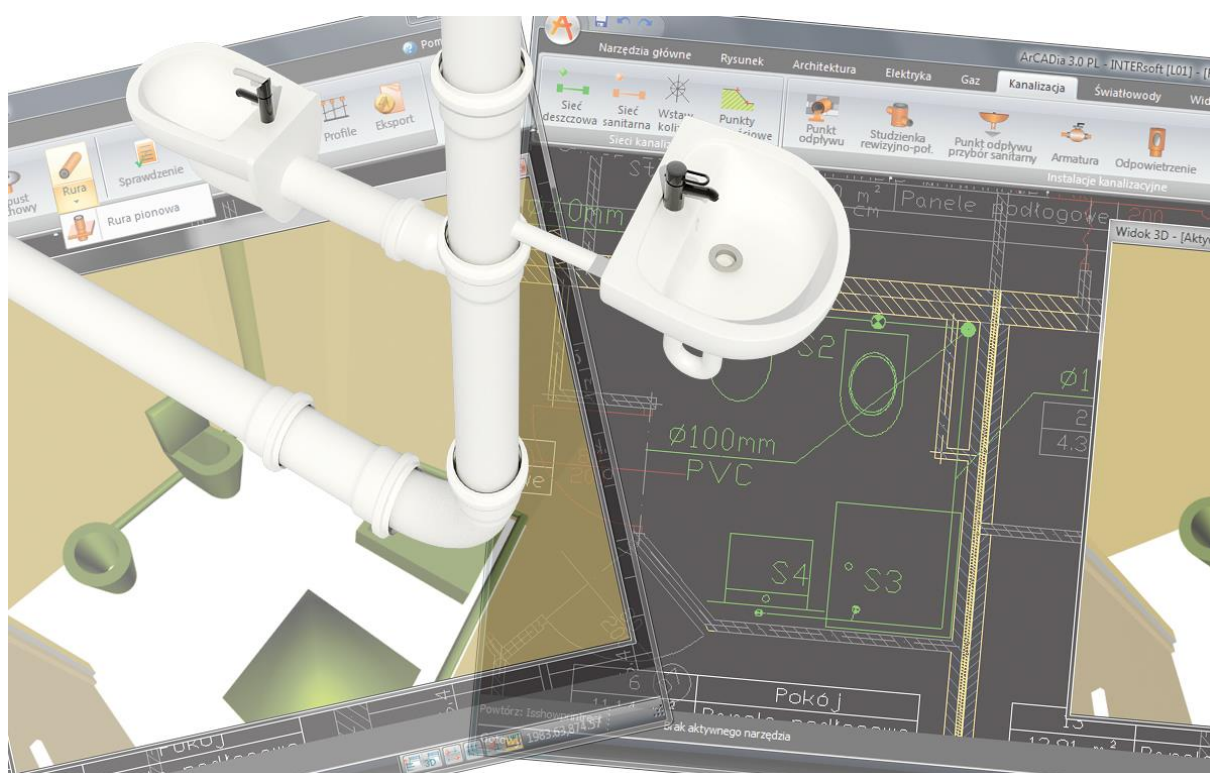


# ArCADia-SEWAGE INSTALLATIONS

## ArCADia-SEWAGE INSTALLATIONS User Manual



2019-05-20

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## Introduction

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## Introduction

# 1 INTRODUCTION

## Introduction

### 1.1 ABOUT

**ArCADia-SEWAGE INSTALLATIONS** is a tool that extends the functionalities of ArCADia-INTELLICAD, AutoCAD and ArCADia-START with features that allow quick creation of drawings of indoor sewage installations on blueprints and creating supplementary drawings: drain pipeline profiles and extensions of sewage stacks and drain pipes. The software is meant for designers of indoor sanitary installations.

The software takes into consideration the different types of sanitary installations in the building: sanitary sewage installations, rainwater sewage systems (draining rainwater from the roofs by means of indoor drain pipes) and a process waste water sewage system.

An additional feature of the software that results from the capabilities of the system into which it was incorporated is defining intersections and crossovers with other items present in the building, as well as with other architectural items of the building.

### 1.2 FEATURES AND POSSIBILITIES OF THE PROGRAM

Technical scope of the software and its basic features:

- Providing characteristic information for sanitary waste water and rainwater recipients.
- Defining branch lines for devices receiving waste water and rainwater.
- Determining the location of sewage stacks and drain pipes in all the projections (levels).
- Determining branch lines for recipients.
- Determining the route of underfloor and ceiling sewage pipelines, connection sites of pipelines and the method of executing connections.
- Calculating the section flow, fill and velocity.
- Determining the diameters of sewage sections, drain stacks, drain pipes and slopes.
- Creating underfloor pipeline profiles with intersections marked.
- Creating drawings of extensions of sewage stacks and drain pipes.
- Verifying the validity of the designed sanitary installation.
- Generating calculation reports.
- Automatically generating a legend of the symbols used in the project.
- Generating schedules of quantities for the materials used in the project.
- Transferring materials used for the creation of the sanitary installation along with the fittings to software used for preparing schedules of values, such as Ceninwest or Norma.

### 1.3 REFERENCES

- 1 Jarosław Chudzicki, Stanisław Sosnowski „Instalacje kanalizacyjne. Projektowanie, wykonanie, eksploatacja” Wydawnictwo „Seidel-Przywecki” Sp. z o.o. , Warsaw 2009.

Catalogues:

- 1 Gamrat, Pipe systems – Technical catalogue (valid from 01.06.2012), fifth issue 2012/2013
- 2 Geberit, Own catalogue prepared on 29.03.2013 [www.geberit.pl](http://www.geberit.pl)

## Introduction

- 3 Karmat eco sanitary systems – "White plumbing" catalogue [www.karmat.pl](http://www.karmat.pl)
- 4 Karmat eco sanitary systems – "Backwater vales, end flap valves" catalogue [www.karmat.pl](http://www.karmat.pl)
- 5 Karmat eco sanitary systems – "Indoor plumbing" catalogue [www.karmat.pl](http://www.karmat.pl)
- 6 Steinzeug Keramo – "Technical parameters of glazed vitrified clay products" September 2008
- 7 Kessel Sp. z o.o. – Product catalogue 03/2010 "Anti-flooding devices, inside drains, basement drain, line drains", [www.kessel.pl](http://www.kessel.pl)
- 8 Magna plast – "HT plus low-noise indoor plumbing – Installation manual", [www.magnaplast.pl](http://www.magnaplast.pl)
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- 10 Wavin – "Sewage wells – Product catalogue. For sewage and sewage systems and for municipal and industrial applications". April 2011, [www.wavin.pl](http://www.wavin.pl)
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- 12 Wavin – "Indoor plumbing system – Product catalogue. For standard and low-noise blackwater, hot industrial waste water and polluted waste water sewage" January 2013, [www.wavin.pl](http://www.wavin.pl)
- 13 AVK Armadan Price list Sewage fittings and accessories , [www.avk.com.pl/cenniki.php](http://www.avk.com.pl/cenniki.php)
- 14 OSMOSE "Traditional vitrified clay in modern technology applications" – Product catalogue
- 15 Koneckie Zakłady Odlewnicze S.A. in Końskie, "Sewage cast iron" [www.kzo.pl](http://www.kzo.pl)
- 16 Sewage manholes – DIAMIR "Reliable sewage network and sewage items", [www.kaczmarek2.pl](http://www.kaczmarek2.pl)

## 2 INSTALLING AND RUNNING THE PROGRAM

## Installing and running the program

### 2.1 HARDWARE REQUIREMENTS

- Pentium IV PC (PIV D recommended)
- 2 GB RAM (4 GB recommended)
- Approximately 1GB of free HDD space for the installation
- DirectX 9.0 compatible graphics card
- Windows Vista 32/64-bit OS, Windows 7 32/64-bit or Windows 8 32/64-bit
- DVD-ROM drive

### 2.2 INSTALLING

The program installation is started automatically when the CD is inserted into the CD drive. The installation should be started manually if the Autostart function is disabled. Open the CD content (Computer/CD drive), and run the Setup.exe file from the program folder. Once the installation is started, proceed according to instructions displayed on the screen.

### 2.3 RUNNING

#### *The ArCADia software:*

The software may be started by double-clicking on the ArCADia-START program icon located on the Desktop and then selecting one of the icons on the ribbon in the sewage tab.

#### *AutoCAD or ArCADia-INTELLICAD software:*

The software may be started by double-clicking on the CAD program icon located on the Desktop and then selecting one of the icons in the **ArCADia-SEWAGE INSTALLATIONS** toolbar.

### 2.4 OPENING A PROJECT (CAD)

Any of the following file types may be opened:

- A standard DWG drawing file.
- Any of the following sample drawings supplied with the ArCADia-START or ArCADia-INTELLICAD software may be used.
- A DXF drawing exchange file.
- A DWF network transmission file.
- A DWT drawing template file.

In order to quickly access the last edited drawing choose File > <file name>. The software stores the names of the last four drawings. In order to quickly access a drawing from the Open drawing dialogue box, double-click the drawing name.



## Installing and running the program

A drawing may be opened when browsing drawings on the computer using e.g. Windows Explorer. All you need to do to open the drawing in ArCADia-START or ArCADia-INTELLICAD is to double-click the file. Miniature drawings displayed when browsing facilitate the identification of the selected drawing.

### Opening an existing drawing

#### *The ArCADia software:*

Use one of the following methods:


- Choose the Home ribbon and then in the Files logical group choose the Open button.



- Press the button and then press the Open button

#### *AutoCAD or ArCADia-INTELLICAD software:*

Use one of the following methods:

- Choose File>Open.
- On the Standard toolbar select the Open  tool.
- Write *open* and then press Enter.

#### *Common for ArCADia, AutoCAD and ArCADia-INTELLICAD software*

1. Choose the type of the file you want to open from the file type.
2. Choose the folder that contains the selected drawing.
3. Do one of the following:
  - Choose the drawing that you want to open and click Open.
  - Double-click the drawing you want to open.

If the drawing requires a password, provide the password, click OK to verify the password and then click Open again.

## 2.5 SAVING A PROJECT (CAD)

A drawing may be saved at any moment.

In order to save a drawing use one of the following methods:

#### *The ArCADia software:*

- Choose the Home ribbon and then in the Files logical group select the button Save. Press the ArCADia button and then the Save button.

#### *AutoCAD or ArCADia-INTELLICAD software:*

- On the Standard toolbar click Save.
- Choose File>Save.

## Installing and running the program

- Write *save* and then press Enter.
- Write *qsave* and then press Enter.

When you save a particular drawing for the first time, the system will display a dialogue box *Save drawing as*, which enables you to select the folder and provide the name for the drawing. You can use any name at all when saving the drawing for the first time. In order to save the same drawing under a different name later, select *File>Save as* and then type in the new name.

## 2.6 AUTOSAVE AND BACK-UP COPY

In order to avoid data loss in case of a power outage or another system error, it is necessary to save your drawing files often. The software may be configured to periodically save your drawings automatically. The *Autosave* setting determines the interval in minutes between automatic saves. The software resets this interval each time the user saves a drawing file (*feature available in ArCADia-INTELLICAD and AutoCAD*).

When the *Autosave* feature is activated, the software creates copies of the drawing. This file is automatically saved to the folder provide under *Options>Paths/Files>Temporary* file and particular the extension indicated in the *Drawing autosave file extension* (SV\$ by default).

Configuring ArCADia-INTELLICAD to automatically save drawings

1. Do one of the following:
  - Select *Tools>Options*.
  - Write *config* and then press Enter.
2. Click the *General* tab.
3. In the *Autosave* area select one of the check boxes in order to turn the *Autosave* feature on and select the autosave frequency.
4. Click OK.

## 3 WORKING WITH THE SOFTWARE

## Working with the software

### 3.1 BASIC INFORMATION ABOUT THE SOFTWARE

**ArCADia-SEWAGE INSTALLATIONS** enables designing sanitary sewage pipelines, rainwater sewage pipelines (draining rainwater from the roofs of buildings) and process waste water sewage. The user may design a sewage installation based on the type of waste water drained: grey and blackwater, rainwater from the roof (for drain pipes located in the building or when its necessary to route the outlet pipes under the building's floor surfacing) and industrial and process waste water (e.g. containing grease). The user also has the possibility to select materials that are necessary to build pipelines and other items of the installation.

Projection drawings may be created on blueprints in the format of raster or vector files. At the beginning the user determines the location of stacks for a group of recipients with the option to define offsets (penetrations under ceilings, stack ventilation method, stack connections). To do that it is necessary to input the thickness of the ceilings, level height (during work on blueprints created in the **ArCADia-ARCHITECTURE** software the building geometry data will be generated automatically). The software also enables defining casing pipes going through a ceiling and fire penetrations.

In the subsequent stages of the design process it is necessary to determine characteristic parameters for all the sewage recipients, i.e. the design sewage factors (which depend on selecting the system for the sanitary installation) and minimum sewage diameters.

In case of a rainwater and industrial waste water sewage installation the drained volumes will be entered by the user based on the discharge parameters of the process equipment.

The user may design a connection between the devices and the stack and based on that connection define the hydraulic loads, which will in turn enable determining the stack diameter.

The next step is to draw the route of underfloor sewage pipelines in the projections. In order to graphically differentiate the pipelines the user may employ different line formats. When drawing a sewage section the flow volume is calculated based on the number of devices discharging waste water to the particular section. The user may define the manner of connecting the sections (three-way fitting accounting for the connection angle, connection well).

The software enables defining items in horizontal sections (cleanouts, inspection openings, wells, separators, storm flaps and backdrops).

Based on the pre-determined slopes, diameters and the data on strip footing and other facilities in the network, the software will generate a longitudinal profile of the installation. It is possible to define additional parameters in a generated profile, i.e. pipe slope or diameter, which will be included in the general sewage model.

A stack extension will be generated based on the information about the number of devices connected to a stack and the sewage system. It will be possible to introduce certain modifications (especially to modify the sequence of connections).

Once the calculations are carried out and diameters are selected, the designer may introduce additional corrections and repeat the calculations. Should the designer make an error, the software will automatically generate a warning and provide limit parameters.

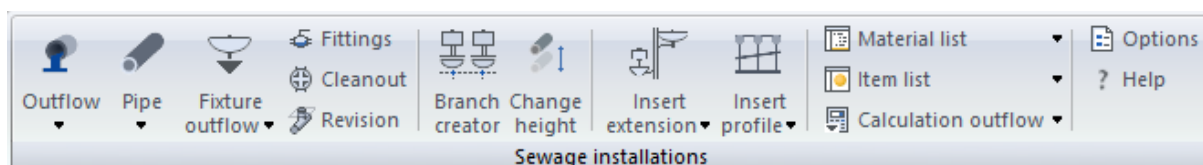
## Working with the software

After the entire sewage installation is designed and the project validity is verified, the user may generate a calculation report along with a material list.

The report casings hydraulic calculations for stacks and outlet sections. The entire pipeline and all the items along with the characteristic parameters are included in the material lists.

### 3.2 SOFTWARE ITEM DESCRIPTION

Features of the ArCADia-START toolbar for AutoCAD or ArCADia-INTELLICAD (column I) and the ArCADia (column II) ribbons:



*(Drop-down buttons)* includes more than one command

Fig. 1. The ArCADia-SEWAGE INSTALLATIONS tool ribbon (*ArCADia software*)

































Fig. 2. ArCADia-SEWAGE INSTALLATIONS toolbar  
(*AutoCAD or ArCADia-INTELLICAD software*)

Tab. 1. Functions of the ArCADia-SEWAGE INSTALLATIONS toolbar

I	II	Option	Description
		Show/Hide Project Manager	Displays or hides the level management window. This feature is available in the <b>View</b> tab in the <b>Show/Hide</b> logical group
		Show options	Enables settings the basic drawing options. This feature is available in the <b>Home</b> tab in the <b>Modules</b> logical group,
		Insert outflow point for a sewage line	Enables defining the waste water outflow site, type of sewage line based on the type of waste water and the relative drain location altitude.
		Insert internal sewage pipe*	Inserts a pipeline section with the option to determine relative altitudes and determine the function for the pipeline.
		Insert internal sewage pipe with a continuous route	Inserts a set of sewage pipes with descriptions
		Insert vertical internal sewage pipe	Enables inserting a vertical pipe section with a particular function (defining a stack) and defining the parameters

## Working with the software

		Insert connection and inspection well	Inserts the connection well item with a description and parameters
		Insert outflow point for a sanitary fixture	Defines the sewage outflow from a sanitary fixture into the sewage installation pipes, especially the location, installation height, diameter.
		Insert outlet pipeline fitting	Inserts stop and shut-off fittings (e.g. backwater valve) along with a description, parameters and housing
		Insert cleanout	Inserts the cleanout item along with a description and parameters
		Insert inspection opening	Inserts an inspection opening along with description, parameters and housing, with the option to select a pipeline
		Insert vent	Inserts a vent in the sewage stack in the form of a soil vent or a vacuum relief valve
		Insert inside drain	Inserts an inside drain in the rainwater pipeline
		Inserting branch lines for sanitary fixtures	Enables defining group branch lines from a stack to sanitary fixtures. Activates the branch lines organization configurator.
		Change installation height	Enables changing the height of a sewage installation item group by the selected value
		Insert sewage installation extension	Enables generating an extension of the internal sewage installation
		Insert sewage installation branch extension	Enables generating an extension of the selected sewage installation part
		Insert sewage profile*	Enables generating a profile for the internal sewage outlets
		Create an internal sewage profile	Enables defining the organisation of side profiles from the main profile
		Insert material list*	Inserts a material lists table into the drawing
		Insert material list from selected elements	Insert material list from installation elements selected on the projection
		Insert item list	Inserts an item list of the sewage installation along with the graphical symbols, names, markings and quantity
		Insert selected elements list	Inserts the list of the installation elements selected on the projection
		Sewage installation verification	Generates a list of items that have been designed with errors. Identifies pipe sections with the wrong functions in the sewage line
		Determine diameters of outlet lines*	Displays the calculation tables and generates a report presenting the technical calculations and the validity of the designed sewage installation of outlet pipelines. Generates calculation reports.
		Selection of sewage stacks	Enables the designer to easily verify whether sewage stacks were correctly selected. Generates calculation reports.
		Project options	Displays project options

## Working with the software

		Show help	Displays the software help contents
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\* Icons marked with this triangle are extendible icons that have more than one command

### 3.2.1 General software options

#### The ArCADia software:

After clicking the icon: The **System** ribbon ⇒ **Options** logical group ⇒  displays a dialogue box with the general options of ArCADia.

#### AutoCAD or ArCADia-INTELLICAD software:

After clicking the icon: **Architecture** ⇒  toolbar

or input `ISA_O`

This window includes the tabs of the available ArCADia software.

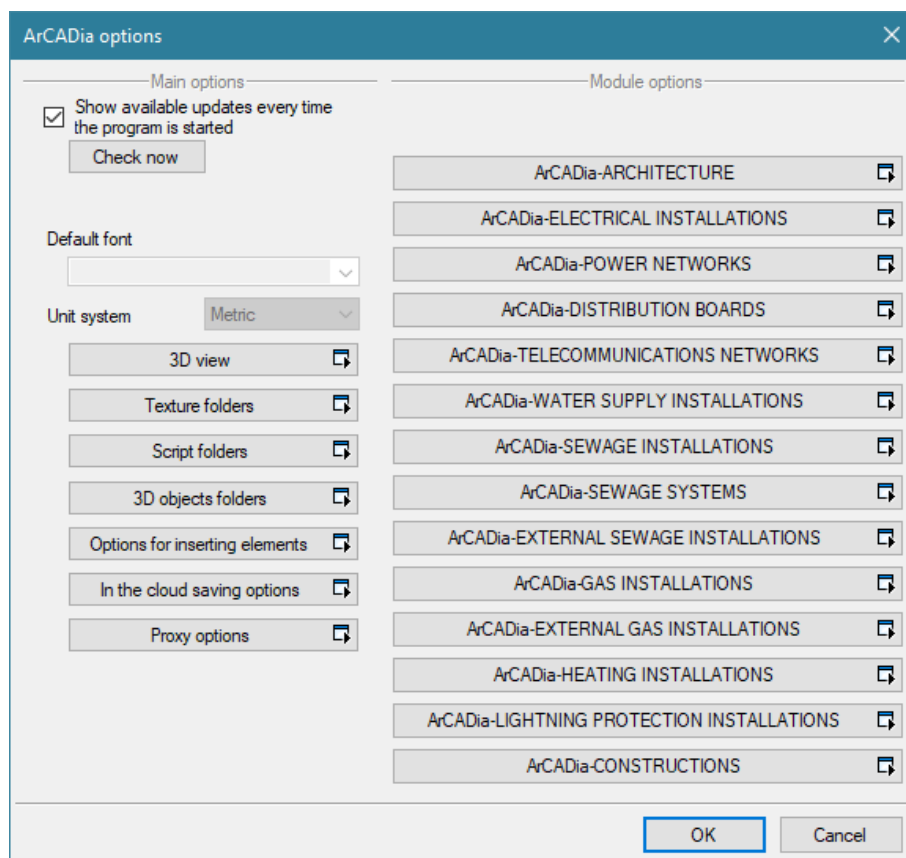


Fig. 3. ArCADia system options window

On the left side of the options window the last button is **Options for inserting elements**. After clicking on that button the following window appears:

## Working with the software

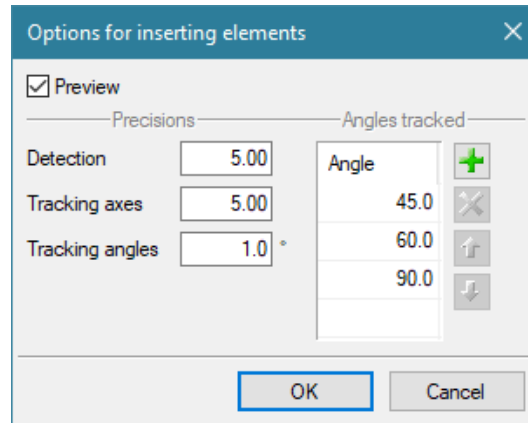







Fig. 4. Tracking options window

On the left side the user may define how precisely (maximum distance from the element axis which will allow for detection) will the elements, axes and angles be detected while element axis  and angles  tracking is enabled and elements detection  is enabled.

