the parameter's name you should take into account:

- 1. Similar parameters of the objects from the database (for example, dr thread diameter, p thread pitch, L- rod length).
- Names of parameters in the standard (for example, D1 flange outer diameter, Dy

 drift nominal diameter, b thread length. The function of the parameter should
 be specified by the comment in the table or by description of the public
 parameter.
- 3. Rules of the variable's name for C language.

Rules to define the variables:

- Identifier is a sequence of symbols, which are variable's, function's or operator's names.
- Identifier can consist of Latin letters, numbers and underscore character.
- Identifier should be started from a letter or underscore character.
- Identifier, consisting of the same sequences of symbols but in a different case (upper/lower case), are different identifiers.
- Maximum length of the identifier is limited to 50 symbols.

Recommendations for variables names:

- Use prefixes for variable types (r real, i integer, str string, b logic, vec vector, pnt - point)
- Use descriptive variables' names (for example, rLength instead of L, bSection instead of sh)
- Use different cases of letters in the long names of the variables (for example, rWP2offset, bUseFlatSeal)

The parameters should be described as public if:

1. It is needed to specify a connect for the object

- 2. It is needed to specify a nominal size for the object (the parameters are important)
- 3. It is needed to extract the parameter for further use (by universal marker or to add to the table fields and etc.)

In any other cases the parameter should not be added to the public section.

You can specify only values of the strTheName, strTheType and strTheSubType variables in English. The values of these parameters should be specified in a way to provide the maximum standardization of the connect procedures.

All parameters of the Public type should have descriptions. This also applies to the descriptions of the working planes. The descriptions of the parameters should be started from the object noun (for example, "Bolt head width").

It is not recommended to describe the parameters with dimensions in the Public section. The descriptions of parameters in the table and in VFLD field can have dimensions. In this case, the dimension is specified in SI units after a comma (for example, "Outer diameter, mm").

All parameters names of the VFLD and BFLD sections should be filled in. It is not allowed to use the variable name as the description of the variable (e.g. L,"L").

If the preview is set with the dimensions of the detail, it is allowed to use the comments of any parameters in the VFLD L, "L, Length".

It is recommended to specify the description for all parameters used in the script (as comments).

If a detail's mass is specified in the standard, it should be added to the public parameters and in the UniDialog DBINF section.

The mass of the detail is specified as a "massa" parameter and in kilos per one detail.

If the mass of the implementations is specified in the table, these parameters have names: massa1, massa2 and etc.

To provide the correct localization of the scripts, all string values should be references to the resources, except for the implementation's name strings, strTheName, strTheType, strTheSubType classifiers, form names etc.

Resource names are specified in English upper case letters without spaces.

For example:

```
@DIAMETER_OF_THREAD
@WORKING_PLANE_1
```

The system names should contain only English letters.

Script

It is recommended that the comments are created in English

It is not recommended to place several operators in one line.

When creating the script, follow the order of the functions:

- ActHeader()
- 2. OnInitialisation()
- 3. (Custom functions)
- 4. OnMakeParameters()
- 5. SetGripPoint()
- OnMoveGripPoint()
- 7. OnDialog()
- 8. OnDialogChanged()
- 9. OnChangeParams()
- OnInitSelect()
- OnSelectParam()
- 12. OnMenu()
- 13. BeforeConnect()
- 14. OnConnect()

The operators, setting the strPartName and strPartDescription variables, should be placed at the end of the OnMakeParameters parameters.

The script version and the GOST description should be placed in the first lines of the script. General comments of the object can be placed after them. For example:

```
SVersion = 2;
ObjectDescription = "GOST 19425-74";
// Slope of flange should be taken
//between 4 and 10%.
//In particular 8%
```

It is recommended to use the tabulation to specify an offset for the composite statement and is not recommended to use spaces.

Composite statements should satisfy the following requirements:

- Open bracket is on the same level as the statement
- Nested statements are placed in the same level with the 1 Tab offset.
- Close bracket is on the same level as the composite statement.

Example:

```
function OnConnect {
  if (rPart == 0) {
```

```
if (obj.strTheSubType == "vaBottom") {
    setWorkId (0, obj.objectID);
    Handled = OBJ_HANDLED;
};
if (obj.strTheSubType == "vaShell") {
    setWorkId (1, obj.objectID);
    Handled = OBJ_HANDLED;
    };
};
...
};
```

The UniDialog function should satisfy the following requirements:

- The Function is formed as a composite statement
- Every keyword is started from a new line
- Every option of multi-version sections starts from a new line with the offset.

Example:

```
UniDialog(
 DBFLD, seria, h, b,
 DBINF, num, mas1,
 VFLD,
  L,"length of I-Profile, mm",
  strRefDataHeader,"Reference data:",
  A, "A, sm^2",
  lx, "lx, sm^4",
  ix, "ix, sm",
  Wx, "Wx, sm^3",
  Sx, "Sx, sm^3",
  ly, "ly, sm^4",
  Wy, "Wy, sm^3",
  iy, "iy, sm",
 BFLD, bHid, "Show hidden lines",
 TVIDS, IViewType, "AnyWBK",
 VIEW,"Vids"
);
```

It is recommended to break difficult arithmetic expressions over several lines, or use several additional variables.

It is recommended to use the descriptive comments to group lines of the code which have a close logic structure (for example, block of statements to specify working planes etc.).

Graphics

The drawing should provide recognition of the parametric 2D view of the object from the database with maximum legibility and contain all required views for the element (including the graphic for which the preview was created).

The expressions "single parametric element from the database", "detail" and "GOST" (in lower case so that the letters are not confused with the standards) are set as equivalent.

The drawing of the detail or details should be created in one file. The file name should contain all the numbers of the standards used to create the detail and, if needed, the description. (for example, "GOST 7798-70 Hexagon Head Bolts Product Grade A").

General requirements

By default the scale is set 1:1. The scale to draw a graphic is selected by the user, but the drawing should be legible. It is recommended to draw a detail according to its values from the table.

All objects are drawn in the model space. Default settings are used to create elements.

Layers

By default the line width is set to default for all layers and objects.

Layers, used for the drawings:

Layers name	Parameter - linetype of the object	Colour	Objects
MAIN	0 or not specified	White	Objects, which should have this linetype Insertion point
THIN	2	Red	Objects, which should have this linetype Hatch
DASHED	4	Green	Objects, which should have this linetype
AXIS	Specified by the command	Red	Objects, which should have this linetype
WORKING	Checkbox "working object"	Yellow	Objects, which should have this linetype

DIMENSIONS	Not specified	Blue	Dimensions and text formulas
			Names of GOSTs, implementations, views and other comments

The "centre Line" parameter should be set for graphic objects after their replacement on the specified layer.

Placement of graphic

The separate details and the separate implementations of one GOST should be separated from the other GOSTs and implementations in the drawing (zonally or with the rectangular frames). If there is more than one GOST or implementation, the GOST number or implementation name should be written above of the group of implementation or GOST views.

The views should be in the projective connection in the drawing.

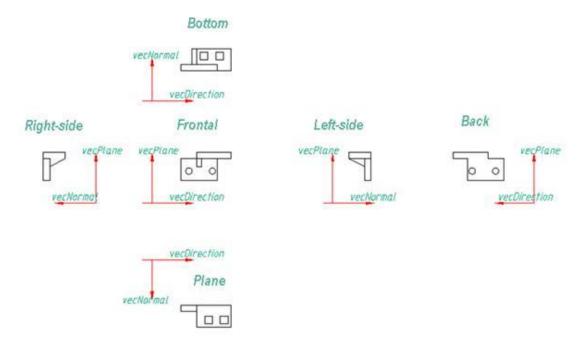


Figure 1. Placement Drawing Views.

The views, which are out of the projective connection, should have clear names to define the relation.

It is recommended to group the views with cuts, simplified views and views with dimensions near their projective views.

If one or several views belong to one GOST/implementation, they should have clear names to define the relation (for example: "Left-side view (all implementation)", "Frontal (GOST 7798,7805, 7806)"). The graphic of the details view should have a name.

The detail should be oriented that the detail's direction (vecDirection of script) should coincide with the OX axis (to the right for the frontal view).

Dimensions

To set the dimension, take into account:

- 1. Correct recognition;
- 2. Legibility of the drawings;
- 3. Unified system for design documentation requirements.

It is not permitted to place the dimensions inside the hatched area (the hatch is not allowed to flow over the dimension values).

Hatch

Hatch should be executed by the "User defined" type, slope angle 45 degrees. A hatch step should be specified parametrically according to the width of the narrowest hatched part (s):

For example:

- 1. For thin-wall objects: s/2;
- 2. For massive objects: s/8;
- 3. Intermediate step: s/4.

A hatch type can be specified in absolute units divisible by 10 (0.1;1;10;100)

You can ignore these rules if you need to hatch in both sides.

Parameters

Using the "Set parameter" tool, set the parameter for the dimensions. It is possible to switch off the "Work object" checkbox for the dimensional view only.

It is recommended to avoid text formulas in the drawing fields (place the calculations in the script).

Text formulas are allowed to be placed in the drawing, if you need to calculate the parameters of the implementation's view and it is defined that their use is not needed in the script.

Use of non-English letters is only allowed in the names

When specifying the parameter's name take into account:

- 1. Similar names existing in the database
- 2. Parameters names in the GOST
- 3. Meaningful parameters names, corresponding to the syntax of the C language.

If possible, avoid difficult arithmetic expressions set in the dimension parameters (it is recommended to use the Protected variables).

Other requirements

The views names should be specified with text of 10mm height. Text formulas should have the text height of 5 mm. The views names are placed above the view, text formulas are placed below the view.

Specify meaningful names for the blocks in the array in English (for example, hole, chamfer etc.). The insertion point of the blocks, used for creating an axial array, should be placed in the centre of the axial array.

It is possible to add an image of the detail, copied from the GOST, into the drawing field, if it does not cause difficulties in legibility and overlap other objects.

Syntax scripting language

Script - is the code in a language similar to SI, which determines the nature of the object database software parameters, the plane impact on the response object. Automatic installation of dependencies, etc. A script comprises a series of blocks, which perform defined events from outside the object.

Identifiers

Identifier is a sequence of characters representing the name of a variable, function, or operator. Rules describe identifiers MechWizard similar to the rules in C:

- Identifier can consist of letters of the alphabet, numbers, and the underscore character.
- The identifier must begin with a letter or underscore.
- Identifiers consisting of identical sequences of letters, but in a different case (uppercase / lowercase) are different identifiers.
- The maximum identifier length is limited to 50 characters.

Recommendations to the name variable names are listed in the document.

Keywords

Keywords - are reserved identifiers that are endowed with a certain sense. They can be used only in accordance with the value of the known macro-language interpreter. Keywords cannot act as an identifier.

List of key words listed in the annex.

Data Types

In the macro language, there are five main types of data:

- 1. Valid floating-point number (double analogue in C). Range-1.7e308.. 1.7e308.
- 2. Line.
- 3. Three-dimensional point (Point)
- 4. Three-dimensional vector (Vector)
- 5. Plane defined by the reference point and a normal vector (Plane).

The script made an agreement to the names of real type variables prefixed r, to add a prefix to a string variable str or s, to the point type variables prefixed pnt or p, the variables of vector type to add a prefix or vec v, and the plane denoted WP (WorkPlane).

Initialization of variables is carried out without prior specification as in BASIC. To declare a variable, you just need to assign it a value. If the variable is not described in the header function in the sections ActHeader Public or Protected, it will be considered local and will retain its value from the first moment until the end of the definition, in which it is described.

```
StrName = "ObjectA";
rPI = 3.1415926;
rA = 2.0;
```

To initialize the points and vectors used special constructor functions Point (), Point (x, y, z), and Vector (), Vector (x, y, z) respectively.

```
pnt2=Point();//handle length
pnt1= Point(1.0, 10.0, 10.0); //This is the point with specific coordinates
vec1 = Vector(); // vector of unit length, which coincides with the axis OX (1,0,0)
vec1 = Vector(1.0, 1.0, 0); //Vector specific coordinates
```

To separate the coordinate point or vector can be accessed using the qualifier:

```
pnt1:x = 12.5;//Removing the abscissa of the point vec1:y = 25.6;//Removing the ordinates of the point
```

Plane used to initialize a constructor function Plane (pnt, vecNormal).

```
WP1 = Plane( pntBase, vecNormal );
//pnt- This is the basic point for the plane WP1
//vecNormal- This is the normal vector to the plane of WP1
```

Eg

```
WP1 = Plane( pntOrigin, vecDirection);
```

Indexing variables

If you declare a number of variables of any type with names that differ only by the number in the end, then these variables can be accessed by index, as an array.

```
rParam1 = 1.0;
rParam2 = 2.0;
rParam3 = 4.0;
...
rParam[2] = 45.7;
rParam[3] = 9.1223;
```

Comments

Comments in the script begins with the double slash line and ends at the end of the line.

```
vecNormal=getLocalNormal(vecDirection,vecPlane);

WP1 = Plane( pntOrigin, vecDirection );

WP2 = Plane( pntOrigin-vecPlane*(0), -vecPlane );

//Right side

WP3 = Plane( pntOrigin+vecNormal*(b/2), vecNormal );

WP4 = Plane( pntOrigin+vecNormal*(b/2)+vecPlane*h, vecNormal );

WP5 = Plane( pntOrigin+vecPlane*(h), vecPlane );
```

//First set up a plane in counter-clockwise order

Operators

All operators of the macro language can be divided into the following categories:

- arithmetic operators
- Boolean operators
- conditional operator
- loop operator
- other operators (empty statement, the assignment operator, the operator access to internal members)

All operators end empty statement - a semicolon ";".

