

ArCADia-HEATING INSTALLATIONS

ArCADia-HEATING INSTALLATIONS 2.0
user manual



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1 INTRODUCTION

Introduction

1.1 The purpose of the software

ArCADia-HEATING INSTALLATIONS is an industry module of the ArCADia BIM system. The program allows for the creation of a professional internal heating installation. The software is intended both for heating installation designers, as well as all the people working in the sanitary and installation sectors in the construction industry. When using the ArCADia-HEATING INSTALLATIONS software, the user can create drawings of an internal central heating system in architectural building projections based on items, with simultaneous creation of calculation diagrams and generation of three types of axonometric projections. There is an expandable library of components used in heating installations available to the user, who can develop it and adjust it according to their own individual needs regarding used equipment and types of materials used in pipelines.

The combination of specialized features used in the application for creating heating installation plans in the scope of the selection and routing of pipelines, as well as selecting fittings along with the possibility to carry out calculations and run validity checks on the designed system provides the perfect tool for designing internal heating installations.

1.2 Features and functions of the software

ArCADia-HEATING INSTALLATIONS software allows the user to:

- prepare drawings of the internal heating system, from the heat source through all the necessary fittings all the way to the receiver;
- insert the receivers, e.g. heaters and fan-coil units, and the route of the pipeline transporting the heating medium;
- insert plumb lines and distributing pipes from a substantial library of pipes made of different materials, using the option of simultaneous drawing of several parallel tubes serving different functions and combining them in a smart way;
- insert fittings and equipment from a comprehensive library of manufacturers (heaters, shut-off valves and filtering fittings, adjusting-protection and measuring fittings and equipment);
- insert different types of equipment with customized shapes and sizes (boilers, expansion vessels, circulating pumps, etc.);
- creating heater connections - automatically create connections of heaters distributed along the pipeline, using the selected geometric method with the detection of pipeline function;
- automatic selection of the diameters of pipes, fittings and heat receivers, including the size of radiators and parameters of underfloor heating;
- automatically create numbering points and an installation description with the editing option and the option of creating your own templates;
- generate three axonometric types (also partial) and make them more legible using the offset method and shortening the segments during one short operation;
- calculate active gravity pressure and active circulation pressure, calculate the required circulation pump parameters and calculate the installation capacity;
- see a preview of the installation in 3D (view generated as an ArCADia 3D View and a view directly in the CAD environment) aiding the correction of pipelines routing errors, which you cannot see in the plan view;

Introduction

- validate the installation in terms of the correctness of connections, as well as providing a clear method of error detection and correction;
- generate reports of performed calculations with the summaries of losses in particular sections of the installation;
- generate prepared lists of the materials and equipment included in the project and intended for further processing and creating estimates of costs and estimating prices.

1.3 References



1. H. Recknagel, E. Sprenger, E. R. Schramek, „Kompendium wiedzy: ogrzewnictwo, klimatyzacja, ciepła woda, chłodnictwo”, RECKNAGEL 08/09 OMNI SCALA.
2. dr inż. Michał Strzeszewski, „Obliczenia hydrauliczne instalacji centralnego ogrzewania”, Wydział Inżynierii Środowiska Politechniki Warszawskiej, Materiały do zajęć z ogrzewnictwa, 2010 r., (źródło – Internet).
3. H. Koczyk, „Ogrzewnictwo praktyczne”, Systherm Serwis, Poznań 2005.
4. PN-EN 1264:2009, Płaszczynowe systemy ogrzewania

1.4 Catalogues


Catalogues of the library of elements are available in the *Producers* tab.

Activation:

ArCADia and ArCADia PLUS

- *Manage* ribbon ⇒ logical group *Options* ⇒ *About ArCADia BIM*  ⇒ *Producers* tab
- *ArCADia-SYSTEM* toolbar ⇒ *About ArCADia BIM*  ⇒ *Producers* tab

ArCADia LT

- *View* ribbon ⇒ logical group *Option* ⇒ *About ArCADia BIM*  ⇒ *Producers* tab

Introduction

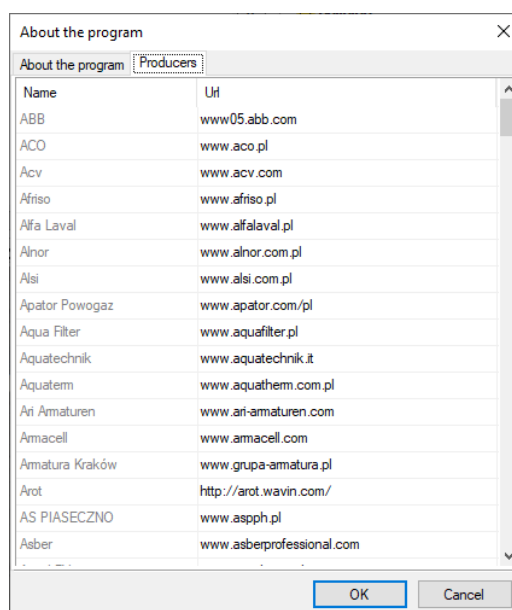


Fig. 1 About the program – producers tab

2 WORKING WITH THE SOFTWARE

Working with the software

2.1 Basic information about the Software

The ArCADia–HEATING INSTALLATIONS software enables the design of internal two-pipe heating systems and the determination of the route of the heating installation pipelines from the heat source to the heaters. The Software allows the user to locate the fittings and devices necessary to create the complete design of a heating installation in terms of drawing. The Software also checks whether the pipelines have been selected properly, heat receivers, determines the critical circuit and selects installation elements from the project library.

The first stage of a project is always to complete the drawing. Inserting any component of the heating installation from the ArCADia–HEATING INSTALLATIONS bar activates the software, which has been designed to enable a flexible (customized) workflow when creating a drawing.

Below is one of the possible workflows for creating a project.

Phase I - creating a drawing

- The design of a heating installation can be started by inserting a heat source or a heating boiler. You need to enter the project input parameters into the properties of these devices e.g., the average supply and return temperature and its type.
- Then you can insert different types of heaters based on the specific nature of the project, radiant heating, fan-coil units, air heaters, giving them the appropriate geometric and technical parameters.
- The next step is to determine the route for the installation so that the receivers are logically connected with the heat source or the heating boiler. When drawing pipeline routes, you can determine their diameter, material, and series of type. Alternatively, you may select catalogues with the manufacturers' series of type and after performing the calculations the software will choose those pipelines that meet the selection criteria.
- While drawing the route, appropriate blocking fittings, regulatory-protective fittings, measurement devices and filters etc. need to be inserted.
- After drawing an installation, you can run validity checks on the designed installation in terms of the connection of all the designed items in the installation project, verifying the continuity of the installation and verifying the connection to the heat source.

Phase II. Calculations, lists and bills of materials

1. Once the drawings are ready and the validity checks of the installation have been performed, the user may perform the calculations. Calculations can be selected for each circuit and the software will indicate the critical circuit. The user has the possibility of controlling the chosen diameter adjustments and the application of these adjustments applies them automatically to the drawing and the installation is recalculated and regenerated.
2. The user receives information about: a total of linear and local pressure loss in the particular circuit and the total pressure loss for the entire installation.
3. The calculations and results for the selected installation circuit can be generated in an RTF report.
4. The user has also the possibility of performing the axonometry of an inserted installation, not only of the whole system, but also of any selected part of the installation, as well as adjusting the appearance and location of the items in the axonometry, e.g. for printing.
5. After confirming the correctness of the graphical part and the calculation part of the heating installation, the user may choose to generate:

Working with the software

- an item list (legend) – can be saved in RTF format,
- a bill of materials – can be saved in RTF format and exported to Ceninwest software in order to create estimates of costs and estimating prices with the use of the simplified method.

3 PROGRAM INTERFACE DESCRIPTION



Program interface description

3.1 Project Manager


Project Manager allows the user to manage all ArCADia–HEATING INSTALLATIONS software: pipelines, fittings, receivers etc.

Activation:

ArCADia and ArCADia PLUS

- *Manage* ribbon ⇒ logical group *Project* ⇒  *Project Manager*
- *ArCADia-SYSTEM* toolbar ⇒  *Building wizard*

ArCADia LT

- *View* ribbon ⇒ logical group *View* ⇒  *Project Manager*

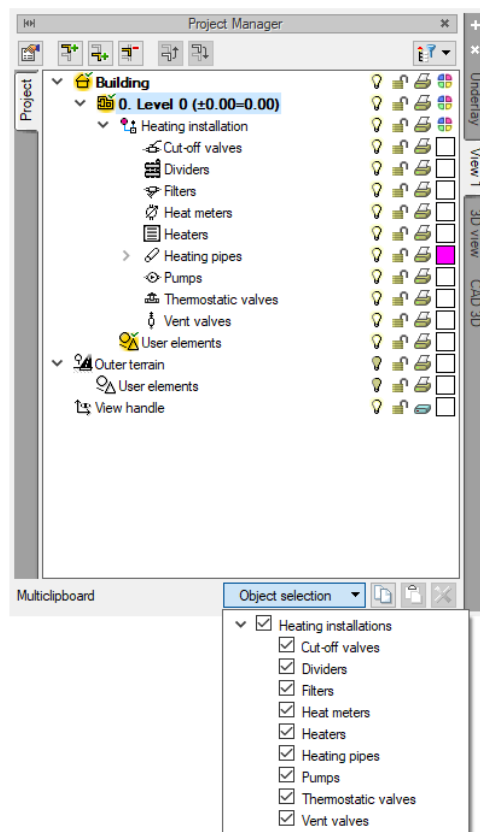





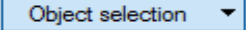


Fig. 2 The Project Manager window

Program interface description

Tab. 1 The Project Manager functions

Icon	Description
	<i>Insert level above</i>
	<i>Insert level below</i>
	<i>Delete level</i>
	<i>Move level up/down</i>
	View tab
	multi-clipboard item selection

From the *Project Manager* window, the user can add and remove building levels and change their location in relation to each other. The user can also switch between views using the tabs on the right or left side of the *Manager*.

The *Manager* window can also hide the components that are not necessary for the user during design, by clicking the bulb (dark bulb) located next to the names of the components. After clicking the padlock (dark padlock), the user will not be able to make changes in the selected element. After clicking the printer symbol, you can similarly deactivate the elements selected for printing.

After you select the elements tree, in the *Project Manager*, there is a multi-clipboard at the bottom of the window. By using it, the user can copy elements from the selected level onto the clipboard. Selecting the elements to be copied is done by selecting them in the list of item selection. Then it will be possible to paste them, e.g. into the next level.

Program interface description

3.1.1 Adding and editing groups, object management

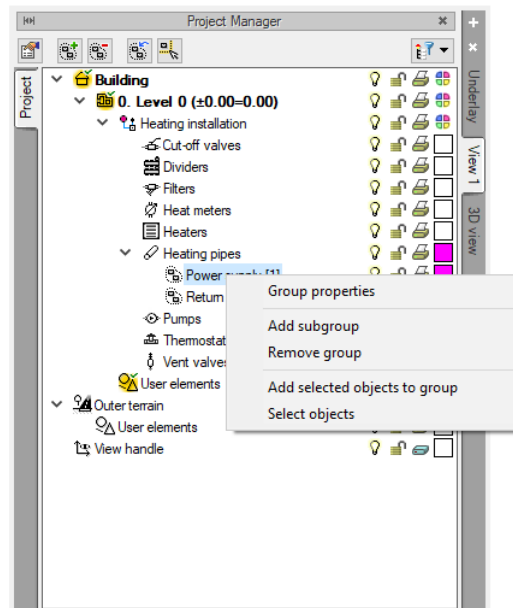


Fig. 3 The Project Manager window, object management

From the level of this window, you can change general settings, such as colours or line thickness for a specific group of items. You can also select and edit the properties of all heating installation elements, by right-clicking on a group of items such as Heating pipes/Return. By the group name in brackets [] there is a certain number of elements belonging to this group. When you right-click on a particular group, the user can select the operations to perform. Similarly to managing groups, the user can manage items. From the Manager tree level, you can select, for example, all the valves and change the settings of the description, pens, fonts, perform renumbering etc.

3.2 3D view

ArCADia projects are three-dimensional projects. All entered elements have information about the sizes in the plan view and in the vertical view. The project can be viewed in the 3D View, in a 3D CAD model, in a cross-section and e.g., in axonometry.

NOTE: The ArCADia system has a separate project tree for each view, placed on the tab of a given view. This means that the 3D view has a separate project tree and to include (exclude) elements from the preview, first change the view to **3D view** in the **Project Manager**, and then select the visibility of the elements. This will not change the visibility in the other views.

The 3D view tree is different from the other views in that you cannot adjust item printing properties in the view tree, since only a saved image can be printed. Instead of printing, the view tree offers the feature to glaze an element. You can use the “glass” icon to do this.

Program interface description

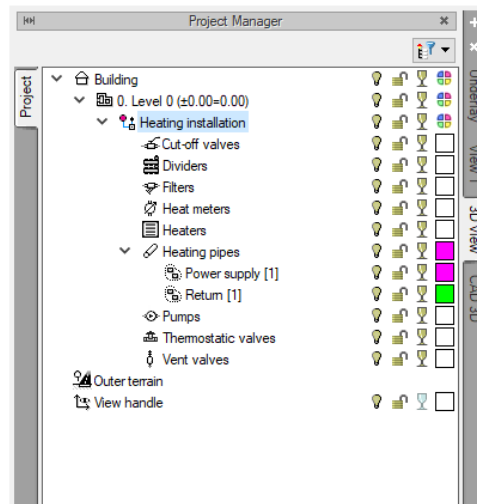





Fig. 4 3D view in the Project Manager window

Activation:

ArCADia and ArCADia PLUS

- View ribbon ⇒ logical group Views ⇒  3D view
- ArCADia-SYSTEM toolbar ⇒  Show/Hide 3D view

ArCADia LT

- View ribbon ⇒ logical group Insert ⇒  3D view

NOTE: Depending on the configuration of the computer, the program will start the Advanced or Simplified **3D view** engine. If the computer does not meet the basic hardware requirements, the old engine will be used.

A DirectX 11 compatible graphics card with a minimum of 2 GB VRAM is required to support the new 3D view engine; 4 GB + VRAM recommended (depends on the loaded project - the number of textures used, their resolution, quality settings, resolution of the 3D view window). The supported operating systems are: Windows (7 SP1 / 8/10) x86 / x64. Processor: with SSE2 function support; minimum Intel Pentium 4/AMD Athlon x64; Intel i5 / i7 with 3 GHz + clock recommended (as many cores as possible are recommended, the engine can use them). Operating memory: minimum 1 GB; recommended 8 GB + (depends on the size of the loaded project).

The **3D view** is handled similarly to the plan view by the **Project Manager** in its separate **View** tree, which means that to select visible (or invisible) elements first switch to the **3D view** tab. Then, what is marked in the current view in the project tree is displayed on the preview, and what is turned off is not displayed.