Angles tracked may be inserted on the right side of the window. In the table the user may add, using the  button, another angle that he wants to be tracked when entering elements. If the user wants to delete one of the angles, he needs to select it by clicking it in the table and then delete one of the values using the  button on the right.

After defining the detection and tracking precision, the number of angles tracked and their values, the user may confirm changes using the **OK** button (changes will be saved in the software) or discard them using the **Cancel** button (all changes done in the in the tracking options window will be canceled).

The project options window is displayed after selecting the **ArCADia-SEWAGE INSTALLATIONS** tab.



## Working with the software

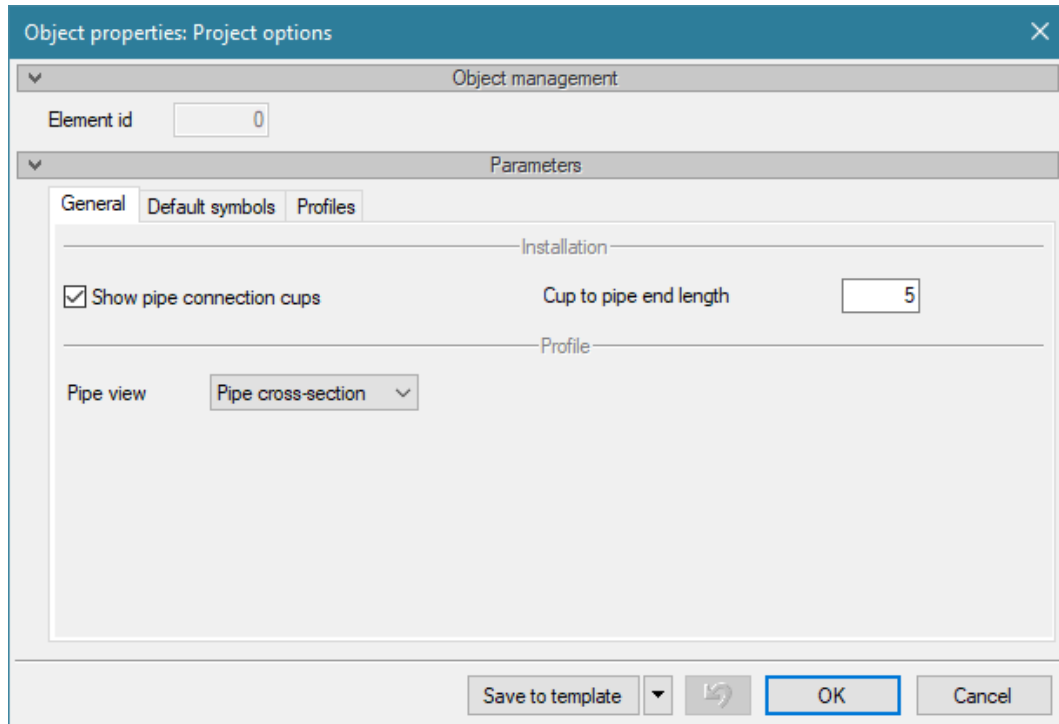


Fig. 5. Software option window: General tab

In this window the user may change the general software settings relating to the design of sewage installations:

### Parameters control group

#### Installation

The **Show pipe connection cups** option enables the visualisation of connection cup symbols.

**Cup to pipe end distance** enables setting the distance between the symbols and the connection point.

#### Profile

**Pipe view** – this feature provides the possibility of defining a global setting for the entire project, and the view of the pipelines in the profile. When selecting the **Pipe bottom** item the pipeline view in the profile will be generated with a single line symbolizing the pipeline bottom.

After selecting the **Pipe cross-section with axis** feature a view of the pipeline cross-section along with the pipe axis will be generated. The third feature is the cross-section without an axis, where the pipeline will be drawn symbolically as the channel's **Pipe cross-section**. The view creation feature is also available for each pipe section individually in the generated profile by double-clicking the pipe and changing the view settings for the particular section only.

## Working with the software

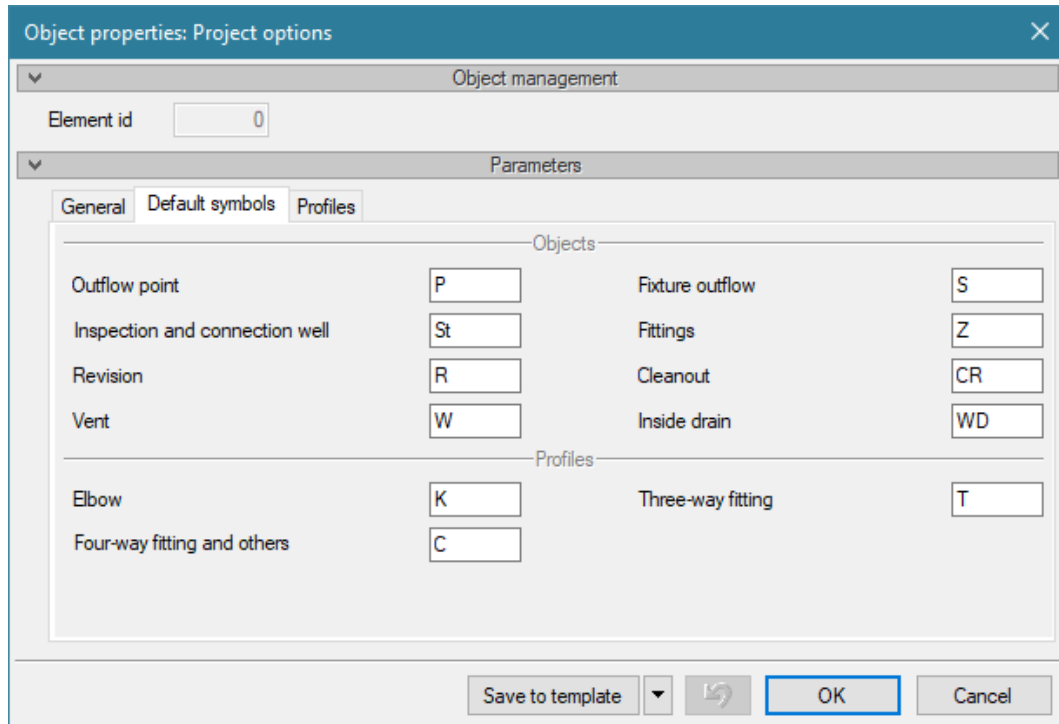


Fig. 6. Software option window: Symbols tab

Project options tab – **Default symbols****Items**

The user has the option to skip or introduce his own markings for the sewage installation items. The inserted markings will be inserted automatically when inserting items. The user may change the symbol for the particular item type individually for each item. The symbols will be inserted in the projection and in other views, e.g. extension, profile.

**Fittings**

As above, the user has the option of inserting a fitting item. The difference consists in the fact that the fitting is not an item inserted by the user, but only modified. A symbol is created at the same time when pipelines are connected as a set of fittings, with the symbol being determined for the main fitting, in this case for the elbows, three-way fittings and four-way fittings. Connections creating calculation points and characteristic points in the views such as the profile.

## Working with the software

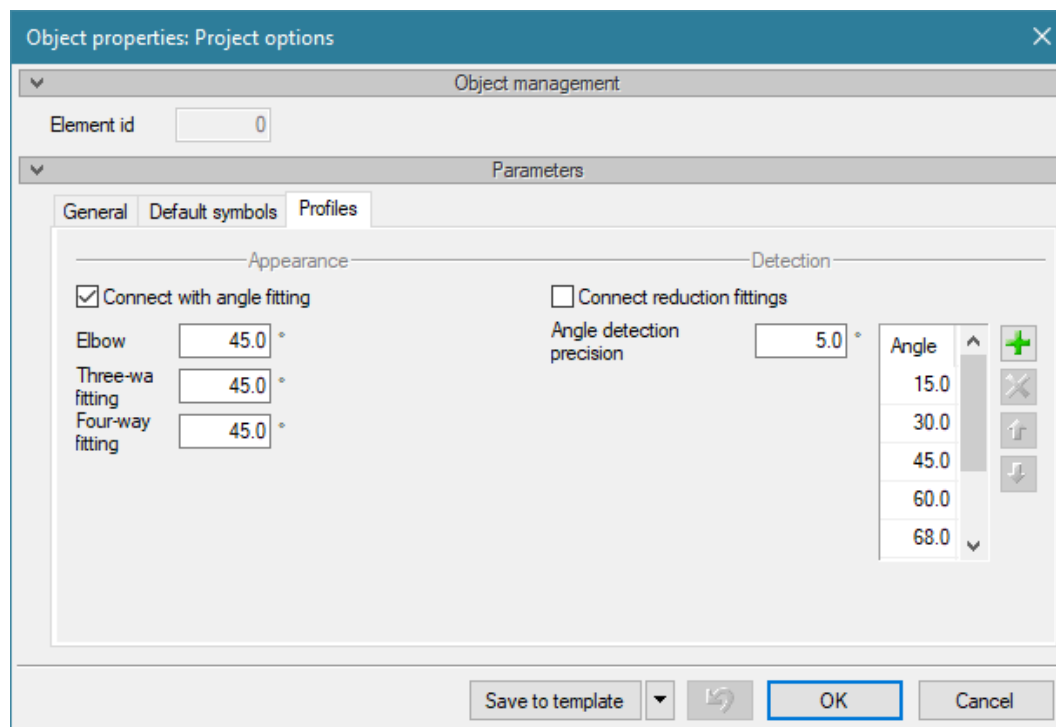


Fig. 7. Software option window: Fittings

The project options **Fittings** tab is used for selecting and/or changing the default settings for the connections (Fittings) created in the project when inserting the route of a sewage installation.

**Appearance**

**Connect with angle fitting** – used for changing the automatic creation of connections between pipelines in the form of angle fittings. If the user introduces an installation route with the IntelliCAD or AutoCAD [Ortho](#) feature (inserting at a 90° angle or without it, however on condition of inserting at a straight angle in relation to the existing pipeline), they have the possibility to automatically detect and insert angle connection fittings i.e. 45° elbow or 60° three-way fitting. In order to have such connections created automatically upon insertion you need to tick the check box located on the left at the **Connect with angle fitting** headline.

Below that the user will be able to define what default connections are to be created depending on the number of pipes being connected, that is the type of the fitting. In the case of three-way fittings the branch angle in relation to the pass-through and in the case of three-way fittings – the angle of both branches.

**Note!** In each fitting (Fittings set) you can individually change the default settings and introduce the necessary angle or completely disable the angle fittings insertion feature.

If the user does not tick the Connect with angle fitting check box, the connections will be done in the form of resulting fittings with free branch angles generated at the moment of connecting pipelines. You can therefore obtain a 57° three-way fitting, which gives the option of inserting fittings that are rarely used or custom-made.

## Working with the software

### Detection

**Connect into reduction fittings** – this feature allows setting the default connections executed in the form of reduction fittings (check box ticked) or a fitting and a reduction item (check box unticked). This means that by default the user will have e.g. a DN100/Dn50 three-way reduction fitting or a DN100 three-way fitting and a DN50 reduction, whereas the remaining parameters, such as the angle and material of the fitting depend on the other settings and parameters of the pipelines introduced into the project.

**Angle detection precision and angle list** – this feature allows determining to which connection angles a pipe connection without the connect with angle fitting feature should be reduced.



Example:

A user unticks the connect with angle fitting feature, e.g. when the installation route is not plotted using the ortho feature (straight angle) and wants the connections to be created automatically, however with reference to the products existing in the market and not depending on what is the precision setting used for inserting pipelines into the project. Then the connection at any angle will be reduced to the angle provided in the detected angles list. Detection can be reduced to the appropriate number of degrees. Same as in the settings from REF \_Ref354433293 \r \h Fig., the connection of two pipes at a 28°32' angle will be listed as a 30° elbow (5° detection).

If in the case of the above example set of typical angles the users sets 2 ° in the "Angle detection precision" field, then:

- angles in the range of 28 – 32° will be treated as 30°
- angles in the range of 43 – 47° will be treated as 45°
- angles in the range of 58 – 62° will be treated as 60°
- angles in the range of 88 – 92° will be treated as 90°

This facilitates the quick insertion of an installation route with low precision, e.g. for the purposes of a material list or creating a simplified bill of values.

Adding subsequent items is possible after pressing  and items may be removed after clicking the particular item with an angle provided and clicking .

## 4 DESCRIBING AND EDITING ITEMS

## Describing and editing items

### 4.1 PRELIMINARY NOTES ON ITEM EDITING

Editing each item consists in inserting an item symbol to the blueprint. The software offers two types of items divided due to the definition of their characteristic geometric real dimensions, i.e. : items that require geometrical parameters to be defined and items that are only reflected as graphical symbols, without defining their real dimensions.

The item symbol includes information about the characteristic parameters, i.e. technical, process and geometric parameters of the item (if required), which are necessary to execute supplementary drawings, calculations and verify their validity.

An item is inserted in the model by selecting the appropriate icon from the software toolbar Fig. 1. The item insertion window appears. The window for each item enables selecting the item location by defining a handle in the contour or the item's characteristic point and enables spatial localization (etc. Installation level of the selected characteristic item).

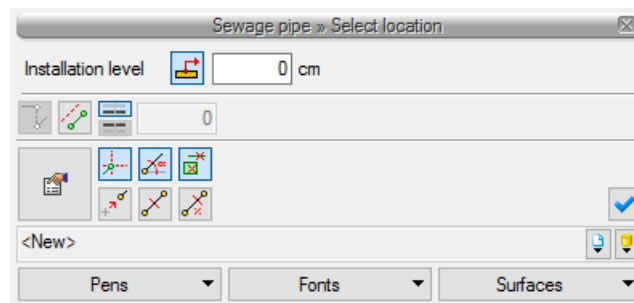






Fig. 8. Element insert window: Sewage pipe


Icon	Description
	Import for element
	Parallel offset
	Offset direction
	Insert vertical section
	Tracking axes
	Tracking angles
	Element and section detection
	Reference
	Between points (center)

## Describing and editing items

	Between points (percentage)
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By selecting the **Import from item**  button the user may insert an item connecting it at the appropriate characteristic point for the particular item with the connecting items of another item that has already been inserted into the drawing.


The window also includes options that facilitate accurate insertion of the item. These features are activated by pressing the appropriate buttons for tracking  or detection  of other items already included in the drawing.

Pressing  allows drawing vertical sections of the installation without deactivating the horizontal pipe insertion command.

There are two ways to insert an item into a drawing:

## Method #1.

After selecting the appropriate icon from the **ArCADia-SEWAGE INSTALLATIONS** (Fig. 1) toolbar, an item insertion window will appear. When it appears, the user can edit the item's parameters by

selecting the button  which corresponds to the **Item properties** in the item insertion window.

After that, the Item properties window will appear, allowing the user to change the item characteristic parameters. After changing the settings, press the OK confirmation button which will bring you back to the item insertion window and click with the hooked item symbol in a chosen place on the drawing field. Such an item insertion procedure ensures that the parameter settings and fonts, pens and areas are saved for each subsequent item of the same group.

## Method #2

After selecting the appropriate icon ( REF\_Ref354132933 \r \h Fig.), insert the item symbol using the item localization feature. Next select the item, which will display a toolbar that allows modifications.

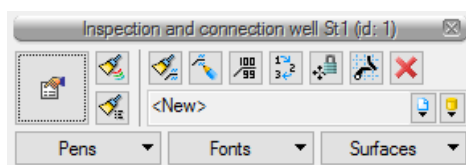
















Fig. 9. Item modification selection toolbar

Icon	Description
	Go to properties dialog
	Fonts and pen painter

## Describing and editing items

	Type painter
	Description painter
	Edit description
	Set description on the link
	Create actual view
	Object renumbering
	Lengthen/shorten pipe maintaining slope
	Move with connections
	Move without connections
	Delete marked objects
	Project library / Global library

You can edit the item's parameters by selecting the  button. Once the parameters are set in the Item properties window, you can press the OK confirmation button, which will change the parameters of the previously inserted item.

The **Item properties** windows are used to set the characteristic, geometric and technical parameters of an item and are divided into control groups for every item:

Control group – Item management

**Symbol – setting the name** displayed on a projection along with the item's subsequent number. If the user does not implement any change in the active window, the name will be generated from the **Options** window.

**Item id** – the number of the subsequent inserted item of a particular type

**Type** – Allows the user to insert items with shared parameters into the project library and the global library.

**Group** – common for every item. Allows the user to group selected items and transferring them to the Project Manager.



## Describing and editing items

**NOTE!** It is very important that the division into groups includes all the items and using default groups the user can define the purpose for a particular sewage installation (sanitary blackwater or greywater drainage, rainwater drainage or process drainage). While drawing the first item, the user will assign it to an appropriate group and the next item of that type will automatically be drawn in this group.

### Appearance control group

The set of controls included in this group is the same (or very similar) for all domain items included in the software.

**Description appearance** – allows to start the description content settings configurator and its organization. The user decides whether a description will appear on a projection by marking the **Description on projection** check box.

**Angle** – by changing the value in the editing field, the user can change the angle at which an item will be inserted.

**Pens** – setting the thickness, contour drawing lines on a model and 3D view.

**Fonts** – setting the font format for the name displayed in drawing projections.

**Surfaces** – setting the colours and patterns of the surfaces visible in 3D.

## Describing and editing items

Fig. 10. Item properties window – General appearance

**Parameters control group**

Individual controls set for each item. Allows the user to set the defining installation parameters, for example the item location, its functions, elevation etc.

**Type parameters control group**

Individual controls set for each item. Allows the user to set the parameters that specify a particular item etc.: technical or geometric parameters (diameter, material etc.).

**Approve (save/cancel) control group**

Fig. 11. Save/cancel buttons

## Describing and editing items

**Save in a template** – allows the user to save the default for a particular template of a particular item type.



– the button allowing the user to restore the default settings for a particular type.

**OK** – approve and implement changes.

**Cancel** – delete changes and return to the previous window.

Once the check box on the left side in the **Appearance** control group is selected (ticked), the Description button becomes active and once it is pressed, the description appearance configurator window appears.

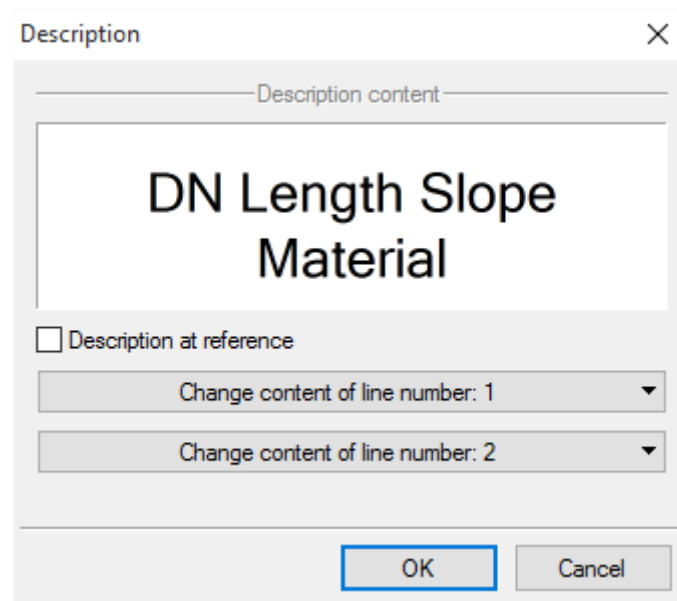


Fig. 12. Description configurator – main window view

In this window the user may set the technical contents of the description components (different for the particular item) and their sequence of placement and localization in relation to the description line.

After pressing the appropriate (upper or lower) line content button, an additional window is activated where you can select the appropriate layout and contents Fig. 7 (example of setting the bottom line for a pipeline description).

## Describing and editing items

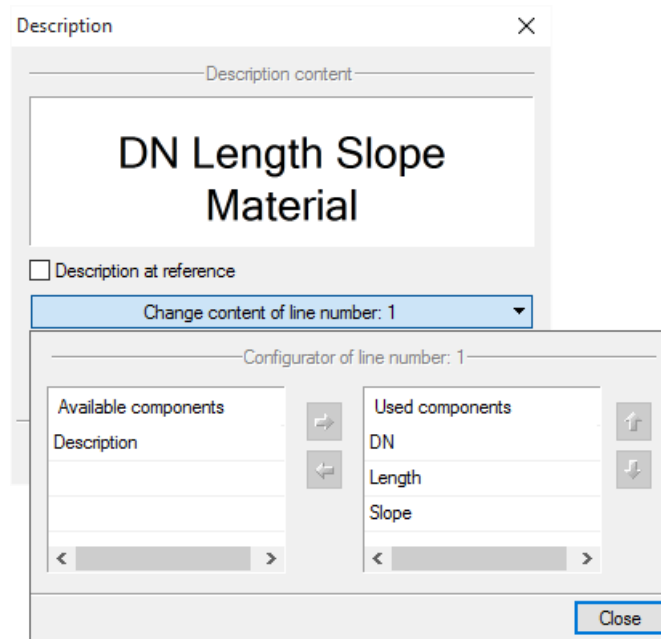



Fig. 13. Description configurator – settings window view

There are two tables in the description configurator window: on the left side there are the available components and on the right side there are the contents of the particular line. The availability of components for a particular line depends on introducing them into an inactive line. Inserting a description on the selected line consists in selecting the description name and pressing the arrow towards the line description content table. The selected description title will be transferred and therefore won't be available in the Available components table. Should the user wish to share the component, he needs to act in a similar manner, marking the description components in the line content table and then use the arrow to transfer these to the available components table.

The sequence of description components in a particular line is set from left to right as per the top-down sequence in the line contents table. You can change the sequence by marking a component in the line contents table and controlling the sequence change buttons, which causes the sequence of the particular component to be changed by one field. Each use of the arrow moves the item one field up or down. After pressing the Close button the changes will be applied.

**NOTE:** If we select several pipelines with different descriptions (the square next to the description will be filled blue), we will have the possibility to change the description for every pipeline simultaneously. In that situation, the description configurator will set an empty description in the link. Click the description control and set the appropriate description components.