Empty operator

Empty statement consists only of a semicolon. When this statement is executed, nothing happens. This statement is a delimiter for other operators, functions, and lines in the script.

Composite operator

A compound statement is a few operators and announcements enclosed in curly braces {}. Execution of the compound is in the sequential execution of its constituent operators. At the end of a compound statement the semicolon is placed.

The assignment operator

The assignment operator is denoted by the sign of equality.

expression A = B; means that variable A is assigned the value of expression B, and the type of the variable A type of expression is established B.

Operator access to internal members of the complex data types

To access the internal members of the complex data types, a special qualifier operator ":". For example, it can be used to access the individual coordinates variables of type Point and Vector.

Arithmetic and logical operators

Syntax of arithmetic and logical operators in macro language script syntax is similar to SI.

Arithmetic	C	Puzzle		
A + B	Addition	A == B	A is equal to B	
A - B	Subtraction	A != B	A nonequilibrium In	

A * B	Multiplication	A > B	A more in
A/D	Division	A < B	And in less than
		A && B	A and B
		A B	A or B

For arguments of type Point subtraction result is a vector. A multiplication of a vector by a new vector will equal the scalar product of the vector by.

```
vecDirection = pntEnd - pntStart;
vecScaled = vecDirection * rScale;
```

The conditional operator

Format statement:

```
if ( <expression> )
    operator_IF1;
else
    operator_ELSE1;
    //<expression>- it is a logical condition to perform operator
```

As operatora_IF1 and / or may act _ELSE1 composite operator, ie group of statements enclosed in braces.

Execution if the operator starts with the evaluation of expression.

Further execution is as follows:

- if the expression is true (ie, different from 0), then the operator IF1.
- if the expression is false (ie, equal to 0), then the operator _ELSE1
- if the expression is false and there is no operator _ELSE1, then the following if statement in

Block of statements after else may be missing along with the word else. In this case, the conditional statement is as follows:

```
if ( <expression> )
    operator_IF1;
```

As an expression can be any logical or arithmetic operator or a sequence of statements separated by parentheses.

```
if (A>1)
    operator_IF1;
if ((A>1)&&(B<5)&&(C==25))
    operator_IF1;</pre>
```

You can use nested conditional statements, ie conditional statement can be included in the design **if** the design or **else** another conditional statement.

```
if (A > 1){
    if (B < 5){
        if (C == 25)
            operator_IF1;
    }
};</pre>
```

Cycle Operator

Format statement:

```
while (expression) operator_BODY;
```

Requirements for the expression, such as in the if statement. _BODY Operator called the loop body.

Executing the cycle begins with the evaluation of the expression. Further execution is as follows:

- 1. If the expression is true (not 0), the loop body is executed.
- 2. If the expression is false, then the next while the operator.
- 3. The cycle is repeated from step 1.

Functions

Function - a set of operators and other function call. Each function has a name. Function declaration begins with the keyword function. The function body is enclosed in braces. In this version of the browser functions have no parameters.

Format function:

```
function Function_Name{
  operator_1;
  ...
```

```
operator_N;
}
Allowed to call one of the other functions, but called from funcA functions must be declared above in the body of the script.

Example:

function user_Function_1{
    MessageBox("This is my first feature");
}

function OnInitialization{
    user_Function_1(); // The correct call. The called function is declared above!
    user_Function_2(); // Wrong call. The called function is declared below!
}

function user_Function_2{
    MessageBox("This is my second feature");
}
```

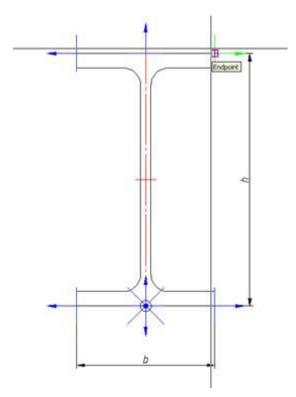
The interpreter has a number of built-in functions as listed in Appendix 2.

Specifying the object plane

Target abstract object geometry (points vectors planes) may be in coordinate form (almost not used) or relative to the local coordinate system. Position of the points defined by specifying operators addition point and plane. In the example, the position of the reference point is defined as the plane

```
pntWP4=pntOrigin+vecDirection*(b/2)+vecPlane*h
```

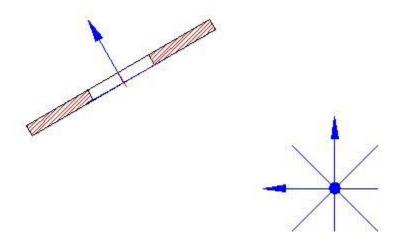
Normal vector of the plane collinear insert vecDirection



Consequently, she illuminated plane WP4 will be set as

WP4=Plane(pntWP4,vecDirection);

If the surface normal vector is not orthogonal coordinate system, it is often determined by the operator or RotateBy GetLocalNormal.



For example, for lining the conical bottom, surface normal vector is defined as the WP2

vecNormal=getLocalNormal(vecDirection,vecPlane);
vecFitting = rotateBy(vecDirection,90-ang/2,vecNormal);
//ang - is the angle of the bottom in terms of

Apart from the above identified, operators are used to find the vector normal plane and the base point:

```
pntWP1 = Point(WP1);
vecWP1 = Vector(WP1);
```

To find the distance between the point and the plane used the difference point and plane

```
rDistance = WP1-pntOrigin;
```

Vector length (distance between points) define the operator vecLen:

```
rLength = vecLen(pntWP1 - pntOrigin);
```

Orthogonal vector operator is getPerp:

```
vecPlane = getPerp(vecDirection);
```

Worksheet

To work with the table object used by two operators and LoadInCache SelectInCache.

The operator loads the LoadInCache specifies the parameters in the cache of the table. This operator in the new versions must be called only when the sample is forced with an expression to evaluate the parameters of the (..., "+", ...).

SelectInCache operator selects from the table according to the specified criteria (see syntax in the appendix)

Sampling by "kFirst" selects one first row. Sampling by "kFilter" selects a range of records from a table that match the specified filter.

Dining sample-specific parameters "~" - the approximate equality parameter selects the value in the record. "=" - An exact equality, "+" - the sample on the filter. Picks by filter oznachet that if the logical filter condition is satisfied, then the record is selected from the table (subjected to further checks on the conditions).

For example, the

```
SelectInCache("kFirst", "dr", "~", rdr, "L", "+", "L>=rMinLen&& L<=rMaxLen&& (L-b<=rTrLen)");
```

selects the first record of the table, where the combination of parameters dr, L, b such that dr?rdr, rMinLen<=L<=rMaxLen, (L-b)<=rTrLen.

Function SelectInCache important order of the sampling conditions. This means that in the first place will be selected from the table entry corresponding to the first condition, then - of which selects records corresponding to the second condition, etc.

If there are multiple items in the tables, then the coincidence parameter names must enable the checkbox "Use the table name as a prefix to the parameters" in the context menu of the corresponding table.

In this case, an appeal to the parameter in the script will be as follows:

<Name of the table>.<Parameter name>

For example:

```
If (Table0.dr==Table1.Thread1) {
    ...
};
```

To provide a sample of the first table is not necessary to modify the operator SelectInCache.

For example, if you need to select from the table Table1 parameter dr, equal to 10, then the first condition in the operator to select from a table must follow the table index (starting from 0):

```
SelectInCache(1, "kFirst", "dr", "~", 10);
```

For a table with imenenm Table0 table name can be omitted. le it is also true, and another expression:

```
SelectInCache ("kFirst", "dr", "~", 10, "L", "~", 50);
SelectInCache ("0", "kFirst", "dr", "~", 10, "L", "~", 50);
```

Dialog object. Making function UniDialog

View Insert Object dialog box is defined by specifying the key features UniDialog.

See the appropriate section of the application.

It should be easy to compare that

DBFLD - the defining table parameters.

DBINF - reference table settings.

VFLD - are arbitrary parameters and reference data.

VIDS - a list of versions of the object (possibly omitted if there is only one execution.

TVIDS - different views of the same design (possible keys - by type, All - those present, AnyWBK - opposing views generated mirror (for symmetrical objects).

VIEW - thumbs species.

Key OnDglBeforeSelParam in ActHeader determines whether the dialog is called before the dynamic parameter selection.

Connecting UserForm

If an object is given shape, then in order for it to be called, you need to function in place of the function OnDialog UniDialog cause concrete form.

For example, if the object is given form named frmMain, you should write the following:

```
functionOnDialog{
   ShowForm("frmMain");
}
```

Similarly, the terms can cause several different forms of the object, referring to them by name using the operator ShowForm.

Set dependencies

Operators set up dependencies implement geometric and parametric dependence.

Parametric dependencies

SetParamConstraint(< param >,obj,EXPR,< expression to constrain>,bBidirect);

<param> - name of the parameter object to which the time dependence.

Obj - which object set.

EXPR - so far only the dependence on the expression

<expression to constrain> - arithmetic combination of parameters on which dependence is placed (must be in quotes).

bBidirect - bidirectional or unidirectional relationship.

Geometric constraints

```
SetGeomConstraint(rTYPE, rDIRECTION, obj, < WPname >, < WPtoConnect
>,offset,bBidirect);
SetGeomConstraint(ANGE,CODIRECT,< obj >,< wpSourcePlane >,< wpObjPlane >,< rAngle >,< bBiderect >);
```

Types of dependencies rTYPE = INSERT (inset)) MATE (alignment on the plane) AXIS (alignment axis) DIRECTION (aka ANGLE) (angular orientation).

Direction rDIRECTION = CODIRECT (co-directed) CONTRDIRECT (opposite directions).

<WPname> - The name of the plane, which are attached.

<WPtoConnect> - The name of the plane, joined.

Offset - numerical or parametric expression that defines:

INSERT - axial distance between the planes.

MATE - the normal distance between the planes.

AXIS - relative displacement in terms of the axes.

DIRECTION - angle relative orientation of the planes.

For dependencies DIRECTION (ANGLE) there are certain conditions:

Syntax:

SetGeomConstraint(ANGE,CODIRECT,< obj >,< wpSourcePlane >,< wpObjPlane >,< rAngle >,< bBiderect >);

ANGLE - keyword angular dependence.

CODIRECT - always for the angular dependence. It is believed due to the minimal angle.

<obj> - which object set.

<wpSourcePlane> - the plane of the source object to which dependence is placed.

<wpObjPlane> - the plane of the object to which you subscribe.

<r Angle> - numerical value of the angle in degrees, depending.

Depending on the type ANGLE should be added after the dependency type INSERT, MATE, AXIS.

When the dependency type INSERT, MATE or AXIS rotation is relative to the axes of the planes dependence.

In the absence of dependency type INSERT, MATE AXIS or move it in the normal to the plane in which both vectors lie in the direction of the minimum angle of rotation.

If we consider the vectors are collinear, move it about the axis OX.

Example:

SetGeomConstraint(ANGLE,CODIRECT, obj,WPnormal,obj.WPnormal,45); SetGeomConstraint(ANGLE,CODIRECT, obj,OYPlane,obj.WP2,15,TRUE);

Examples of different types of dependency can be found in the appendix.

Function ShowValue

Using the debugger windows can detect errors in the script and determine the values of parameters during the execution of the script. Syntax, see Appendix.

Object versioning support

The object versioning is necessary in order for the new parameters in the updated object to be correctly displayed and used on the previously inserted objects.

The seted protected parameter is used to support the object versioning. The parameter is automatically generated when using the script wizard and can be renamed or added manually if necessary.

Consider the script for creating a rectangle (the script is not complete, only methods relevant for the example are shown):

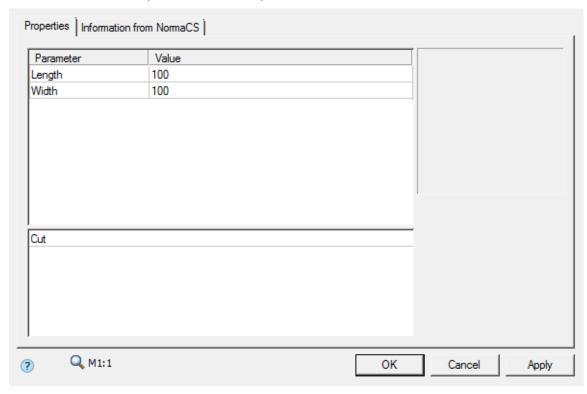
```
function ActHeader {
...... NPart=0;
...... Public(a,"Length", b,"Width");
...... Protected(seted);
...... Changeable(a,b);
...... OnDlgBeforeSelectParam = 0;
...... ShowWhenSelPnt = 1;
...... ContourOnLine = 0;
};
.....
function OnInitialization {
...... if(seted == UnknownValue) {
...... seted=1;
...... a = 100;
..... b = 100;
.....};
};
function OnDialog {
....... UniDialog( VFLD, a, "Length", b, "Width", TVIDS, IViewType, "All", VIEW, "Vids");
};
.....
```

The ActHeader method specifies the seted protected parameter and the public length and width parameters.

In the OnInitialization method for an object that has no version, add the length and width parameters and set version 1.