Program interface description

3.3 CAD 3D Model

In ArCADia 14, in new projects, when drawing with ArCADia system objects, a new **CAD 3D** view is automatically introduced. By default, this is a three-dimensional mesh design model placed in the drawing area. There can only be one such model in a project.

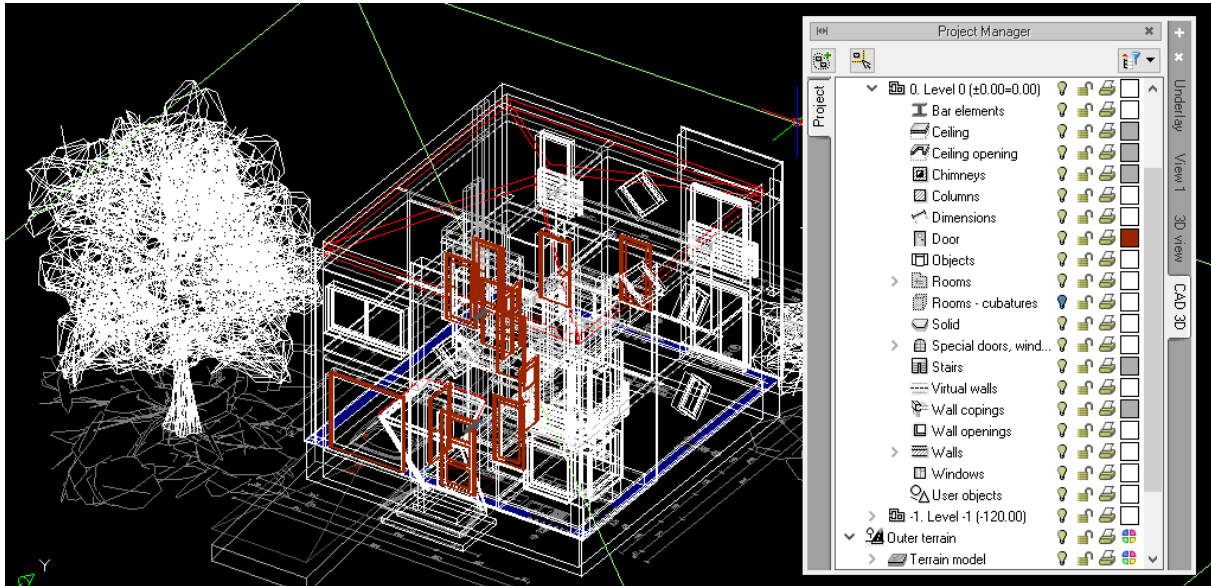





Fig. 5 Sample project in 3D CAD view

In documents from earlier versions of the program, the model is not entered automatically, it must be entered by indicating the location (similarly to entering subsequent projections).

Activation

ArCADia and ArCADia PLUS

- **Insert** ribbon ⇒ logical group **View** ⇒  **Insert 3D CAD view**
- **Project Manager** ⇒  ⇒ **Insert 3D CAD view**
- **ArCADia-SYSTEM** toolbar ⇒  **Insert 3D CAD view**

The view is entered by inserting a view handle.

Program interface description




3.4 Cross-section

Having installed the license for ArCADia-ARCHITECTURE or ArCADia-VENTILATION SYSTEMS, any number of vertical sections can be entered into the project. Sections can be straight or stepped.

3.4.1 Adding a cross-section

Activation:

ArCADia and ArCADia PLUS

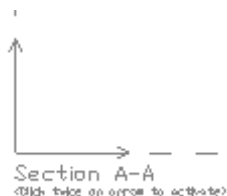
- [Insert](#) ribbon ⇒ logical group [View](#) ⇒  [Insert cross-section](#)
- [Project manager](#) ⇒  ⇒ [Insert cross-section](#)
- [ArCADia-SYSTEM](#) toolbar ⇒  [Insert cross-section](#)

ArCADia LT

- [View](#) ribbon ⇒ logical group [Insert](#) ⇒  [Insert cross-section](#)

NOTE: The cross-section can only be created in the active plan view. In the remaining views: sections, 3D view, axonometry, etc., the cross-section will not be inserted, but information about the need to switch to the projection view will be displayed.

The cross-section is introduced by indicating with two points the building cutting line, its direction and the place of drawing. By default, when you set a cross-section, it is shown as an inactive view. If we want to go to the cross-section, just double-click on the view symbol



or select its name on the [Project Manager](#) tab.

All levels are active in the cross-section, so you can edit elements on each of them without having to switch between them. The program allows you to turn on 3D objects on a cross-section. This option is disabled by default, because redrawing more objects may take some time (depending on the complexity of the objects and their number). When opening a project from an older version, the objects in the cross-sections will not be visible because their visibility bulb is turned off. Objects will be turned on when the bulb status changes.

NOTE: In the **View properties** it is best to set the refresh method to **Manual** for the cross-section created. This will not slow down your work due to having to insert one item in each view.

Program interface description

In the cross-section properties you can define the way of showing the cut building: only cut elements visible or all cross-section elements visible. The *Zero Depth* option shows only cut elements, and features that are distant from the cross-section cut line are not displayed.

NOTE: *The cross-section is one of the views of the designed building solid. Any modifications on the cross-section will also be mapped on the other views (projections and in the 3D view). If there is a need to change the cross-section without interfering with the solid of the building, then in the **View properties** you can use the **Convert to drawing** function for the cross-section. Any modifications to the exploded view no longer affect the design. It also means that the change of the building solid will not be drawn on such a cross-section.*



After inserting a cross-section, it is an inactive view, work still continues in the plan view. To switch to the cross-section, click its tab in the *Project Manager* window or double-click the cross-section handle.

3.5 Project options


The ArCADia BIM system has a program settings window for drawings made in all industry modules or in specific ones, e.g. in ArCADia-HEATING INSTALLATIONS. General settings include font definition, the ability to automatically check for program updates, information about the texture and script folders used in the program, and the tracking options. Settings for specific modules can be found under the buttons in the right part of the window.

Activation:

ArCADia and ArCADia PLUS

- *Manage* ribbon ⇒ logical group *Options* ⇒  *ArCADia BIM options*
- *ArCADia-SYSTEM* toolbar ⇒  *Options*

ArCADia LT

- *Home* ribbon ⇒ logical group *Options* ⇒  *Options*

Program interface description

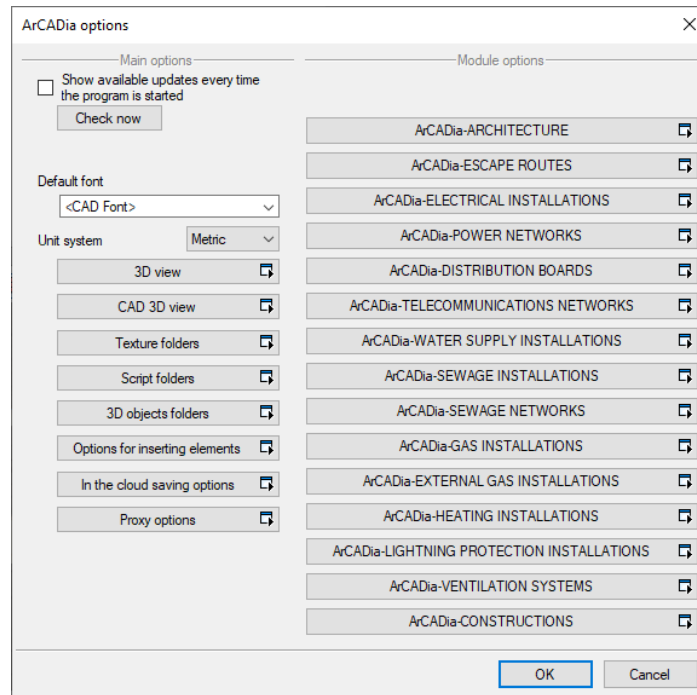





Fig. 6 ArCADia options window

3.5.1 View



The ArCADia program presents the project in a building or building views: projections, 3D CAD model, sections, elevations. All existing buildings and levels or only selected elements can be displayed on the view.

Adding a view:

ArCADia and ArCADia PLUS

- *Project Manager* ⇒  ⇒ *Insert view*
- *Insert* ribbon ⇒ logical group *View* ⇒  *Insert view*
- *ArCADia-SYSTEM* toolbar ⇒  *Insert view*



ArCADia LT

- *Project Manager* ⇒  ⇒ *Insert view*
- *View* ribbon ⇒ logical group *Insert* ⇒  *Insert view*


NOTE: Another (new) view can be inserted with only the plan view active. In the remaining views: cross-sections, 3D view, axonometry etc. new views will not be inserted, but information about the necessity to switch to the projection view will be displayed.

Program interface description

Switching and managing the view takes place in the *Project Manager*.

Only one building and one level can be active for a view. The rest is just an underlay that can be seen or turned off with the icon . It means that entering and editing takes place only on the level marked with the icon  of the active level. Switching between what is active, is done by double clicking on a given level.

NOTE: For views such as: *View* and *CAD 3D*, you need to activate the level you are working on (this applies to a building made of ArCADia system objects). There is no active level in the other views.

To add a projection view, we insert the view after selecting the *Insert view* icon  and indicating its location. Before or after entering a view, you can set its properties by right-clicking on a tab of a given view and selecting *View properties* from the context menu.

High - the most detailed view, pipes are drawn with four lines reflecting their actual external and internal dimensions (pipe thickness is shown), objects reflect objects seen in the 3D view.

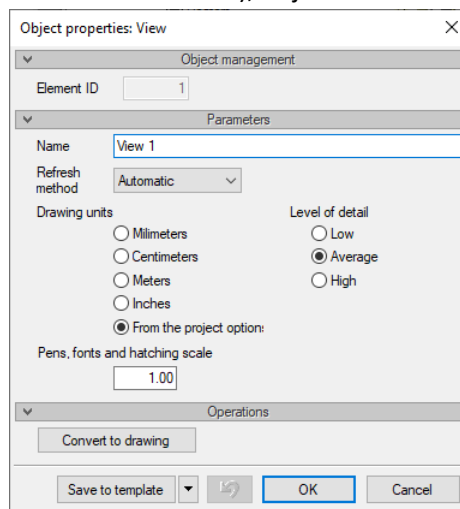


Fig. 7 Properties window of the selected view

In the above window you can assign a *Name*, *Refresh Method* and *Drawing Units*. Additionally, the selected view can be *Converted to drawing* that will be composed only of lines. This will allow, for example, to refine the details of a cross-sections or other details.

Changing the *Drawing Units* will rescale the elements of this view, descriptions will change automatically only if this is checked in the description units: *From project options*. Otherwise, they will remain described by the unit that is given to them.

Selecting a *Level of Detail* determines how design elements are displayed:

Low – simplified view, pipes are drawn as lines, and objects are presented as default 2D views.

Program interface description


Average – extended view, pipes are drawn with two lines reflecting their actual dimensions, objects are a reflection of objects seen in the 3D view.

High - the most detailed view, pipes are drawn with four lines reflecting their actual external and internal dimensions (pipe thickness is shown), objects reflect objects seen in the 3D view.

NOTE: With a large project consisting of several views, you may need to define the refresh method as **Manual**. This will significantly speed up the work on the project, because the element introduced in one view will not have to be presented on the others. Each time all the introduced options are mapped to more than one view, the drawing process is significantly longer.



3.5.2 3D view

ArCADia BIM 14.0 has two built-in 3D view graphics engines. Depending on the parameters of the graphics card, a new or old 3D view will be launched with the program. If you run the old one, it will mean that either the computer does not meet the minimum hardware requirements, or it meets them in the minimum option and the project will run very slowly.

Switching engines can be done in the **3D View** window with the icon  **Switch the 3D View mode or in the Options window**. The first option toggles the engine only in a given document. If more than one project is open, the rest will still be displayed in the default engine. The **Options** window defines the 3D engine with which the program and each subsequent project will be launched by default.

Activation:

ArCADia and ArCADia PLUS

- **Manage** ribbon ⇒ logical group **Options** ⇒ **ArCADia BIM options**  ⇒ **3D view**
- **ArCADia-SYSTEM** toolbar ⇒  **Options**

ArCADia LT

- **Home** ribbon ⇒ logical group **Options** ⇒ **Options**  ⇒ **3D view**

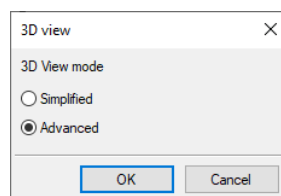


Fig. 8 3D view mode change window

3.5.3 CAD 3D view

ArCADia 14.0 introduces three-dimensional elements into the CAD environment. You still work in the project on the view, but if the view is changed to isometry, you will see the mesh of 3D elements and their symbol. The appearance of the model can be modified using the **Visual Styles** (the option is available on the **View** ribbon).

Program interface description

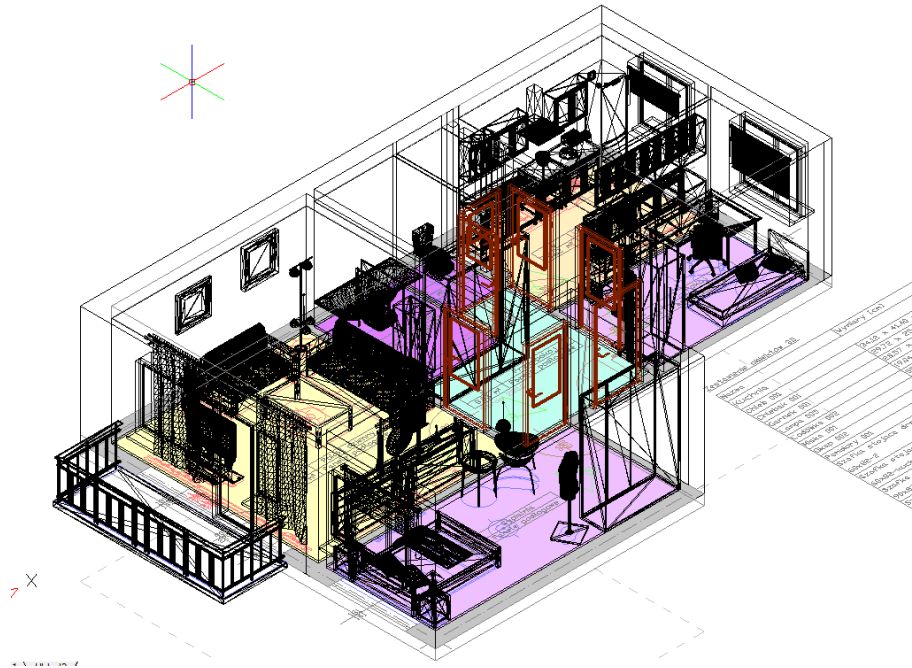


Fig. 9 Sample project in CAD 3D view

View settings, which are the automatic insertion and view adjustment, can be found in the window below.

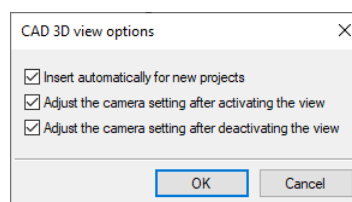


Fig. 10 View settings window of 3D CAD

Insert automatically for new projects – the option creates a CAD model in each new project while drawing elements. With lower spec computers, you can turn off this option. A *CAD 3D* model can be introduced at any time during work, but there can be only one such model in the project.