By clicking the  **Edit description** button on the item modification toolbar (Figure 5), you can open the item description editor. The description editor window will become available (Figure 8a)

## Describing and editing items

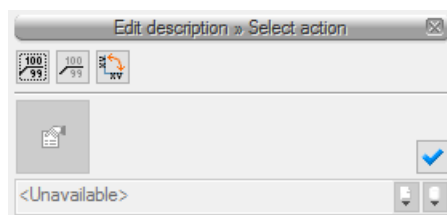






Fig. 14. Description editor window

Icon	Description
	Enable/disable description
	Enable/disable link
	Change direction

To export description settings from an item, you should choose the  **Description painter** button on the item modification toolbar (Figure 5). A window will appear where the user can select which description parameters will be transferred ("painted") onto another item's description by unticking an appropriate check box.

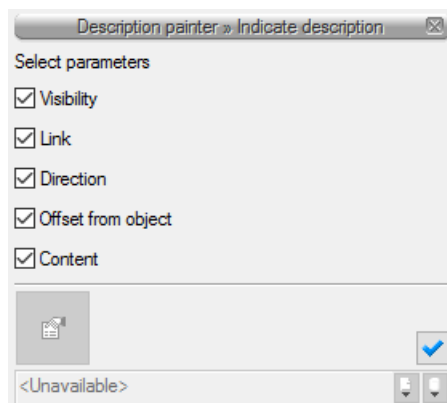


Fig. 15. Description painter selection window

The available parameters include:

**Visibility** – transfers the enabled/disabled description settings


**Link** – transfers the description settings with/without a link

**Direction** – transfers the vertical/horizontal description settings

**Offset from object** – transfers the description position settings in relation to the item onto a subsequent item

**Content** – transfers the description lines content set in the description configurator

## Describing and editing items

In order to renumber installation items, you should press the  **Object renumbering** button on the item modification toolbar. A renumbering window will appear. In this window you can set:

- The symbol of an item from which you want to begin the renumbering
- Manner of renumbering: after unticking the field items will be numbered from the digit symbol up, when the increase field is ticked, the software will assign the same symbol to all items of a particular type
- Automatic renumbering
- Direction: from which corner of the document the renumbering process should start and if it "goes" vertically or horizontally
- Range: renumbering items in the whole building or only on the active level

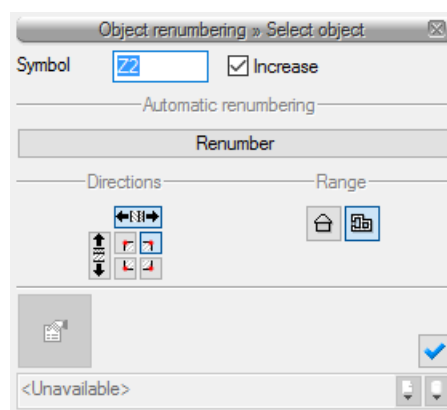



Fig. 16. Item renumbering window

"Sticking" items, i.e. fittings, is a very useful additional feature to be used during the design process. An inspection opening or a cleanout for the pipeline onto which it is inserted. This means that every change in the length or slope of the pipeline will automatically force the item to change the installation level and position on the projection. Obviously, inserting each item independently, i.e. not connecting it to a particular pipeline, is possible. This option comes in handy while installing a fitting on an already existing installation in an already existing project (modernized item).

**Note!** The feature of connecting fittings with a pipeline is a new feature and it's available in the ArCADia-SEWAGE INSTALLATIONS module.

## 4.2 EDITING AND INTRODUCING TYPES

*The ArCADia software:*

After clicking the icon: **System** ribbon ⇒ **Libraries** ⇒  logical group

*AutoCAD or ArCADia-INTELLICAD software:*

After clicking the icon: **Architecture** ⇒  toolbar

## Describing and editing items

or input *ISA\_ETL*

**The Type library editor** is used to edit and introduce new item types into ArCADia. It facilitates access to manufacturer's catalogues and enables selecting only those catalogues that the user uses most often when designing. Additionally, types are divided into a Standard library (i.e. the library provided with a given software version) and a User library, where all the new or user modified element types are saved.

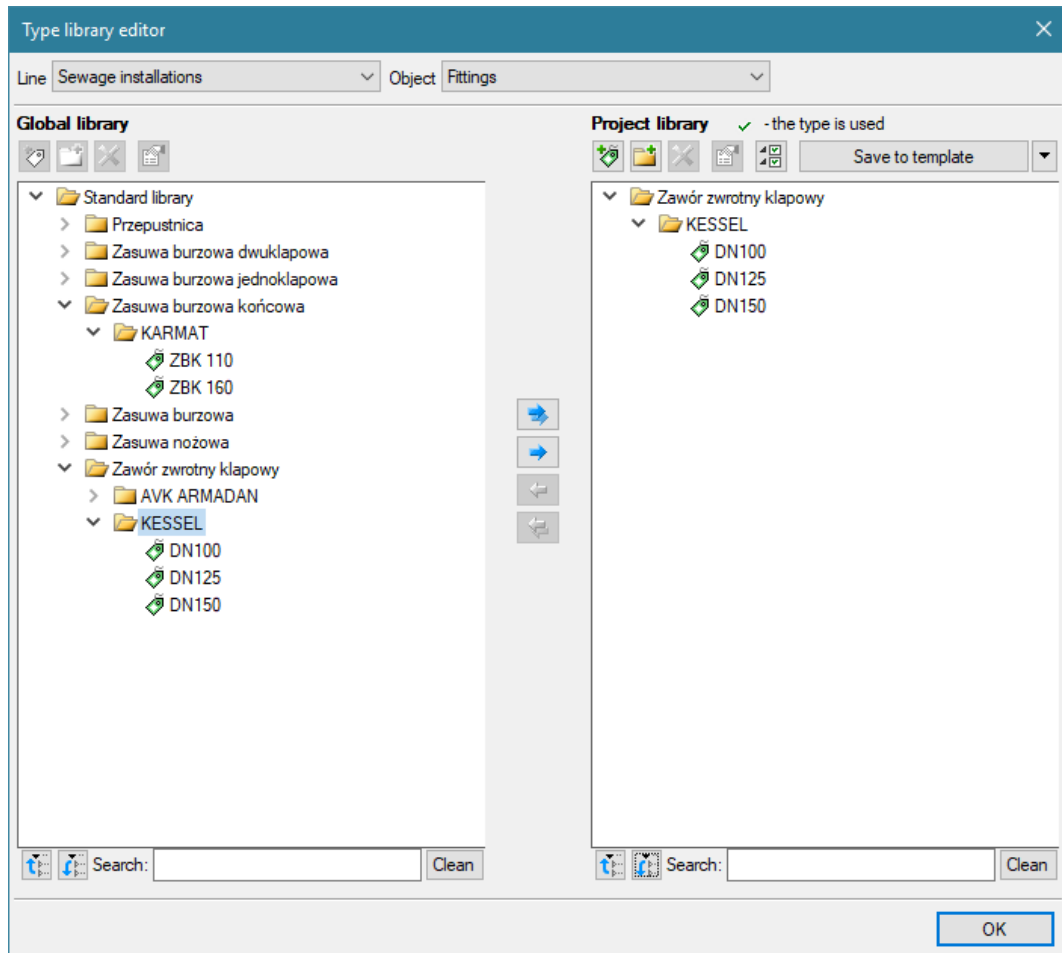
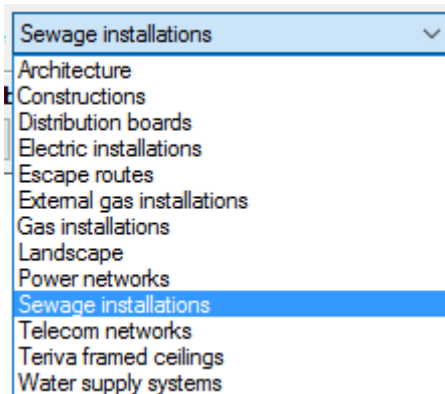


Fig. 17. Type editor window

In the upper part of the type editor (Fig. 17) window the user has the possibility to select a branch from the drop-down list where all the branch-modules available in ArCADia are listed.



## Describing and editing items

Fig. 18. View of the expanded list of branches available in ArCADia

After selecting the appropriate branch the user has access to all the items, e.g. sewage pipe, available in the selected branch (module) from the Items drop-down list (on the right side).

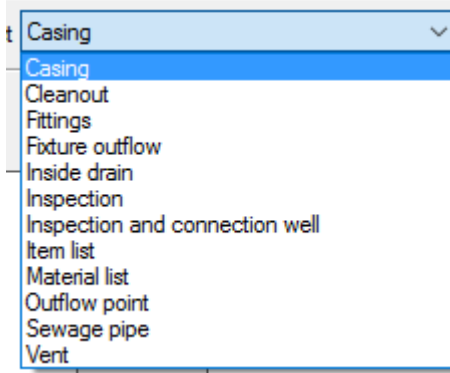


Fig. 19. View of the expanded list of branches available in ArCADia

After clicking on the selected item in the **Global library** all item types will be available. During the first run it will be the types available in the software by default. Additional types can be added to the libraries during the design process.

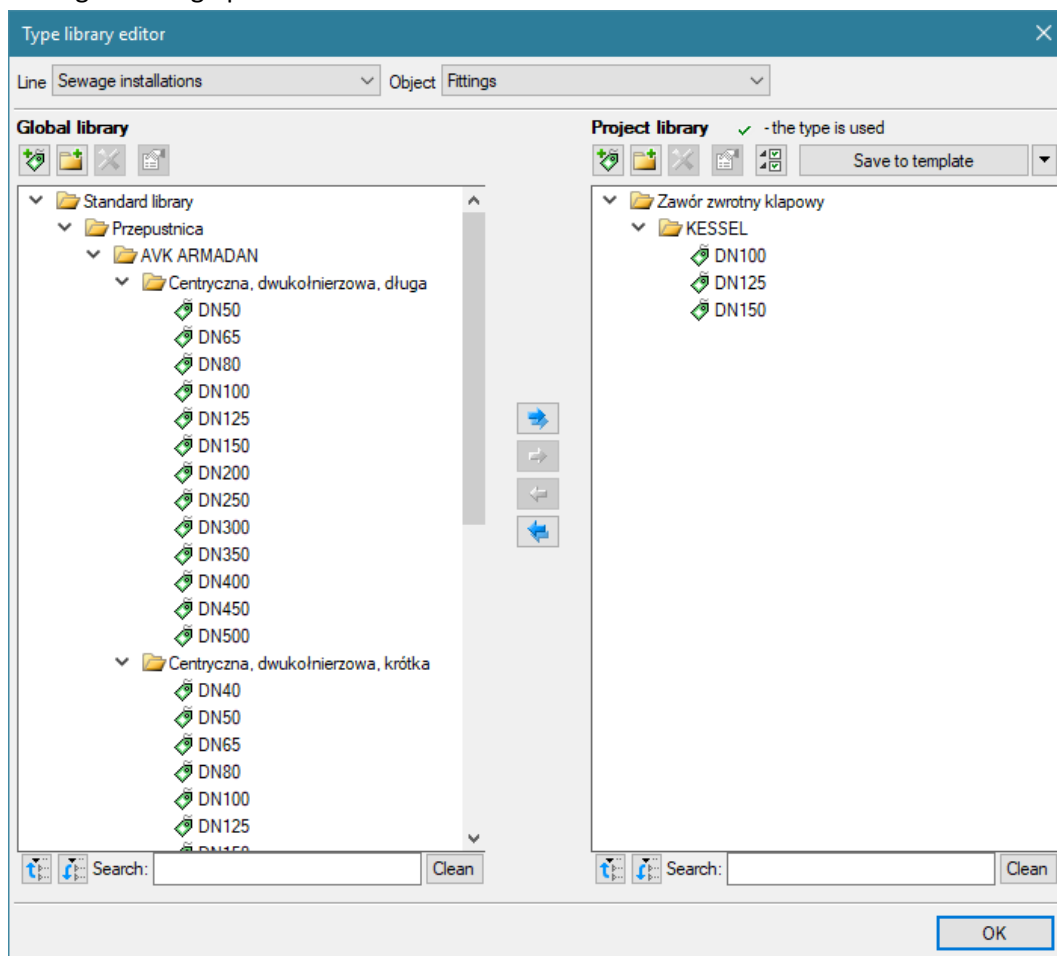


Fig. 20. Types library editor window after selecting the appropriate branch and one of its items



## Describing and editing items

Lower part of the editor window is divided into the **Global Library** page (left) and **Design Library** page (right).

The **Global library** is the place where all the default element types available for the user and the elements added when working with the software are added; it is divided into the Standard library (a library provided with a given version of the software, which the user does not change) and a User library, which contains elements (types) saved by the user when working with the software.

**Project library** – where all the element types used or available for use in the project are listed. A type for an element can be selected from the Element properties window:

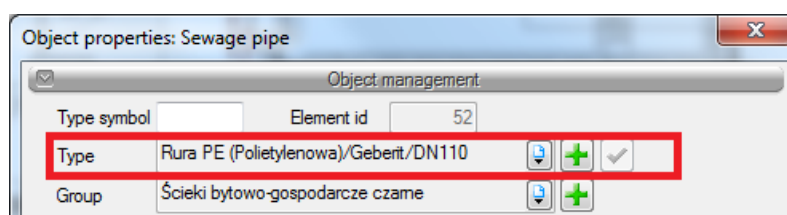


Fig. 21. Type entry point from the item properties level

as well as in the modification and insertion windows

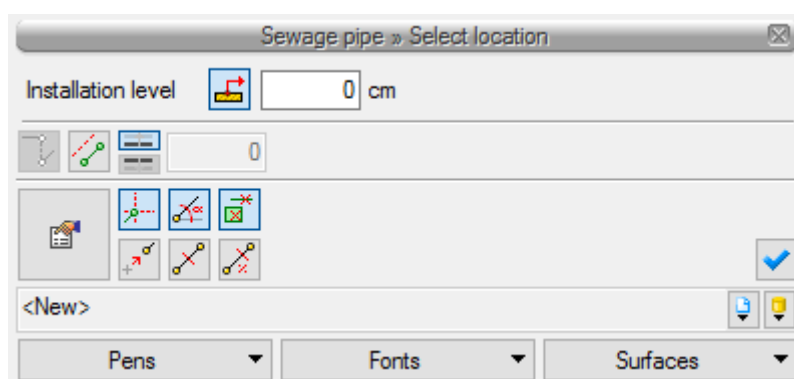




Fig. 22. Type entry point from the item modification and insertion window level

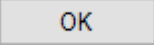
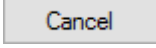
Above the type library windows there are icons with the following functions:

**Add new type**  – after clicking this icon the user has the possibility to add a new type to the **Global library** or the Project library. Type properties for the particular item, where the user may determine all the parameters of the item that are characteristic for it are, among others, the type parameters, view.

**Note!!!** Clicking the **Add new type** icon when a type has been previously highlighted in the Library will add a new type based on the highlighted one. This facilitates the input of a catalogue of items to the library, e.g. supplied by one company, where the only distinctive feature is e.g. the diameter of the pipe.

**Add new folder**  – after clicking this icon the user has the possibility to add a new folder, where he can then later add item types. A folder name input window will appear. After entering the folder

## Describing and editing items

name you need to press the  button in order to add the folder to the library or  to cancel the command.

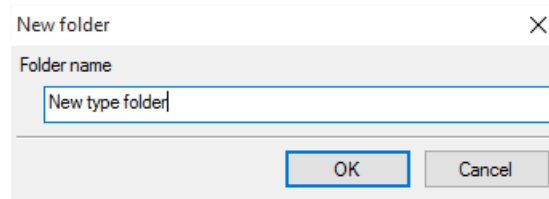





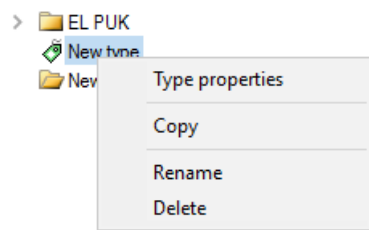
Fig. 23. Folder types insertion window

**Delete**  – after clicking this icon the user may delete the selected type or folder.

**Type properties**  – after clicking this icon the user will have access to the properties of the selected type. He can edit and save these values here.

**Leave only the types used in the project**  – after clicking this icon in the Project library, only the types used in the project (used in any object in the project) will remain visible.

After clicking a type with the right mouse button, a menu becomes available:



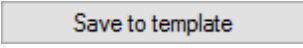

**Type properties** – works the same as the icon described above.

**Copy** – copies the type.

**Paste** – pastes a previously copied type and inserts it with the same name and subsequent number.

**Rename** – the user may rename an already inserted type.

**Delete** – works the same as the icon described above.

Above the project library there is the  button. Once you click this button the **Project library** settings will be saved in the template and will be accessible for future projects with this template. After clicking the  icon placed next to it the user obtains a list of available templates.

## Describing and editing items

Type properties for the element: Sewage pipe

Appearance

Type name  
DN110

Type parameters

Material: PVC

Standard/Manufacturer: GAMRAT

Type/Series of type: SDR 34 - SN8

Outside diameter: 110.0 mm Wall thickness: 3.20 mm

Diameter DN: 110.0 mm Friction factor: 0.0130 s m<sup>-1/3</sup>

Additional description: (kielichowa)

OK Cancel

Fig. 24. Example Properties window

In the **Project library** window you can also check what types of a particular item are currently in use in the projection, which is displayed in the form of the ✓ symbol on the left of the name of a particular type.

## Describing and editing items

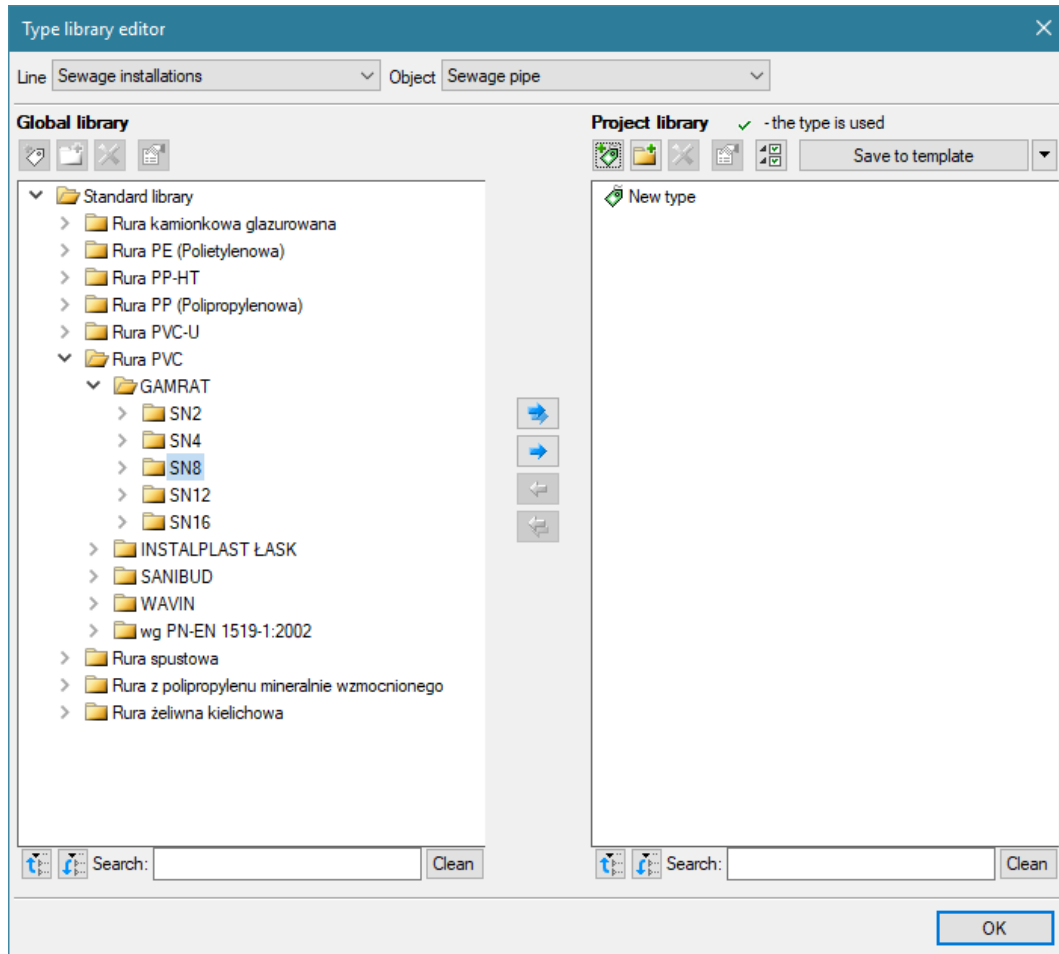





Fig. 25. Type library editor window after saving a type in the project library


Below the two libraries there are the **Hide everything**  icons – once you click this icon the type tree in a particular library is reduced to the root folders.


The user may also search the type library by typing part or the entire name of the desired type in the **Search:**  field. The search field will be cleared after clicking the **Clean** button.

Once you select types or folders, the transfer buttons located between the libraries are activated.

**Copy all to the project library**  – copies the entire global library content to the project library.

**Copy to the project library**  – copies the selected items to the project library.

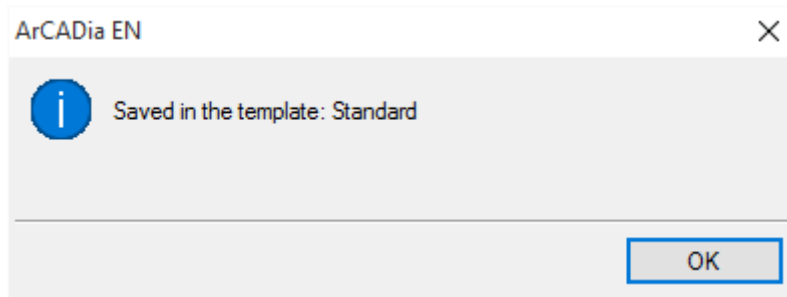
**Copy to the global library**  – copies the selected items to the global library.

**Copy all to the global library**  – copies the entire project library content of the selected item to the global library.

Messages that may be displayed when working with the **Type library editor**:

1. This message informs that there is already a type with this name. After clicking the **OK**  information from the new type will be saved and will overwrite the information in the previous type.