In the OnDialog method, we call a dialog with the width and length fields.

Let's insert an object (hereinafter Object1). When placing an object on a drawing, a window with default parameters will open.



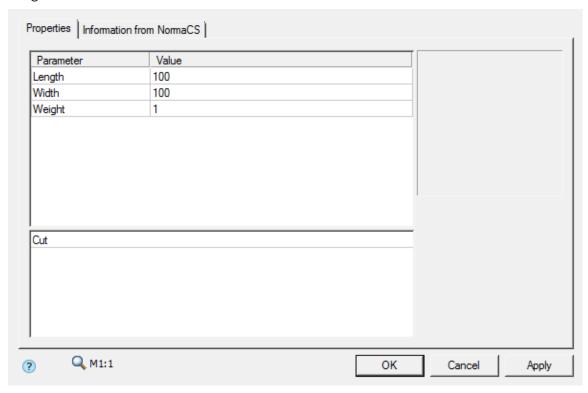
Suppose we need to add line thickness for the rectangle.

To do this, we add the "weight" parameter:

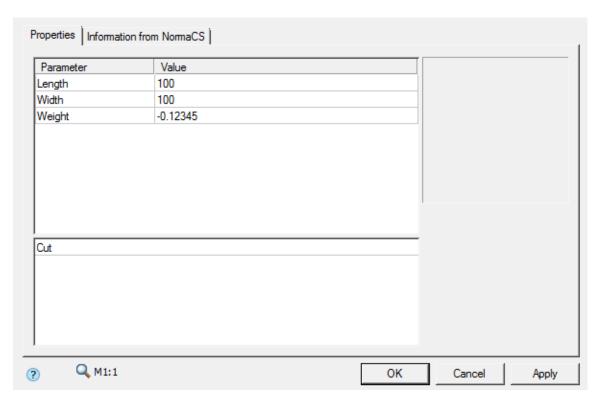
```
Public(a,"Length", b,"Width", weight, "Weight");
.....
function OnInitialization {
...... if(seted == UnknownValue) {
...... seted=1;
...... rZOrder=100;
...... a = 100;
...... b = 100;
...... weight=1;
.....};
};
.....
function OnDialog {
....... UniDialog( VFLD, a, "Length", b, "Width", weight, "Weight"
TVIDS, IViewType, "All", VIEW, "Vids");
};
```

•••••	•••••	•••••	•••••	•••••

Let's insert an object (hereinafter Object2). The dialog correctly displayed the line weight to us.



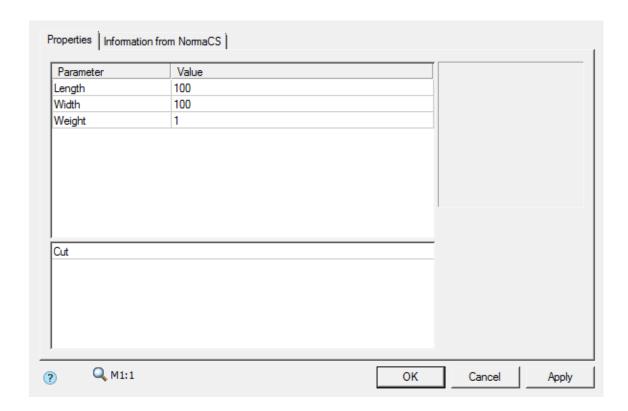
Let's open Object1 for editing and see that the "Weight" parameter is displayed incorrectly.



The point is that Object1 already has version (seted) 1 and the weight is not assigned. Let's fix the OnInitialization method. If there is no version, we will increase it to 2, add a condition if we have version 1.

```
function OnInitialization {
....... if(seted == UnknownValue) {
...... seted=2;
...... rZOrder=100;
..... a = 100;
..... b = 100;
..... weight=1;
..... };
..... if(seted == 1) {
..... seted=2;
..... weight=1;
..... };
};
```

Now objects of older versions will open correctly.



Appendix

Appendix 1. A list of keywords and reserved variables

SVersion=2;	The first line of the script, which determines the version of the interpreter
strTheType	Object type
strTheName	Object Name
strTheSubType	Subtype object
pntOrigin	Insertion point
vecDirection	Vector insertion direction

VecPlane	Orthogonal vector to vecDirection
Scl	Object Zoom
rZOrder	Ranking (used for overlap)
strDesignName	Execution system name
rXcoord	Relative abscissa cursor with dynamic selection of the parameters
rYcoord	Relative ordinate cursor with dynamic selection of the parameters
VecCoord	Mostly available in OnSelectParam VecCoord: X - X coordinate of the relative VecCoord: Y - Y coordinate of the relative
pntGrip#	(# Number) point pens with the number #
rPart	Serial number of the request.
rKbd	Flag keyboard input. Equal to 1 if the value is entered from the keyboard.
strPartName	Name of detail in the specification (section name)
strPartDescription	Part description in the specification (section designation)
strPromt	Help line (in the dynamic selection or when selecting items for a connection)
NSelect	The number of requests when inserting objects.
NPart	Number of selectable parameters if 0 or undefined then simply called dialogue.
BreakCur	End the current dynamic parameter selection

BreakAll	Complete the entire cycle of selection of dynamic parameters
NoVectorSelect	Does not indicate the vector inserts (used at a connection)
Handled	Result processing facility
NGrip	Number of Handles
NMovingGrip	Phone editable pens
ISimpleView	Variable specifies the type of species, UniDialog created and installed automatically.
	If == 1 - a simplified view.
	If == 2 - sectional view
scaleDisable	If this parameter is set to 1 in UniDialog prohibits the changing Scale
ShowWhenSelPnt	If this box is checked, the object will be drawn at the time of insertion, if not specified, it is enabled by default
ContourOnLine	Generation circuit is not drawing from a script, and on the fly after drawing
IsAHole	The object is a hole (Embedded object)
OnDlgBeforeSelectParam	Call dialogue before calling OnSelectParam.
IsACalculator	Is set equal to 1 for the calculations
No3dViews	Disables automatic views
AutoShift	Automatic pseudo-pressing of the Shift button
UseOnlyZOrder	Used only for crossing rZOrder, do not use Z-coordinate

fUseCommonScale	Maintain external control scale
MINPOSSIBLEVALUE	The minimum acceptable value for the application
NotStdBody	If == 1, then the item is placed in the component catalog
SpecPartition	Unit specifications, which gets the item
UnknownVal=nknownValue=- 0,12345	The value assigned to the default variable. If the variable is not defined, it is assigned a value.

Filter List function SelectInCache:

- "kAsk" Ask the user.
- "kFirst" Find the first value in the table that satisfies a specified condition.
- "kLast" Find FOLLOWING value in the table that satisfies a specified condition.
- "kFilter" all the values from the table that satisfy the specified condition.
- "kAskIfNeed" Ask user if the selection was not successful.

Values that the variable can Handled:

- OBJ UNHANDLED Dependencies are not processed.
- OBJ_HANDLED Dependencies processed
- OBJ_WAITMORE Waiting for Input
- OBJ WAITMORE M
- OBJ_WARNING- Error installing dependencies. When returning this code, the
 parent object will seek to establish the same parameters as that of the child, and
 then update the child object is repeated.
- OBJ ERROR

Constants for the variable type IViewType

- VFRONT Front view
- VLEFT Top view
- VRIGHT Bottom View
- VTOP Left View
- VBOTTOM Right Side View
- VBACK Rear View

Types depending

- INSERT Insert
- MATE Combination by plane
- AXIS Combining axis
- DIRECTION Combining the direction
- ANGLE The angular dependence

Subtypes depending

- CODIRECT co-directional dependence
- CONTRDIRECT contra dependence

Recurrence dialog codes or function MessageBox:

- IDOK
- IDCANCEL
- IDYES
- IDNO

Codes for the function MessageBox:

- MB YESNO
- MB OKCANCEL
- MB_OK
- MB ICONINFORMATION
- MB_ICONQUESTION
- MB ICONERROR
- MB ICONWARNING

Example:

```
MessageBox("Test");
if(IDYES == MessageBox("Yes or No", MB_YESNO, MB_ICONQUESTION)){
    ...
}
```

Appendix 2. Built-in functions

Mathematic functions to work with the surfaces

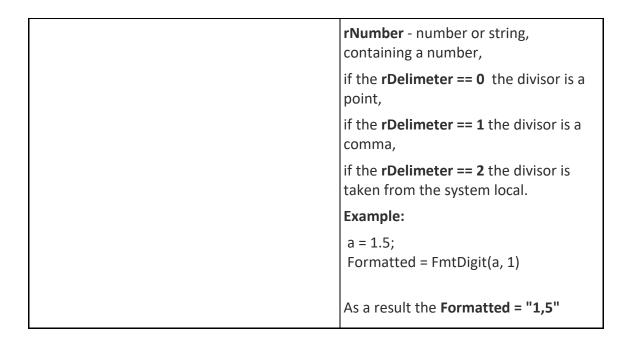
Function	Comment
----------	---------

sin(alfa) cos(alfa) tg(alfa)	Trigonometric functions. alfa - angle in degrees Returns a real number
asin(c) acos(c) atg(c)	Arc-trigonometric functions. c - number Returns an angle in degrees.
DegToRad(deg)	Function converts degrees to radians. deg - angle in degrees
RadToDeg(rad)	Function converts radians to degrees. rad - angle in radians
int(value)	Function rounds a real value to integer value - real number
abs(value)	Function gets the modulus of the number
sqrt(value)	Functions returns the square root of the number
min(a,b) max(a,b)	Function returns maximum and minimum numbers from a and b
iff(expr, a, b)	Function is analogue of the if arithmetic operator . Returns a , if the result of the expression expr >= 1, b otherwise.
VecLen(vec)	Function returns the length of the vec vector.
VecUnit(vec)	Function gets the normal vector (of unit length) from the vec .
VecCodirect(vec1,vec2)	Function checks if the vec1 and the vec2 are codirectional. Returns 1 if the

	vec1 and the vec2 are codirectional, 0 otherwise.
anglePi(vec1, vec2)	Function returns the angle between the vec1 and vec2 in the interval from0 to PI.
angleTwoPi(vec1,vec2)	Function returns the angle between the vec1 and vec2 in the interval from0 to 2*PI.
Point() Point(x, y, z) Point(plane)	Function returns a point. Can be used as a point constructor. If it is without arguments, it returns the P(0,0,0) point. If the argument is a plane, it returns a base point.
Vector() Vector(x, y, z) Vector(plane)	Function returns a vector. Can be used as a vector constructor. If it is without arguments, it returns the V(1,0,0) vector. If the argument is a plane, it returns a normal.
Plane(pntBase,vecNormal)	Function is a constructor of the plane. Returns the plane containing the pntBase point and having the vecNormal normal.
getPerp(vec)	Function returns a vector, orthogonal to the vec vector.
rotateBy(vec1,rAngle,vecNormal)	Function rotates the vec1 vector by the rAngle angle (in degrees) in the plane, having the vecNormal normal. Returns the result of the operation.
getPerpendicular(pnt1,pnt2,pntFrom,pntBase)	Function returns the length of the perpendicular from the pntFrom point to the line, specified between the pnt1 and the pnt2 points. In the pntBase variable, the point of the

	perpendicular base on the specified line is returned.
getMiddle(pnt1, pnt2)	Function returns a point in the middle of the line, specified by the pnt1 and pnt2 points.
getLinesIntersect(pnt1,vec1,pnt2,vec2) getLinesIntersect(pnt11,pnt12,pnt21,pnt22)	Function returns a point of intersection of the lines, specified by the pairs of the points: [pnt11, pnt12] and [pnt21, pnt22] or by a point and a vector: [pnt1, vec1] and [pnt2, vec2]. if the lines do not intersect, the Z coordinate is -1 in the returned point.
getLocalNormal(vec1,vec2)	Function returns a vector product of the vec1 vector and the vec2 .vector.
projectOnPlane(pnt,plane2,rDistance) projectOnPlane(plane1,plane2,rDistance)	Function returns a projection of the pnt point in the plane, placed in the rDistance distance from the plane2 plane.
	If the plane is a first argument, the function returns the plane through the Point (plane1) point projection on the plane, placed in the rDistance from the plane2 plane and having a normal vector, coinciding with the normal vector of the plane2 plane.
Subtraction of the point from the plane	Example: d = WP - pnt;
	Operation returns the distance of pnt point from the WP plane. If point pnt is on side where normal of WP plane points, direction is positive, negative otherwise.
Formation of the string by the numbers	To the string variable you can add a number. The result is a string.

	Example:
	A = 1; B = 5; Str = "Type " + A + ". Modification " + B + ".";
	The result is a string "Type 1. Modification 5."
FmtText(text, number, formated_text,,)	Returns an rtf text, if among the parameters there is even one formatted, ordinary otherwise.
	Various numbers of the parameters can be a result of the function. Expressions can be used as parameters.
FmtSuper(Text); FmtSub(Text);	FmtSuper() - returns an rtf text, formatted as the Superscript (upper index) FmtSub() - for the Subscript (lower index).
	Text can be a string or a number.
FmtDiv(Text1, Tex2, Splash)	FmtDiv() - returns a fraction,
	if Splash != 0 the fraction will have a divisor.
	Example of use:
	a = "super"; b= 1; c = 3; strPosition = FmtText("beginning of the text", "Upper index-", FmtSuper(a), "Lower index-", FmtSub("sub"), " Text", "Frection- ",FmtDiv(b, c, TRUE), "fraction without a divisor- ",FmtDiv(b, c, FALSE));
FmtDigit(rNumber, rDelimeter)	Returns a string, formatted by a decimal symbol.