Adjust the camera setting after activating the view – the option automatically changes the design view to isometric when switching to *CAD 3D* view. The automatically changing view shows the entire project, not just the zoom area where you are currently working.

Adjust the camera setting after deactivating the view – the option automatically changes the project view into a top view when switching to the view type: plan view, cross-section or axonometry. The automatically projected view centers the entire project.

3.5.4 Options for inserting elements

While introducing elements, the ArCADia system displays various information at the cursor, e.g. location or distance. This information is shown in the underlay and in an additional floating window. The management of these items can be found in the window below.

Program interface description

The ArCADia BIM system has tracking options (for most of the entered elements). This means that when entering a given element, it will detect the same elements and, in some cases, walls, columns and binding joists.

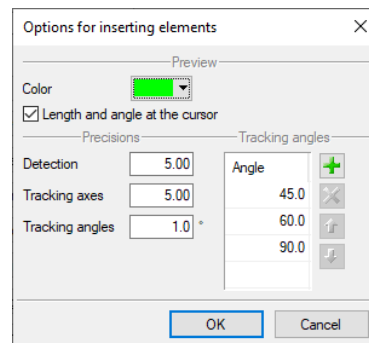


Fig. 11 The options window for inserting elements

Color – color of trace of entered elements and displayed tracking lines.

Length and angle at the cursor – the distance of the cursor from the last click location given by the length and angle. By default, these data are displayed next to the cursor.

Precisions:

Detection – the option detects edges, axes, corners and points of elements already introduced into the project, thus enabling precise placement of the cursor on drawn objects.

Tracking axes – the option detects points and edges of the entered elements, leading from them the horizontal and vertical axes relative to the screen or, if it is e.g. a wall edge, it also shows the extension of such a line.

Tracking angles – the option indicates the angles set in the above window, determining them from the previously entered elements, e.g. from the edges of the drawn walls.

Angle – angles that the program detects and indicates between elements that already exist in the project and those that are entered.

Enabling and disabling the above-described tracking options takes place while drawing in the element insertion window.

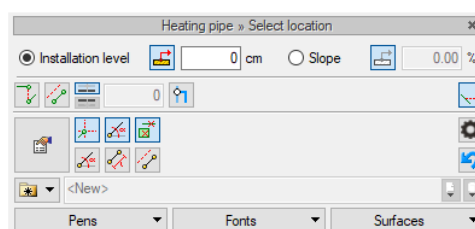






Fig. 12 An example of a window for inserting the Heating pipe element

Program interface description

Tab. 2 Tracking functions in the insert window

	<i>Tracking axes</i>	Option showing straight horizontal and verticals from detected points of inserted elements. If the option detects the edge of the entered element, it will show the straight extended edge found.
	<i>Tracking angles</i>	The option shows the given angles determined from the existing elements in the project.
	<i>Element and section detection</i>	The option detects edges and points of the entered elements.
	<i>Options for inserting elements</i>	Brings up the settings window.

3.5.5 Module options

The user can also turn on the options window of a given module (*Project options*) from the ArCADia options window. For this purpose, select the module name from the options available on the right side of the window - eg ArCADia-HEATING INSTALLATIONS. The *Project Options* window is displayed

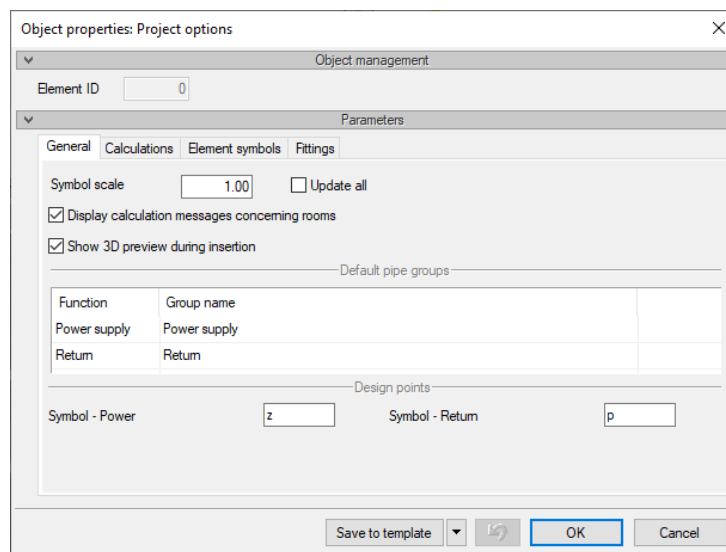


Fig. 13 The project options properties window – General tab

In the project options properties, you can set the main features, using one of five tabs:

General tab

Here, the user can define which default (groups) of pipelines they want to have available from the bar (ribbon) level while working with the program. The feature assigns the pipelines to a group with particular default parameters and a specific function, e.g. *Supply*. In the column *Group name*, the user can set their name, which will be displayed on the various reports.

Symbol scale – the user can change the scale of symbols inserted on the projection, and after the *Update all* checkbox is ticked, the program will change the scale of the symbols previously inserted into the view.

Program interface description

Display calculation messages concerning rooms – once this checkbox is ticked, the program will display messages related to the arrangement of receivers in the rooms. Information will be provided if there is no heat receiver in any of the rooms. Information will be provided as to whether a receiver is assigned to a room and what is the ratio between the power of the heater and the thermal power of the heated room.

Show 3D view during insertion – when selected, the *3D view preview* window will appear while inserting and combining elements.

Object properties: Project options

Object management

Element ID: 0

Parameters

General Calculations Element symbols Fittings

☒ Consider heat gain from pipes

Heating circuits

Circuit type	Delivery temperatur...	Return temperatur...
1 Radiator heating	75.0	55.0
2 Floor heating	45.0	35.0

Heat consumers matching tolerance

Receiver power shortage: 5 % Receiver excess power: 15 %

Thermostatic valve authority matching tolerance

Minimum authority: 0.30 Maximum authority: 0.70

Permissible values for the radiant heating

Max loss of pressure for the coil: 20 kPa Max coil length: 120 m

Save to template OK Cancel

Fig. 14 The project options properties window – Calculations tab

Calculations tab

Consider heat gains from pipes – selecting this option reduces the required heat power of receivers in the room by the value of heat gains from pipes of the central heating installation run through this room.

Heating circuits – the user can define the circuit type, supply temperature and return temperature. The heating circuits can be selected at a divider or a three-way valve and calculation parameters can be changed for subsequent design sections.

Heat consumers matching tolerance – the user can determine the acceptable receiver power deficit or excess for the project. If the power of the receivers in comparison to the power demand of the room exceeds the values determined in the options, a message giving information about exceeding these values will appear in the calculations.

Thermostatic valve authority matching tolerance – the user can determine the minimum and maximum value of thermostatic valve power. The program will include these values in the calculations and selections. If they are exceeded and the Software does not find a valve set point that meets the criteria in the database, a message will appear in the calculation window to inform the user that the software could not select a thermostatic valve set point.

Permissible values for the radiant heating – the user has two controls available:

Program interface description

- *Max loss of pressure for the coil [kPa]* – in the editing field, the user can enter the maximum pressure loss value. The program will include this value in the calculations and will display an appropriate message if it is exceeded.
- *Max coil length [m]* – the user can enter the maximum coil length value in the editing field. The program will include this value in the calculations and will display an appropriate message if it is exceeded.

Element symbols tab

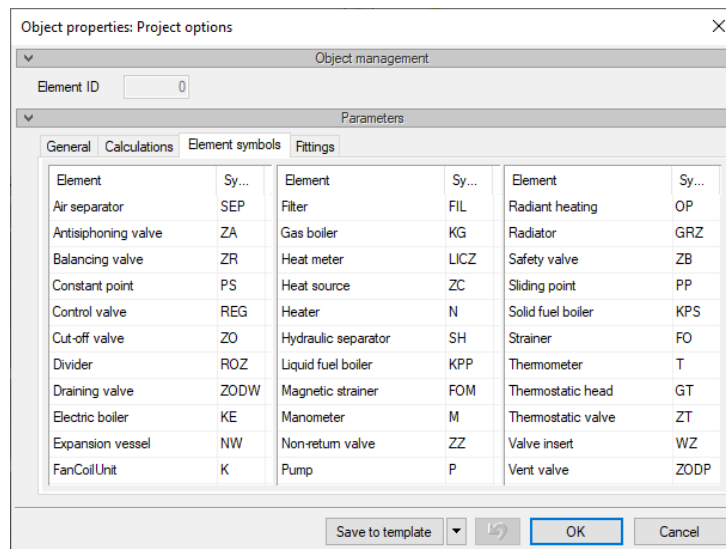


Fig. 15 The project options properties window – Element symbols tab

This is where the user can change the heating pipe symbols of elements, set by default in the program.

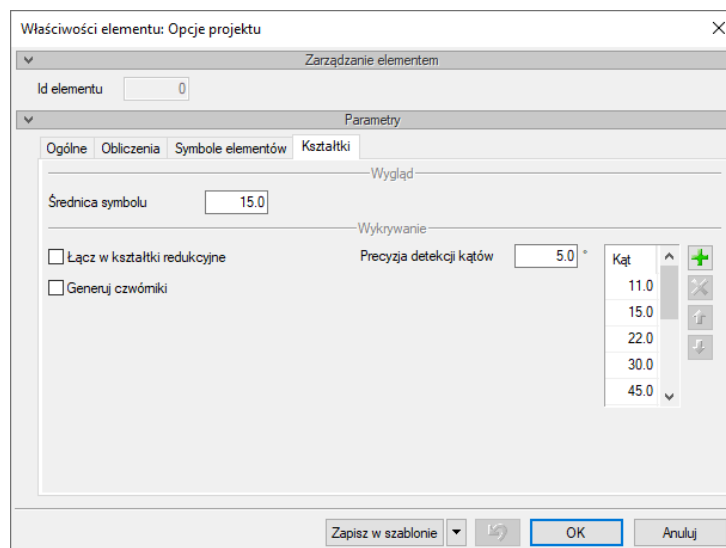


Fig. 16 The project options properties window – Fittings tab

Program interface description

Fittings tab

This is where the user can change the default settings associated with generating of fittings in the heating installation.

3.6 ArCADia–HEATING INSTALLATIONS module tool bar

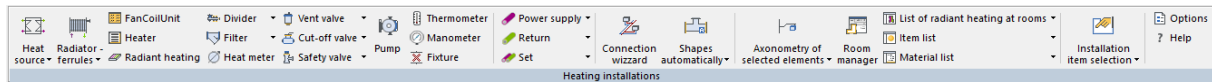



Fig. 17 ArCADia–HEATING INSTALLATIONS module tool ribbon













Drop-down buttons  include more than one command

The table below describes all the functions available in the toolbar. To make it easier to navigate around the toolbar, groups of objects and commands with different functions are separated by vertical separators.


**BIM* – options available to ArCADia BIM license holders, i.e. after purchasing one of the programs: ArCADia, ArCADia LT or ArCADia PLUS.

Program interface description



















Tab. 3 ArCADia–HEATING INSTALLATIONS module features

Icon	Option	Description	*BIM
	<i>Heat source</i>	Inserts a heat source and allows you to select and/or define the characteristic parameters of the heat source as the heating installation start point.	✓
	<i>Heating boiler</i>	Inserts a boiler and allows you to select and/or define the characteristic parameters of the boiler as the heating installation start point.	✓
	<i>Radiator</i>	Inserts a radiator and allows you to select and/or define the characteristic heater parameters.	✓
	<i>Radiator-connectors</i>	Inserts a radiator with connectors.	✓
	<i>Fan coil unit</i>	Inserts a fan coil unit and allows you to select and/or define the characteristic fan coil unit parameters.	✓
	<i>Heater</i>	Inserts a heater and allows you to select and/or define the characteristic heater parameters.	✓
	<i>Radiant heating</i>	Inserts a radiant heating and allows you to select and/or define the characteristic radiant heating parameters.	✓
	<i>Divider</i>	Inserts a divider and allows you to select and/or define the characteristic divider parameters.	✓
	<i>Expansion vessel</i>	Inserts an expansion vessel and allows you to select and/or define the characteristic expansion vessel parameters.	✓
	<i>Hydraulic separators</i>	Inserts a hydraulic separators and allows you to select and/or define the characteristic hydraulic separators parameters.	✓
	<i>Filter</i>	Inserts a filter and allows you to select and/or define the characteristic filter parameters.	✓
	<i>Strainers</i>	Inserts a Strainers and allows you to select and/or define the characteristic Strainers parameters.	✓
	<i>Air separator</i>	Inserts an air separator and allows you to select and/or define the characteristic air separator parameters.	✓
	<i>Heat meter</i>	Inserts a heat meter and allows you to select and/or define the characteristic heat meter parameters.	✓
	<i>Vent valve</i>	Inserts a vent valve and allows you to select and/or define the characteristic vent valve parameters.	✓
	<i>Draining valve</i>	Inserts a draining valve and allows you to select and/or define the characteristic draining valve parameters.	✓
	<i>Thermostatic valve</i>	Inserts a thermostatic valve and allows you to select and/or define the characteristic thermostatic valve parameters.	✓
	<i>Cut-off valve</i>	Inserts a cut-off valve and allows you to select and/or define the characteristic cut-off valve parameters.	✓

Program interface description

	<i>Non-return valve</i>	Inserts a non-return valve and allows you to select and/or define the characteristic non-return valve parameters.	✓
	<i>Safety valve</i>	Inserts a safety valve and allows you to select and/or define the characteristic safety valve parameters.	✓
	<i>Balancing valve</i>	Inserts a balancing valve and allows you to select and/or define the characteristic balancing valve parameters.	✓
	<i>Control valve</i>	Inserts a control valve and allows you to select and/or define the characteristic control valve parameters.	✓
	<i>Pump</i>	Inserts a circulating pump and allows you to select and/or define the characteristic pump parameters.	✓
	<i>Thermometer</i>	Inserts a thermometer and allows you to select and/or define the characteristic thermometer parameters.	✓
	<i>Manometer</i>	Inserts a manometer and allows you to select and/or define the characteristic manometer parameters.	✓
	<i>Fixture</i>	Inserts a fixture and allows you to select and/or define the characteristic fixture parameters.	✓
	<i>Power supply</i>	Inserts a heating pipe from the <i>Supply</i> group and/or allows you to define the parameters of the particular pipeline and select the supply pipeline insulation.	✓
	<i>Vertical heating pipe – supply</i>	Inserts a vertical heating pipe from the <i>Supply</i> group and/or allows you to define the parameters of the given pipeline and select supply pipeline insulation.	✓
	<i>Change line into heating pipe - supply</i>	Converts a line into a supply pipe, at the active level.	✗
	<i>Return</i>	Inserts a heating pipe from the <i>Return</i> group and/or allows you to define the parameters of the given pipeline and select return pipeline insulation.	✓
	<i>Vertical heating pipe – return</i>	Inserts a vertical heating pipe from the <i>Return</i> group and/or allows you to define the parameters of the given pipeline and select return pipeline insulation.	✓
	<i>Change line into heating pipe - return</i>	Converts a line into a return pipe, at the active level.	✗
	<i>Set</i>	Inserts a heating pipe set from the groups of any configuration and/or allows you to define the parameters for a given pipeline set and to choose pipelines insulation from this set.	✓
	<i>Vertical heating pipes set</i>	Inserts a vertical heating pipe set from the groups of any configuration and/or allows you to define the parameters for a given pipeline set and to choose pipelines insulation from this set.	✓
	<i>Connection wizard</i>	Automatically inserts connections between heaters and pipelines in three possible ways.	✗