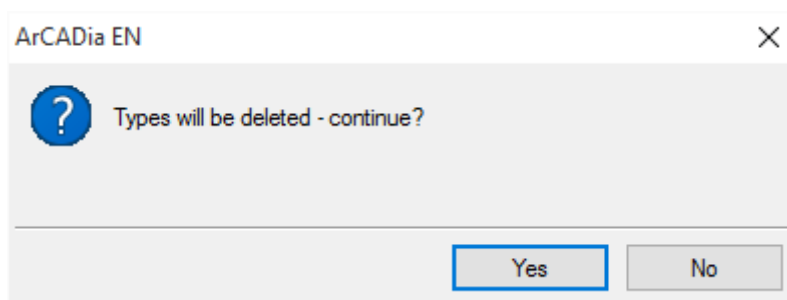
## Describing and editing items



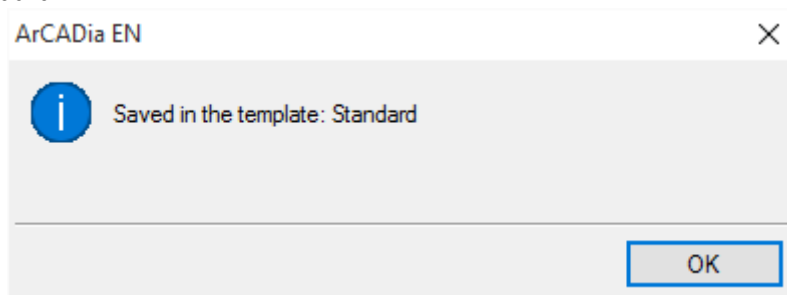
2. This message informs that the types marked by the user were removed. The

A small rectangular button with the text 'OK' inside, highlighted with a blue border.

button confirms type deletion.



3. This message informs that the layout of the project library was saved to a project template, e.g. Standard.




NOTE! If the user has made any changes in the Project library while working with the project, modified existing types or expanded the library by adding new types, the new types will become available for future projects. The user should add the new types to the Global library using the transfer buttons.

## Describing and editing items

## 4.3 OUTFLOW POINT FOR A SEWAGE LINE

The **Outflow point for a sewage line** item is inserted to the model once the icon is selected;

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒  Outflow

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒ toolbar   
or input ISWR\_OP

An item insertion window is displayed. The item is the virtual point to which the sewage from a particular sewage (system) section is drained. The point is usually located outside the building.

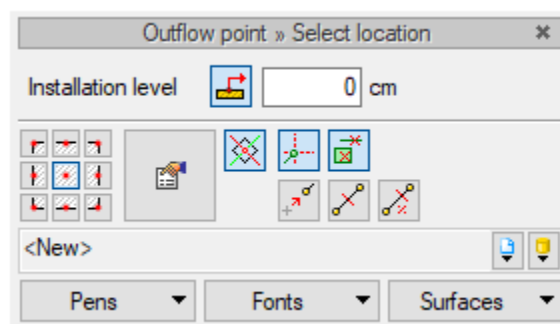





Fig. 26. Settings window for the outflow point of the sewage line.

The connection point symbolizes and defines the manner of connecting the designed outlet sewage pipeline along with the sewage receiving installation.

The window allows the user to set the appropriate insertion position for the point of connection by:

- Having the user select an anchor on the contour or the middle point of the symbol.
- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- Setting the installation level settings (nesting) in relation to the level where the item is drawn – pressing the **Import from item**  button allows adjusting the axis depth to the previously drawn item (e.g. pipe). A minus sign means inserting the pipeline below the surface of the active level.

The window also allows the user to use the software's libraries. The user can select an exemplary type of connection fitting used in the project from the drop-down list of a particular library.

When the connection point insertion window is active, a conventional marking of the particular connection point appears in the model's drawing field (projection). Clicking a chosen spot inside the drawing area inserts a designation symbolising the item. The marking on a projection of this item does not have the actual dimensions and is meant solely for demonstrative purposes. Setting the size (if the marking is supposed to be more or less visible, the user has to change its size in the options window by configuring his own symbols scale). After selecting the symbol in the projection, the software will display an item modification window.

## Describing and editing items

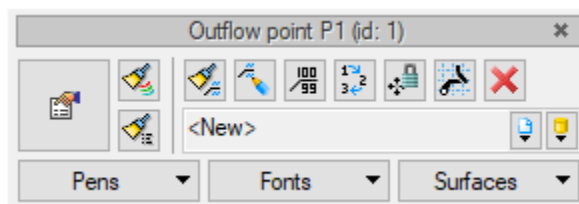



Fig. 27. Modification window for the sewage line outflow point item

By selecting the button  or double-clicking on the inserted item the sewage line outflow point properties editing window appears.

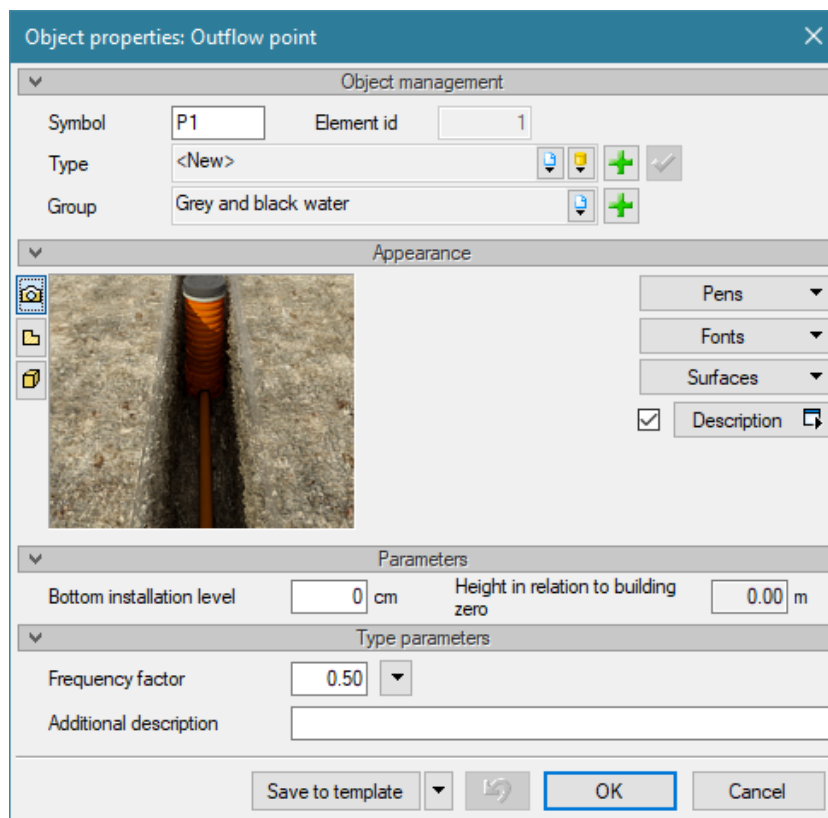


Fig. 28. Item properties window – sewage line outflow point

**Parameters control group.**

Setting the installation and process parameters of the sewage line outflow point:

**Bottom installation level** – the user inputs the value of the required vertical distance in relation to the floor surface in the active level

**Ordinate in relation to building zero level** – the relative ordinate is published in the window

**Type parameters control group****Frequency factor**

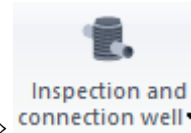
In this part the user chooses from a drop-down list the appropriate type of the building in which the indoor sewage installation is being designed. This way the appropriate frequency factor  $K$ , characteristic for a particular type of building, is defined.

## Describing and editing items


**Additional description** – an editing field where the user can insert their own information that will then be published in lists.

### 4.4 INSPECTION AND CONNECTION WELL

The **Inspection and connection well** item is inserted into a model after selecting the icon:



*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar  
or input ISWR\_W

An item insertion window is displayed.

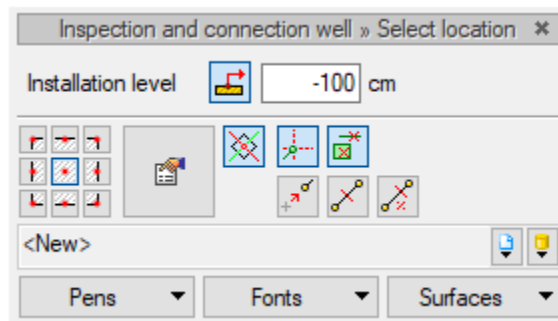





Fig. 29. External inspection and connection well insertion settings window

The window allows the user to set the appropriate insertion position for the well by:

- Having the user select an anchor on the contour of the well or the middle point.
- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- Well bottom installation level settings – pressing the **Import from item**  button allows the user to adjust the bottom height to the existing item (e.g. the pipeline).

The window also allows the user to use the project libraries. From a drop-down list the user can select an example type of a well used in the particular project.

When the well insertion window is active, an item symbol shows up in the model's drawing field (projection). Clicking a chosen spot inside the drawing area inserts an item. After selecting the item, the software will display an item modification window.



## Describing and editing items

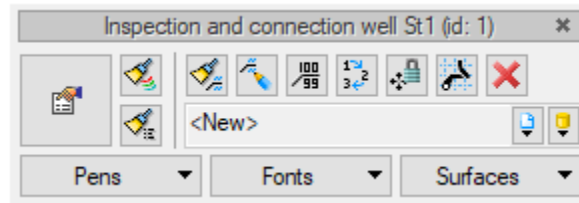


Fig. 30. Inspection and connection well item modification window


The well properties editing window is displayed by selecting the  button or double-clicking the inserted item.

Fig. 31. Item properties window – inspection and connection well

In the item properties window you can adjust the appearance of the item in the projection, as well as the installation and technical parameters.

## Describing and editing items

**Parameters** control group.

**Well bottom type** – the user selects the bottom shape from the drop-down list: well bottom without a profile (for example sump well or cooling well), one-way manhole base (profiled into the duct shape)

**Manhole installation level** – the user defines the top of the well height in the editing field (over or under the floor). The relative ordinate is displayed next to it.

**Bottom installation level** – in the editing field the user defines the well bottom height (if the well has a flat bottom or is a manhole base (if the well has a profiled bottom)). The relative ordinate is displayed next to it.

**Minimum connection height** – the minimum height from the bottom of the well at which the pipeline can be connected

**Type parameters** control group

In this group the user inputs the characteristic (specifying) parameters of the well:

**Name** – input the name of an item e.g. inspection well

**Standard/Manufacturer** – in this field you can enter the standard number or the Manufacturer of a particular item.

**Type/Series of type** – this is a field in which the user inputs the item type or it's series of type or the catalogue number

**Shape** – the **well projection shape is selected from** a drop-down list.

Well projection dimensions are defined in the **editing fields** below basing on its shape

**Additional description** – the user enters additional data that characterize the item and are moved to the material list.

## 4.5 OUTFLOW PIPELINE FITTINGS

The items that symbolise the fittings installed on the outlet pipes are inserted into the model after selecting the icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒



*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒



toolbar

or input ISWR\_AS

An item insertion window is displayed.

## Describing and editing items

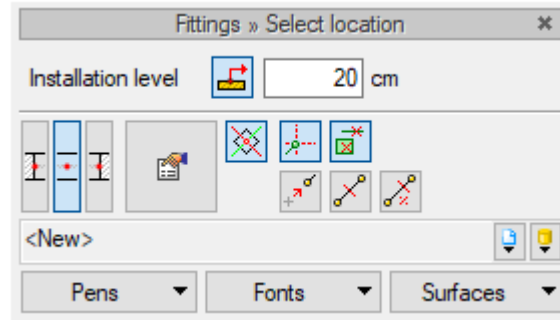





Fig. 32. Fittings insertion window

This window enables:

- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- The installation level values on the pipeline are obtained by pressing the **Import from item**  button, which allows to automatically connect a fitting to the pipeline. The item connected to the pipeline will split the pipe into two parts.

The window also allows the user to use the libraries. From a drop-down list of a particular library the user can select an example type of fitting and its application in the project.

After selecting the inserted item the software will display an item modification window.

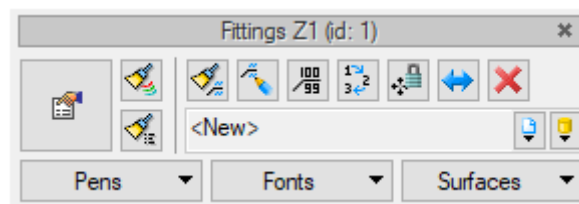



Fig. 33. Fittings item modification window

The fittings type properties editing window is displayed by selecting the  button or double-clicking the inserted item.

## Describing and editing items

Fig. 34. Fittings properties window

**Parameters** control group.

**Height in relation to the level** – the user inserts the value of the required height or nesting in relation to the surface of the active level.

**Height in relation to building zero** – displays the height of the item in relation to the zero of the building where the installation is included

**Casing** – after ticking this field the user has the possibility to define the fitting protection item (for example a well).

**Additional equipment** – a window where the user may select and add additional equipment that will be included in the material list.

**Type parameters** control group.

**Name** – input the name of an item e.g. backwater valve or select it from a drop-down list

## Describing and editing items

**Standard/Manufacturer** – in this field you can enter the standard number or the Manufacturer of a particular item.

**Type/Series of type** – this is a field in which the user inputs the item type or it's series of type or the catalogue number

**Connectors material** – from a drop-down list the designer selects the connector pipes material for the particular item

**Nominal diameter** – from a drop-down list the designer selects the nominal fitting diameter. If the **Automatic** check box next to the diameter is unticked (the parameter is set by default), then selection of the valve diameter is blocked and the valve only assumes the diameter of the pipeline to which it is inserted.

**Additional description** – the user enters additional data that characterize the item and are moved to the material list.

**Object properties: Casing**

**Object management**

Symbol: OBD1    Element id: 1

Type: <New>    [Icons]

Group: Grey and black water    [Icons]

**Appearance**

[3D Model of Casing]

Angle: 0.0°    Pens: [Dropdown]    Fonts: [Dropdown]    Surfaces: [Dropdown]

[X] Description: [Icon]

**Parameters**

Manhole installation level: 280 cm    Upper ordinate to building zero: 2.80 m

Bottom installation level: -16 cm    Lower ordinate in relation to building zero: -0.15 m

**Type parameters**

Name: Casing [Dropdown]

Standard/Manufacturer: [Text Field]

Type/Series of type: [Text Field]

Shape: Circle [Dropdown]

Inside diameter: 320 mm

Wall thickness: 30 mm

Additional description: [Text Field]


[Save to template] [OK] [Cancel]


Fig. 35. Fitting casing definition window

## Describing and editing items

## 4.6 CLEANOUT

The item symbolizing a cleanout can be installed on a vertical and horizontal pipeline.

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar  
or input ISWR\_CO

An item insertion window will appear.

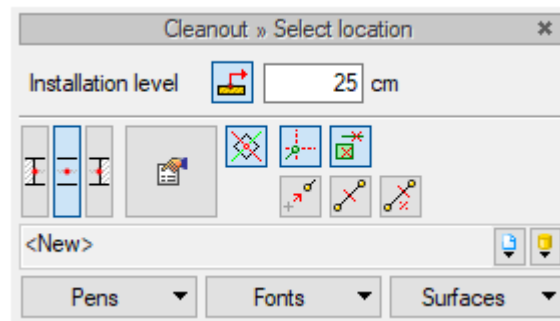





Fig. 36. Cleanout insertion window

This window enables:

- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- The installation level values on the pipeline are obtained by pressing the Import from item  button, which allows to automatically connect a cleanout to the pipeline at an appropriate height. If the button is not pressed, the cleanout will be inserted at the height provided in the editing field next to the icon.  
The window also allows the user to use the project libraries.  
The user can select an exemplary type of items and application in the project (type) from the drop-down list of a particular library.

After selecting the item an item modification toolbar appears. The item modification toolbar give the user an additional modification possibility that is not available for other items.

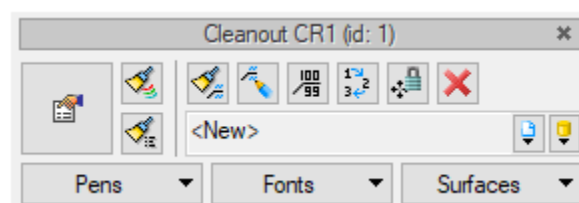

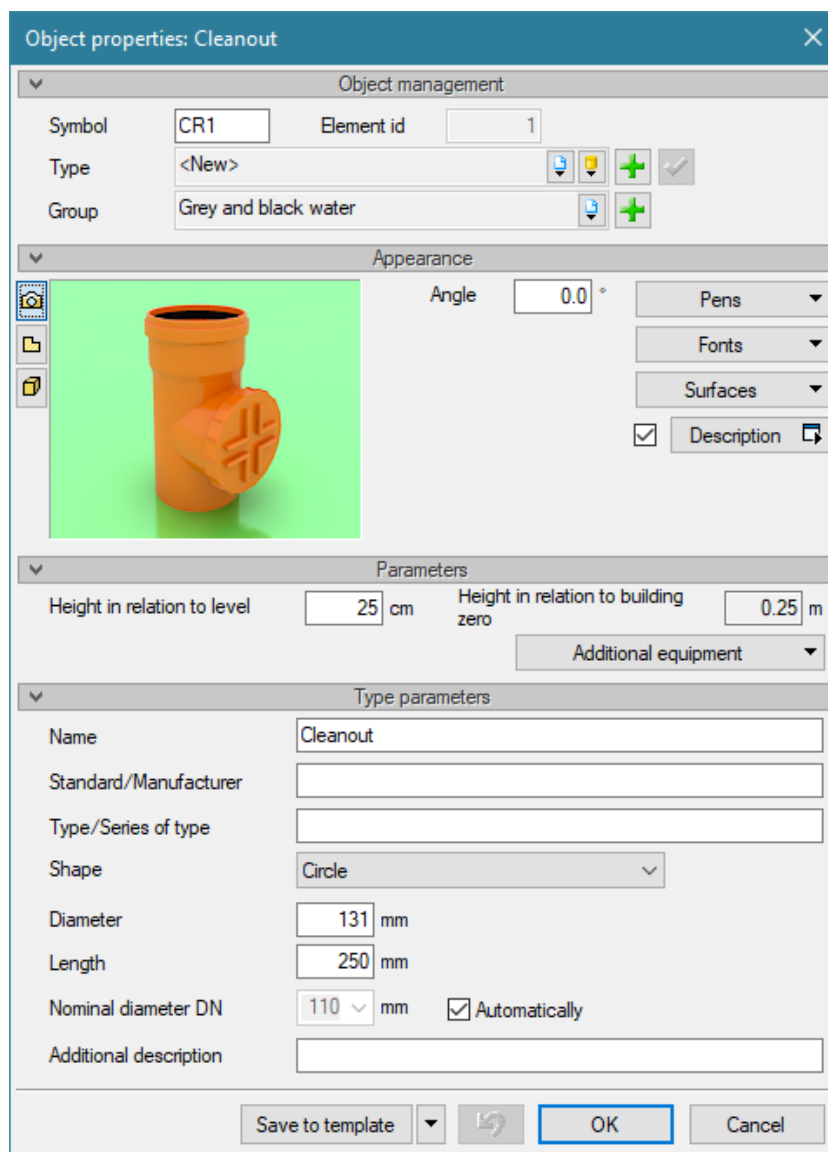


Fig. 37. Cleanout item modification toolbar

## Describing and editing items

The cleanout type properties editing window is displayed by selecting the  button or double-clicking the inserted item.



The dialog box is titled "Object properties: Cleanout" and contains several sections for configuring the object:

- Object management:**
  - Symbol: CR1
  - Element id: 1
  - Type: <New> (with icons for selection, deletion, and confirmation)
  - Group: Grey and black water (with icons for selection and addition)
- Appearance:**
  - Angle: 0.0 °
  - Pens, Fonts, and Surfaces dropdown menus
  - Description checkbox (checked)
- Parameters:**
  - Height in relation to level: 25 cm
  - Height in relation to building zero: 0.25 m
  - Additional equipment dropdown menu
- Type parameters:**
  - Name: Cleanout
  - Standard/Manufacturer: (empty)
  - Type/Series of type: (empty)
  - Shape: Circle (dropdown)
  - Diameter: 131 mm
  - Length: 250 mm
  - Nominal diameter DN: 110 mm (dropdown) with an "Automatically" checkbox (checked)
  - Additional description: (empty)

At the bottom, there are buttons for "Save to template", "OK", and "Cancel".

Fig. 38. Clean properties window

**Parameters** control group.

**Height in relation to building zero** – the user inserts the height in relation to the floor of the active level [cm].

**Height in relation to the building zero** – the software automatically fills the item height in relation to the building zero in [m] units.

**Additional equipment** – here the user may add additional equipment items that will be included in the material list but will not be drawn

**Type parameters** control group.

## Describing and editing items

**Name** – in this field the user may change of a particular item or give it a new name.

**Standard/Manufacturer** – in this field the user can enter the name of the standard or the manufacturer of a particular item.

**Type/Series of type** – here the user may input the series of type of a particular item

**Shape** – the user may select the cleanout hole shape (round or rectangular) from the drop-down list

**Diameter** – the user inputs the cleanout hole diameter or **the width and height** in case of a rectangle.


**Length** – the user inputs the length of a cleanout installed on the pipeline.

**Nominal diameter** – the user may determine the nominal diameter of a cleanout or by ticking a check box the cleanout diameter will be automatically imported from the pipeline onto which the cleanout will be inserted.

**Additional description** – the user enters additional data that characterize the item and are moved to the material list.

## 4.7 INSPECTION OPENING

Items symbolizing an inspection opening installed on horizontal pipelines of an internal installation are inserted into the model by pressing the icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input ISWR\_SI

An item insertion window is displayed.

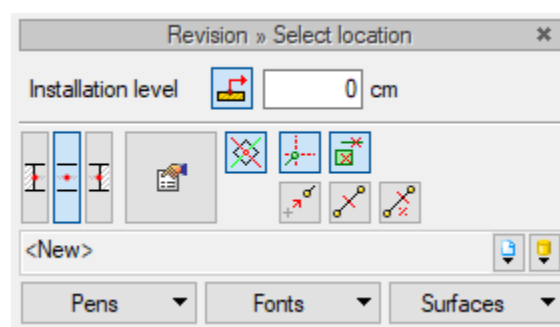





Fig. 39. Inspection opening insertion window

This window enables:

- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.



## Describing and editing items

- The installation level values on the pipeline are obtained by pressing the Import from item  button, which allows to automatically connect an inspection opening to the pipeline at an appropriate height. If the button is not pressed, the inspection opening will be inserted at the height provided in the editing field next to the icon.