Functions to process surfaces

Function	Comment
GetNearestPlane(pnt)	Function returns the name of the nearest plane to the pnt point of the selected object.
	pnt - variable of the Point type.
	Example:
	<pre>function OnConnect{ if(obj.strTheType == "StdJointParts"){ // } else { strName = GetNearestPlane(pntOrigin); if(strName != UnknownValue){ SetGeomConstraint(INSERT, CODIRECT, obj, WP1, strName, 0); NoVectorSelect = 1; Handled = OBJ_HANDLED; } } }</pre>

```
//variant 1
                                     Returns an index of the nearest point or plane
findNearest(
                                     according to the parameters types, specified
                                     with the Name1, ... NameN or arrName names.
  pnt,
  Name1,
                                     Function supports two types of call:
  Name2,
                                     1) the particular names of the public
                                     parameters are specified as arguments
  NameN
                                     2) the array of the public parameters with the
//variant 2
                                     starting index for searching and calculating a
findNearest(
                                     number of the array elements, is specified as
  pnt,
                                     the arguments
  arrName,
                                     pnt - variable of the Point type.
  arrIndexStart,
                                     Name1, NameN, arrName - names of the public
  arrSize
                                     parameters of the selected object
).....
                                     arrIndexStart - starting index for searching in
                                     the array
                                     arrSize - array size
                                     Example:
                                     //variant 1
                                        rNearest = findNearest(pntOrigin, obj.WP1,
                                     obj.WP11, obj.WP21);
                                        // rNearest takes 0, 1 or 2 values
                                     //variant 2
                                        rNearest = findNearest(pntOrigin, obj.WP, 1,
                                     4);
                                        // rNearest takes 1, 2, 3 or 4 values.......
                                      .....
//variant 1
                                     Returns an index of the nearest point or plane
nearestPlaneName(
                                     according to the parameters types, specified
                                     with the Name1, ... NameN or arrName names.
  pnt,
  Name1,
                                     Function supports two types of activation:
  Name2,
                                     1) the particular names of the public
                                     parameters are specified as arguments
  NameN
                                     2) the array of the public parameters with the
//variant 2
                                     starting index for searching and calculating a
nearestPlaneName(
                                     number of the array elements, is specified as
  pnt,
                                     the arguments
  arrName,
```

arrIndexStart,	pnt - variable of the Point type.
arrSize)	Name1, NameN, arrName - names of the public parameters of the selected object
	arrIndexStart - starting index for searching in the array
	arrSize - array size.
	Example:
	<pre>//variant 1 strNearest = nearestPlaneName(pntOrigin, obj.WP1, obj.WP11, obj.WP21); // strNearest takes "obj.WP1", "obj.WP11" or "obj.WP21" values //variant 2 strNearest = nearestPlaneName(pntOrigin, obj.WP, 1, 4); // strNearest takes "obj.WP1", "obj.WP2", "obj.WP3" or "obj.WP4" values</pre>
restoreBasis(vecOld, vecNormal, vecNew);	Function converts an old basis according to the new position of the vector.
	Following combinations are applied in the next order:
	(x, y, z, newX)
	(y, z, x, newY)
	(z, x, y, newZ) vRrev - previous vNext in the XYZ
MakeVectorsFromView(IViewType, vecDirection, vecPlane);	Sets the position of the vectors from the view type
	Example:
	MakeVectorsFromView(VTOP, vecDirection, vecPlane);
setBasePlaneForSelect(planeName, vecPlane = vecPlane);	Sets a plane coordinate system, where the SelectParam will work, i.e. the rXcoord, rYcoord will depend on this system.
	Applying. When selecting non-symmetrical details whose selection direction depends on the fixed plane and the distance is calculated

from any plane; for example, the standard ends of the arbors, not from the pntOrigin.
Example:
setBasePlaneForSelect(WP1);
Used for connecting the ends of the arbors.

Functions for working with tables

Loading a table from the database to Cache

LoadInCache(name1, name2, ..., nameN)

Loads the selected fields from the table.

Function has various numbers of arguments.

name1, ... , **nameN** - names of the table parameters.

Example:

```
LoadInCache(D);
LoadInCache(dr, dH);
```

Selection from the table

SelectInCache(strFilterKey, strParamName, strOperation, Value ..., strFilterKeyN, strParamNameN, strOperationN, ValueN)

Executes selection from the object's table cache. Various numbers of arguments.

strFilterKey - key of filtration - string, taking the following values:

"kFirst" - select the first from the values, satisfying the filtration condition

"kLast" - select the last from the values, satisfying the filtration condition

"kFilter" - select the range of the values

"kAsk" - ask user (activates the dialog for manual selection of the value)

"kAskIfNeed" - ask user if automatic selection cannot be preformed

strParamName -name of the table parameter - string, containing the name of the table parameter, on which selection is made.

strOperation - operation of filtration - string that can take values :

"=" - equals

">=" - more or equals

```
"<=" - less or equals
"~" - approximately equals
">" - more
"<" - less
"+" - calculation of the expression

Example:
LoadInCache(dr, L);
SelectInCache("kFirst", "dr", "~", 14, "L", ">=", 100);

LoadInCache(dr, L, b);
SelectInCache("kFirst", "dr", "~", rdr, "L", "r;+", "L>=rMinLen && L<=rMaxLen && (L-b<=rTrLen)");</pre>
```

Dialogs of the database objects

UniDialog function

```
UniDialog (

[DBFLD, D, Dn, ...,]

[DBINF, Number,Seria,...,]

[VFLD, rA, "A", rB, "B", ...,]

[BFLD, bKey1, "Key1", bKey2, "Key2",...,]

[RADIO, rKey1, "Version1", "Version2", ...,]

[VIDS, strDesignName, "Design1", "Design2", ...,]

[TVIDS, IVidType, {"F", "T", "R", "L", "AII"},]

[VIEW, {"Vids", "Hdr", "None"}]

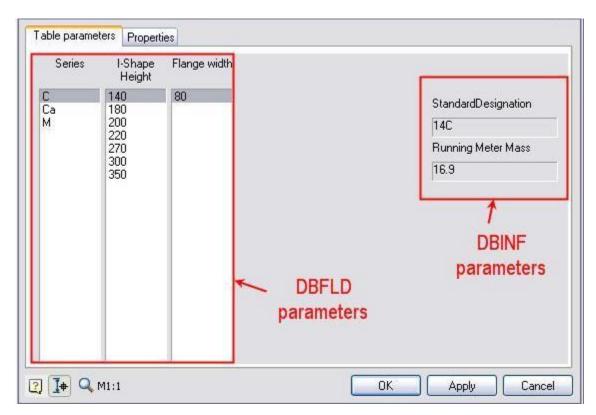
).......
```

The function activates the dialog to edit the standard object from the database. The function returns the **IDOK**, if the OK button was pressed, and the **IDCANCEL**, if the Cancel button was pressed.

for optional parameters

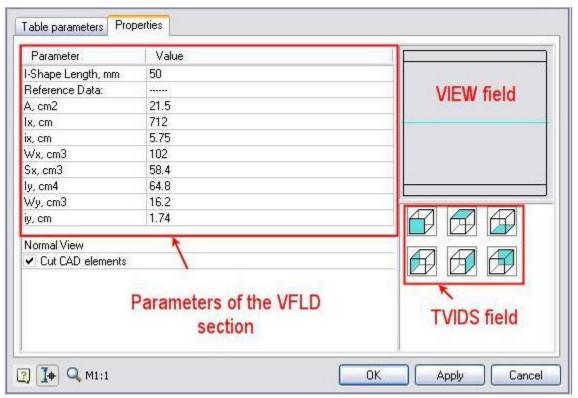
DBFLD - keyword, after which the table's parameters are listed.

D,Dn, ... - names of the table parameters.



VFLD- keyword, after which the object's parameters are listed, announced in the **Public** or **Protected** sections.

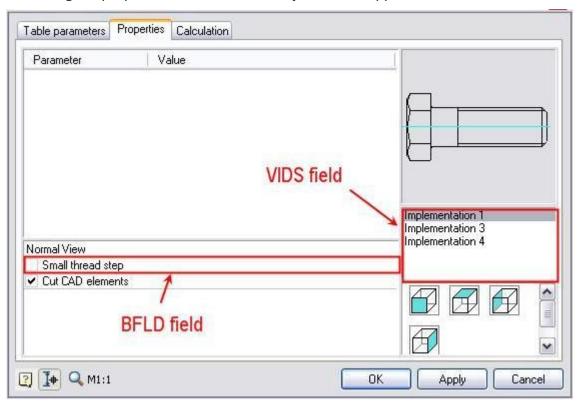




BFLD - keyword, after which the checkboxes are listed - variables, taking only 1 (CHKD) and 0 (UNCHKD).

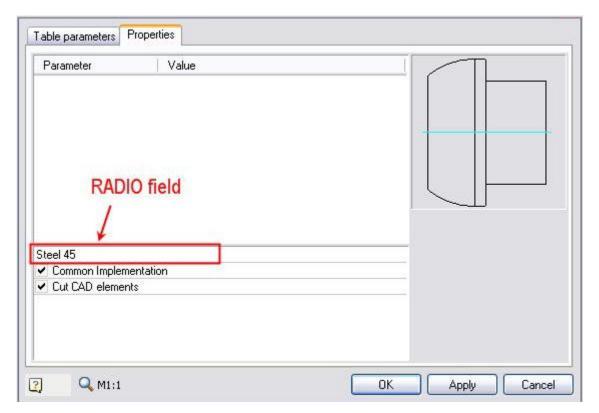
bKey1, "**Key1**",**bKey2**, "**Key2**" - names of the variables with names of the checkboxes.

A block of the parameters, starting form the **BFLD** keyword, is a list of the dialog's components, which are standard **CheckBox**(es) and has two modes: Checked and Unchecked. The parameter-variable, going after the BFLD, according to the checkbox mode takes 1 for Checked and 0 for Unchecked values. Such checkboxes are used for describing the properties of the standard objects in the application.



RADIO - keyboard, after which the group checkboxes are listed - variables, taking discrete integer values.

rKey1, "Variant 1", "Variant 2", ... - names of the variables of the group checkboxes with names of selection variants.



A block of the parameters, starting from the **RADIO** keywords, is a list of the dialog's components, which are standard drop-down lists with the permanent number of the unchanged strings. The parameter-variable, going after the RADIO, takes the index values of the selected string in the ComboBox. The top string has 0 index, the last is a subtraction of the number of strings and 1. Such checkboxes are used to select a material for the standard object in the application.

For the described example, the bCommon parameter takes 0 or 1 integer values, and the rd1 parameter takes 0, 1 or 2 values.

Parameters for the BFLD and RADIO can be described in the Public and Protected sections. Before activating the dialog, such parameters should be initialized (usually in the **OnInitialization**).

VIDS- keyword, after which all an object's implementations are listed.

strDesignName, "Design1", "Design2" - variable's name, storing the name of the object's implementation with the available implementations' names.

TVIDS- keyword, after which the object's views are listed.

IViewType- variable, storing the name of the object's view and taking values from the multitude {VFRONT, VRIGHT, VLEFT, VTOP, VBOTTOM, VBACK}.

[&]quot;F" - view name "Frontal".

[&]quot;R" - view name "Right-side view".

[&]quot;L" - view name "Left-side view".

```
"T" - view name "Plane view".
"B" - view name "Bottom view".
"All" -names of all views.
VIEW - keyword, after which the slide's type goes from the multitude {"Vids", "Hdr",
"None"}.
"Vids" - implementation's slides of the object
"Hdr" - slide of the object's header (Header)
"None" - there are no slides
Examples:
LoadInCache(dr);
UniDialog (
  DBFLD, dr,
  VFLD,
  Lthread, "thread length",
  Lhole, "hole length",
  d hole, "hole diameter",
  VIDS, strDesignName, "All",
  TVIDS, IViewType, "AII",
  VIEW, "Vids"
);
LoadInCache(Dn);
UniDialog (
  DBFLD, Dn,
  BFLD, bCommon, "General purpose",
  RADIO, rd1, "Aluminium alloy", "45 steel", "Bronze",
  VIDS, strDesignName, "All",
  TVIDS, IViewType, "All",
  VIEW, "Vids"
);
.....
Custom forms
```

ShowForm("FormName");

Activates the object's form with the **FormName** name.

MessageBox function

```
MessageBox(StrMessage[,mb_Buttons = MB_OK, mb_Icons])
```

The function activates the standard Windows pop-up message.

```
StrMessage - message string
```

mb_Buttons - parameter, defining the buttons in the MessageBox.

Can take one of the following values:

MB_OK - only OK button

MB_OKCANCEL - OK/Cancel buttons

MB_YESNO - Yes/No buttons

mb Icons - parameter, defining the icons in the MessageBox.