Program interface description



	<i>Change installation height</i>	Moves heating installation vertically by a given value.	✓
	<i>Fittings automatically</i>	Automatically generates connection fitting sets on pipelines.	✓
	<i>Fastenings automatically</i>	Automatically inserts fastenings in the installation – sliding points.	✓
	<i>Axonometry</i>	Inserts the axonometry of the heating installation	✗
	<i>Branch axonometry</i>	Inserts the axonometry of installation sections (branches).	✗
	<i>Room manager</i>	Displays the Room manager window, where you can define the rooms included in the project.	✓
	<i>List of heating</i>	Inserts a list of the heating types and room power.	✓
	<i>List of receivers at rooms</i>	Inserts a list of receivers based on the room, where they are designed.	✓
	<i>List of radiant heating at rooms</i>	Inserts a list of Radiant heating in the rooms.	✓
	<i>Item list</i>	Inserts an item list with symbols used in the View (drawing key).	✓
	<i>Insert selected elements list</i>	Inserts a user defined elements list with symbols used in the View (drawing key).	✓
	<i>Material list</i>	Inserts a material list for the elements located in the View.	✓
	<i>List of selected element materials</i>	Inserts a material list for the elements selected by the user in the View.	✓
	<i>Installation item selection</i>	Displays a window with installation verification, possible errors, information and warnings.	✗
	<i>Calculations and report for the heating systems</i>	Displays calculation tables and generates a report showing the technical calculations and correctness of the designed installation.	✗
	<i>Heating system verification</i>	Displays a window with installation verification, possible errors, information and warnings.	✓
	<i>Options</i>	Sets basic drawing options.	✓
	<i>Help</i>	Displays the help content for the program.	✓

Program interface description

3.7 Object Explorer

Activation:

ArCADia and ArCADia PLUS

- *Insert* ribbon ⇒ logical group *Insert* ⇒  *Object Explorer*
- *ArCADia-SYSTEM* toolbar ⇒  *Object Explorer*

ArCADia LT

- *View* ribbon ⇒ logical group *Insert* ⇒  *Object Explorer*

The *Object Explorer* window is used to introduce and insert pre-defined 2D and 3D objects, as well as layouts.

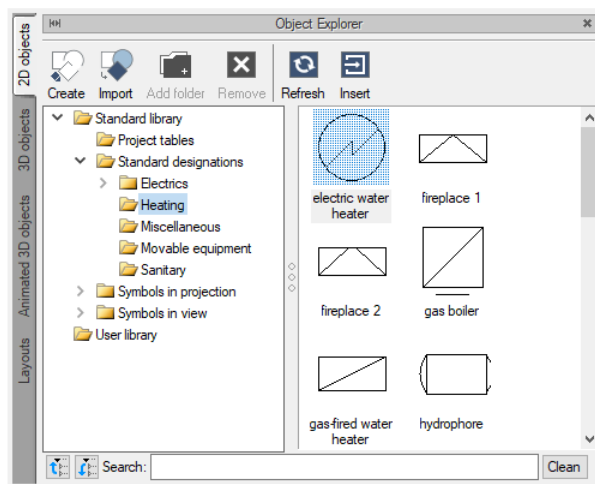


Fig. 18 Object explorer window

On the left side of the *Object Explorer* window there are the following tabs:

2D Objects – this tab allows you to select an existing 2D object or introduce a new 2D object such as Title Block.

3D Objects – this tab allows you to select an existing 3D object or introduce a new 3D object.

Each of the 3D objects (both from the *Standard library* or the *User library*) can be used to change the default appearance of heating objects. Such a change can be made in the *Object Properties* window e.g. Filter **Błąd! Nie można odnaleźć źródła odwołania.**Fig. 19

Program interface description

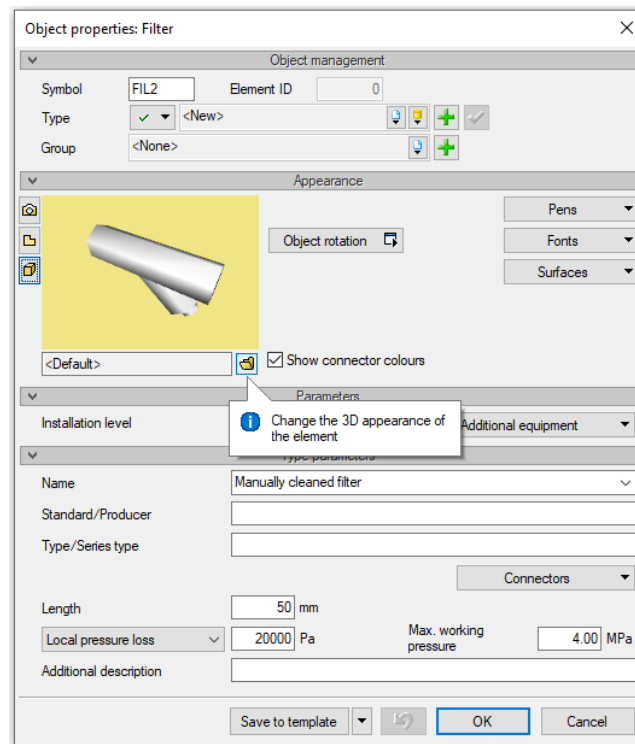



Fig. 19 Filter element properties window

Animated 3D objects – the tab for selecting an existing animated 3D object or introducing a new one.



Layouts – the tab for selecting an existing or inserting a new layout on a drawing.

3.7.1 Introducing 3D objects


3D objects are introduced from the *Object Explorer* launched with the *Object Explorer*  from the toolbar or menu.

Activation:

ArCADia and ArCADia PLUS

- *Insert* ribbon ⇒ logical group *Insert* ⇒  *Object Explorer* ⇒ *3D Objects* tab
- *ArCADia-SYSTEM* toolbar ⇒  *Show 2D/3D Object Explorer*

ArCADia LT

- *View* ribbon ⇒ logical group *Insert* ⇒  *Object Explorer* ⇒ *3D Objects* tab

Program interface description

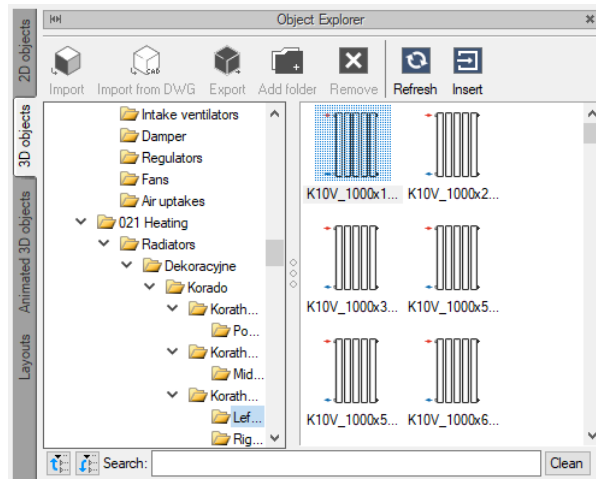


Fig. 20 Program library, 3D Objects tab

The selected element is marked by pointing on it, then it is inserted on the view using the *Insert* button. The location and angle of insertion on the view are shown.

3.7.1.1 Import of 3D objects

We can load objects into the program's library, e.g. made available by producers, from files with the extensions .3Ds, .obj, .o2c. We can also add .XOBJ3D files created in the ArCADia system by saving e.g. any defined solids.

Such objects are introduced with the *Import 3D object* command  (Fig. 20). After importing, they will appear in the User's library folder (Fig. 21).

Activation:

- *Object explorer* window \Rightarrow *3D object* tab \Rightarrow  *Import 3D object*

Program interface description

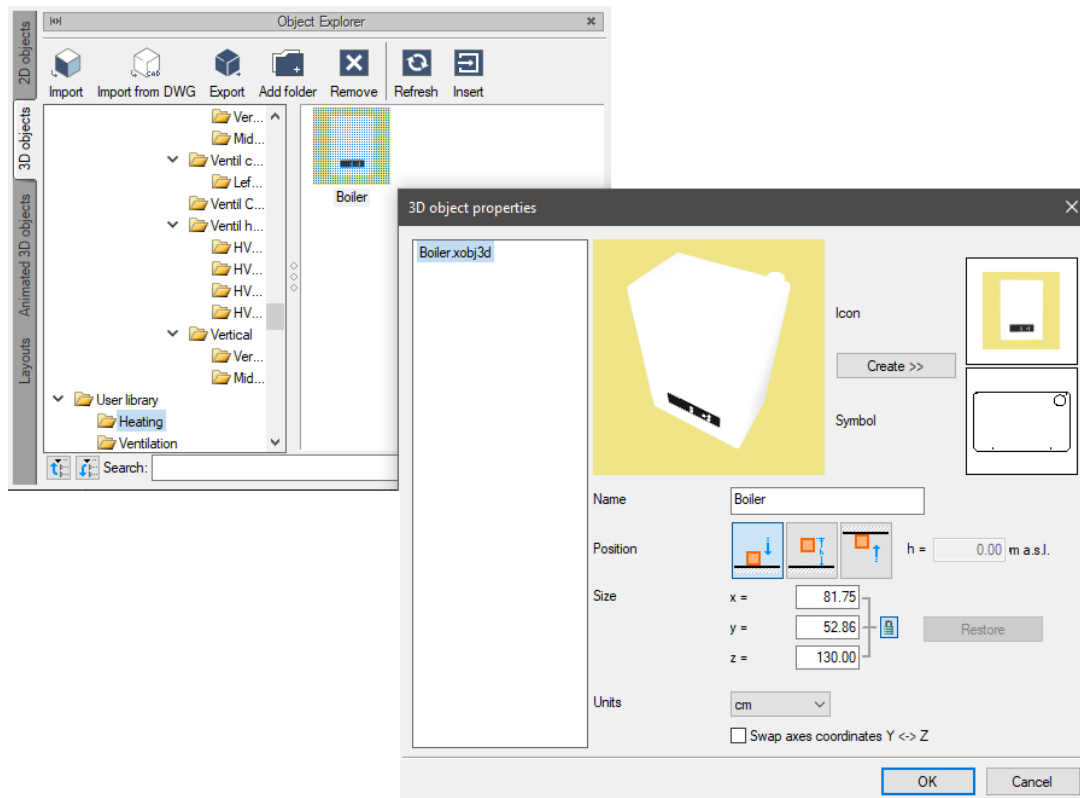


Fig. 21 3D objects properties window

We can give an imported element a name and create its symbol on the view. Additionally, after saving it to the library, the object can be modified in the *Object Explorer* by invoking the *Properties* option from the context menu.

Options available in the properties window:

Icon – a preview image displayed in the program library. It is created automatically, but you can modify it by changing the object's position in the preview window and pressing the button *Create >>*.

Create >> – creates a new preview of the imported object together with the 2D symbol shown on the project view.

Symbol – the view of the imported object that will be available in the project view.

Name – the name of the element.


Position – the default height of the imported object's location.

Size – information about the size of the imported object.

NOTE: Renaming a 3D object will cause this object, used in previous projects, to lose its 3D appearance. Changes in object size do not affect previous projects.

Program interface description





3.7.1.2 DWG models

Models created in three-dimensional CAD space can be imported to the program library by opening such a file and using the Import 3D DWG objects icon in the *Object Explorer*  window (Fig. 20).


NOTE: The **3D DWG objects** Import icon is available after selecting the directory in which the object is to be placed.

Activation:

ArCADia and ArCADia PLUS


- *Insert* ribbon ⇒ logical group *Insert* ⇒  *Object Explorer* ⇒ *3D Objects* tab ⇒  *Import from DWG*
- *ArCADia-SYSTEM* toolbar ⇒  *Show 2D/3D Object Explorer* ⇒  *Import from DWG*

ArCADia LT

- *View* ribbon ⇒ logical group *Insert* ⇒  *Object Explorer* ⇒ *3D Objects* tab ⇒  *Import from DWG*



After running the command, select the model to be added to the library and confirm the selection with Enter.

3.7.1.3 RVT models

In order to enter an object from an RVT file, it must first be imported to an ArCADia file. Entering projects saved in the RVT format is done using the *Import RVT*  command.

Activation:

ArCADia and ArCADia PLUS

- *Insert* ribbon ⇒ logical group *Data* ⇒  *Import RVT*
- *ArCADia-IFC RVT* toolbar ⇒  *Import data from the RVT format*

ArCADia LT

- *Home* ribbon ⇒ logical group *Communication* ⇒  *Import data from the RVT format*

After calling the command, the data import dialog box appears on the screen, in which the project file is selected.

NOTE: The **RVT import** option also supports the **RFA** format files.

Program interface description

After the RVT model is loaded, a tab with the name of the loaded model will be available on the left side in the *Project Manager* window.

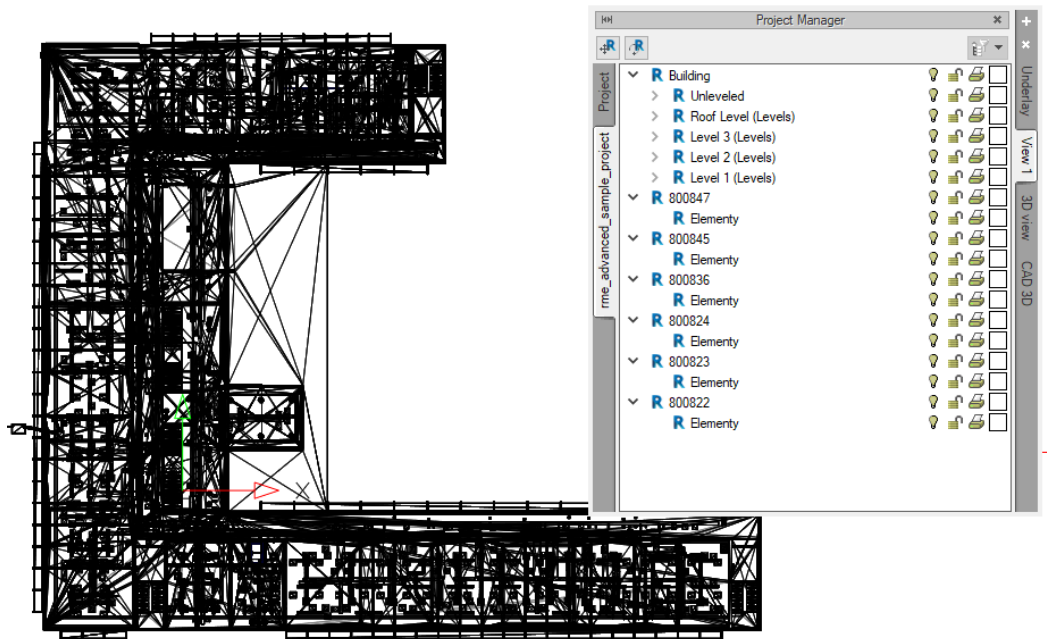



Fig. 22 The Project Manager window, the RVT model tab view – potrzebny zrzut

Then the model loaded from the RVT file can be imported to the program library by opening the *Object Explorer* window, using the *Export* icon  (Fig. 20), selecting the object and confirming the selection with Enter. After a while, the *3D Object Properties* window will open.