The window also allows the user to use the project libraries.

The user can select an exemplary type of items and application in the project (type) from the drop-down list of a particular library.

After selecting the item an item modification toolbar appears. The item modification toolbar give the user an additional modification possibility that is not available for other items.

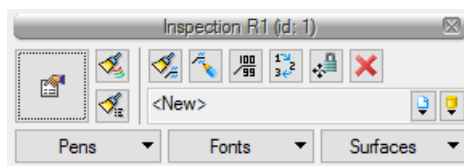



Fig. 40. Inspection opening item modification toolbar

The inspection opening properties editing window is displayed by selecting the  button or double-clicking the inserted item.

## Describing and editing items

Fig. 41. Inspection properties window

**Parameters** control group.

**Height in relation to building zero** – the user inserts the height in relation to the floor of the active level [cm].

**Height in relation to the building zero** – the software automatically fills the item height in relation to the building zero in [m] units.

**Top installation level** – the inspection opening plug top height value is provided in this place. It can be set automatically (with the check box ticked) or manually typed into the editing field by the user [cm]

**Additional equipment** – here the user may add additional equipment items that will be included in the material list but will not be drawn

## Describing and editing items

Type parameters control group.

**Name** – in this field the user may change of a particular item or give it a new name.

**Standard/Manufacturer** – in this field the user can enter the name of the standard or the manufacturer of a particular item.

**Type/Series of type** – here the user may input the series of type of a particular item

**Shape** – the user may select the cleanout hole shape (round or rectangular) from the drop-down list

**Diameter** – the user inputs the cleanout hole diameter or **the width and height** in case of a rectangle.

## 4.8 MOULDER

The Fitting item is inserted automatically at the connection of pipelines. The default fittings insertion settings can be changed in General software options.

A set of fittings is created at such a connection site and the user may select different manners of executing such a connection, e.g. whether the fittings are to be reduction fittings.

After clicking the fitting item and selecting it from the project tree in the project manager,

## Describing and editing items

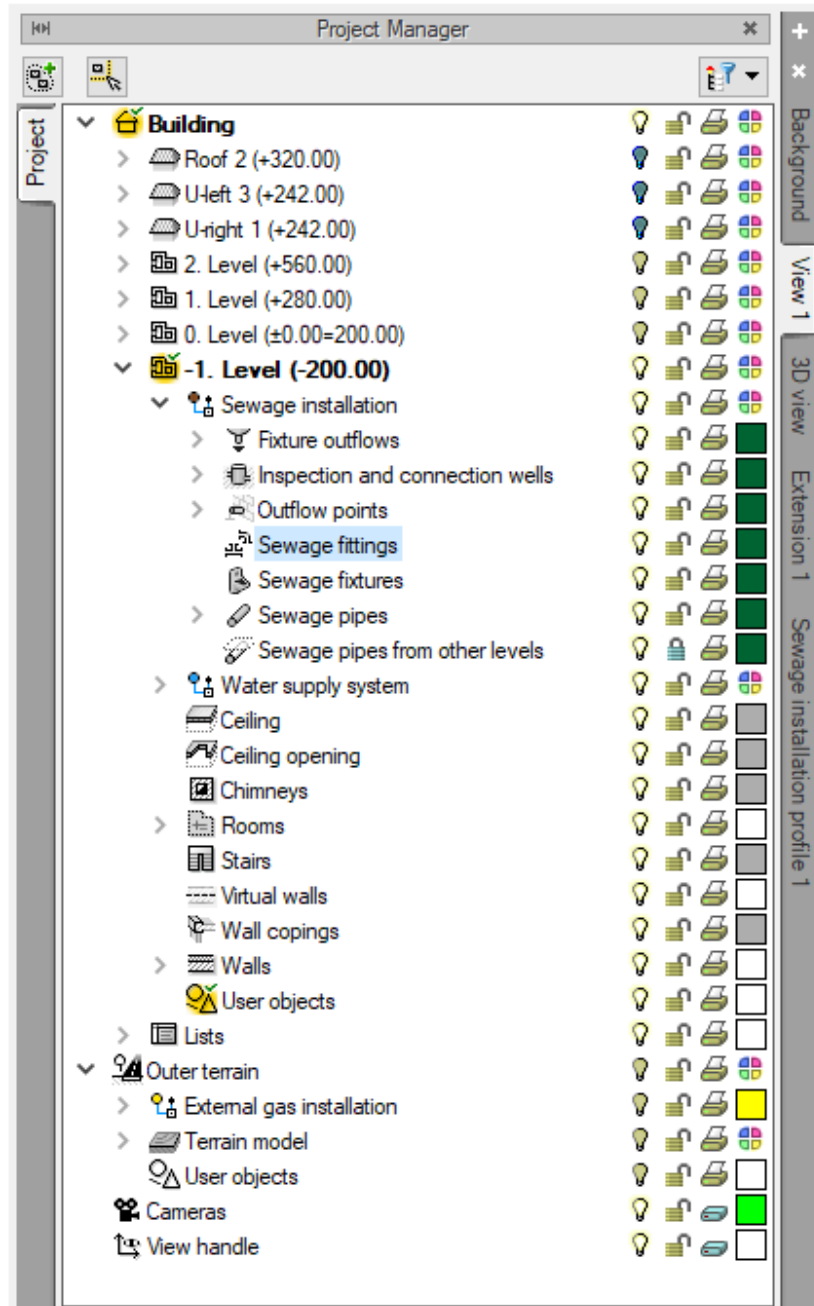


Fig. 42. Project manager window

a modification window Fig. 43 will be available.

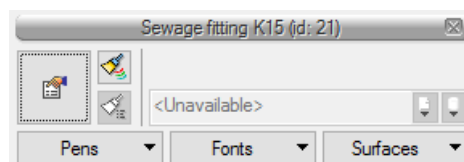



Fig. 43. Fitting modification window

The user may change the colour and thickness of the line pen, the colour, size and type of font used for the description, as well as modify the appearance of the fitting surface in the projection.

## Describing and editing items

After clicking the  icon or by double-clicking the fitting item, the fitting properties window will be activated.

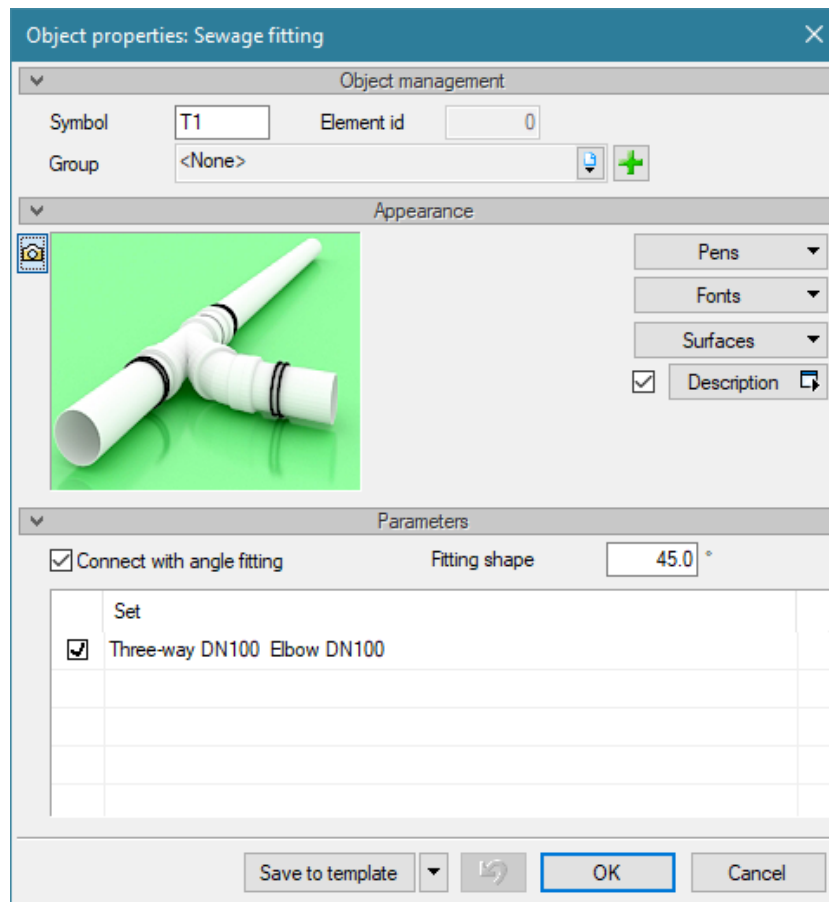


Fig. 44. Sewage fitting properties window

There are three groups of controls available in the window:

### **Appearance**

The user may change the colour and thickness of the line pen, the colour, size and type of font used for the description, as well as modify the appearance of the fitting surface in the projection.

It is also possible to insert a fitting description after ticking the description checkbox. The description configuration window will be activated after clicking the description button. The default description is set as the fitting symbol, for example T14

## Describing and editing items

### Parameters

**Connect with angle fitting** – after ticking the check box the fitting will be created with the angle provided next to the fitting. This means that if two pipes will be drawn in the projection at a straight angle e.g. using the ortho drawing feature, the connection fitting between them will be inserted automatically with the fitting angle input in the properties.

**Set** – table with the sets of possible connection sets. After clicking a particular row the user may check exactly how many and what type of fittings are included in a particular set.

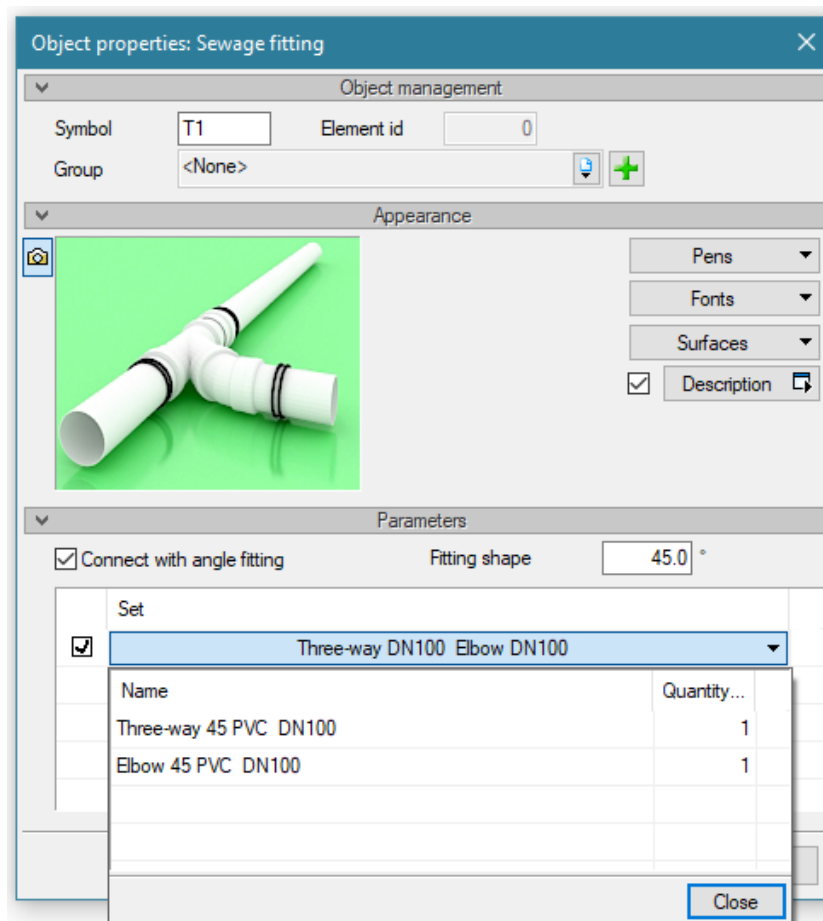


Fig. 45. Properties window with an expanded list of a particular fittings set

If the user has selected the appropriate set, they confirm the selection with the OK button and close the properties window.

A fitting set created by this method is automatically added to the material list.

## Describing and editing items

Drainage system material list				
Item	Name	Unit	Quantity	Dimensions [mm]
Grey and black water				
1	Cleanout	pcs	2.00	DN110
2	Cut-off valve/gate valve	pcs	1.00	DN100
3	Drainage pipe PVC	lin.m	22.22	DN100
4	Drainage pipe PVC	lin.m	3.01	DN250
5	Inspection and connection well	pcs	2.00	DN1000
6	Inspection	pcs	3.00	DN110
Ungrouped				
1	Connector PVC DN100	pcs	1.00	DN100
2	Elbow 2° PVC	pcs	1.00	DN250
3	Elbow 5° PVC	pcs	1.00	DN100
4	Elbow 37° PVC	pcs	1.00	DN100
5	Elbow 60° PVC	pcs	1.00	DN100
6	Elbow 85° PVC	pcs	1.00	DN100
7	Elbow 90° PVC	pcs	1.00	DN100
8	Reduction PVC DN250/DN100	pcs	1.00	DN250/DN100
9	Three-way 81° PVC	pcs	1.00	DN250

Fig. 46. Example of a material list

## 4.9 SEWAGE POINT FOR SANITARY FIXTURE

The **sewage point for sanitary fixture** item is inserted into a model after selecting the icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations ⇒ logical group



*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒



toolbar

or input `ISWR_DO`

An item insertion window is displayed. The item provides the pipeline inlet for the sewage from the sanitary fixture or, in other words, the connection point of the sanitary fixture outflow item (e.g. drain trap outflow) with the internal sewage installation pipeline.

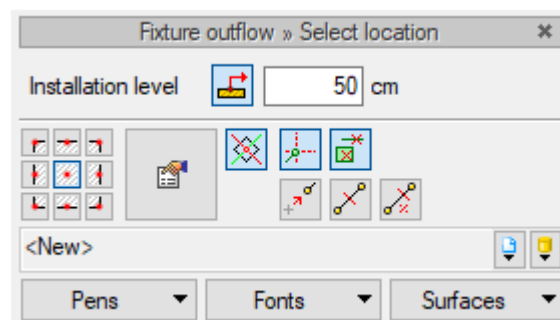





Fig. 47. Sanitary fixture outflow point insertion window

## Describing and editing items

This window enables:

- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- Pipeline bottom installation level settings are adjusted by entering the installation level value into the editing field or by pressing the **Import from item**  button, which enables automatic connection of the outflow with the pipeline. The window also allows the user to use the project libraries or the global libraries. The user may select an example type of outflow for a particular sanitary fixture from the drop-down list of the particular library and use it in the project.

After inserting a particular item and selecting it, the item modification window appears.

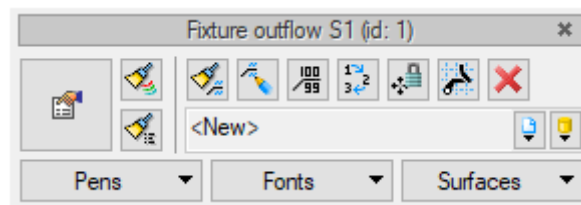


Fig. 48. Fixture outflow item modification window

A **sanitary fixture outflow point** properties defining window is displayed by selecting the button



or double-clicking the inserted item.



## Describing and editing items

**Object properties: Fixture outflow**

**Object management**

Symbol: S2    Element id: 0

Type: <New>

Group: Grey and black water

**Appearance**

Angle: 0.0 °

Pens: [dropdown]

Fonts: [dropdown]

Surfaces: [dropdown]

Description: [checkbox checked] [icon]

☐ Show fixture

☐ Profile characteristic point

**Parameters**

Height in relation to level: <n/a> cm    Height in relation to building: <n/a> m

Fixture top installation height: 80 cm    Additional equipment: [dropdown]

**Type parameters**

Name: Sink [dropdown]

Standard/Manufacturer: [text field]

Type/Series of type: [text field]

Branch diameter DN: 50 mm    Width: 60 cm

Unit outflow DU: 0.50 dm³/s    Depth: 50 cm

Height: 20 cm

Additional description: [text field]

Save to template [dropdown]    OK    Cancel

Fig. 49. Sanitary fixture outflow point properties window

Additional controls were introduced into the **Appearance** control group that enable creating views of the sanitary fixture for which the outflow point is meant.

If the user does not tick the **Show fixture** field, then the symbol of the sanitary fixture will not be inserted into the projection and the item will not be visible in the 3D projection. This course of action may be selected by the user if he received an architectural projection with sanitary fixtures already marked. Should the user want to introduce markings for a particular fixture into the projection, then he ticks the **Visible fixture** field and may define the dimensions of the fixture available in the type parameters. The fixture's location may be set by grabbing the handle of the graphic symbol and dragging it to the appropriate location. You can also move using a general CAD software command. Rotating a fixture symbol is possible using the **Rotate with base point** CAD command or by entering the rotation angle value in the fixture properties dialogue box.

**Profile characteristic point** – unticking this field gives the user the possibility to generate a profile that ends with the selected fixture. The item will be visible in the profile.

## Describing and editing items

**Parameters** control group.

**Height in relation to the level** – the user inserts the value of the required height or nesting in relation to the surface of the active level.

**Height in relation to building zero** – displays the height of the item in relation to the zero of the building where the installation is included

**Fixture top installation height** – the user inputs the sanitary fixture installation height by entering the height of the fixture's top above the level.

**Additional equipment** – a window where the user may select and add some additional equipment that will be included in the material list in the material lists

**Type parameters** control group.

**Name** – in this field the user may change of a particular item or give it a new name.

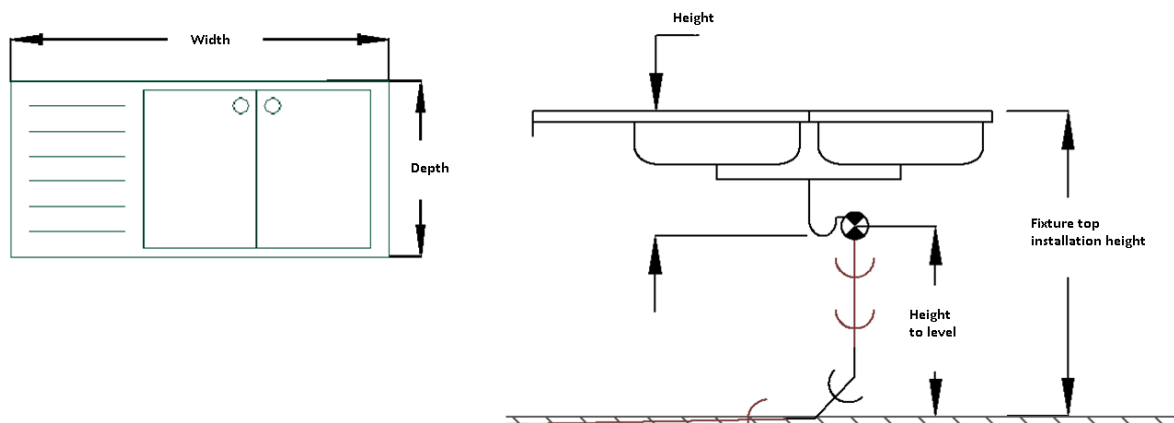
**Standard/Manufacturer** – in this field the user can enter the name of the standard or the manufacturer of a particular item.

**Type/Series of type** – here the user may input the series of type of a particular item

**Branch diameter** – a drop-down list with input options.

**Unit outflow** – the values in the editing field are set by default (recommended) depending on the selection of the device and sewage system.

The user can input the fixture dimensions in the fields provided at the side.




**Additional description** – the user enters additional data that characterize the item and are moved to the material list.

## Describing and editing items

## 4.10 VENT

Items that symbolize vents installed on indoor installations vertical pipelines are inserted into the model by selecting the following icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input `ISWR_V`

An item insertion window is displayed.

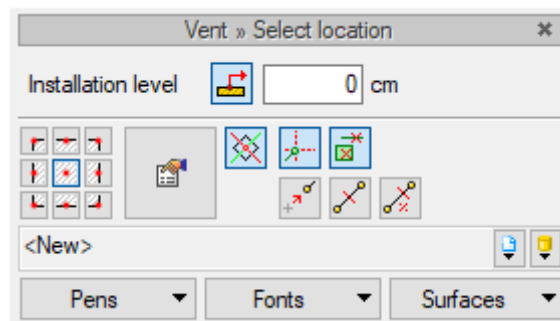





Fig. 50. Vent insertion window

This window enables:

- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- The installation level values on the pipeline are obtained by pressing the **Import from item button** , which allows to automatically connect a fitting to the pipeline. The window also allows the user to use the software libraries or the global libraries. The user can select an example type of item and its application in the project from the drop-down list of a particular library.

After selecting the item an item modification toolbar appears. The item modification toolbar give the user an additional modification possibility that is not available for other items.

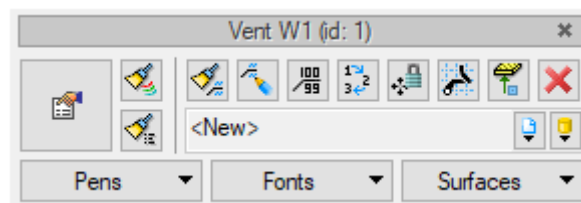

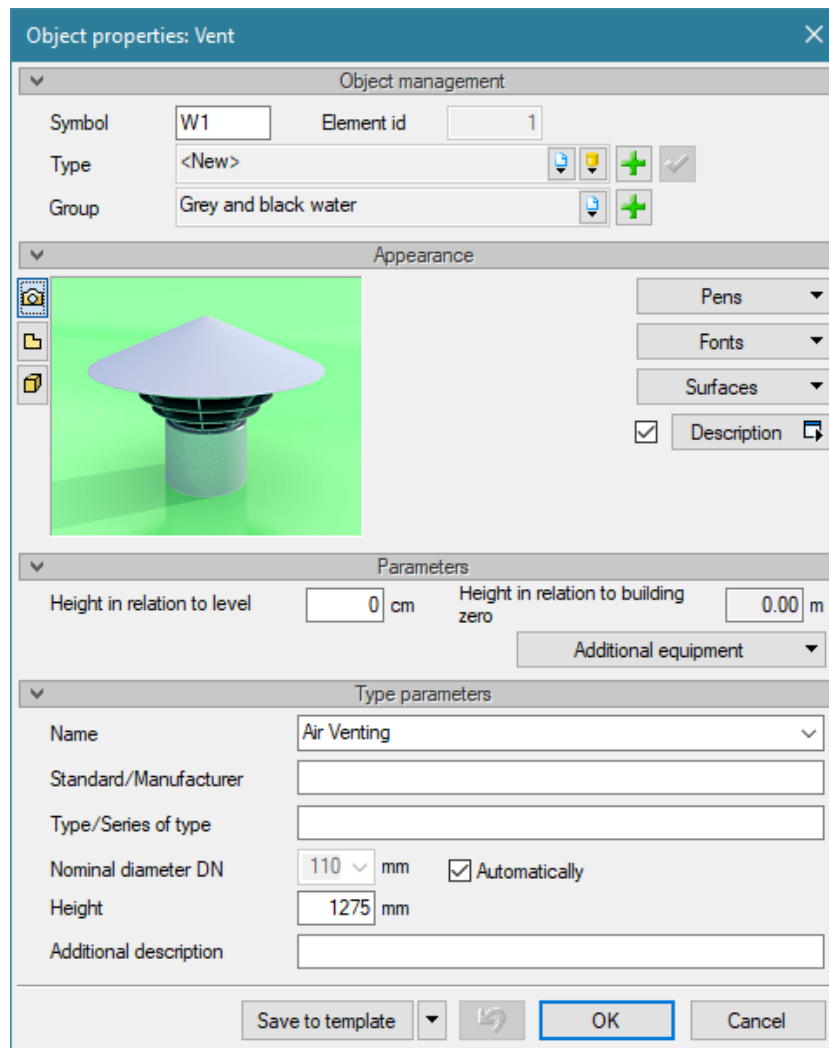


Fig. 51. Vent item modification toolbar

The dragging function allows the user to insert a soil vent on the roof surface. On the drawing the bottom end of the soil vent connects with the roof surface. It is especially recommended to use this feature in the case of sloped roofs, where the soil vent will be located in the sloped roof surface.