Can take one of the following values:

MB ICONWARNING - warning

MB_ICONINFORMATION - information message

MB_ICONERROR - error

MB_ICONQUESTION - question

The function returns the following values according to which button is pressed:

IDOK - OK button was pressed

IDCANCEL - Cancel button was pressed

IDYES - Yes button was pressed

IDNO - No button was pressed

Example:

MessageBox("Connection error!", MB_OK, MB_ICONERROR);

Message in the notifier

ShowMessage("Text"[, nplcon, objectID]);

Shows the notification message with the specified **Text** text.

nplcon can take the following values:

npSimple == -1, // without icon

npUsual == 0, // "page"

npWarning == 1, // " exclamation mark "

npCure == 2, // "cross"

npHint == **3**, // "lamp"

npError == 4 //error

If the objectID was specified, the message with the button for editing the object is specified as the **objecteID**.

Note:

Message with the **objectID** cannot be sent during the insertion process or the dialog activation.

The setting "Show pop-up messages" does not affect the
messages with the npError key.

ShowValue function

ShowValue(StrMessage, Value);

The function shows the values of the transferred (**value**) parameter as an argument, with the **strMessage** string to the window of the special debugger - InDebMon.exe. Any parameter or variable can be used as a value.

Example:

```
ShowValue("pntOrigin", pntOrigin);
ShowValue("vecDirection", vecDirection);
ShowValue("WorkPlane WP1", WP1);
ShowValue("Dn", Dn);
ShowValue("***************************, 1);
ShowValue("OnConnect Start", 1);
```

Functions to work with dependences

Function	Comment
ResetAllConstraint(idFrom = NULL)	Switches off the dependences, set in the last OnConnect, when the insertion of the object with the selection of several objects is used.
	idFrom - object identifier, from which the dependences should be switched off. By default it equals NULL; in this case, all dependencies from all objects are switched off.
SetParamConstraint(Parameter, idFrom, TYPE, expr, bBidirect = FALSE, idTo = objectID	Sets the parametric dependence. Parameter - parameter name idFrom - object identifier from which the dependence starts TYPE - the type of parametric dependence (EXPR is only used) expr - expression, setting the parameter of the connected object bBidirect - checkbox, TRUE - two-sided dependence,

	T
	idTo - object identifier to which the dependence is set
	(By default is objectID - identifier of the current object)
	Example:
	SetParamConstraint(rDn, obj, EXPR, "obj.rDnE2", TRUE); SetParamConstraint(LTPlug, obj, EXPR, "obj.rLT");
SetGeomConstraint(Sets the parametric dependence.
TYPE, SUBTYPE, IdFrom,	TYPE - type of the geometric dependence. Can take the following values:
PlaneTo,	INSERT - Insertion
PlaneFrom,	MATE - Coincidence by plane
expr,	AXIS - Coincidence by axis
bBidirect = FALSE, idTo = objectID);	DIRECTION - Coincidence by direction (angular dependence)
	SUBTYPE - Dependence subtype. Can take two values:
	CODIRECT - codirectional dependence
	CONTRDIRECT - opposite directional dependence
	idFrom - object identifier, from which the dependence is set.
	PlaneTo - plane of the inserted object.
	PlaneFrom - plane of the connected object.
	expr - expression, setting the dependence parameter (for insert the INSERT - distance between planes)
	bBidirect - checkbox, TRUE - two-sided dependence,
	FALSE (by default) - one-sided dependence.
	idTo - object identifier, to which the dependence is set
	(by default equals the objectID - the identifier of the current object)
	Example:
	SetGeomConstraint(INSERT, CODIRECT, obj, WP1, obj.WP2, 0);
IsFixedParam(Parameter, bOnlyFixed =FALSE)	Function as used in the OnChangeParameters event handler.

Checks if the dependence for the parameter was set and if the parameter was changed, if the bOnlyFixed is TRUE.
Activation by default (from FALSE) is recommended when checking the parameters of objects with permanent geometry (screw). In this case, the function returns 1 if the parameter is connected by the dependence and changed its value; and 0 otherwise. Activation (from TRUE) is recommended for objects with changing geometry (tubes, barrels); the function returns 1 if the parameter is connected by the dependence.
Example:
<pre>if (IsFixedParam(WP1, TRUE)) {</pre>

Function - event handlers, activated by the base of the application

Function	Comment
ActHeader	Description of the object, list of the parameters, setting checkboxes. Activated every time the object is opened.
OnInitialization	Initialization of the object. Activated every time the object is called up.
BeforeConnect	Execution of the previous actions before the selection of the objects during the insertion. Activated upon insertion of the object.
OnConnect	Setting of the dependences when connecting to other objects. Activated upon insertion of the object.
OnChangeParameters	Setting of new values for the object parameters by another object. Activated when connected by the dependences, the parameters are changed.

OnDialog	Editing the object parameters. Activated when the dialog opens.
OnMakeParameters	Final preparation of all parameters. Activated before closing the object.
SetGripPoint	Preparing the grip-points. Activated when the object is selected.
OnMoveGripPoint	Reaction to changing the grip-points position. Activated whengrip-points are moved.
OnAddObject	Setting of the inverse dependences to the connected objects. Activated when insertion with selection of another object is executed.
OnDialogChanged	Interactive process of the input values. Activated every time the object parameters are changed in the dialog.
OnInitSelect	Initialization of the prompt string and pop-up menu. Activated before every step of the dynamical selection cycle of the parameters.
OnSelectParam	Process of the values input from the keyboard or mouse. Activated in the body of the of dynamical selection cycle of the parameters. Align values by grid.
OnMenu	Menu handler. Activated after the menu item is selected, created by the SetMenu function.

Function for working with objects' identifiers

Function Comment

setWorkId(index, id)	Saves the selected identifier in the special storage with the specified index.
	index - integer value (index >= 0).
	id - object identifier.
	Every object of the application, when created, gets a unique identifier like GUID in Windows. To get access to the Obj1 identifier of the object in the script use the Obj1.objectID expression.
	Example:
	<pre>id1 = getWorkId(0); id2 = getWorkId(1); If (id1 == id2) MessageBox("Attempt to connect to one object two times!", MB_OK MB_ICONWARNING);</pre>
getWorkId(index);	Returns the saved identifier.
	index - integer value (index >= 0).
	Example:
	<pre>if (obj.strTheName == "MyEnabledObject") { setWorkId(0,obj.objectID); }</pre>
getObjData(WorkId,ObjName)	Function gets the public-parameters of the object, having the ididentifier from the database.In the case of successful execution it returns 1, otherwise 0. To access the received parameters, use the ObjName .Param1 expression etc.
getObjectConnectedTo(idOut, objToSerch, strExpression, ParamName);	Searches the objects, connected with the dependence, with the ParamName variable of the objToSerch object, satisfying the strExpression condition.
	Condition can be null.

Other functions

setGlobalParam(var,	Sets the global var variable in the val value.
val);	Example:
	<pre>if(rLen2 <= B/4){ SetGeomConstraint(INSERT, CODIRECT, obj, WP1, obj.WP2, 0); setGlobalParam(rSubType, CONTRDIRECT); } else if(abs(rLen1) <= B/4) { SetGeomConstraint(INSERT, CODIRECT, obj, WP1, obj.WP1, 0); setGlobalParam(rSubType, CODIRECT); } else { SetGeomConstraint(INSERT, rSubType, obj, WP1, obj.WP1, rLen1); };</pre>
GridRound(b)	Align the values by grid. The parameter of the grid is specified in the parameters or in prompt parameters (Ctrl+Shft+Q by default);
	Example:
	a = GridRound(b);
	If the grid step is 5 and, b ==12.4, the function returns 10; If the b >= 12.5 function returns 15.
	rDiameter = GridRound(abs(rYcoord*2));
paramByName(strName)	Returns the parameter value by its name: Example:
	strName = GetNearestPlane(obj); plane = paramByName(strName);
getChildrenCount()	Returns the number of child objects
getChildId(nChild);	Returns the identifier of the nChild child object.

Appendix 3. Object Classes

For some types of objects in the database has its own class reserved:

Number	Icon	Description
200	G	Default object. By default, when creating a new object, class 200 is assigned. The developer can assign his own class to created objects. All classes of objects, except for the ones described below, will have the same icon.
600	ē	Blueprints. All object classes from 600 to 650, except for the ones described below, will have the same icon.
601	20	Tables, specifications
630	Ē.	System object
631	□	Collection
632	ē	Object project construction site
633	4	Object - building site signs
634	ē	Master of Engineering
645		Batch file, when clicked, the command stored in the comment is sent
646	 ■	Bolted, riveted connections
647	<u>A</u>	Callouts
648	<u> </u>	Markers
649	₿	Templates
650	6	Object groups
670	G	Window
671	ß	Wall

Number	Icon	Description
672	ß	Wall modifier
673	ß	Wall object
674	6	Architecture object
675	6	Column
676	6	Opening
680	6	Door
750	6	Piles
751	6	Additional crane objects
752	ß	Load chart
806		Formats
807		Stamps
809	ŢÎ	Cover Sheet and Cover Templates
820	*	Connectors
821		Track
822		Equipment with connectors

Line Type nanoCAD Construction

nanoCAD Construction It operates nine types of lines:

Νō	Title	Type in the platform
1	Solid thick main line	Solid

Νō	Title	Type in the platform
2	The solid thin line	Solid
3	The wavy line	GOST 2.303 3
4	Dashed thin (axial) line	GOST 2.303 5
5	Cross-hatching line	GOST 2.303 4
6	The dashed line is thickened	GOST 2.303 6
7	Open line	Solid
8	Continuous thin line kinked	GOST 2.303 8
9	Dashed with two dots thin line	GOST 2.303 9

Each line corresponds to its number in nanoCAD Construction.

Adjust the color and thickness of lines made "Settings - General settings - LineType".