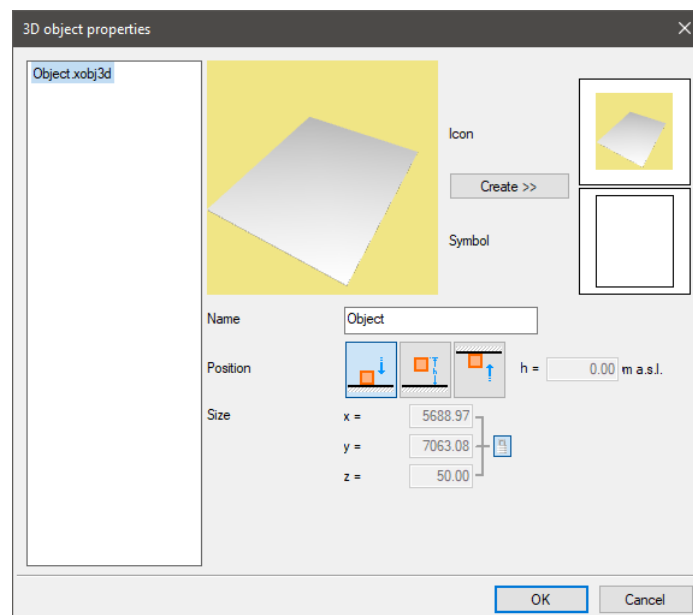


Fig. 23 The Properties window of a 3D object created from the RVT model

The 3D object properties window is described in section 3.7.1.1



Program interface description

3.7.2 Saving the project with objects added to the library

If we have introduced our own 2D or 3D objects to the object library and used them in a project that we want to transfer to another computer, we need to transfer these own elements together with the project. For this purpose, after saving the project, use the *Project package* option and, together with the file, move the created directory with the same name as the project.

Activation:

ArCADia and ArCADia PLUS

- *Collaboration* ribbon ⇒ logical group *Export* ⇒  *Project package*
- *ArCADia-SYSTEM* toolbar ⇒  *Create project package*

ArCADia LT

- *Home* ribbon ⇒ logical group *Communication* ⇒  *Project package*

After transferring the project to another computer, the project with the catalogue must be in the same location. Then, when opening, the program reads additional libraries, textures, and templates, loading the project together with additional elements.

NOTE: Elements introduced into the project are saved to the **Project Package**: from the **Object Explorer** from the **User Library**; textures that were not installed with the program, but were selected from any directory on the computer, and the drawing template, if changed.

3.7.3 Introducing layouts to the library

When designing heating installations, it happens that ready-made diagrams are used, which do not differ between the designs of the elements used, but, for example, in their diameters. Often, manufacturers also offer products consisting of several different elements. For efficient design, an option was created that allows you to create such a layout and save it to the Layouts library. This notation will allow you to use the layout of elements in any project together with initially set parameters.

To add a new layout of elements that are already drawn:

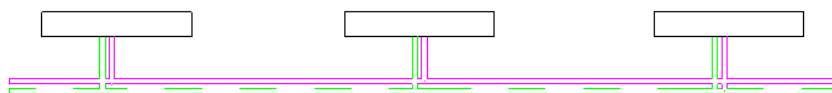


Fig. 24 Elements of drawing before saving the layout

Program interface description

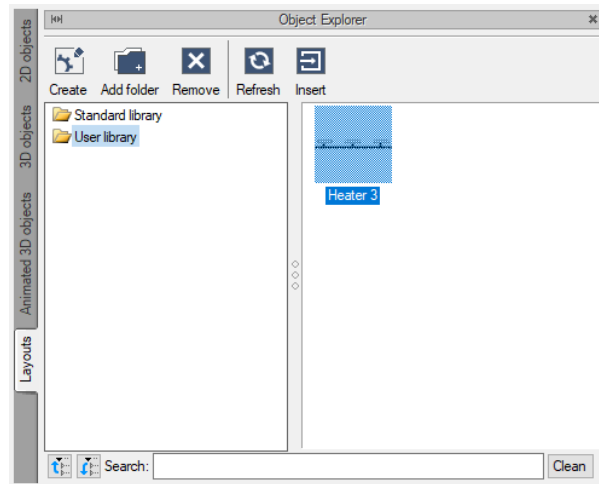



Fig. 25 The saved layout

Activation:

- *Object Explorer* ⇒ *Layouts* tab

To add a new layout of elements that is already drawn:

1. In the *Object Explorer* window, on the *Layouts* tab, select *Create layout* .
2. In the *Object Explorer* window, on the *Layouts* tab, select the layout to be inserted.
3. Press the *Insert* button and indicate the location of the layout in the project.

Inserted objects in the drawing are grouped. To edit the layout, select the inserted layout - the *Different Objects* layout window will appear.

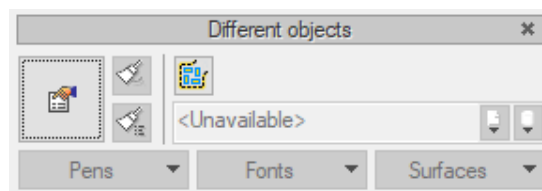



Fig. 26 Layout selection window

After entering the properties window, we can change the properties of a given type of objects included in the system, e.g. elbow. The icon  is used to explode an inserted layout. After selecting this command, you will be able to edit each object separately.


3.8 Connections editor

The *connections editor* command allows users to define their own objects with the option of connecting them to the installation designed in the ArCADia system. It also allows exploitation in the designed installation of 3D objects provided by manufacturers, therefore as close as possible in terms of appearance and dimensions to real objects.

Program interface description

In the first step, you should insert the type of device you are interested in - e.g. heater.

ArCADia objects can be connected to the defined connectors.

The *Connections editor* command is called with the icon  from the modification window, which appears after selecting an object entered into the drawing.

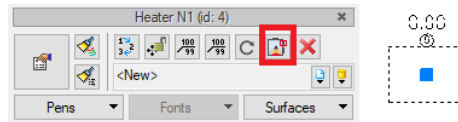


Fig. 27 Element modification window with the selected *Connections editor* command

After running the command, the *Connections editor* window will open.

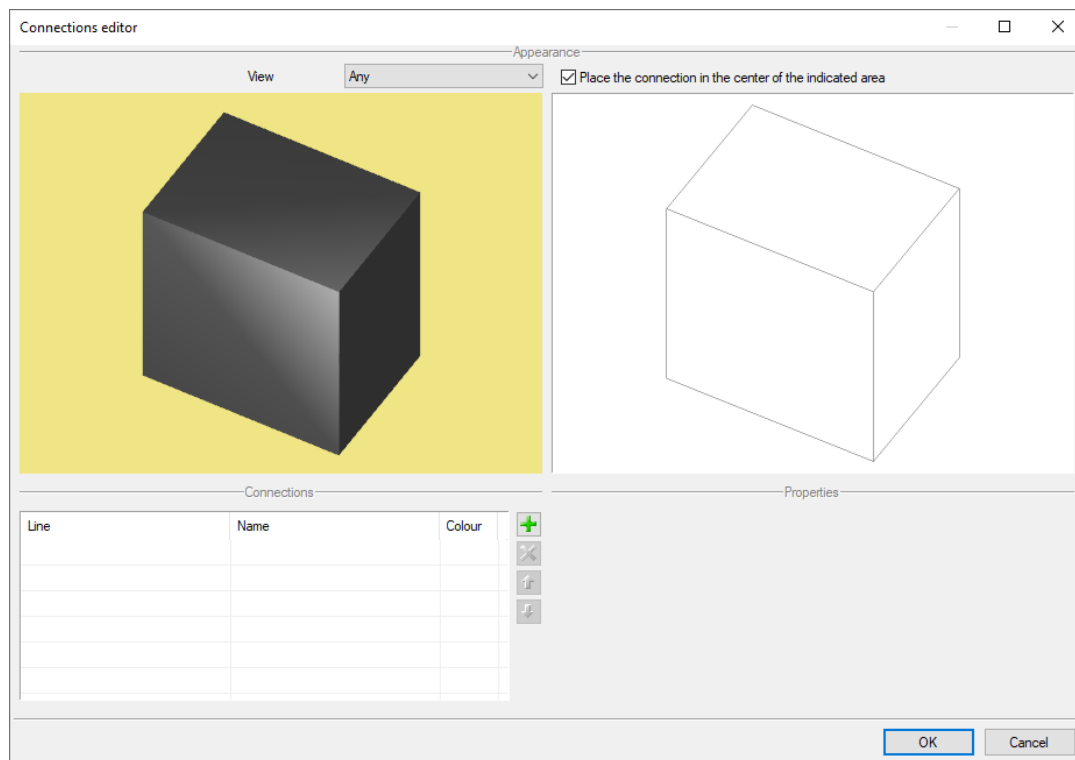


Fig. 28 The *Connections editor* window

There are two views in the *Connections editor* window - the view against the yellow background is a 3D preview of the edited element in the form of a homogeneous solid. We can freely rotate and zoom it and move away. There is also a 3D view in the right window, but it allows the user to select individual areas on the object. As the element rotates in the left window, the view in the right is redrawn. The user can define any view of the object or select one of the 6 defined perpendicular views from the list at the top of the window.

Program interface description

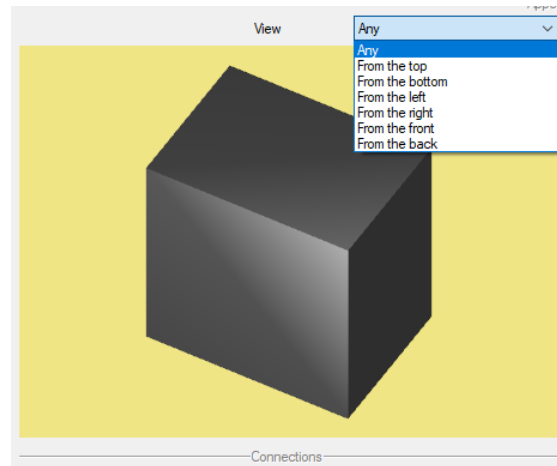


Fig. 29 The selection options of a defined view in the Connector editor window

The number of connectors can be freely defined - adding and subtracting connectors is done using "+" and "x".

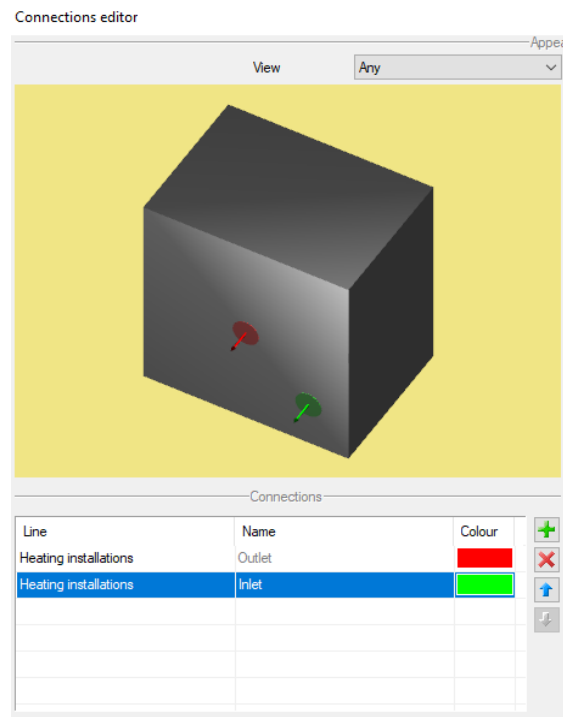


Fig. 30 The connection editor - heater with 2 connectors

For easier identification of the connectors (inlet, outlet) in the drawing, each of them can have a different colour defined. The colours of the connectors can be freely changed.

To edit the location and size of the connectors, you should:

1. In the *Connections editor*, in the left window, rotate the layout so that the area to which you want to transfer the nozzle is clearly visible.
2. Mark the line with the connector you want under the left window. The current position of the connector will be highlighted in blue in the right window. Its properties will also appear on the right,

Program interface description

i.e. type, material, diameter DN of the connection and the type of connection. These properties can be edited at every stage of the work, both in the *Connections editor* window and in the *Object properties* window (Fig. 67).

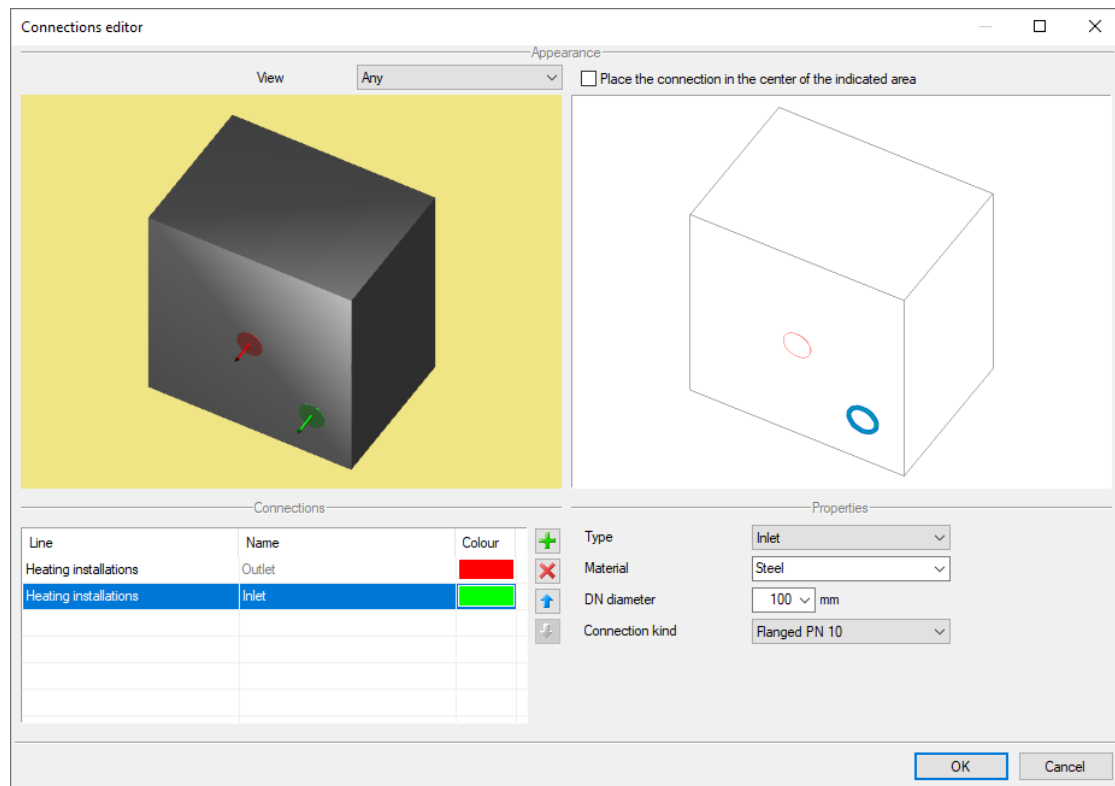


Fig. 31 Defining the location of connectors in the *Connections editor* window

3. Next, move the cursor over the location of the new connector (it will be highlighted in blue) and click (Fig. 31). If the *Place the connection in the center of the indicated area* option is checked at the top of the window, the connector will be defined in the center. Otherwise, the center of the connector will be at the point indicated by the cursor. The defined location can be freely changed by indicating successive points on the marked areas.