## Describing and editing items

The vent type properties editing window is displayed by selecting the  button or double-clicking the inserted item.



The dialog box is titled "Object properties: Vent" and contains several sections for configuring a vent object.

- Object management:**
  - Symbol: W1
  - Element id: 1
  - Type: <New> (with icons for selection, deletion, and confirmation)
  - Group: Grey and black water (with icons for selection and addition)
- Appearance:**
  - A 3D preview of a vent is shown on the left.
  - On the right are dropdowns for Pens, Fonts, and Surfaces, and a checked checkbox for Description.
- Parameters:**
  - Height in relation to level: 0 cm
  - Height in relation to building zero: 0.00 m
  - Additional equipment: (dropdown menu)
- Type parameters:**
  - Name: Air Venting (dropdown)
  - Standard/Manufacturer: (text field)
  - Type/Series of type: (text field)
  - Nominal diameter DN: 110 mm (dropdown) with a checked "Automatically" checkbox
  - Height: 1275 mm (text field)
  - Additional description: (text field)

At the bottom are buttons for "Save to template" (with a dropdown), a refresh icon, "OK", and "Cancel".

Fig. 52. Venting properties window

**Parameters** control group.

**Height in relation to the level** – the user inserts the value of the required height or nesting in relation to the surface of the active level.

**Height in relation to building zero** – displays the height of the item in relation to the zero of the building where the installation is included

**Additional equipment** – a window where the user may select and add some additional equipment that will be included in the material list in the material lists

**Type parameters** control group.

**Name** – in this field the user may change of a particular item or give it a new name.

## Describing and editing items

**Standard/Manufacturer** – in this field the user can enter the name of the standard or the manufacturer of a particular item.

**Type/Series of type** – here the user may input the series of type of a particular item


**Nominal diameter DN** – a drop-down list with an input option next to the checkbox – automatically ticked will import the diameter from a pipeline

**Height** – vertical dimension of the soil vent

**Additional description** – the user enters additional data that characterize the item and are moved to the material list.

## 4.11 INSIDE DRAIN

Items symbolizing inside drains installed on internal vertical sewage installation pipelines. These are inserted into the model after selecting the following icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input ISWR\_GR

An item insertion window is displayed.

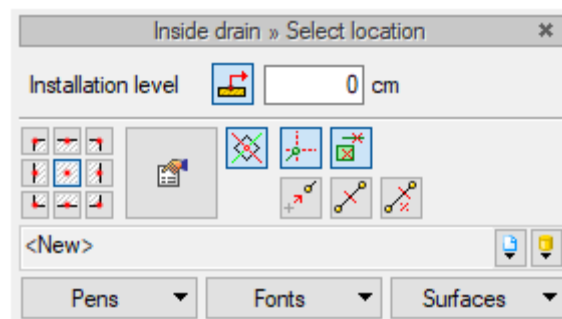





Fig. 53. Inside drain insertion window

This window enables:

- Selecting the feature of inserting in relation to the items already drawn, i.e. setting the items detection, sections detection , items tracking and section ends tracking  features.
- The installation level values on the pipeline are obtained by pressing the **Import from item**  button, which allows to automatically connect a drain to the pipeline. The window also allows the user to use the project libraries or the global libraries. The user can select an example type of item and its application in the project from the drop-down list of a particular library.

## Describing and editing items

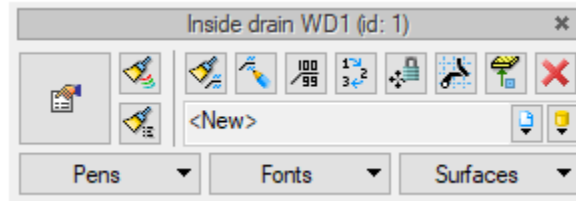



Fig. 54. Inside drain item modification toolbar

In the item modification toolbar, similar as in the case of a vent, the user may drag the surface of the inside drain to the roof surface or e.g. a terrace.

The inside drain type properties editing window is displayed by selecting the  button or double-clicking the inserted item.

 A detailed properties window for an 'Inside drain'. It is organized into several sections:
 

- Object management:** Fields for 'Symbol' (WD1), 'Element id' (1), 'Type' (<New>), and 'Group' (Grey and black water). Includes icons for adding and removing items.
- Appearance:** A 3D preview of the drain on a green surface. To the right are dropdowns for 'Pens', 'Fonts', and 'Surfaces', and a checked 'Description' checkbox.
- Parameters:** Fields for 'Height in relation to level' (0 cm), 'Height in relation to building zero' (0.00 m), and 'Real outflow' (1.00 dm³/s). Includes an 'Additional equipment' dropdown.
- Type parameters:** Fields for 'Name' (Inside drain), 'Standard/Manufacturer', 'Type/Series of type', 'Shape' (Circular), 'Diameter' (50 mm), 'Length' (100 mm), 'Nominal diameter DN' (50 mm), and 'Additional description'. Includes an 'Automatically' checkbox.

 At the bottom are buttons for 'Save to template', 'OK', and 'Cancel'.

Fig. 55. Inside drain properties window

## Describing and editing items

**Parameters** control group.

**Height in relation to building zero** – the user inserts the height in relation to the floor of the active level

**Height in relation to building zero** – displays the height of the item in relation to the zero of the building where the installation is included

**Additional equipment** – a window where the user may select and add some additional equipment that will be included in the material list in the material lists

**Real outflow** – outflow value of the inside drain

**Type parameters** control group.

**Name** – in this field the user may change of a particular item or give it a new name.

**Standard/Manufacturer** – in this field the user can enter the name of the standard or the manufacturer of a particular item.

**Type/Series of type** – here the user may input the series of type of a particular item

**Shape** – the **drain projection shape is defined from** a drop-down list.

**Nominal diameter DN** – the designer selects the nominal fitting diameter from a drop-down list.

If the Automatic check box next to the diameter is unticked (the parameter is set by default), then selection of the valve diameter is blocked and the valve only assumes the diameter of the pipeline to which it is inserted.

Well projection dimensions are defined in the **editing fields** below basing on its shape

**Additional description** – the user enters additional data that characterize the item and are moved to the material list.

## 4.12 SEWAGE PIPE

Horizontal pipelines, both outflow and internal, are inserted into the project by pressing the icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar  
or input ISWR\_SW

After pressing it, the software will display a first pipeline section ending (beginning) insertion window.

Similar as in the previously discussed cases, by unticking the appropriate check box you can activate the tracking and detection features for previously drawn items.

## Describing and editing items

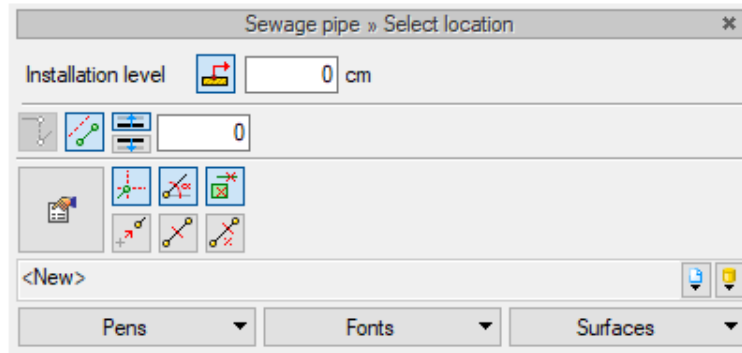


Fig. 56. Horizontal sewage pipe insertion window – beginning

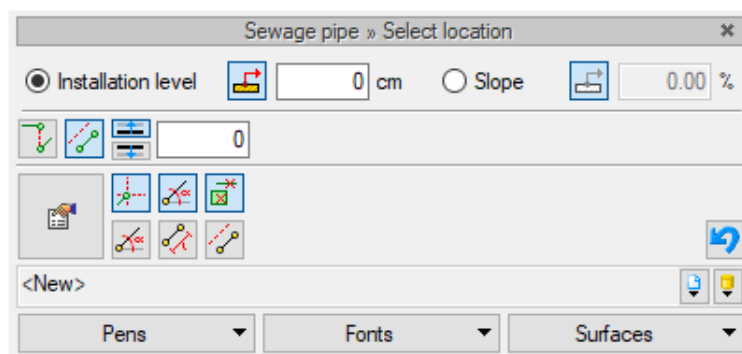



Fig. 57. Horizontal sewage pipe insertion window – ending


Inserting a horizontal pipeline with a manual insertion function allows the user to insert the starting section height as well ending height into the editable field ("start" and "end" of a section are defined along with the drawing direction). This operation is executed by ticking the **Installation level** field. The user clicks a starting point of a section and draws a continuous line in the chosen direction and finishes by clicking the ending point of a sewage pipe section.



If the user wants to insert a pipeline with a constant slope, then they need to select the **Section slope** check box. Then the **Section level** editing field is blocked and the field where you can enter the slope in % (**Section slope**) is unblocked. The direction of the drop is the same as the drawing direction. If the user wants the end of the pipeline to be located higher than the beginning, they should insert the slope with a "-" sign.


Pressing the **Import from item**  button allows the user to add pipeline sections to the points of previously drawn items. Selections can be made independently, i.e. the user can select one or both of the fields. While editing the beginning of a section, the user inserts the estimated height (as accurately as possible) to a point in which the height will be measured. That estimation gives the user the possibility to specify which item will be the beginning of the drawing (which benchmark item will be the starting point). Ending of the drawing can be compatible with the scheme described above or the user can press the **Import from item** button at the estimated section ending height and add it precisely in the desired point. In addition in the section where you define the drawing method, the



## Describing and editing items

user can enable and disable the option of drawing in pre-selected angles . This function enables the drawing mode according to the angles defined in the options (described in the part concerning software options setting).

Pressing the **Parallel offset**  button allows drawing an installation in parallel to other items, e.g. a wall offset by the selected distance. There are two **Offset direction**  buttons that allow you to choose the offset direction from an item. Next to it there is an editing field where the user should input the offset value (the field will activate after clicking the **Parallel offset** button).

Pressing the **Insert vertical section**  button allows inserting without the need to disrupt the horizontal and vertical pipelines command. After pressing the button, the insertion window will become a horizontal pipe ending insertion window without the possibility to input slope value and you need to input the vertical pipeline ending installation level. Next we draw the other horizontal sections and at any time the user can insert a vertical section by clicking on the **Insert vertical section** button

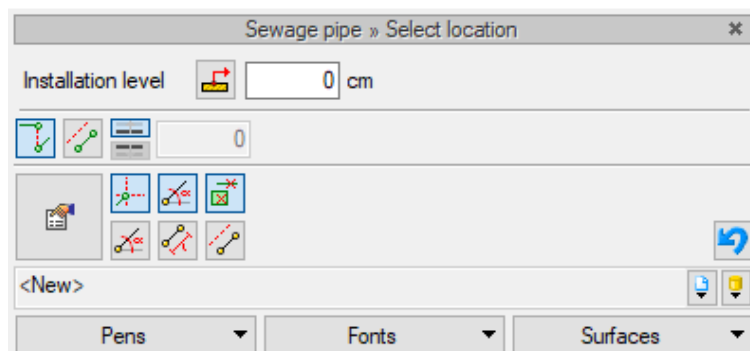



Fig. 58. Sewage pipe insertion window

Function marked with an icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input ISWR\_SPR

enables inserting sections continuously, with different directions with a pre-defined height of the beginning of the first section and pre-defined height of the ending of the last section.

After inserting the internal sewage pipeline and selecting the item, an item modification toolbar appears.

## Describing and editing items

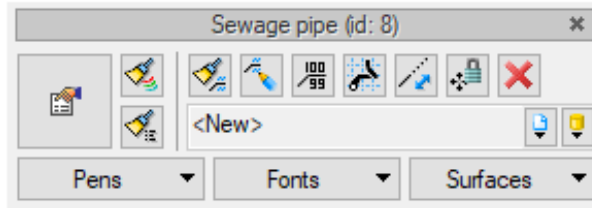



Fig. 59. Internal sewage pipe item modification toolbar

In the toolbar there are additional icons characteristic only for the pipe item.

**Lengthen/shorten pipe maintaining slope** – this procedure allows lengthening or shortening the pipeline, maintaining the slope. After selecting a section, the user moves the cursor closer to the end of the pipeline and the stretching mark will appear. Then click the left mouse button on it to initiate the lengthening/shortening procedure. Next move the mouse in the chosen direction by the selected value, which will change the length of a pipeline section. Pressing the left mouse button again will end the lengthening procedure.

The designed pipe section properties defining window is displayed by selecting the  button or double-clicking the inserted pipe section.

**Parameters control group**

**Bottom installation level**

- beginning – insert duct beginning bottom installation level
- end – input duct end installation level

**Ordinate in relation to building zero** – the software automatically fills the item height in relation to the building zero in [m] units.

**Actual length and length in the projection** – as in description. Parameters will differ if the pipeline is routed with a slope and if the Automatically checkbox is not ticked.

**Slope** – the value calculated as the difference between the beginning and ending of the pipeline installation levels. The slope can be set in the section ending insertion window.

**Type parameters control group**

**Material** – the user may change or input a new material name for a particular item.

**Standard/Manufacturer** – in this field the user can enter the name of the standard or the manufacturer of a particular item.

**Type/Series of type** – here the user may input the series of type of a particular item

**Nominal diameter DN** – input the nominal diameter DN

**Outside diameter** – input the outside pipeline diameter [mm].

**Wall thickness** – input the wall thickness of a particular pipeline

## Describing and editing items

Fig. 60. Horizontal sewage pipe properties window

**Material** – The user inserts the material that will be used to build the pipeline sections from a drop-down list. The designer inserts the materials allowed to be used in the particular section of a building according to the applicable standards.

**Nominal diameter** – the user selects the nominal diameter of a pipeline section (in accordance with the selected series of type) from a drop-down list

**Outside diameter** – the pipe diameter is calculated according to the external dimensions and corresponds to a particular series of type of a specific nominal diameter

**Wall thickness** – pipe wall thickness for a particular outside diameter. Pipe wall thickness can vary for a particular outside diameter. Inserting values into the editing fields allows the user to choose any series of type of pipelines.


## Describing and editing items

**Roughness factor** – the coarseness coefficient is set by default to match the material to be used for building the installation – 0.013 by default. The user can set another value.

**Additional description** – the user enters additional data that characterize the item and are moved to the material list.



### 4.13 VERTICAL PIPE

Vertical pipeline drawing starts by pressing the icon:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input `ISWR_VSP`

Vertical pipes insertion window will appear after pressing the button. Similar as in the previously discussed cases, by unticking the appropriate check box you can activate the tracking  and detection  features for previously drawn items.

The pipeline insertion procedures are determined by the appropriate function setting in the vertical sewage pipes insertion window.

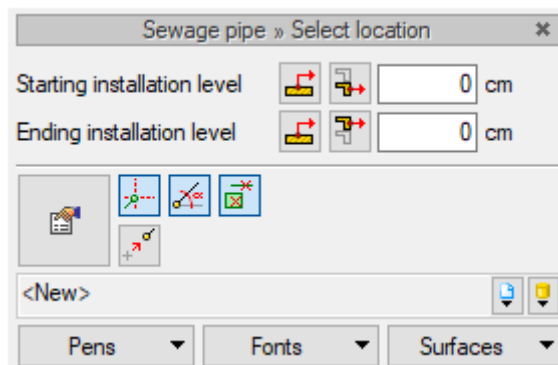





Fig. 61. Vertical sewage pipe insertion window

Inserting **Vertical** pipelines with a manual insertion function allows the user to type ordinates for both ends of the pipeline into the editable fields. A vertical section with the selected section end heights is then edited.

The **Import from item**  buttons allow the user to add pipeline sections to the points of previously drawn items. For this method, editing is done in the same way as in the case of horizontal pipes.

**Import from a level**  stretches the appropriate end of the pipeline to the next level surface, allowing the user to punch through the ceiling.

The vertical sewage pipe section properties defining window is displayed by selecting the  button or double-clicking the inserted pipe section.

## Describing and editing items

The window and the functions are the same as in the case of a horizontal pipe. The only difference is the lack of drop (vertical pipe).

You can also define an inspection opening in the vertical outlet pipe by marking the appropriate field and then, if necessary, introduce an encased item, e.g. a well.

If the user chooses the stack function from the drop-down list, they will have to untick the stack number in the appearance part and insert the planned number in the symbol description part in order to input stack numbers. Starting from the input value, the stacks will be numbered in ascending order.

**Object properties: Sewage pipe**

**Object management**

Type symbol:  Element id:

Type:

Group:

**Appearance**

☒

**Parameters**

	Beginning	End
Bottom installation level	<input type="text" value="0"/> cm	<input type="text" value="200"/> cm
Ordnate to building zero level	<input type="text" value="0.00"/> m	<input type="text" value="2.00"/> m
Length on the projection	<input type="text" value="0.00"/> m	
Actual length	<input type="text" value="2.00"/> m	<input type="checkbox"/> Automatically <input type="checkbox"/> Stack <input type="text" value="1"/>

**Type parameters**

Material:

Standard/Manufactur:

Type/Series of type:

Outside diameter:  mm Wall thickness:  mm

Diameter DN:  mm Friction factor:  s·m<sup>-1/3</sup>

Additional description:

Fig. 62. Vertical sewage pipe properties window

## Describing and editing items

After selecting the inserted vertical pipe item, a modification toolbar will appear

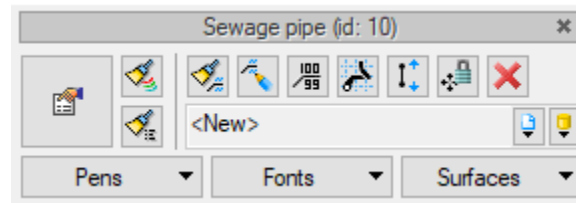


Fig. 63. Vertical pipeline modification selection window

In the toolbar there is an icon allowing the user to stretch vertical pipelines not only in a particular level, but also between them.

After pressing that icon, a dialogue box will appear, where the user can set up to which level the vertical pipe will be stretched. After stretching the pipeline that goes through several levels constitutes a set of pipelines with the length equal to the level height (this is not a single pipe).

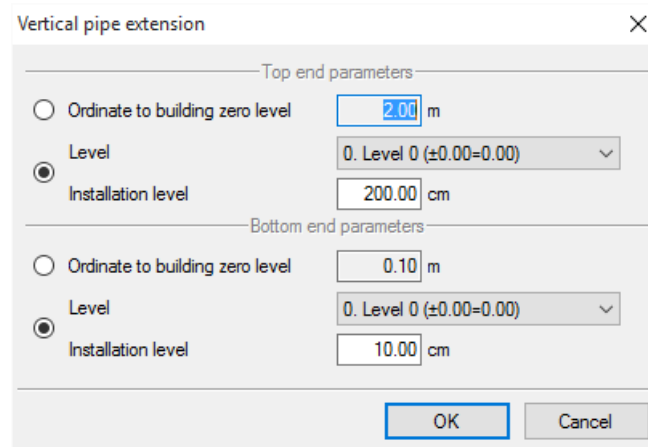


Fig. 64. Vertical pipe stretching window

In the window you may input the vertical location parameters separately for both ends. The user may input the height of the particular end in relation to the building's "zero" or in relation to the height of the selected level (height above the floor). The user selects a particular option by unticking an appropriate switch.

After selecting the Ordinate to building zero level option, the user should input an appropriate relative value in the dialogue box. If e.g. the third level is located at the +9.20 level and the user would like to place the end of the pipe 1 m above the floor, then he should input +10.20.

While using the installation height the user should choose the number of the level where the particular end should be placed from the drop-down list and then input the height of that end in relation to the floor (i.e. 100 cm), relevant to the example above.

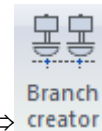
NOTE: After inserting a vertical or horizontal sewage installation section, there are two functions that support the correct installation design. After selecting a horizontal pipeline, numbers representing the installation height (for its beginning and end) will appear on its ends. Apart from that circled numbers will appear at the ends of the pipeline, meaning the number of items connected to the

## Describing and editing items

particular end. In the case of vertical pipes, once you select it, the above mentioned numbers are visible one under the other and the top ones are assigned to the lower part, whereas the bottom ones are assigned to the top part of the selected vertical pipeline section.

### 4.14 INSERTING BRANCH LINES TO SANITARY FIXTURES

Once a stack (sewage stack) is inserted into the project, i.e. the stack checkbox is ticked in the pipeline properties window, and its branch lines are connected to draw-off points, you can configure such a connection. It is of no importance what degree of slope are the pipelines routed with or whether they are routed without any slope at all, what is important is for them to be connected to the fixture's outflow point and a stack.







*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input ISWR\_AC

A branch lines configuration window will appear.