Examples

Object - centre holes GOST 14034-74

```
SVersion = 2; // The first line of the script determines the version of the interpreter // Description. It will be displayed in the Properties pane // You can also sort the objects in the field // Tabular data and mcqs
ObjectDescription = "center hole";

// This is the function description of the object function ActHeader {
    NPart = 2; // The number of requests to a dynamic selection of parameters

// This section contains descriptions of the parameters open object // Visible to other objects
Public (
    // Define the parameter size hole - the diameter d, "diameter",
```

```
// Plane to install, depending on the shaft end
  WP1, "the beginning of the plane"
  rValType, "Shaft Type" // Type of shaft, which connect the hole
       // Set for overlap on
       // Kinds and with a cut without cutting
  Lhole, "The depth of the holes," // This is the total hole depth
  Lthread, "Thread length" parameter // length thread
  // Parameters specific performances
  DF, "shaft diameter to form F",
  DH, "The diameter of the shaft to form H"
 // Private parameters used to plot
 // And calculate the limits of other parameters
 Protected (seted, freeLen, bBlind, rSuppressPointHeight);
 // This section lists the parameters of the open,
 // Which will be accessible from the outside for editing
 // This is only classified as specific actions under
 // Changing the parameters of external functions defined in
 // OnChangeParameters
 Changeable (d, WP1, DF, DH, rValType, Lhole, Lthread);
 // Show dialog box to insert dynamic selection parameters
 OnDlgBeforeSelectParam = 1;
 // Do not regenerate suppression circuit after insertion
 ContourOnLine = 0;
 // This is the part of the shaft member
 IsAValPart = 1;
 // And a built-in part of the shaft
 InsidePart = 1;
// This element - opening (this variable is used to
 // Dimensioning in Inventor)
 IsAHole = 1;
};
// Initialize the object parameters
function OnInitialization {
 // Load the table into the cache
// Parameters table of the current line in the script is always available
 // Therefore loaded only one parameter d
```

```
LoadInCache (d);
 // Variable seted is the default value UnknownValue
 // As initialized with this value
 // So, if we put the following test, this unit
 // Operators will be executed only once:
 if (seted == UnknownValue) {
  seted = 1; // Set seted 1 to the condition is not fulfilled
   // Again
  // Set initial values
  rValType = 1; // The hole is placed on the shaft portion
  rZOrder = 4220; // Ranking - initial value of
  // Select from a table initial values
  SelectInCache ("kFirst", "Form", "~", "FH", "d", "~", 10);
  //T.e. according to the syntax of the operator - selected the first record
  // Table where Form parameter is "FH", and a parameter
  // Hole diameter d is approximately equal to 10
  // Set, pursuant to which the object will be initially
  // Displays
  strDesignName = "Form F";
  // Set the initial value of arbitrary parameters
  Lhole = 30; // The length of the hole
  Lthread = Lhole-d / 2; // This is the minimum possible length of the thread
  // The variable that determines whether the hole deaf.
  // Default - blind.
  bBlind = TRUE;
  // This variable determines the value of the parameter is relative to
  // Height of the end point of the cone of suppression. (See the drawing)
  rSuppressPointHeight = tg(30) * (d-1.082 * p) / 2;
 };
};
// Setting function handles
function SetGripPoint {
 NGrip = 3; // Total 3 pens
 pntGrip0 = pntOrigin; // The first - at the insertion point
 // The second handle - the handle length of the threaded portion
```

```
pntGrip1 = pntOrigin + vecDirection * Lthread;
 // Third handle - handle is the total length of the hole
 pntGrip2 = pntOrigin + vecDirection * Lhole;
};
// This function determines the reaction of the object on the movement of the handles
function OnMoveGripPoint {
// Here comes the variable NMovingGrip, equal to the index with a slide
// Handle the numbering of the array starts from zero.
 // When editing the first handle just move the item to
 // Where the cursor is with this pen. Ie move the insertion point
 // Where is the first pen
 if (NMovingGrip == 0) {
  pntOrigin = pntGrip0;
 };
 // This we stretch the length of the (second pen)
 // This defines the length of the threaded portion, depending on the current
 // Execution of holes
 if (NMovingGrip == 1) {
  // Determine the distance stretching as vector length,
  // Defines a point ruchki1 and ruchki0
  rDistance = vecLen (pntGrip1-pntGrip0);
  // For the execution (shaped hole) "P"
  if (Form == "P") {
  // The length of the thread should be limited to reduce the amount of
  // (L-d / 2). Obviously, the length parameter thread Lthread
  // Will be set to the relative position of the cursor
  // If it is greater than (L-d / 2).
  Lthread = max (rDistance, L-d / 2);
  };
  // For the execution of "F H"
  if (Form == "F H") {
  // The same goes for the execution of the thread length must be
  // Size is bounded below by (1 + d / 2).
  Lthread = max (rDistance, l + d / 2);
  };
```

```
// Finally, in this condition, we limit the length of the thread
 // On, since the length of the thread can not be more
 // The length of the hole. Therefore, we will pull out all the hole
 // According to the new diameter of the thread.
 if (Lthread > Lhole-d / 2) {
 //T.e. when you change the length greater than the length of the thread holes
 // Set the new length of the holes equal
 // Thread length plus half the diameter
 Lhole = Lthread + d/2;
 };
};
// This section examines the movement of the third handle.
// The result of editing it is increasing the length of the hole,
// Without affecting the thread.
if (NMovingGrip == 2) {
 // In this case, the current distance is defined as
 // Length of the vector formed by dots and ruchki0 ruchki2
 rDistance = vecLen (pntGrip2-pntGrip0);
 // For the execution of "P"
 if (Form == "P") {
 // The length of the hole is limited below the parameter L
 Lhole = max (rDistance, L);
 };
 // Dlyaispolneniya "F H"
 if (Form == "F H") {
 // Length of the restricted orifice parameters (I + d)
 Lhole = max (rDistance, l + d);
 };
 // If you change the length of the hole is less than the length of the thread
 // Move thread abroad
 if (Lhole > Lthread + d/2) {
 // That is, if the length of the opening is smaller than Lthread + d / 2,
 // Recalculate the new thread length which is less than
 // Current length of the holes in the d / 2
 Lthread = Lhole-d / 2;
 };
};
```

```
};
// Function of the final calculation of parameters
function OnMakeParameters {
 // Name, surname and patronymic of the object
 strTheName = "CenterHole"; // Centering Hole
 strTheType = "ArborParts"; // Refers to detail shafts
 strTheSubType = "Simple"; // Type of opening - easy
 // Set the position of the plane WP1. It's just a plane
 // The base point at the insertion point and a normal vector,
 // Coincides with the vector direction of insertion
 WP1 = Plane (pntOrigin, vecDirection);
 // Realize the overlap for different occasions:
 // If the variable rValType, specifying the type section of the shaft, at the
// Set that the hole is equal to 1 (this is a simple
 // Portion of the shaft), the order of the overlap is equal to 4220
// (This number is given on the basis of the values ??of the order of
 // Portions of the shaft, so that the hole overlaps the shaft to its
 // Loop suppression
 if (rValType == 1) rZOrder = 4220;
 // For internal shaft portions and other portions where rValType not equal to 1
 else rZOrder = 2150;
 // The sequence will be different
 // This parameter constraints are found, depending on the version
 // For the execution of "P", more precisely, for the current record in the table,
 // Form that meets the hole "P".
 if (Form == "P") {
  // Limits the length of the holes parameter L
  Lhole = max (Lhole, L);
  // Limits the length of the thread parameter (Ld / 2)
  Lthread = max (Lthread, L-d / 2);
  // Define strDesignName in "Form P"
  //t.e. choose what the two-dimensional design, which corresponds to
  // The current parameters of the table
  strDesignName = "Form P";
 };
 // The same goes for the form "F H"
 if (Form == "F H") {
```

```
// Limit the parameters of the holes and the length of the thread length
 Lhole = max (Lhole, l + d);
 Lthread = max (Lthread, I + d / 2);
 // This reassurance, if it does the user chose
 // Execution "P" in the two-dimensional forms, since the table
 // Exhibited parameter value in Form "FH".
 // In general, if you select the wrong version, the set
 // First correct.
 if (strDesignName == "Form P") {
 strDesignName = "Form F";
 };
};
// Limiting the length of the thread from the top, depending on the
// Total length of the hole
Lthread = min (Lthread, Lhole-d / 2);
// The holes form P always deaf
if (Form == "P") {bBlind = TRUE;};
// This is to ensure that the correct path is drawn suppression
// The schedule has a contour suppression, the position of one of the points
// Which is specified by rSuppressPointHeight
// So as to whether the user has selected the display
// Blind or through-hole, set the parameter
// RSuppressPointHeight desired value
if (bBlind == TRUE) {// For blind hole
 rSuppressPointHeight = tg(30) * (d-1.082 * p) / 2;
} Else {// For the through-hole (ie, not from the cone drill)
 rSuppressPointHeight = 0;
};
// This line simply sets specifications
// Depending on the version adds the necessary letter
// To the designated holes.
if (strDesignName == "Form F") {strLetterForm = "F";};
if (strDesignName == "FormaH") {strLetterForm = "H";};
if (strDesignName == "FormaP") {strLetterForm = "P";};
// Parameter strPartName - a string specification holes.
// In addition, he also displayed hinte.
strPartName = "Ed. Center." + strLetterForm + "M" + d + "GOST14034-74";
```

```
// Format string automatically, ie
// When adding a string value with
// Numerical value is automatically converted to a string
};
// This function determines the type of dialogue the insertion hole
function OnDialog {
 // Load the parameters of the cache work table
 LoadInCache (d);
 // Call the dialogue with the key
 UniDialog (
  // This defines the fields of the table hole
  // The shape and diameter. Output as a table defining the parameters
  DBFLD, Form, d,
  // The diameter of the shaft to form F and Form H
  // Output only as reference parameters
  DBINF, DF, DH,
  // Parameters asked randomly (subject to restrictions, of course)
  // Display on the Properties tab
  VFLD,
  Lthread, "thread depth"
  Lhole, "The depth of the hole"
  // Tag blind or through hole
  // Display on the properties tab in the form of a tick
  BFLD,
  bBlind, "Deaf"
  // Choices performances. Displays all performance
  VIDS, strDesignName, "All",
  // Displays all recognized types
  TVIDS, IViewType, "All",
  // Displays preview
  VIEW, "Vids"
);
};
// This function is performed before the dynamic selection of the parameters
function OnInitSelect {
// This function comes variable rPart - sequence number
 // Prompt you to choose the dynamic parameters. counting begins at 0
 if (rPart == 0) {
  // For the first case indicate the diameter of the thread
  // Output a corresponding hint
  strPromt = "Enter the depth of the thread";
 };
```

```
if (rPart == 1) {
  // For the second case indicates the depth of the hole (it zhe
  // Total length).
  strPromt = "Enter the hole depth";
 };
};
// This function defines the behavior of the object in the dynamic selection of the
parameters
function OnSelectParam {
 // For the first cycle of selection parameters. In principle, the limitations
 // The same as for the handles.
 // These variables come rXcoord and rYcoord - relative
 // Abscissa and ordinate of the cursor
 if (rPart == 0) {
  // Parameter range is determined
  // Module relative abscissa
  rDistance = Abs (rXcoord);
  // Limitations on choice of parameters depending on the version
  if (Form == "P") {
   Lthread = max (rDistance, L-d / 2);
  };
  if (Form == "F H") {
   Lthread = max (rDistance, I + d / 2);
  };
  if (Lthread > Lhole-d / 2) {
   Lhole = Lthread + d/2;
  };
 };
 // For the second request
 if (rPart == 1) {
  // Parameter distance
  rDistance = Abs (rXcoord);
  // Restrictions.
  if (Form == "P") {
   Lhole = max (rDistance, L);
  };
   if (Form == "F H") {
   Lhole = max (rDistance, I + d);
```

```
};
  if (Lhole < Lthread + d / 2) {
Lhole = Lthread + d/2;
};
};
};
// This function is performed when the parameters in the dialog insert
function OnDialogChanged {
// Function adds interactivity in the form of dialogue.
// In this case we need to hide execution and daw "deaf"
// Operator ShowDesign hides or displays performance.
// Depending on the value of the first parameter (1 - Shows
// 0 - hides.
// Operator ShowBool ??hides and displays switches (tick)
// For a start, execution and show all daw
ShowDesign (1 "Form F");
ShowDesign (1, "Form H");
ShowDesign (1 "FormaP");
ShowBool ??(1, "deaf");
// If you choose such a line in the table where d3 is 0,
// It is necessary to hide the performance of "Form H". (As defined in the guest,
// That the performance is not used for such values
// Settings
if (d3 == 0) ShowDesign (0, "Form H");
// If the selected row corresponding to the shape of the hole "P", then
// To hide the other two performance (they can not be selected)
// And daw "blind" because the shape of P is always blind.
if (Form == "P") {
ShowDesign (0, "FormaH");
ShowDesign (0, "FormaF");
ShowBool ??(0, "deaf");
};
// But for the chosen form of "FH", you need only to hide
// Execution "Form F"
if (Form == "F H") {
ShowDesign (0, "Form P");
};
};
```

```
// Function OnChangeParameters performed under external influence
// Object. It is an attempt to establish a dependence or direct
// Change the parameters of the object properties panel
// This function determines the reaction of the object to such a change.
function OnChangeParameters {
// Here comes the object new, representing a
// The same object with the new value of open options.
// Random variable we can immediately assign new values
rValType = new.rValType;
Lhole = new.Lhole;
Lthread = new.Lthread;
// Here consistently given, how to choose a line from the table,
// The new value of the corresponding parameters.
// Check whether the changed parameter d
if (new.d! = d) {// ie. If the new value is not equal to the old
// Table is loaded into the cache
LoadInCache (d);
// And get out of it the first available record with a parameter
// D, approximately equal to the new value.
SelectInCache ("kFirst", "d", "~", new.d);
// Then we check not change any other parameters
} Else if (DH! = New.DH) {// change the diameter of the shaft H performance
// Load
LoadInCache (DH);
// Select the first record
SelectInCache ("kFirst", "DH", "~", new.DH);
} Else if (DF! = New.DF) {// change the diameter of the shaft version F
// Load
LoadInCache (DF);
// Select the first entry with an approximately equal value
SelectInCache ("kFirst", "DF", "~", new.DF);
};
// Default processing completed successfully.
//T.e. send the object to change the parameters that
// Set the necessary parameters.
// To do this, we assign the value of the variable Handled OBJ HANDLED
Handled = OBJ HANDLED;
// If after selecting from the table the shaft diameter is not established
// The new value, it may require the cyclical update
```

```
// Send a variable object variable
// Handled equal OBJ WARNING
if (d! = new.d) {
Handled = OBJ WARNING;
};
// In this block operators recalculated the new position of the object
// When you change its work plane
// Variable fix to test the ability to move.
// In general, in this case it could not be used
// Because the hole does not change when you change its geometry
// Planes.
// This block is generated script wizard, so it has
// This unified view
fix = 0;
// Check if the dependency has changed and whether the
// PloskostWP1
if (IsFixedParam (WP1)) {
// Increase the value of the variable fix, for the follow-up audit
fix = fix + 1;
// Save the old value of the vector insertion.
vecXOId = vecDirection;
// Assign new value to the vector inserts match
// To the new position of the plane WP1
vecDirection = Vector (new.WP1);
// And move the insertion point to a new position openings
// PloskostiWP1
pntOrigin = Point (new.WP1);
// Restore the coordinate system on the basis of
// Old and new values ??of the vectors
restoreBasis (vecXOld, vecPlane, vecDirection);
};
// If all of a sudden hole with fixed geometry
// Objects begin to stretch in different directions, then
// Return an error
if (fix > 1) {
  Handled = OBJ ERROR;
};
};
```

```
// This function is performed before each attempt to establish a relationship
function BeforeConnect {
 // Here we just reset according to the latest
// The following function to establish new
 ResetLastConstraint ();
}
// This function sets dependency. More specifically,
// It determines exactly how to behave when an object
// Accession to another object
function OnConnect {
// Check for the value of the variable rPart, defining
 // The sequence number of the request to join the parts.
//T.e. if the relationship is set in two stages,
 // Or more, it is possible to install one piece
 // Depending on two or more parts.
// But in this particular case, depending on established only
 // From one piece, so only one request and verification
 // RPart equal to 0
 if (rPart == 0) {
  // The function comes on Connect object obj - this is a detail,
  // To which we are trying to join. We can help qualifier
  // Access to the parameters of the parts to check whether
  // Automatically install dependencies or not.
  // Check whether the part to which are trying to join,
  // Shaft:
  if (obj.strTheType == "Arbor") {
  // Next - will set depending on the current execution
  // Holes. Ie different versions is implemented differently depending on the shaft.
  if (Form == "F H") {
   // Set for the opening of the shaft of the same type as that of the
   // Section of the shaft, which join (this is necessary for the implementation of
   // Overlap
   rValType = obj.rValType;
   // Find the nearest plane to the plane of the opening WP1:
   strNearestPlane = nearestPlaneName (WP1, obj.WP1, obj.WP2);
   // This takes into account only the plane WP1 and WP2 object
   //t.e. if these are not the nearest plane, strNearestPlane
   // Is uncertain.
```

```
// Further - check the shaft type. for common areas (external):
 if (obj.rValType! = 1)
  // Set the geometric relationship
  // Type "insert" codirectional. By the object to which
  // Subscribe for planes WP1 details and found
  // The nearest plane. The distance between the planes - 0 mm.
  // Dependence unidirectional
  SetGeomConstraint (INSERT, CODIRECT, obj, WP1, strNearestPlane, 0, FALSE);
 // For the internal sections of shafts:
 else
  // Set the relationship with the same parameters,
  // But oppositely.
  SetGeomConstraint (INSERT, CONTRDIRECT, obj, WP1, strNearestPlane, 0, FALSE);
 // Set the parameter depending on the current execution
 // Holes.
 // To form the hole F must be equated
 // Parameter rDiameter (shaft diameter) to the diameter DF table hole
 if (strDesignName == "Form F") {
  // So if the test is performed, the
  // Set the parametric dependence on expression.
  // RDiameter equating to DF
  SetParamConstraint (DF, obj, EXPR, "obj.rDiameter");
 };
 // To form H is the same test, but establishes a relationship
 // Already diameter hole DH.
 if (strDesignName == "FormaH") {
  SetParamConstraint (DH, obj, EXPR, "obj.rDiameter");
 };
 NoVectorSelect = 1; // setting the variable NoVectorSelect 1
    // Disable the selection of the direction vector for details
    // Since been joined and established addiction
    // Then choose further it is not necessary.
 Handled = OBJ_HANDLED; // Set the variable Handled
  // Value OBJ HANDLED, ie saying that according to
  // Set successfully.
};
};
```

```
};
}
```