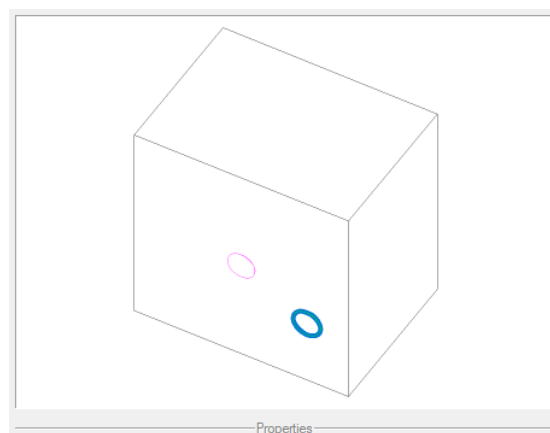


Fig. 32 Inserting a connector at the point indicated by the cursor

Program interface description

Additionally, in the *Object properties* window, we can change the 3D appearance of the object. After selecting the *3D view* option and the *Change the 3D appearance of the element* option, the 3D objects library window will open (Fig. 20). Changing the view is by selecting a 3D object file and confirming it with the *OK* button.

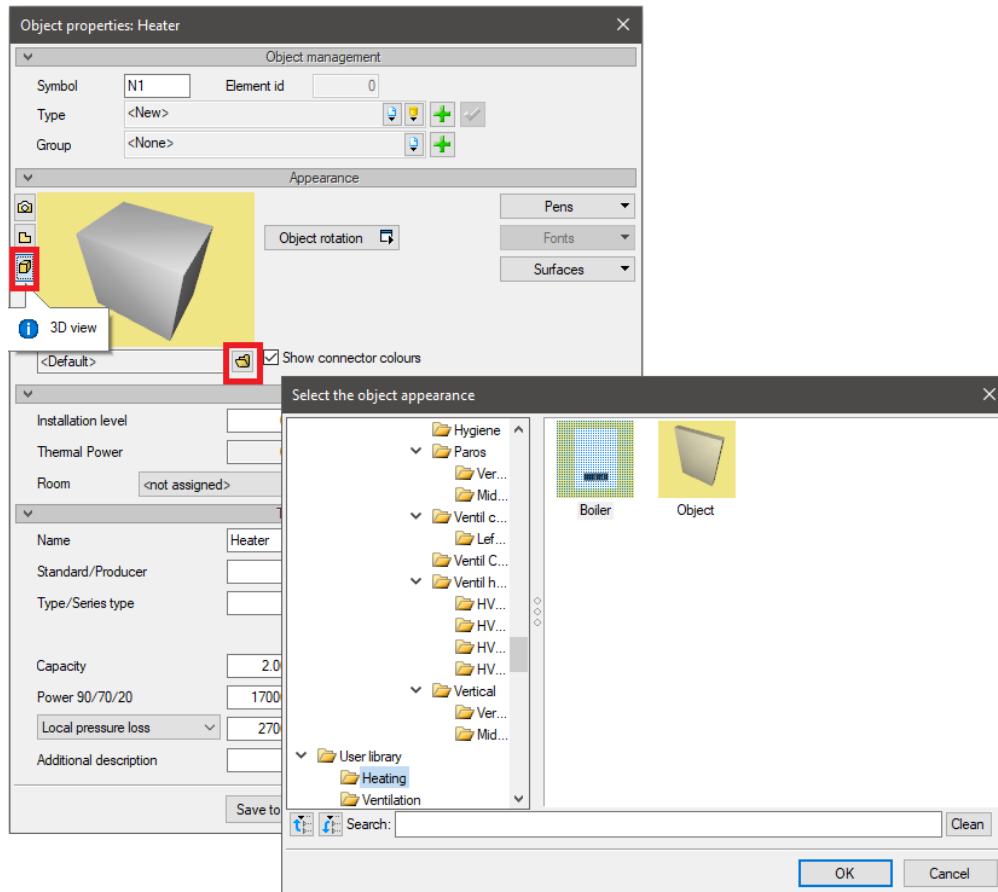


Fig. 33 The 3D object appearance window opened from the Connector editor window

After selecting a new 3D view, you should correctly define the location and size of connectors on it.

Program interface description

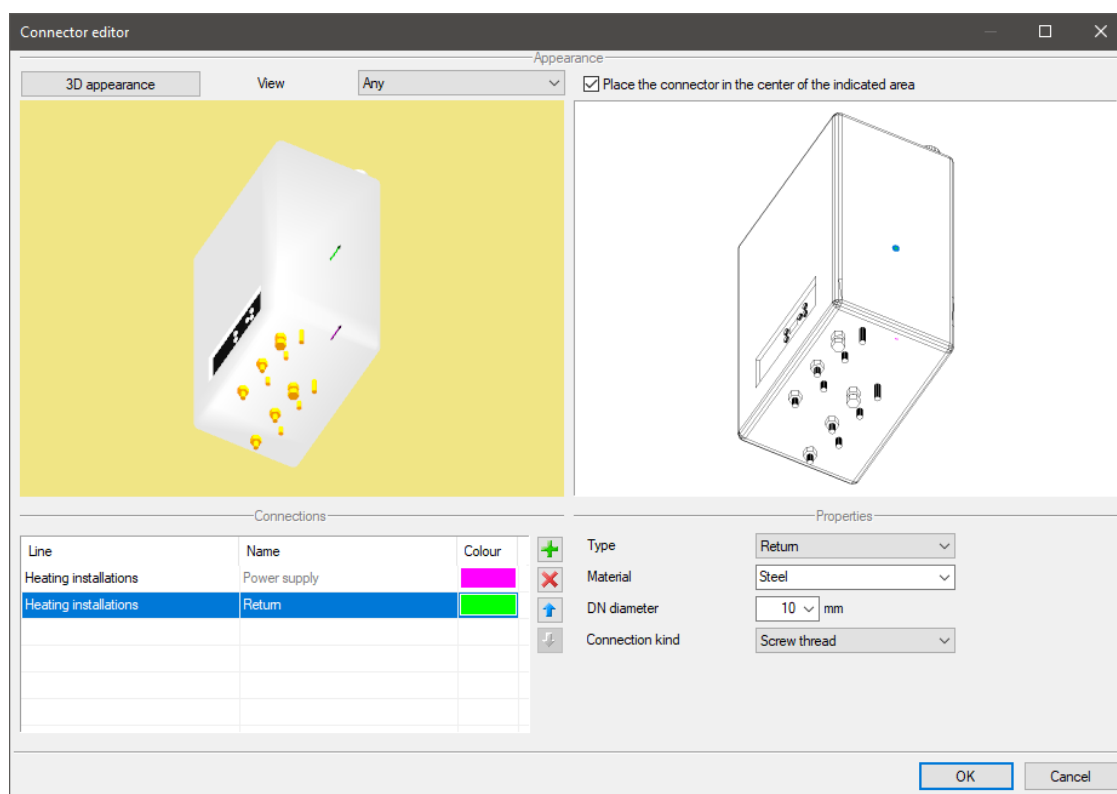


Fig. 34 The connector editor window: new view of the 3D object with connector left in their default position

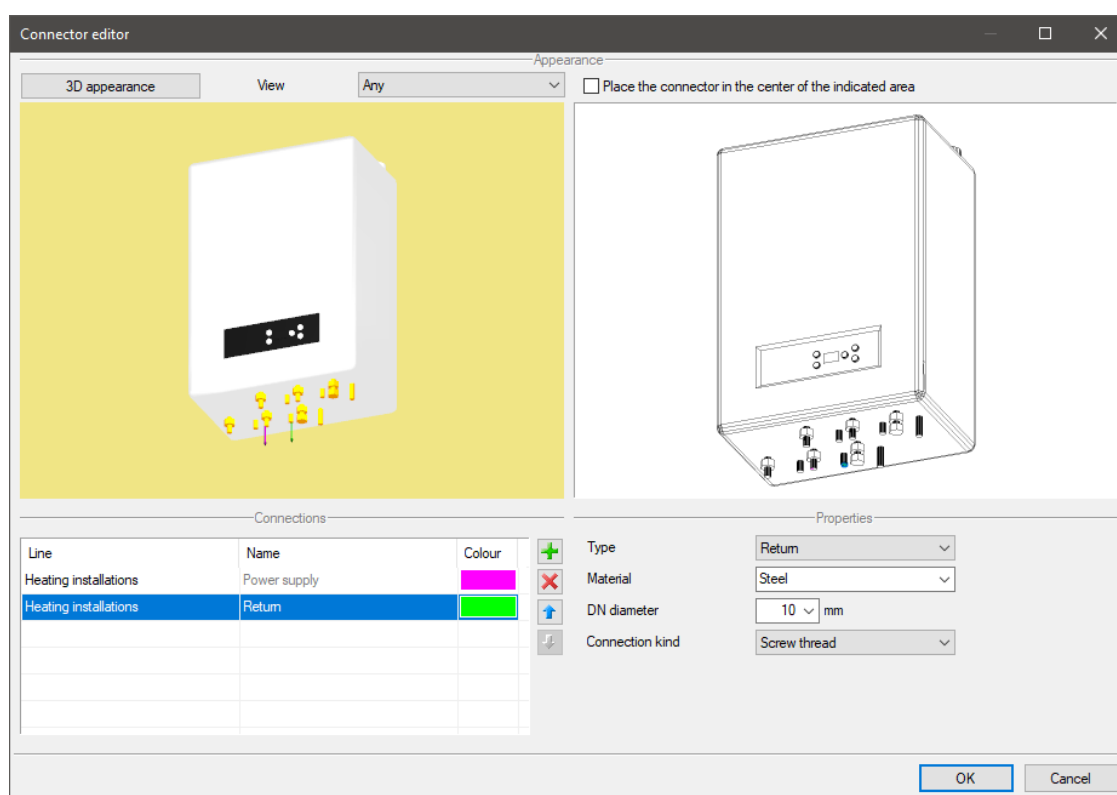


Fig. 35 The connector editor window: new view of the 3D object with correctly defined connectors

Program interface description

Activation:

ArCADia and ArCADia PLUS

- *Manage* ribbon ⇒ logical group *Libraries* ⇒  *Template manager*
- ArCADia-SYSTEM toolbar ⇒  *Template manager*

ArCADia LT

- *Home* ribbon ⇒ logical group *Libraries* ⇒  *Template manager*

A new template feature is provided to save all the element settings, not just their width and height, but also features such as pens, planes and level heights. This feature stores the settings selected by the user and recalls them for the next project. The number of templates is unlimited, it may be linked to the industry, project printing scale or e.g. with the type of the designed building. The stored heights and level parameters for industrial buildings and single-family development are different and repeated changes consume more time than creating a template file with pre-selected values for all the necessary parameters.

This feature is not the same as the Element type, since it saves all additional parameters. For example, this feature will save the thickness and color scheme of pens assigned to a wall (all the walls will from then on be drawn with the pens selected by the user), the selected heights (which is by default the level height), a wall inserted by default that does not need to be a single-layer 25 cm thick wall any more but may be any wall selected by the user (e.g. through the *Type*). The entered parameters will be saved to the active style once you press the *Save to template* button, located at the bottom of each object properties dialogue box.

A template is selected at the beginning of working on a project. After selecting any ArCADia feature, you will see the following dialogue box:

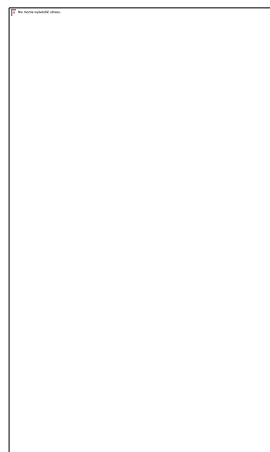






Fig. 36 The template selection window

Program interface description

Tab. 4 The template options

	<i>Add template</i>	Adds a new template.
	<i>Create template copy</i>	Copies the template along with all the parameters.
	<i>Remove template</i>	Removes the selected template.
	<i>Template properties</i>	Opens the <i>Template properties</i> window.



In the *Template properties* window, you can see which elements are included in the template (e.g. modified parameters for the walls, windows etc.). You can remove a selected element or change the template name.

NOTE: When working with the software you can change the template, which will result in all the new elements being drawn with the new parameters. Any drawing and its elements created before changing the template will not be modified.

3.9 Type library editor

Activation:

ArCADia and ArCADia PLUS

- *Manage* ribbon ⇒ logical group *Libraries* ⇒  *Type library editor*
- *ArCADia-SYSTEM* toolbar ⇒  *Type library editor*

ArCADia LT

- *Home* ribbon ⇒ logical group *Libraries* ⇒  *Edit the type library*

The *Type library editor* is used to edit and introduce new item types into the ArCADia program. It facilitates access to manufacturers catalogues and enables the selection of only those catalogues which the user uses most often when designing. Additionally, it divides types into the *Global library* (i.e., the library provided with a given software version) and *Project library*, where all new or user modified element types are saved.