In the upper part of the window the user may select the pipeline catalogue from which the pipelines for selection in the branch line configurator will be selected in sequence.

The green  add button is used for this, whereas the  is used for removal and the  and  buttons are used to change the order.

The catalogues that are available are the ones located in the project library. After clicking the green plus sign, the software will display a field saying "select". Then the user should click this position on the ruler. Two parts will appear: on the left one you can select the catalogue from which the pipelines will be selected and on the right one you can select the types from the catalogue that are to be available (by default all types from the catalogue are selected).

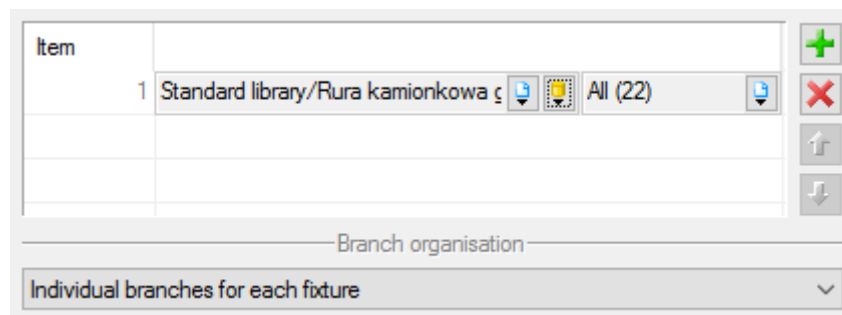


Fig. 65. Configuration window

## Describing and editing items

The catalogue position order in the types available for selection window is important when selecting branch line pipelines. Types from the first catalogue have a priority in the software. If as a result of the calculations and an analysis of the branch line no can be selected from the first catalogue, then the next selection stage will verify whether the required type is available in the next catalogue.

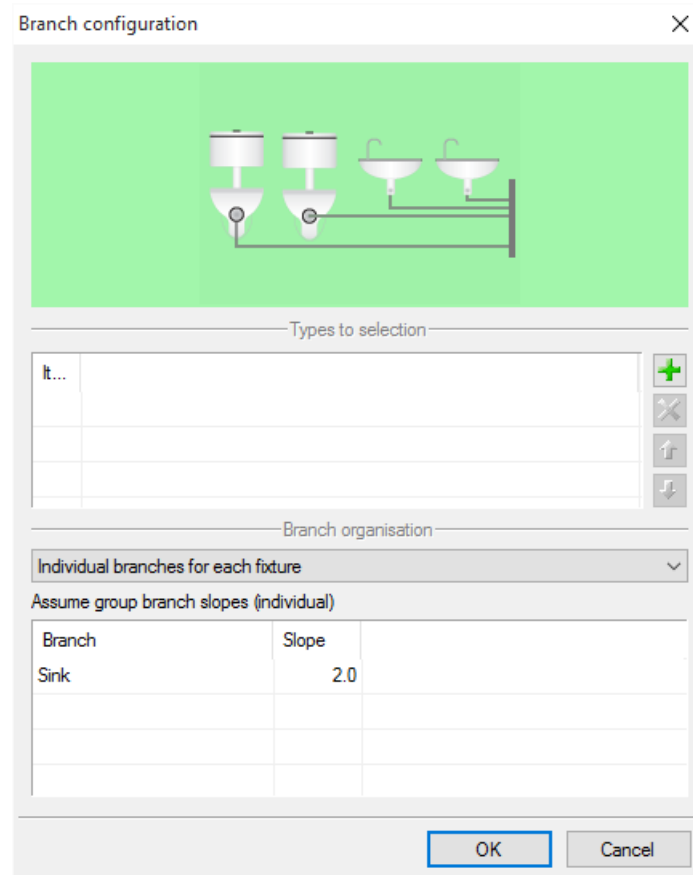


Fig. 66. Branch lines configuration window

The user may choose the branch lines organization in the drop-down list. There are three types available:

- individual branch for every fixture,
- common branch for fixture application,
- ungrouped common branches.



## Describing and editing items

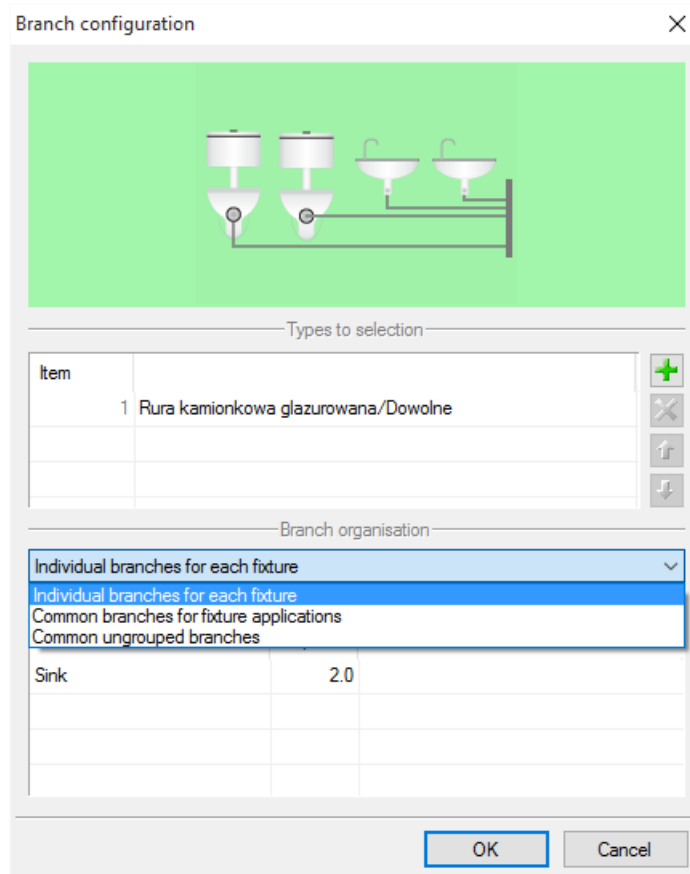


Fig. 67. Branch lines configuration window

Depending on the manner of connection of the branches you can input the required slope (2.0% by default) separately for each fixture, separately for each fixture group with the same application and a single common slope if an ungrouped common branch was selected.

## 5 SEWAGE FITTINGS

## Sewage fittings

### 5.1 CREATING FITTINGS

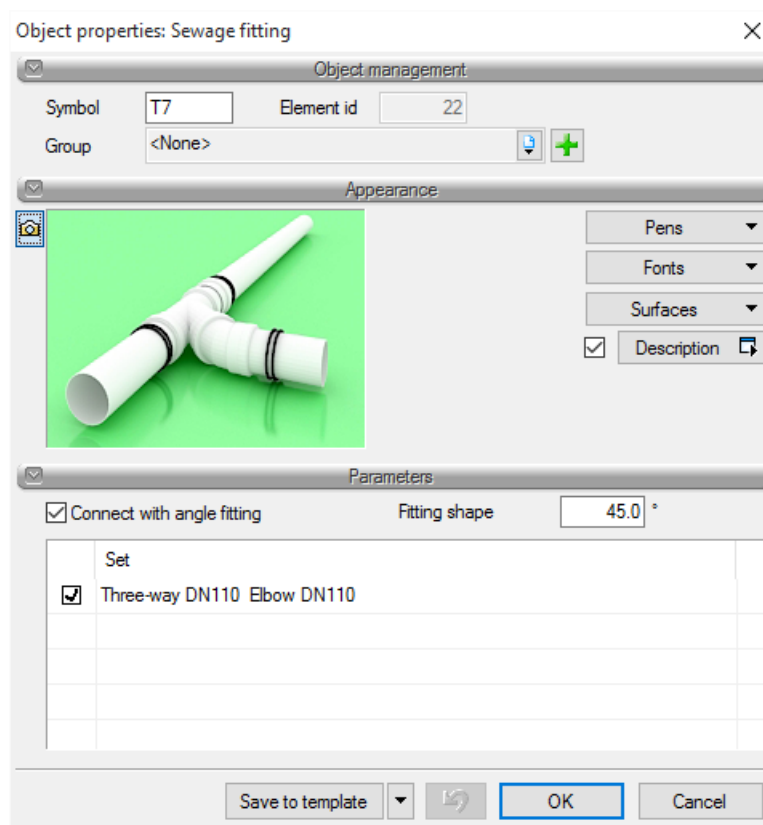
In **ArCADia-SEWAGE INSTALLATIONS** the fittings are created automatically when inserting a sewage installation route in the pipeline connections. Fittings are created in the graphical form of elbows, three-way and four-way fittings and sets of several pipes (more than 4 pipelines). Each fitting of this type is a connection set consisting of the appropriate number of items necessary to execute a connection like that. These connection sets can be configured in various ways. The most optimal items, that are most closely adapted to the project requirements are selected by default, however in the sewage fittings properties it is possible to change the settings and select a different set of fittings.

Basic fittings generated by the software in the Material specifications:

- direction (angle) change, for example a 40° elbow,
- diameter change, for example a DN100/DN50 reduction,
- branch: three-way fitting, four-way fitting, "x" pipe connection,
- material change.

Fittings are created in two ways, depending on the method of drawing the route. 1. If the user uses the *Ortho* feature, the fittings will automatically be created as angle fittings or when connecting to a pipeline at a straight angle, the angle settings will be adjusted as per the Project options, Fig. 5

2. If the route runs at straight angles, then the fittings will be created with freely input angles and their detection can be changed in the project options, Fig. 4



---

Sewage fittings

Name	Quantity...
Three-way 90 Polyethylene DN110	1
Elbow 8 Polyethylene DN110	1
Close	

Fig. 68. Fitting properties window

**Parameters control group**

**Connect with angle fitting** – the connection is created at the fitting angle as provided on the side.

**Fitting shape** – the angle at which the connection and the main angle (elbow, three-way or four-way fitting) are made.

Below is a window where you can select which set of fittings the user wants to place in a particular location. The sets are connected so as to use all the options of executing a connection. The set with a reduction fitting or with a fitting and a reduction is selected by default. This setting can be change in the **Project options** Fig. 7


Fittings from the sets are automatically published and counted in the Material specification generated (9).

## 6 CALCULATIONS AND INTERPRETATION OF RESULTS

## Calculations and interpretation of results

### 6.1 VERIFYING THE VALIDITY OF A DRAWN INSTALLATION

Once drawing the installation is done and all the pipelines and items have been connected, you may verify the validity of the design in the scope of pipeline connections and other items introduced into the project. The verification feature for the installation is activated by clicking the following icon in the software toolbar:

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar  
or input `ISWR_VER`

Next, the "Please select the starting item" command will appear in the ArCADia-Start **toolbar** at the bottom of your screen. The user can for example select the line outflow point.

The table contains information concerning the number of discontinuities in the installation. The software automatically identifies items of the installation that have not been connected and pipeline sections that do not have a connection with an outflow point or a fixture outflow.

After clicking the error information, the user will activate the drawing error detection feature. The software will highlight the routes and items where errors occur. The designer can correct the drawing by connecting items in order to ensure continuity of the installation.

After the corrections are implemented, the software will prepare a report informing the user about the validity of the designed installation.

In the left part of the window the user may filter errors and display only the selected descriptions.

The user may select the outflow point in the **Installation** drop-down list.

The user may limit the range of errors displayed for a particular level in the **Placement** drop-down list.





The **Items** drop-down list gives the user the possibility to choose one of the several item groups that were not connected. If there are connection errors in the fittings and inspection opening groups, the user may select e.g. only the inspection opening.

From the **Category** drop-down list the user selects the error type that occurs in the project: unconnected items, faulty connection etc.

After selecting from the drop-down lists the user can select the items that are not connected and that have been assigned to a particular grouping in the drawing. To do that, press the **Show selected** button. The installation projection view field will then be moved to the particular part of the installation drawing that includes the group of connection items and will mark it with dotted lines with a view of the handles.

## Calculations and interpretation of results




Message window: 4 of 4

Filters		Messages		
Installation		Instalati...	Location	Description
All		P1	Level	Unconnected pipeline
			Level	Unconnected pipeline
			Level	Unconnected items: Fixture outflow
			Level	Items unconnected to any paths: Vent

OK

Fig. 69. Table – Sewage installation report containing information about the validity of the designed installation

### Message types (message icons differ):

- Information 
- Warning 
- Error 

### Message content – Interpretation

#### 1. The installation design is correct

The message appears when there is a connection point present in the installation and all the items are directly and indirectly connected to that point, creating an installation that is correctly designed in terms of connections.

#### 2. No outflow point

This message appears when there is no outflow point in a project.

#### 3. Unconnected pipeline

The message appears when there is an unconnected pipeline in the project.

#### 4. Unconnected items: e.g fittings

The message appears when an item is not connected to any pipeline.

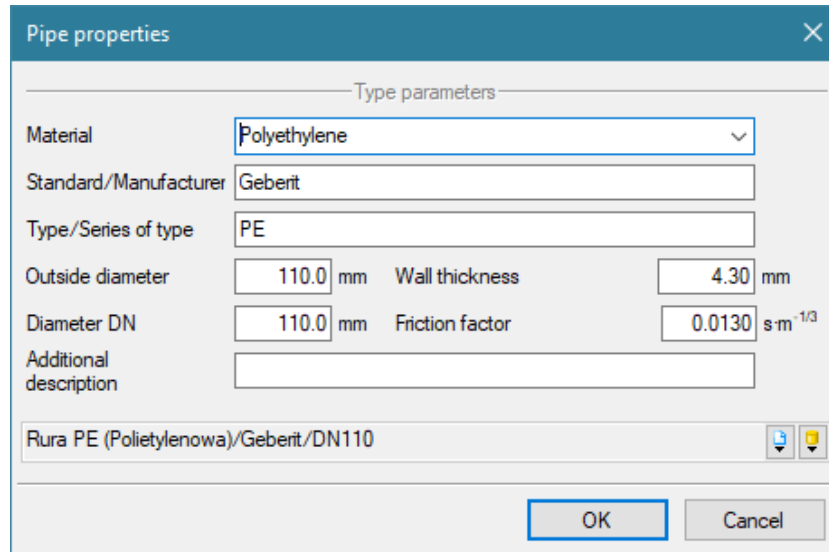
#### 5. Items that are not connected to any route: e.g. sewage pipe

The message appears when an item (also a pipeline) is not directly or indirectly connected to a connection point (can be connected to pipelines, although these pipelines will not be connected to a connection point).





## Calculations and interpretation of results



**Pipe properties**

Type parameters

Material: Polyethylene

Standard/Manufacturer: Geberit

Type/Series of type: PE

Outside diameter: 110.0 mm Wall thickness: 4.30 mm

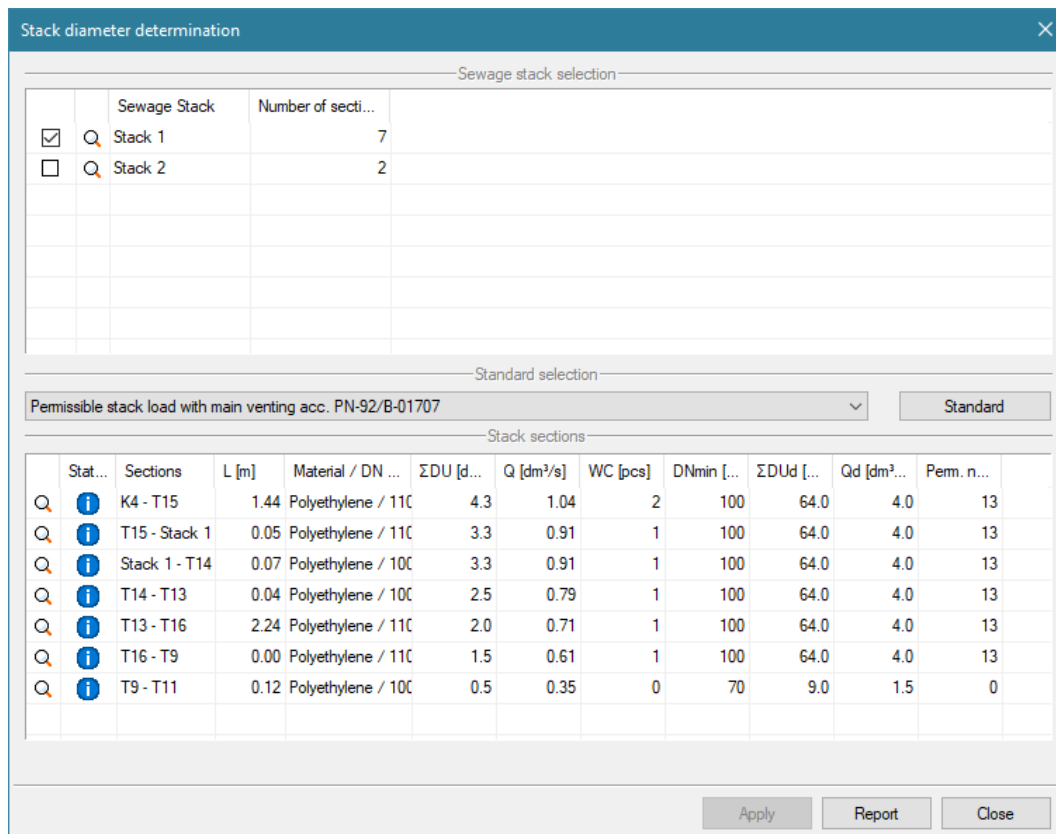
Diameter DN: 110.0 mm Friction factor: 0.0130 s·m<sup>-1/3</sup>

Additional description:

Rura PE (Polietylenowa)/Geberit/DN110

OK Cancel

Fig. 71. Editing diameters in the outlet pipelines calculation table



**Stack diameter determination**

Sewage stack selection

	Sewage Stack	Number of sect...
<input checked="" type="checkbox"/>	Stack 1	7
<input type="checkbox"/>	Stack 2	2

Standard selection

Permissible stack load with main venting acc. PN-92/B-01707

Standard

Stack sections

Stat...	Sections	L [m]	Material / DN ...	ΣDU [d...	Q [dm³/s]	WC [pcs]	DNmin [...]	ΣDUd [...]	Qd [dm³...	Pem. n...
Q	K4 - T15	1.44	Polyethylene / 110	4.3	1.04	2	100	64.0	4.0	13
Q	T15 - Stack 1	0.05	Polyethylene / 110	3.3	0.91	1	100	64.0	4.0	13
Q	Stack 1 - T14	0.07	Polyethylene / 100	3.3	0.91	1	100	64.0	4.0	13
Q	T14 - T13	0.04	Polyethylene / 100	2.5	0.79	1	100	64.0	4.0	13
Q	T13 - T16	2.24	Polyethylene / 110	2.0	0.71	1	100	64.0	4.0	13
Q	T16 - T9	0.00	Polyethylene / 110	1.5	0.61	1	100	64.0	4.0	13
Q	T9 - T11	0.12	Polyethylene / 100	0.5	0.35	0	70	9.0	1.5	0

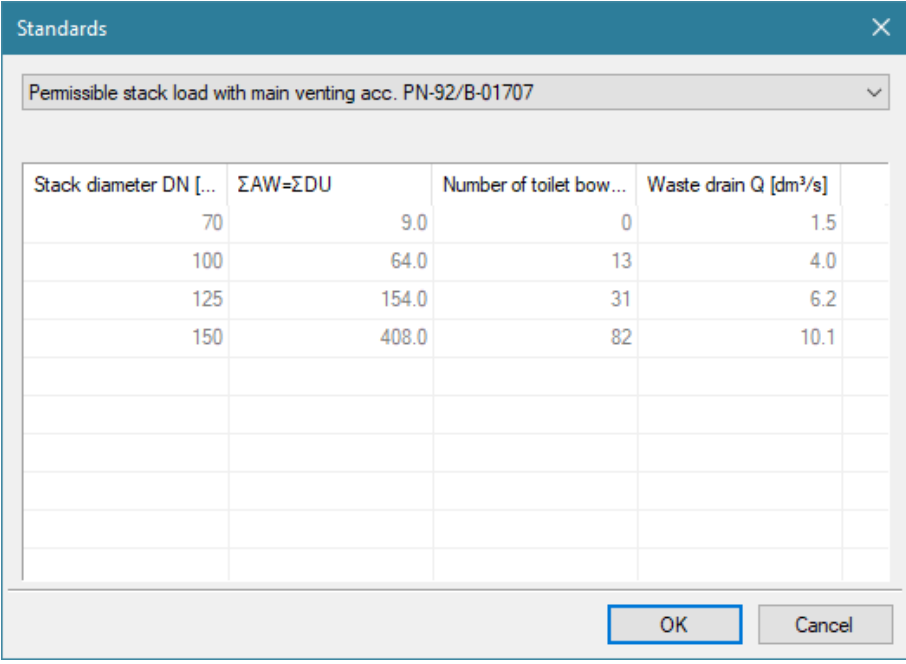
Apply Report Close

Fig. 72. Stack calculation table view

Editing diameters in the stacks calculation table is similar as in the case of the outlet pipelines calculation table.

After pressing the **Standard** button, the user gains access to the tables that are used for calculations relating to the stacks.

## Calculations and interpretation of results



Standards

Permissible stack load with main venting acc. PN-92/B-01707

Stack diameter DN [...]	$\Sigma AW = \Sigma DU$	Number of toilet bow...	Waste drain Q [dm <sup>3</sup> /s]
70	9.0	0	1.5
100	64.0	13	4.0
125	154.0	31	6.2
150	408.0	82	10.1

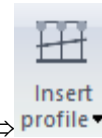
OK Cancel

Fig. 73. Standard selection window in the stacks calculation table

## 7 LONGITUDINAL PROFILE OF THE INSTALLATION SECTIONS

## Longitudinal profile of the installation sections

A profile of the correctly drawn installation section can be created by clicking the icon:



*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒

and for creating and organizing profiles the icon sewage ribbon ⇒ Sewage installations logical group ⇒



*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒



toolbar

or input ISWR\_PV

and for creating and organizing profiles the icon: Sewage installations ⇒



toolbar

or input ISWR\_PVC

After pressing one of them in the IntelliCAD software command bar. AutoCAD and ArCADia-START a window will appear (in the bottom of the screen) with the following message: "Please select the starting item".

After selecting the starting item (outflow point for the entire installation) the calculation path selection window will appear.