Blind GOST 16076-70

```
Script:
SVersion = 2;
ObjectDescription = "16076-70";
functionActHeader {
 NPart = 0;
 Public (
  // From outdoor settings need only determine the face
  // Diameter of a working surface for attachment
   // Material and reference weight.
   Dn, NOMINAL DIAMETER,
   massa, MASS,
   sw0, @ MATERIAL,
   WP1, @ WORKING PLANE1
 );
 Protected (seted, d, D, D1, D2, D3, D4, I, I1, L, type, type1);
 Changeable (Dn, WP1);
 OnDlgBeforeSelectParam = 1;
 ShowWhenSelPnt = 1;
 ContourOnLine = 0;
};
function OnInitialization {
 LoadInCache (Dn, d, D, D1, D2, D3, D4, I, I1, L, massa);
 if (seted == UnknownValue) {
   seted = 1:
   rZOrder = 100;
  // In the 6th version of all the titles in English versions
  // 1 = Implementation Ispolnenie1
   strDesignName = "Implementation 1";
   rd0 = 1;
   sw0 = 1;
   SelectInCache ("kFirst", "Dn", "~", 18);
 };
};
```

```
function SetGripPoint {
 NGrip = 1; // A handle at the insertion point
 pntGrip0 = pntOrigin;
};
function OnMakeParameters {
// All localizable strings specified resource links
// Starting with the dog.
// Accordingly, they will be displayed depending on
// The current application language.
 strTheName = @ BLIND GOST 16076 70;
 strTheType = ON INTERNAL;
 strTheSubType = ON INTERNAL;
 WP1 = Plane (pntOrigin + vecDirection * (0), vecDirection);
 if (rd0 == 0) type = "022";
 if (rd0 == 1) type = "012";
 if (sw0 == 1) type1 = "A"; else type1 = "";
};
function OnDialog {
 LoadInCache (Dn, d, D, D1, D2, D3, D4, I, I1, L, massa);
 UniDialog (
  // Type of dialogue - which determines the nominal diameter
  // And reference weight
  DBFLD, Dn,
  DBINF, massa,
  // Jackdaw overall performance
  BFLD, sw0,COMMON_IMPLEMENTATION,
  // Alternative Material
  RADIO, rd0, @ STEEL 45, @ 12X18H9T X18H9T ,
  // These options affect the string specification covers
  VIEW, "Vids");
};
function OnDialogChanged {
};
function OnChangeParameters {
```

```
if ((Dn! = new.Dn)) {
  LoadInCache (Dn, d, D, D1, D2, D3, D4, I, I1, L, massa);
  // When you change the diameter of the table, select the new value
  SelectInCache ("kFirst", "Dn", "~", new.Dn);
 };
 Handled = OBJ HANDLED;
 if ((Dn! = new.Dn)) {
  Handled = OBJ WARNING;
 };
 fix = 0;
 if (IsFixedParam (WP1)) {
  fix = fix + 1;
  vecXOld = vecDirection;
  vecDirection = Vector (new.WP1);
  pntOrigin = Point (new.WP1) - vecDirection * (0);
  restoreBasis (vecXOld, vecPlane, vecDirection);
 };
 if (fix > 1) {
  Handled = OBJ ERROR;
};
};
function BeforeConnect {
 ResetLastConstraint ();
}
strPartName = @ SPHERE CAP + Dn + "-" + type + type1 + @ GOST 16076 70;
```

Steel welded neck GOST 12821-80

```
Script (only the BeforeConnect and OnConnect procedures)
Other can be seen in the database of the standard details.

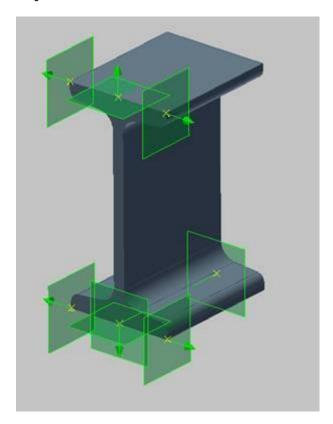
// For flange necessary to geometric constraints
// Have been installed on the gasket and parametric -
// The second flange.
function OnConnect {
// When setting dependencies on multiple objects, we first
// Store information about objects,
// And then use it to install, depending

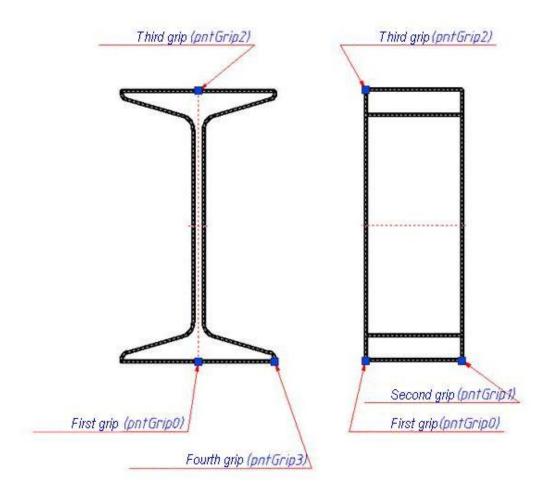
// So, the first stage - the selection of the parameters
// Here rPart is 0 (the serial number of the query begins
```

```
// 0.
// If this is the first request, and the selected object = laying GOST 15180,
// Save the parameters of the object (pads) under the number 0
if (rPart == 0 & & obj.strTheName == " GOST 15180-86 ") {
 setWorkId (0, obj.objectID);
  Handled = OBJ HANDLED;
};
// For the second request - check further whether this
// Object flange GOST 12821, and, if so, to save the parameters of this
// Flange at number 1.
if (rPart == 1 & & obj.strTheName == " GOST 12821-80 ") {
 setWorkId (1, obj.objectID);
  Handled = OBJ HANDLED;
};
// Then consider the stored data objects:
// If something was preserved in the first stage, that is, the data is not equal to 0
if (getWorkId(0) = 0)
 // Restore the data object variable obj 0
  getObjData (getWorkId (0), obj);
 // Closest to the insertion point plane
  strNearestPlane = GetNearestPlane (pntOrigin);
 // If the plane had been found,
  if (strNearestPlane! = UnknownValue) {
   // We set the geometric constraints of the insert.
   SetGeomConstraint (INSERT, CONTRDIRECT, obj, WP1, strNearestPlane, 0, TRUE);
   // Do not choose a direction vector
   NoVectorSelect = 1;
 };
};
// If in the latter case the data has been stored, then:
if (getWorkId(1) = 0)
  // Restore them back to the variable obj
  getObjData (getWorkId (1), obj);
 // Set a set of parametric dependencies
 // In nominal pressure, nominal size,
  // Form with a cut flange Series and a number of performances.
  SetParamConstraint (Py, obj, EXPR, "obj.Py ", TRUE);
```

```
SetParamConstraint (Dy, obj, EXPR, "obj.Dy ", TRUE);
   SetParamConstraint (bSection, obj, EXPR, "obj.bSection", TRUE);
   SetParamConstraint (R, obj, EXPR, " obj.R ", TRUE);
   SetParamConstraint (isp_row, obj, EXPR, " obj.isp_row ", TRUE);
   NoVectorSelect = 1;
 };
 // This block is realized when joining the flange to the pipe
 // The first request for a check type and subtype
 if (rPart == 0 & & obj.strTheType == " Tube " & & obj.strTheSubType == " Round ") {
   // Is the nearest plane
   strNearestPlane = GetNearestPlane (pntOrigin);
   if (strNearestPlane! = UnknownValue) {
    // Set geometric
    SetGeomConstraint (INSERT, CONTRDIRECT, obj, WP2, strNearestPlane, 0, TRUE);
    SetGeomConstraint (DIRECITON, CODIRECT, obj, WPnormal, obj.WPnormal, 0,
TRUE);
    NoVectorSelect = 1;
   };
   // And parametric dependence
   SetParamConstraint (Dn, obj, EXPR, "obj.B ", TRUE);
   Handled = OBJ HANDLED;
 };
};
```

I-profiles GOST 19425





I-profile script:

```
SVersion = 2;
ObjectDescription = @ GOST_19425_74;
function ActHeader {
 NPart = 1;
 Public (
  // Open options- defining the geometry: length, height
  // Width of the shelves.
  L,LENGTH,
  h,I SHAPE HEIGHT,
  b,FLANGE WIDTH,
  // Reference: weight per meter and the total weight
  massa, MASS,
  mas1, RUNNING METER MASS,
  // Standard designation and a series of I-beam
  Designation, @ STANDART DESIGNATION,
  seria, @ SERIES,
```

```
// Working planes
   WP1,CROSS PLANE,
   WP2, @ BOTTOM PLANE,
   WP3, @ SIDE BOTTOM RIGHT PLANE,
   WP4, @ SIDE_TOP_RIGHT_PLANE,
   WP5, @ TOP PLANE,
   WP6, @ SIDE TOP LEFT PLANE,
   WP7, @ SIDE BOTTOM LEFT PLANE,
   WP8, @ CROSS PLANE
 );
 Protected (seted, massa, bHid, seria);
 Changeable (L, b, h, WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, Designation);
 OnDlgBeforeSelectParam = 1;
 ShowWhenSelPnt = 1;
 ContourOnLine = 0;
 NotStdBody = 1;
};
function OnInitialization {
 LoadInCache (seria, Designation, h, b);
 if (seted == UnknownValue) {
   seted = 1:
   rZOrder = 100;
   bHid = 0;
   L = 50:
   strDesignName = "Implementation 1";
   SelectInCache ("kFirst", "seria", "~", "C", "h", "~", 100, "b", "~", 10, "Designation",
"~", "1");
 };
};
function SetGripPoint {
 // At four I-beam handle
 NGrip = 4;
 // Handles are situated at the extreme points of the model I-beam
 // The insertion point
 pntGrip0 = pntOrigin;
 // On the opposite end
```

```
pntGrip1 = pntOrigin + L * vecDirection;
 // At the midpoint of the top shelf
 pntGrip2 = pntOrigin + h * vecPlane;
 // At the extreme point of the bottom shelf
 vecNormal = getLocalNormal (vecDirection, vecPlane);
 pntGrip3 = pntOrigin + vecNormal * b / 2;
};
function OnMoveGripPoint {
// The first carrying handle entire I-beam
 if (NMovingGrip == 0) {
  pntOrigin = pntGrip0;
 };
// The second handle stretches the length of the I-beam and determines
 // Direction vector insertion I-beam
 if (NMovingGrip == 1) {
  L = max (vecLen (pntGrip0 - pntGrip1), 1);
  vecDirection = pntGrip1 - pntGrip0;
  LoadInCache (seria, h, b);
  SelectInCache ("kFirst", "seria", "~", "20", "h", "~", h, "b", "~", b);
 };
 // Handle height of an I-beam
 // At its height stretched selected new I-beam,
 // Roughly equal relative distance from the cursor point
 // Insert parts.
 if (NMovingGrip == 2) {
  // Auxiliary variable height of the new I-beam.
  rNew h = vecLen (pntGrip0 - pntGrip2);
  LoadInCache (seria, h, b);
  SelectInCache ("kFirst", "seria", "~", "20", "h", "~", rNew_h, "b", "~", b);
 };
 // Handle I-beam flange width
 // If it is stretched selected new I-beam flange width,
 // Approximately equal to twice the relative distance
 if (NMovingGrip == 3) {
  // A new auxiliary variable distances.
  rNew b = 2 * vecLen (pntGrip0 - pntGrip3);
```

```
LoadInCache (b, h);
  SelectInCache ("kFirst", "b", "~", rNew_b, "h", "~", h);
 };
};
function OnMakeParameters {
 strTheName = "19425-74";
 strTheType = "Profile";
 strTheSubType = "I-Shape";
 massa = mas1 * L / 1000;
 // Find the right third vector in the workpiece coordinate system,
 // As the vector product
 vecNormal = getLocalNormal (vecDirection, vecPlane);
 // We place the plane in order counterclockwise
 // The plane of the first end
 WP1 = Plane (pntOrigin + vecDirection * (0), vecDirection);
 // The plane of the second end
 WP8 = Plane (pntOrigin + vecDirection * L, -vecDirection);
 // Plane from the middle of the bottom shelf.
 WP2 = Plane (pntOrigin-vecPlane * (0), -vecPlane);
 // Right side
 WP3 = Plane (pntOrigin + vecNormal * (b / 2), vecNormal);
 WP4 = Plane (pntOrigin + vecNormal * (b / 2) + vecPlane * h, vecNormal);
// The plane from the middle of the upper shelf
 WP5 = Plane (pntOrigin + vecPlane * (h), vecPlane);
 // Left Side
 WP6 = Plane (pntOrigin-vecNormal * (b / 2) + vecPlane * h, -vecNormal);
 WP7 = Plane (pntOrigin-vecNormal * (b / 2), -vecNormal);
};
function OnDialog {
// For beauty
 strRefDataHeader = "-----";
 LoadInCache (seria, Designation, h, b);
 // Type of dialogue
 UniDialog (
  // Define the parameters of a series of height and width of the shelves
```

```
DBFLD, seria, h, b,
  // Reference parameters - designation and weight per meter
  DBINF, Designation, mas1,
  // Arbitrary length parameter I-beam
  VFLD, L, @ I SHAPE LENGTH MM,
  // Making reference block settings page
  // Arbitrary properties
  strRefDataHeader, @ REFERENCE_DATA_,
  A, @ A CM2,
  Ix,IX__CM,
  ix,IX CM,
  Wx, @ WX _CM3,
  Sx, @ SX CM3,
  ly, @ IY__CM4,
  Wy, @ WY CM3,
  iy,IY CM,
  // Jackdaw display hidden lines
  BFLD, bHid, HIDDEN LINES,
  // Display types AnyWBK generation means
  // Mirror species, if they are not overridden performances
  TVIDS, IViewType, "AnyWBK",
  VIEW, "Vids"
);
};
function OnDialogChanged {
 ShowBool ??(0,HIDDEN LINES);
 // Check the "invisible line" is only required for those species
// For which they have.
 if (IViewType == VLEFT | | IViewType == VRIGHT)
  {ShowBool??(1,HIDDEN LINES)};
function OnChangeParameters {
// To change the settings:
// Arbitrary simply assigned new values
 L = new.L;
 // For table or selected by a combination of the defining parameters
 if (new.b! = b | | new.h! = h) {
```