Program interface description

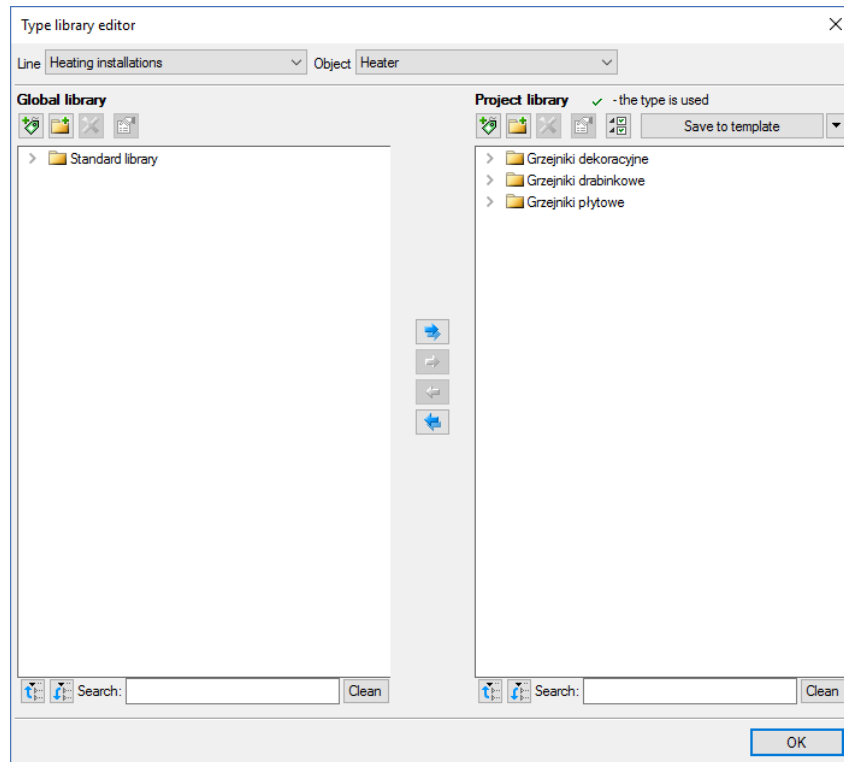


Fig. 37 Type library editor window

In the upper part of the *Type library editor* the user has the option to select an industry from the drop-down list where all the industry modules available in ArCADia System are listed.

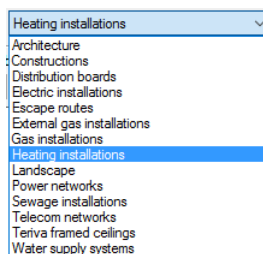


Fig. 38 The drop-down list view of the sectors available in the ArCADia BIM system

After selecting the appropriate industry, the user has access to all the elements, e.g. *Heating pipe* when *Heating installations* are selected, available in the selected industry (module) from the *Elements* drop-down list (on the right side).

Program interface description

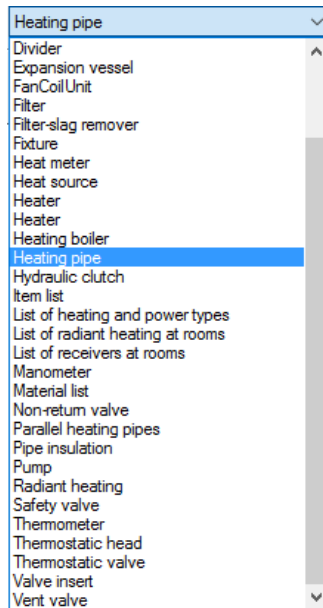


Fig. 39 The drop-down list view of the sectors available in the ArCADia BIM system

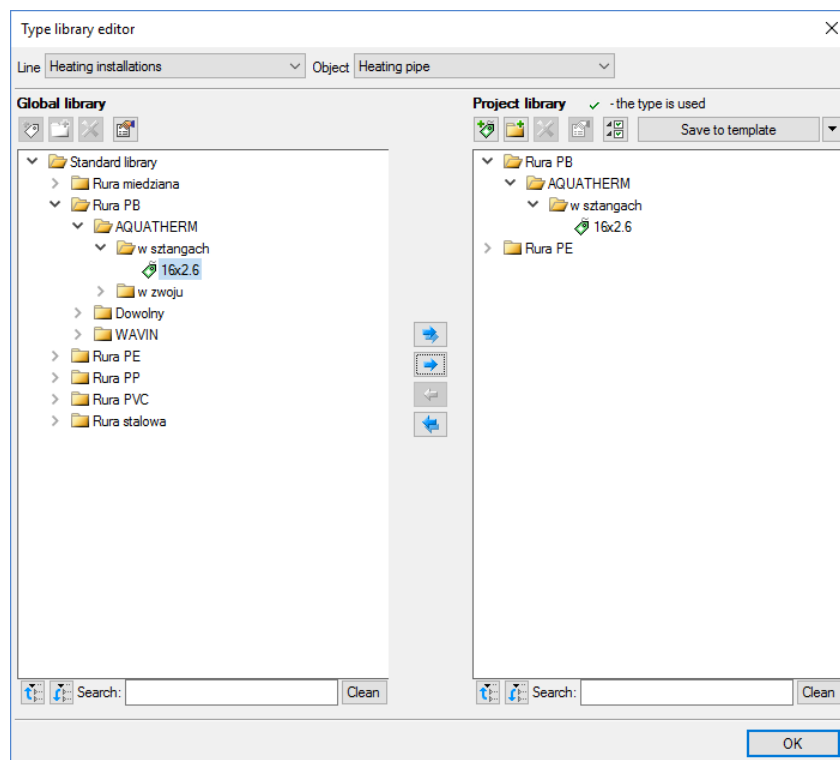


Fig. 40 The type library editor window after selecting an appropriate industry and one of its elements

The lower part of the editor window is divided into the *Global library* (left) page and *Project library* (right) page.

The Global library is the place where all the default element types available to the user and the elements added when working with the software are located; 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.

Program interface description

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 **Object properties window** (Fig. 41, Fig. 42). **Błąd! Nie można odnaleźć źródła odwołania.**, arc

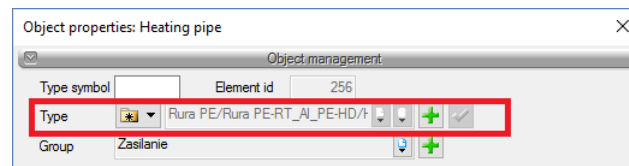


Fig. 41 Place of entering the type from the level of element properties

as well as in modification and insert windows.

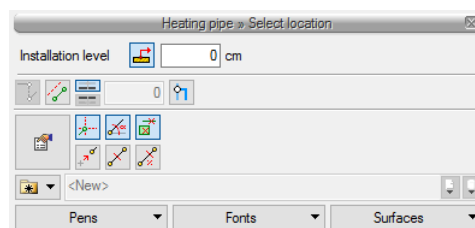




Fig. 42 The place of selecting the type from the level of the element insertion window

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** (to the **User library**). It is also possible to edit type properties for the particular element, where the user may determine all the parameters of the element that are characteristic for it. These include, 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 entering a catalogue of items to the library, e.g. supplied by one company, where the only distinctive feature is e.g. the diameter.

Add new folder  – after clicking this icon, the user has the option to add a new folder, where he can then later add element types. A window prompting for the entry of the folder name will appear. After entering the folder name you need to press the **OK** button in order to add the folder to the library or **Cancel** to withdraw the command.

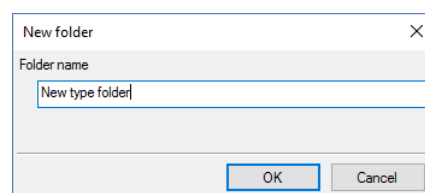



Fig. 43 The folder types insertion window

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

Program interface description

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

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

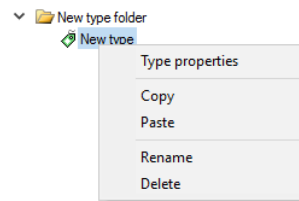




Fig. 44 The modification menu

Type properties  – after clicking this icon the user will have access to the properties of the selected type. These values can be edited and saved here.

The **Save to template** button is located above the *Project library*. Once you click this button, the *Project library* settings will be saved in the template and will be accessible for future projects using this template. Next to it there is an  icon – when clicked, it provides the user with a list of available templates.

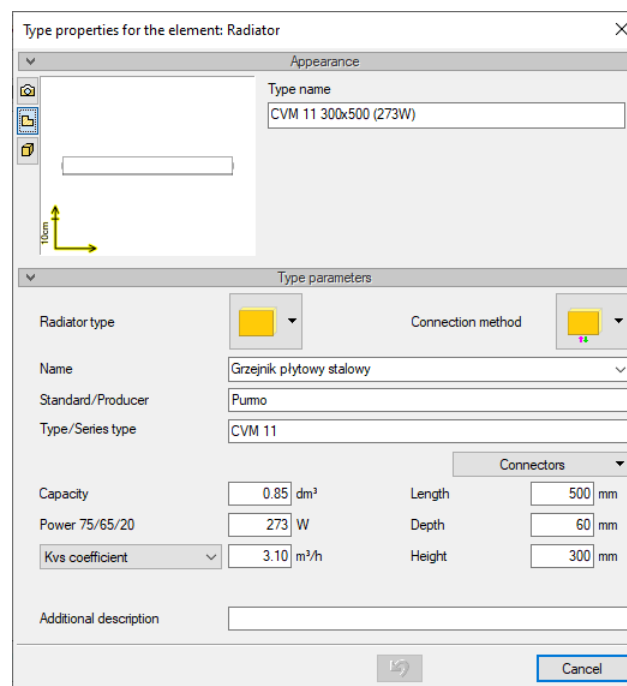





Fig. 45 The sample type properties window

In the *Project library* window, you can also check what types of a particular element are currently being used in the project. This is displayed in the form of the  symbol to the left of the name of a particular type.

The following icons are available below the two libraries:


Program interface description


Hide everything  – after clicking on this icon, the type tree in a given library will be rolled up to the main catalogues.


Show everything  – after clicking on this icon, the types tree in a given library will be expanded.

The user may also search the library by typing a part of or the entire name of the desired type in the **Search:** field. After clicking the **Clean** button next to it, the editing search field will be cleared.

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 elements to the *Project library*.

Copy to the global library  – copies the selected elements to the *Global library*.

Copy all to the global library  – copies the entire *Project library* content of the selected element to the *Global library*.

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

- This message informs the user that a type with this name already exists.

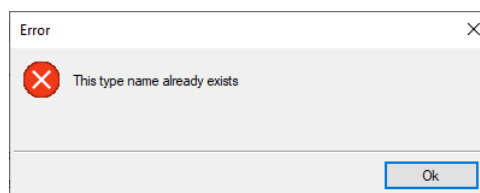


Fig. 46 The message informing about existing type with the same

- This message informs the user that the types marked by the user are going to be deleted. The **Yes** button confirms type deletion.

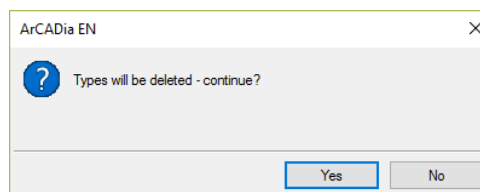


Fig. 47 The deletion message

- This message informs the user that the layout of the *Project library* was saved to a project template, e.g. *Heating Installations*.

Program interface description

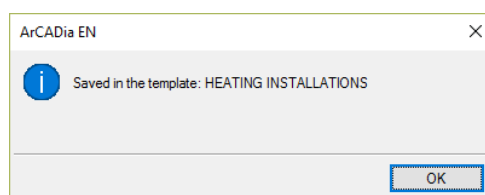


Fig. 48 The message about saving to template

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.

4 CREATING A MODEL STRUCTURE



Creating a model structure

4.1 Building wizard

The ArCADia BIM Software is equipped with an option that helps to create a multi-levelled virtual building with one move. It defines the quantity, names, parameters of subsequent levels, and the placement of the location view. A separate view may be introduced for each level, as a result, levels may be displayed next to each other or one below the other, and not only one on top of the other.

Activation:

ArCADia and ArCADia PLUS

- *Insert* ribbon ⇒ logical group *Insert* ⇒  *Building wizard*
- *ArCADia-SYSTEM* toolbar ⇒  *Building wizard*

ArCADia LT

- *View* ribbon ⇒ logical group *Insert* ⇒  *Building wizard*

After executing the command, the following window will be displayed:

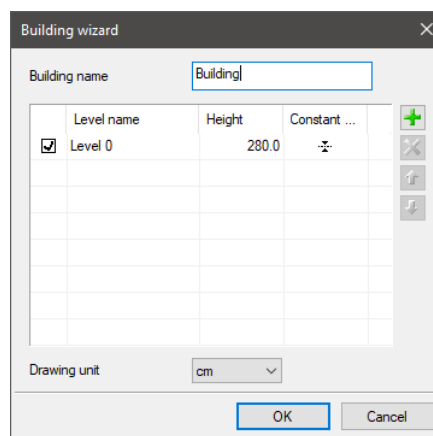


Fig. 49 Window creating a building with the help of defined levels

Building name – the name of the inserted building.

Level name – names of the levels (*Level 0* by default), which can be defined by the user.

Height – level height counted from the top edge of the raw ceiling to the top edge of the row ceiling.

Constant point – the initial view, the location defined by the user as the anchor view of the level. The handles of the subsequent levels can be inserted next to each other or below each other, leaving a space for drawing the project's view.

Add (+) – add a level below the lowest level. If the level is supposed to be above other level it must be moved using the arrow icon *Top* ↑.

Delete (X) – deletes the selected level.

Top (↑) – moves the selected level one level up.

Creating a model structure

Bottom (↓) – moves the selected level one level down.

Drawing units – the selection of the unit which will be used for drawing the projection.

Note: The column before the level name is responsible for the selection of a base level, that is the level which will be “0” level in the project.

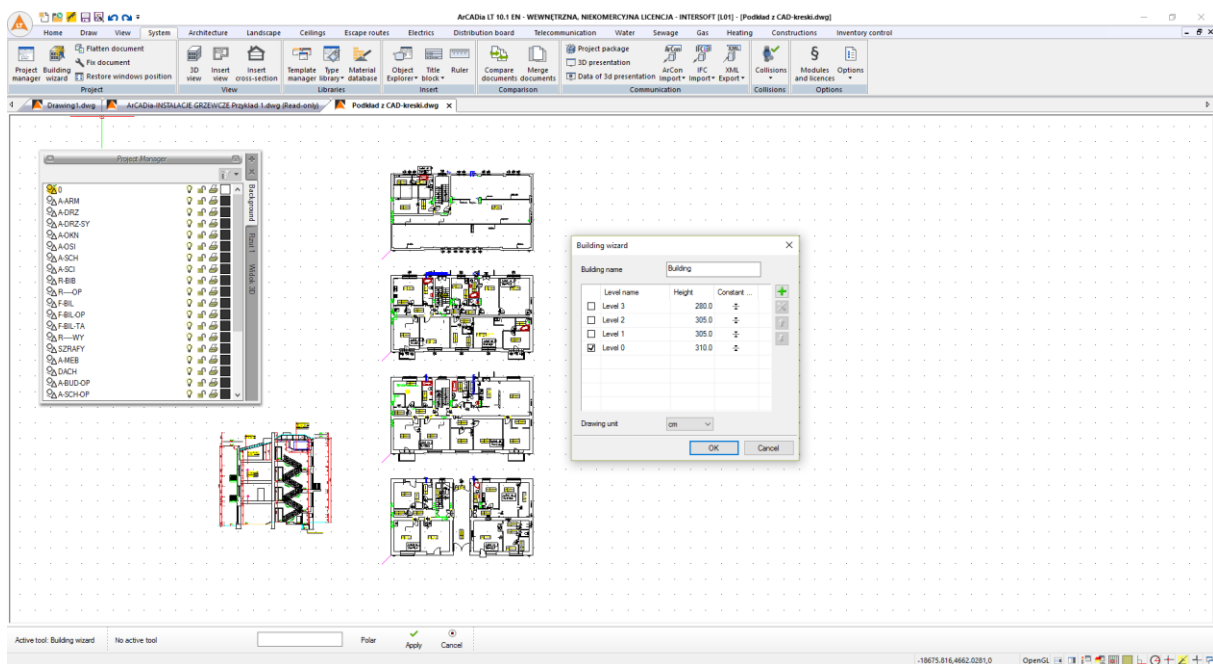


Fig. 50 Example of entering four levels

Enter the level names and height, then you can define a constant point by clicking on the line in the **Constant point** column.