In this window the user selects the main profile path

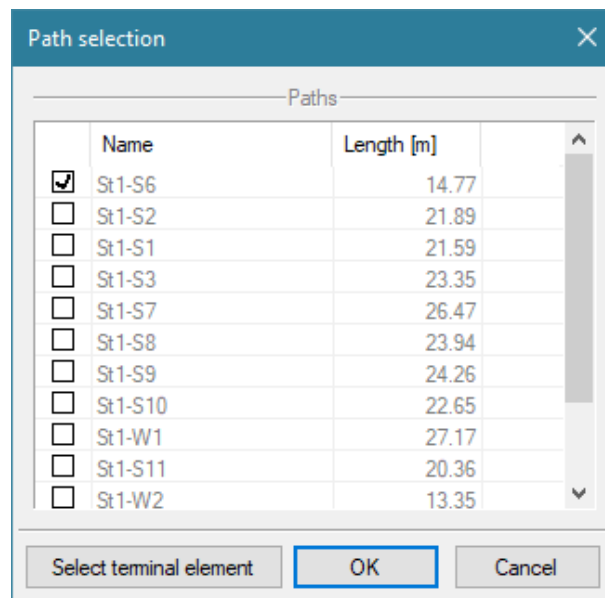


Fig. 74. Main profile path selection window

After selecting the profile route, the user should select the profile insertion point on the model. While the "Sewage installation profile" view is active, the user can activate the modification window by clicking the profile frame.

## Longitudinal profile of the installation sections

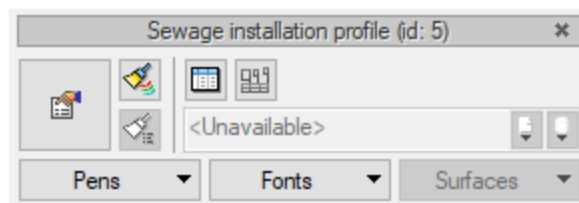



Fig. 75. Profile modification window

A profile properties defining window is displayed after selecting the  or double-clicking the profile frame.

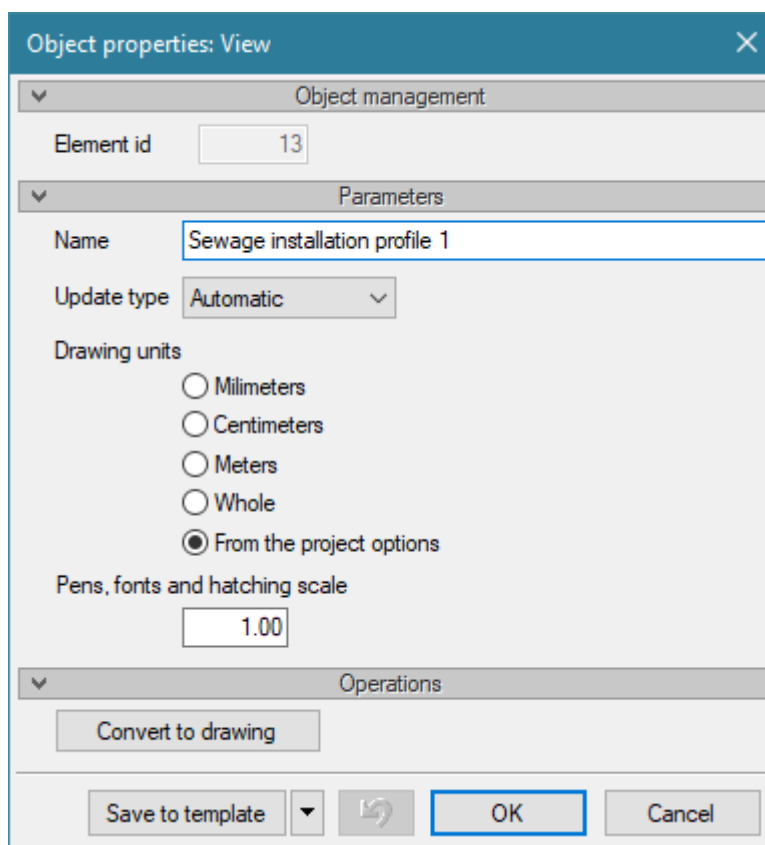


Fig. 76. Sewage installation profile properties window

### Appearance control group

**X scale and Y scale** – The user can use a drop-down list to select the scale in which the installation profile is to be drawn

### Parameters control group.

**Comparative level** – The user can enter the profile comparative level. When the option Automatically is selected, the comparative level is set at a level lower by 5 m than the lowest point of the sewage system.

**Collision configurator** button – after clicking this button the user gains access to a collision configuration window, where there are two windows in which he can select the items of the ArCADia

## Longitudinal profile of the installation sections

system that will be included in collision verification. This setting can be saved as a Type in the project library (**Template**).

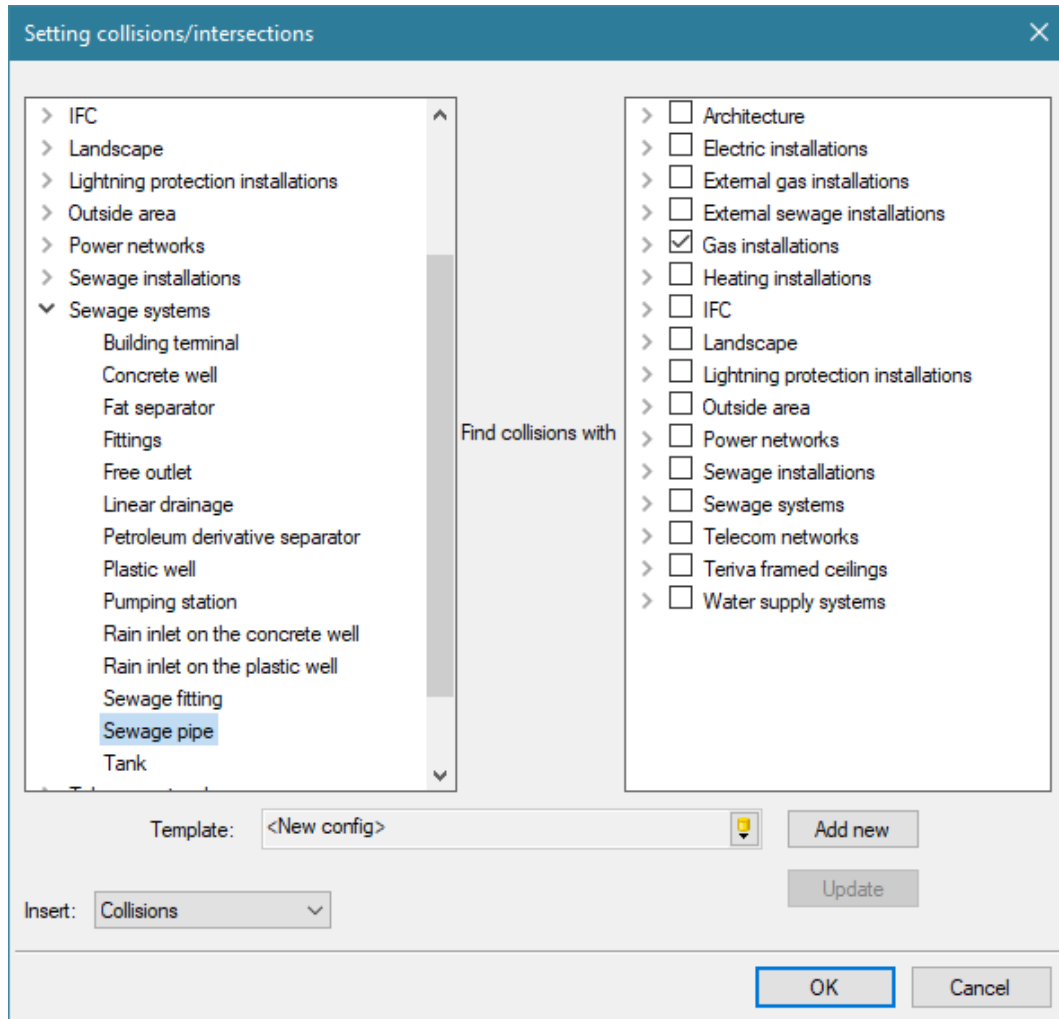


Fig. 77. Collision configurator window

The user may use the drop-down list located in the bottom of the window, where they choose if they want to verify for **Collisions**, **Crossovers** or **Collisions and crossovers**.



Upon approval with the OK button, the colliding items will be visible in the profile.

## 8 SEWAGE INSTALLATION EXTENSION



## Sewage installation extension

An extension of a correctly built sewage installation can be obtained by clicking the:

Entire installation

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations  logical group ⇒  
*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar  
 or input ISWR\_AVA

Installation branches

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations  logical group ⇒  
*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar  
 or input ISWR\_AVB

If the user wants to change the properties of the extension view, he can click the extension frame and then he will gain access to the extensions properties window.

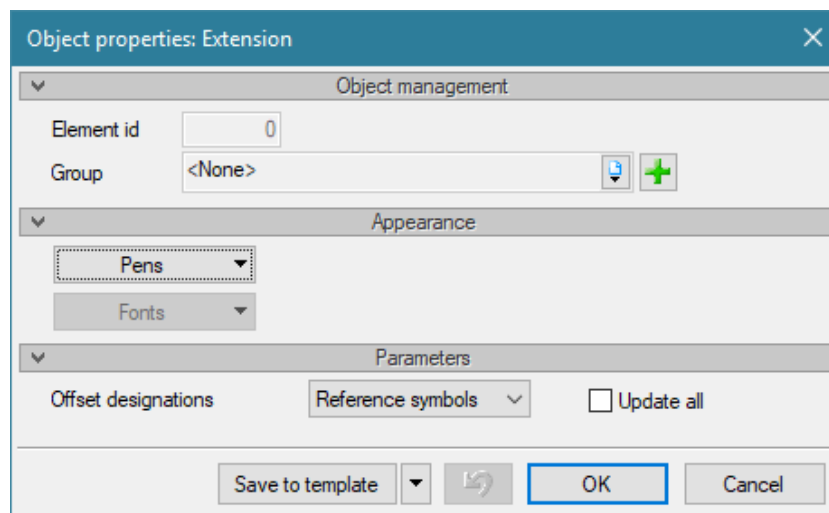


Fig. 78. Extension properties window

**Offset designations** – the user selects one of the two offset insertion possibilities for the extension: these can be reference lines or reference symbols and an update all checkbox. Once the check box is ticked, all the offsets introduced into the extension will change their reference markings and the subsequently introduced ones will already be those selected from the list.



## 9 REPORTS AND LISTS

## Reports and Lists

It is possible to obtain a calculation report for a correctly designed installation

The **RTF report** button is located in the bottom part of the calculation tables. After pressing it the software will display a **Save report** window.

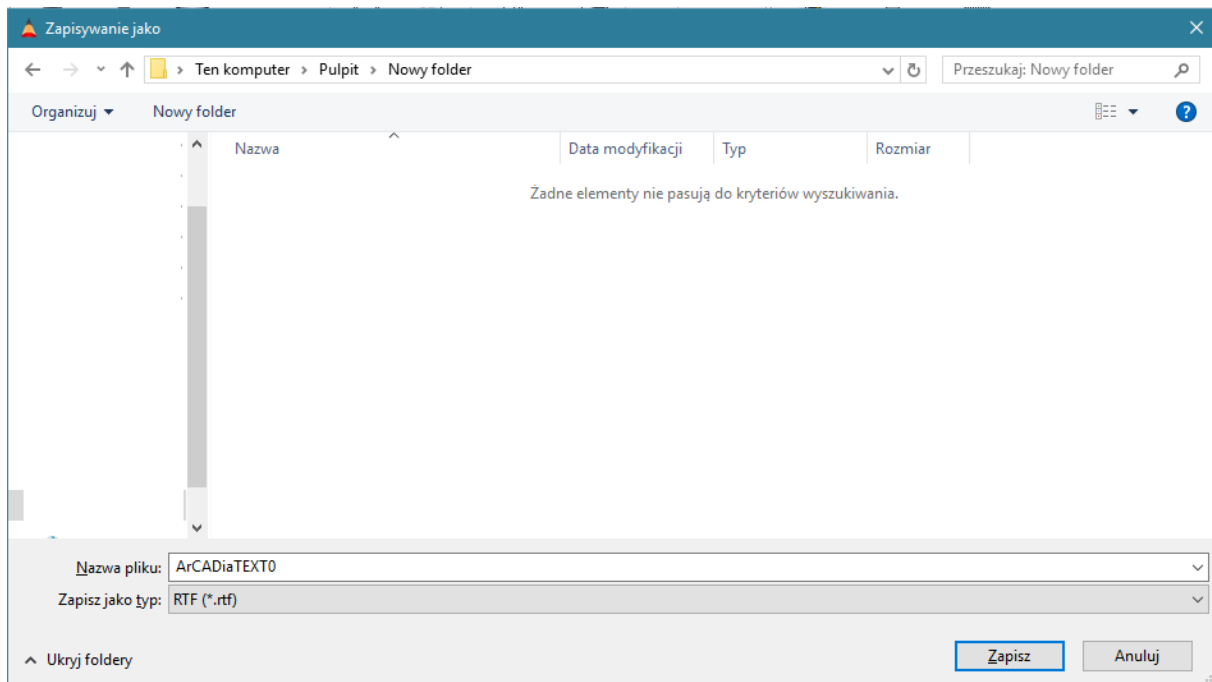



Fig. 79. Saving calculation report window

The software can generate material lists and a sewage installation item list.

For the Sewer installation **material list**

Click the icon:


*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input ISWR\_SLI

or

For the **Sewer installation** item list

*The ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations ⇒  toolbar

or input ISWR\_IL


It is then possible to insert into the drawing a table with a list or material list for all the elements in the project.

## Reports and Lists

If the user wants to insert an element list or list covering only some elements, e.g. for a single room, then:

in order to input a **Selected elements material list** for the sanitary installation, click the icon:

*ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 



*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations toolbar ⇒  (or type ISWR\_SLSI), select items on the projection and confirm by pressing Enter

or

in order to input the **Selected elements list** for the sanitary installation, click the icon:

*ArCADia software:* Sewage ribbon ⇒ Sewage installations logical group ⇒ 

*AutoCAD or ArCADia-INTELLICAD software:* Sewage installations toolbar ⇒  (or type ISWR\_SIL).

Clicking table lines or going to Properties allows the user to edit the table content. After clicking the  button you can also generate RTF reports. After clicking the  button you can export the data from a material list to Ceninwest.

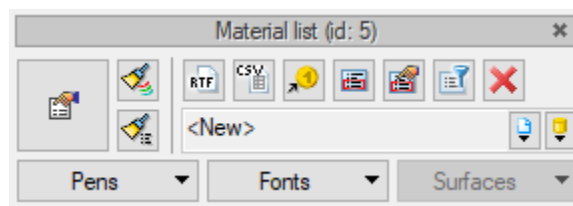


Fig. 80. Sewage installation Material specification modification window

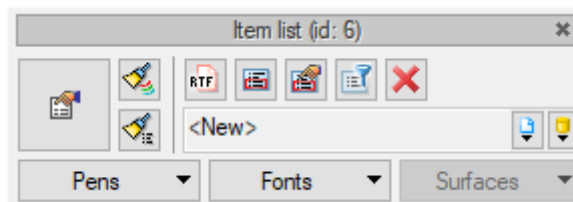



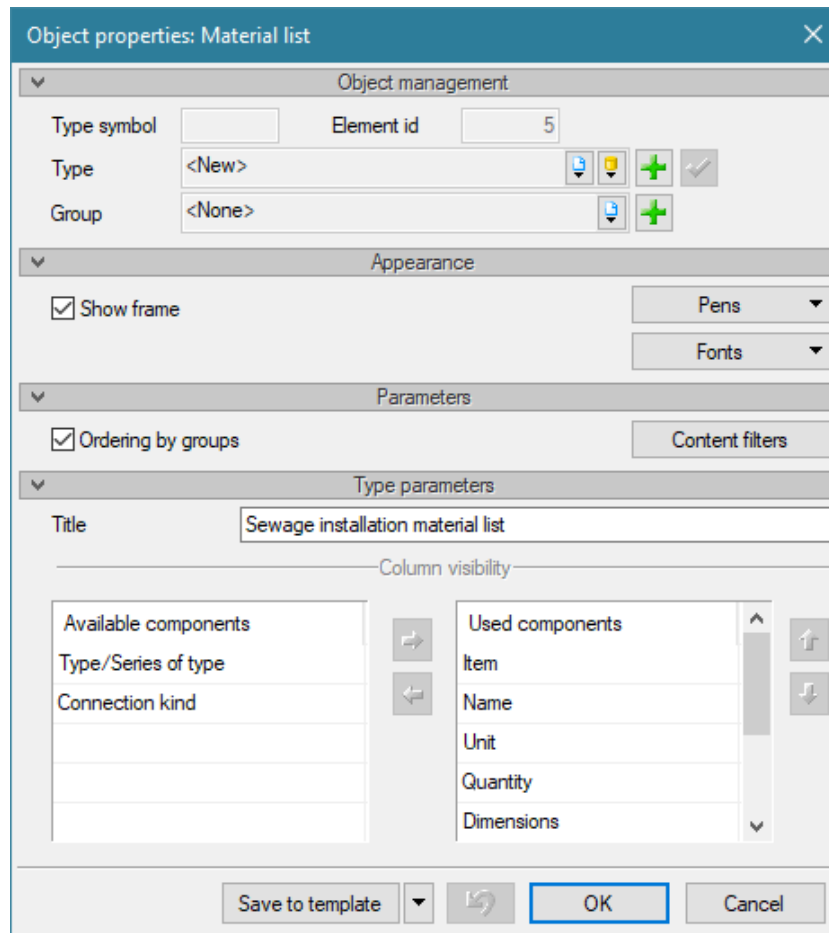
Fig. 81. Sewage installation items list modification window

Once a sewage installation item list or a sewage installation material list is inserted and once you

select the  button or double-click the list frame, a list properties defining window is displayed for the items (Fig. 82) and materials (Fig. 83) respectively.

The appearance and content of the table can be modified by adding or deleting columns (components) in the properties window.

## Reports and Lists



The dialog box is titled "Object properties: Material list" and contains several sections for configuring the material list object.

- Object management:** Includes fields for "Type symbol", "Element id" (set to 5), "Type" (set to "<New>"), and "Group" (set to "<None>").
- Appearance:** Includes a checked "Show frame" checkbox, "Pens" dropdown, and "Fonts" dropdown.
- Parameters:** Includes a checked "Ordering by groups" checkbox and a "Content filters" button.
- Type parameters:** Includes a "Title" field set to "Sewage installation material list".
- Column visibility:** A section with two lists: "Available components" (containing "Type/Series of type" and "Connection kind") and "Used components" (containing "Item", "Name", "Unit", "Quantity", and "Dimensions"). Arrows between the lists allow moving items back and forth.
- Buttons:** "Save to template", "OK", and "Cancel" buttons are at the bottom.

Fig. 82. Sewage installation items list properties window

## Reports and Lists

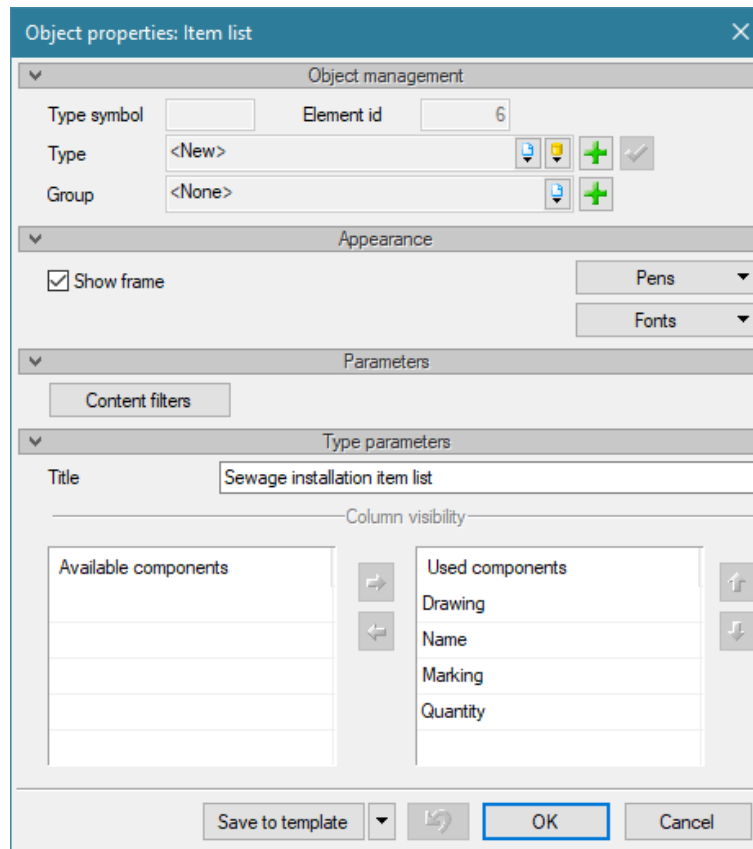




Fig. 83. Sewage installation Material list properties window

A **Material list** or an **Item list** may be selected after inserting – in such a case a modification window becomes available with the icon  **Marking selected elements on the projection**. After clicking on a given icon the user may define the position in the list using the mouse. The highlighted table row can be clicked and all the elements from this row will be selected on the projection.

In order to change properties for all selected elements, e.g. type parameters (diameter, manufacturer, connection type or other parameters), you must click the icon  **Change properties of selected elements**.

## Reports and Lists

Sewage Installation material list		
Item	Name	Unit
Ungrouped		
1	Elbow 8° Polyethylene	pcs
2	Elbow 8° Polyethylene	pcs
3	Elbow 15° Polyethylene	pcs
4	Elbow 30° Polyethylene	pcs
5	Elbow 45° Polyethylene	pcs
6	Elbow 45° Polyethylene	pcs
7	Elbow 45° Polyethylene	pcs
8	Elbow 90° Polyethylene	pcs
9	Elbow 90° Polyethylene	pcs
10	Reduction elbow 90° Polyethylene	pcs
11	Reduction Polyethylene DN110/DN100	pcs
12	Reduction three-way 90° Polyethylene	pcs
13	Reduction three-way 90° Polyethylene	pcs
14	Three-way 45° Polyethylene	pcs
15	Three-way 90° Polyethylene	pcs

Fig. 84. Settings view with selected elements