};

```
LoadInCache (h, b);
 SelectInCache ("kFirst", "h", "~", new.h, "b", "~", new.b);
// Or by defining a standard notation field
} Else if (Designation! = New.Designation) {
  LoadInCache (Designation);
 SelectInCache ("kFirst", "Designation", "~", new.Designation);
};
Handled = OBJ HANDLED;
fix = 0;
// The response to the change of position of the planes.
// Is to recalculate the new position of the insertion point
// And directions
// Under the conditions IsFixedParam units can be grouped into
// Options direction of the plane.
// Surface normal collinear vecDirection
if (IsFixedParam (WP1)) {
 fix = fix + 1;
 vecXOld = vecDirection;
  vecDirection = Vector (new.WP1);
  pntOrigin = Point (new.WP1) - vecDirection * (0);
  restoreBasis (vecXOld, vecPlane, vecDirection);
};
if (IsFixedParam (WP8)) {
 fix = fix + 1;
 vecXOld = vecDirection;
 vecDirection = -Vector (new.WP8);
  pntOrigin = Point (new.WP8) - vecDirection * (L);
  restoreBasis (vecXOld, vecPlane, vecDirection);
};
// Surface normal collinear vecPlane
if (IsFixedParam (WP2)) {
 fix = fix + 1;
  vecYOld = vecPlane;
  vecNormal = getLocalNormal (vecDirection, vecYOld);
  vecPlane = -Vector (new.WP2);
  pntOrigin = Point (new.WP2) + vecPlane * (0);
  restoreBasis (vecYOld, vecNormal, vecPlane);
  vecDirection = getLocalNormal (vecPlane, vecNormal);
```

```
};
if (IsFixedParam (WP5)) {
 fix = fix + 1;
 vecYOld = vecPlane;
 vecNormal = getLocalNormal (vecDirection, vecYOld);
 vecPlane = Vector (new.WP5);
 pntOrigin = Point (new.WP5) - vecPlane * (h);
 restoreBasis (vecYOld, vecNormal, vecPlane);
 vecDirection = getLocalNormal (vecPlane, vecNormal);
};
// Surface normal collinear vecNormal
if (IsFixedParam (WP3)) {
 fix = fix + 1;
 vecZOld = getLocalNormal (vecDirection, vecPlane);
 vecZNew = Vector (new.WP3);
 vecYNew = getLocalNormal (vecDirection, vecZNew);
 restoreBasis (vecZOId, vecPlane, vecZNew);
 pntOrigin = Point (new.WP3) - vecZNew * (b / 2);
 vecDirection = getLocalNormal (vecZOld, vecYNew);
};
if (IsFixedParam (WP4)) {
 fix = fix + 1;
 vecZOld = getLocalNormal (vecDirection, vecPlane);
 vecZNew = Vector (new.WP4);
 vecYNew = getLocalNormal (vecDirection, vecZNew);
 restoreBasis (vecZOId, vecPlane, vecZNew);
 pntOrigin = Point (new.WP4) - vecZNew * (b / 2) + vecYNew * h;
 vecDirection = getLocalNormal (vecZOld, vecYNew);
};
if (IsFixedParam (WP6)) {
 fix = fix + 1;
 vecZOld = getLocalNormal (vecDirection, vecPlane);
 vecZNew = -Vector (new.WP6);
 vecYNew = getLocalNormal (vecDirection, vecZNew);
 restoreBasis (vecZOId, vecPlane, vecZNew);
```

```
pntOrigin = Point (new.WP6) + vecZNew * (b / 2) + vecYNew * h;
  vecDirection = getLocalNormal (vecZOld, vecYNew);
 };
 if (IsFixedParam (WP7)) {
   fix = fix + 1;
   vecZOld = getLocalNormal (vecDirection, vecPlane);
   vecZNew = -Vector (new.WP7);
   vecYNew = getLocalNormal (vecDirection, vecZNew);
   restoreBasis (vecZOId, vecPlane, vecZNew);
   pntOrigin = Point (new.WP7) + vecZNew * (b / 2);
   vecDirection = getLocalNormal (vecZOId, vecYNew);
 };
 if (fix > 1) {
   Handled = OBJ ERROR;
 };
};
function BeforeConnect {
 ResetLastConstraint ();
};
function OnSelectParam {
 // The dynamic selection of parameters.
 if (IViewType == VTOP | | IViewType == VBOTTOM)
  // Do not choose the parameters for the types of side
   {BreakAll = 1;}
 else {
   // For other species to choose the length of an I-beam in the relative
  // Cursor abscissa
  L = max (abs (rXcoord), 1);
   };
};
// Formation of the line specifications, as the sum of substring
strPartName = I PROFILE N + Designation + "x" + L + @ MASS + massa + @
GOST 19425 74;
```

Panel HB

```
Script of the detail:
SVersion = 2;
ObjectDescription = @ MCS STRING6;
function ActHeader {
 NPart = 1;
 Public (
   // Options- exterior length and width of the plate
   L,LENGTH,
   W, WIDTH,
   // Design load and weight plates
   P, @ MCS_STRING9,
   massa, MASS
 );
 Protected (seted, obozn, H);
 Changeable ();
 OnDlgBeforeSelectParam = 1;
 ShowWhenSelPnt = 1;
 ContourOnLine = 1;
};
function OnInitialization {
 LoadInCache (obozn, L, W, H, massa, P);
 if (seted == UnknownValue) {
   seted = 1;
   rZOrder = 100;
  // Set the initial values ??of parameters and execution
  SelectInCache (" kFirst ", " L ", " ~ ", 2700, " W ", " ~ ", 1190);
   strDesignName = "Implementation 1";
 };
};
function SetGripPoint {
 NGrip = 2;
 Two handles // - at the insertion point and with the opposite end
 // Panel
 pntGrip0 = pntOrigin;
 pntGrip1 = pntOrigin + L * vecDirection;
};
function OnMoveGripPoint {
```

```
// When editing handles the following behavior:
 // Move the entire object when you drag over
 // First handle. And stretch the length and change the vector
 // Direction when stretching a second handle
 if (NMovingGrip == 1) {
  // Intermediate variables to define the geometry
  rW = W;
  rP = P;
  // Relative length
  rL = vecLen (pntGrip0 - pntGrip1) / rScl;
  // The new direction of the vector inserts
  vecDirection = pntGrip1 - pntGrip0;
  LoadInCache (P, W, L);
  // Select the new settings plate.
  SelectInCache (" kFirst ", " P ", " ~ ", rP, " W ", " = ", rW, " L ", " ~ ", rL);
 } Else {
  // If you edit the handle to move the 0 point
  // Insert an object
  pntOrigin = pntGrip0;
};
};
function OnMakeParameters {
 // Classifications plates
 strTheName = " Panel NV ";
 strTheType = " Plita ";
 strTheSubType = " Plita ";
};
function OnDialog {// insert type of dialogue
 LoadInCache (obozn, L, W, H, massa, P);
 UniDialog (
  // The table control fields
  DBFLD, L, W, P,
  // The table reference field
  DBINF, obozn, H, massa,
  // Types - front, top, left
  TVIDS, IViewType, "F", "T", "L",
  VIEW, "Vids");
};
function OnDialogChanged {
 ShowDesign (0, " Preview ");
```

```
};
// Parameter changes
function OnChangeParameters {
// Just when controlling parameter changes
// Select from a table those which correspond to the new
 // Values
 if (\text{new.L!} = \text{L} \mid | \text{new.W!} = \text{W})
   LoadInCache (L, W);
  SelectInCache (" kFirst ", " L ", " ~ ", new.L, " W ", " ~ ", new.W);
 }
 Handled = OBJ HANDLED;
};
function OnSelectParam {
// Function of the dynamic selection of parameters
 rW = W;
  // For type VTOP do not select dynamically
 if (IViewType == VTOP) {
   BreakAll = 1;
 } Else {
  // For other species
  // Selected variable rL - how
  // Abscissa the relative position of the cursor.
   rL = abs (vecCoord: x);
  // Selected values ??from the table with the same width,
  // But with a new value for the wavelength plate.
  SelectInCashe (" kFirst ", " W ", " = ", rW, " L ", " ~ ", rL);
};
};
function BeforeConnect {
 ResetLastConstraint ();
}
function OnConnect
// Automatic installation of dependencies
// Set only parametric dependence.
// Between the plates along the length and width.
 if (rPart == 0)
 {
```

```
if (obj.strTheType == " Plita ")
{
    SetParamConstraint (L, obj, EXPR, " obj.L ");
    SetParamConstraint (W, obj, EXPR, " obj.W ");
    NoVectorSelect = 1;
    seted = 1;
    };
};
}
// The name plate is formed on the basis of the table box
// Obozn
strPartName = obozn;
```

Specification object

In this example, we will consider setting up an object to correctly add it to the specification.

There is a script for inserting a rectangle:

```
...... SVersion = 2;
...... ObjectDescription = "Example";
...... function ActHeader {
...... NPart=0;
...... Public();
...... Protected( seted, a, b );
...... Changeable();
...... OnDlgBeforeSelectParam = 0;
...... ShowWhenSelPnt = 1;
...... ContourOnLine = 0;
...... };
...... function OnInitialization {
...... if(seted == UnknownValue) {
...... seted=1;
...... rZOrder=100;
...... a = 100;
...... b = 100;
······ };
...... };
...... function SetGripPoint {
...... NGrip = 1;
```

```
...... pntGrip0 = pntOrigin;
...... };
...... function OnMakeParameters {
...... strTheName = "Rectangle";
...... strTheType = "Rectangle";
...... strTheSubType = "Rectangle";
····· };
...... function OnDialog {
...... UniDialog( VFLD, a, "a", b, "b",
TVIDS, IViewType, "All", VIEW, "Vids");
······ };
...... function OnDialogChanged {
...... ShowDesign(0, "Implementation1");
...... };
...... function OnChangeParameters {
...... Handled = OBJ HANDLED;
...... };
...... function BeforeConnect {
...... ResetLastConstraint();
.......
...... ......
...... SpecPartition="Details"; strPartName = "Rectangle
"+a+"x"+b; ......
            .....
```

For the correct addition of an object to the specification, added: a section of the specification and the name of the object in the specification.

The specification section is specified using the "SpecPartition" parameter. If the specified section is missing in the specification, the object will be added to the specification without the section. It is recommended to set the value using the resource table.

The object name in the specification is specified using the "strPartName" parameter. The value can be composite and generated using the "Part list entry wizard".

When you add the "#" symbol to the value of the name of the object, in the position editor it will be possible to insert text between two lattices with subsequent saving. When exporting a part list, the "#" symbol will not be displayed.

```
strPartName = "Motor 1MP2" + "-" + a + "-" + n + "-" + shema + "#"+ " " + "GOST 31591-2012";
```