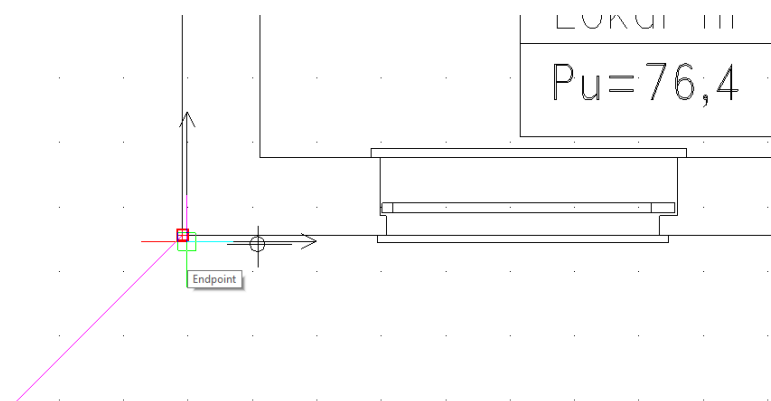


Fig. 51 Inserting a constant point of the view

This point should be an element which is common to all the building levels.

After defining all the constant points on the levels, click **OK** and you will be able to work on the views.

Creating a model structure

In the *Project Manager* window, the building tree can be seen, i.e. three levels, and on the right side, a tab showing which names correspond to which levels. An active level has been defined for each view. Therefore, to switch between the levels, you need to switch the views (tabs).

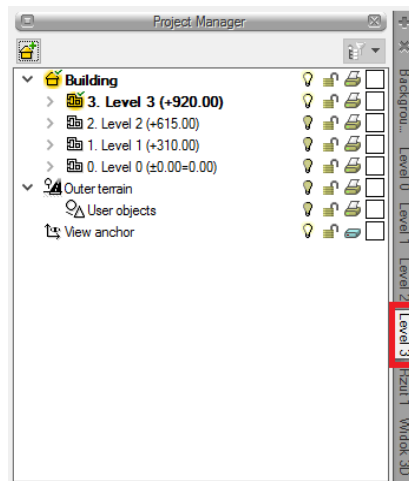


Fig. 52 The view of the Level 3 is visible on the Level 3 tab



While working with each view, you can disable the visibility of the remaining levels leaving the enabled bulb only for the active level.

4.2 Room manager


In the ArCADia–HEATING INSTALLATIONS module, the user can create a structure for a building, as well as for each level, without any architectural background drawing (building model) having been created in ArCADia–ARCHITECTURE. In order to fully utilize the Software’s functionality (e.g. list of rooms and heater power), you need to define the rooms in the *Room manager*. The rooms are automatically loaded from the building model if it is being created in ArCADia–ARCHITECTURE. You can also insert these by pressing the button:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒  *Room manager*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Room manager*

ArCADia LT

- *Heating* ribbon ⇒  *Room manager*

Creating a model structure

The *Room manager* window will then be available:

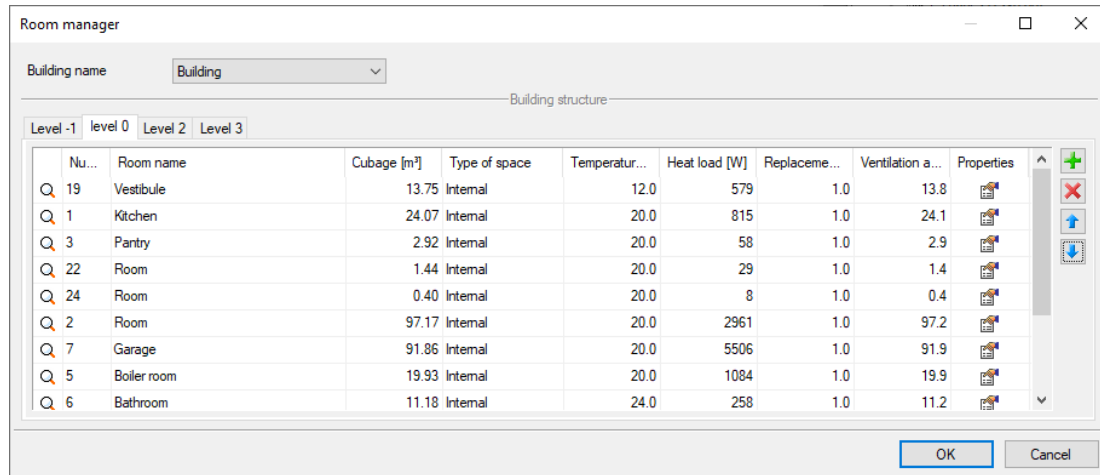


Fig. 53 Room manager window

The user can select the type of building in which they will define the rooms. Available building names are automatically transferred from the *Project Manager*. Then, in the *Building Structure* group, there are level tabs for levels inserted into the building.

If the building is drawn in the ArCADia-ARCHITECTURE program, all columns are automatically filled with data from the rooms. If the user wants to change the data, the properties of a specific room must be entered.

The User fills in the *Temperature* and *Heat load* columns when adding a room. If the room has been selected from the list available in the program, the temperature value is filled automatically.

In the tab of a given level there are columns in which the user successively adds:

- room number,
- name of the room, which can be entered by himself or selected from the drop-down list of hints (Fig. 54),
- cubature, [m³],
- temperature in a given room, [° C],
- heat load of the room, [W],
- air change rate, [1/h]. After selecting the room name from the list, the number of replacements is offered. This value can be edited by the user.
- amount of ventilation air, [m³/h]. This value is calculated based on the volume and the assumed number of exchanges.

Creating a model structure

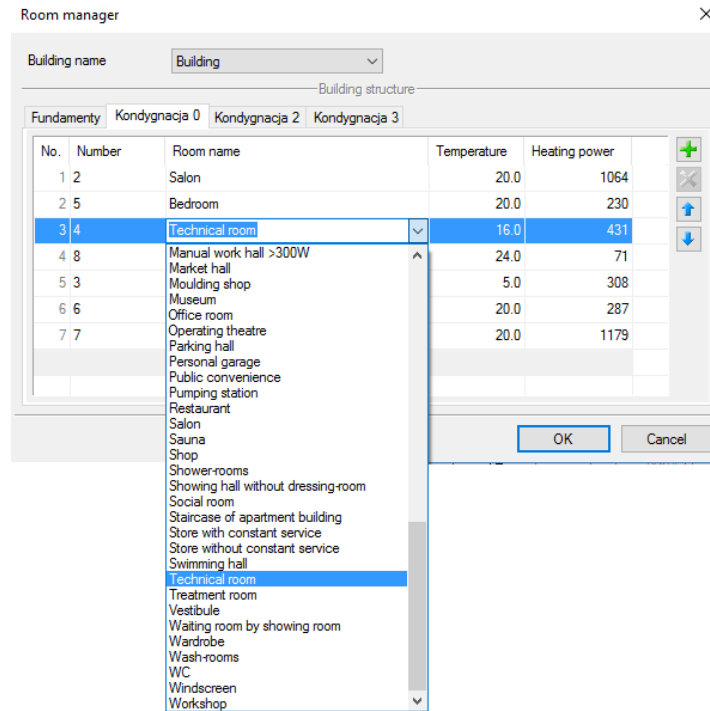


Fig. 54 The room manager window with the expanded list of rooms

4.2.1 Virtual rooms

The user can also add a Virtual Room without having to draw it using the architectural module.

Activation:

ArCADia and ArCADia PLUS

- **Heating** ribbon ⇒ **Insert virtual rooms**
- **ArCADia-HEATING INSTALLATIONS** toolbar ⇒ **Insert virtual rooms**

ArCADia LT

- **Heating** ribbon ⇒ **Insert virtual rooms**

Then the **Virtual room** window will be available:

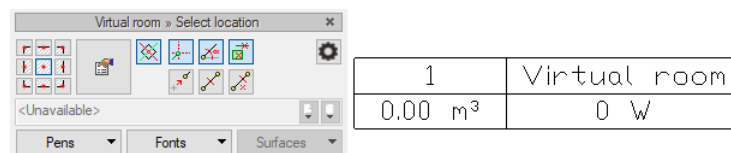


Fig. 55 The virtual room insertion window and its symbol in the drawing

After clicking on the properties button, the **Virtual Room** properties window will open. The user can define the following parameters: **Number**, **Name**, **Type of space**, **Temperature**, **Heat load**, **Cubage**, **Replacement rate**, **Ventilation air volume**.

Creating a model structure

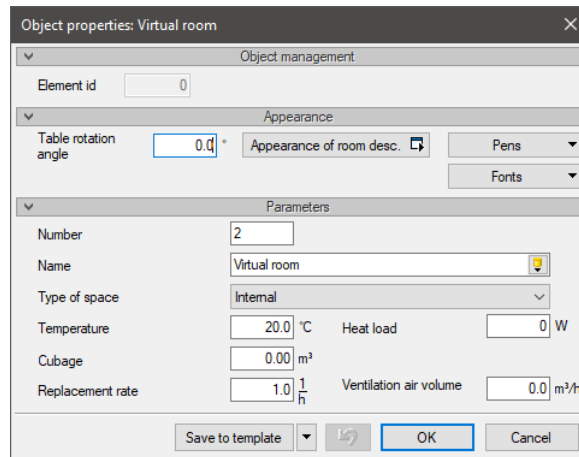


Fig. 56 The Virtual Room properties window

Selecting the *Appearance of room desc.* button opens an additional window in which the user defines which elements will be visible in the drawing.

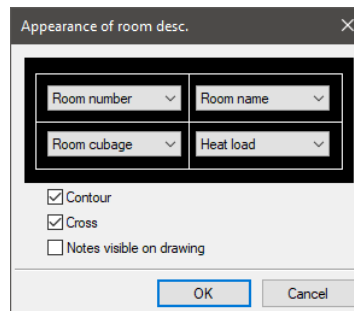






Fig. 57 The appearance of room description window


In the *Room Manager* window, the user can add another room using the button . The button  deletes the selected element. The arrows   change the order in which the selected element is positioned (Fig. 53).




5 DESCRIBING AND EDITING ELEMENTS

5.1 Preliminary notes on editing objects. Inserting objects.

Editing an item involves inserting an item symbol into an architectural projection in the drawing model. The item symbol includes information about the characteristic parameters, i.e. the technical, process and the geometric parameters of the item that are necessary to create supplementary drawings, carry out calculations and assess their correctness.

The item is inserted into the model by selecting the appropriate icon (Tab. 3 ArCADia–HEATING INSTALLATIONS module features) from the software toolbars (Fig. 17). An item insertion window is displayed. The window for each item enables the selection of the position of an item by defining a handle on the contour or at the item's characteristic point and enables the special localization (e.g. Bottom installation level).

By pressing the *Import from element*  button the user may insert an item by linking it at the appropriate point with a linking element of another item already inserted into the drawing.

Reference buttons    improve the element insertion function for pipelines in reference to one or two points. And so:



Reference:

After pressing the button, the user should first select a point on the pipeline (command line question). The software will display a "ruler", an item symbol in the suggested insertion point as well as the distance between the cursor and the chosen reference point (in cm). Next, the user chooses the desired insertion point using the displayed software assistance and its insertion angle.





Center between points:

After pressing the button, the user should select two points that the software will use to measure the centre between them and insert the item in that centre point. Lastly, the user chooses the item's insertion angle.



By percentage between points:

After pressing the button, the user should first give the percentage distance from the first selected point, accept it by pressing ENTER and select the first point on the pipeline. The software will display a "ruler", an item symbol in the suggested insertion point as well as the distance between the cursor and the chosen reference point (in cm). Then the user should insert the second point using the distances displayed in the software assistance from which the program calculates the item's position (in percent). Lastly, the user chooses the item's insertion angle.

The window also includes options that can help insert an item in an accurate way. These options are activated by pressing the appropriate tracking  or detection  buttons for other items already included in the drawing.

Describing and editing elements

There are two methods of inserting an item into a drawing:

METHOD 1:

After choosing an appropriate icon from the ArCADia-HEATING INSTALLATIONS toolbar and displaying the item insertion window, the user can go to item parameters edition by clicking the settings button

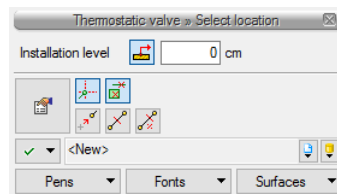


Fig. 58 The element insertion window, general view

The Item insertion window is the same for every item with only minor differences concerning the insertion handles. Insertion handles are located in relation to the inserted item's geometry (for example in the centre, top right corner, left edge centre, etc.)

The following types of insertion windows exist for elements with insertion anchors:

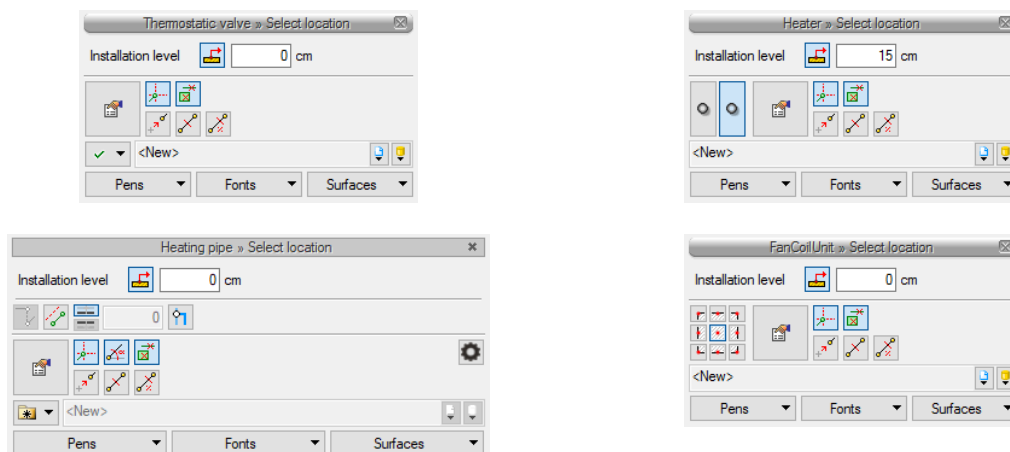












Fig. 59 The insertion window types

Tab. 5 The insertion window options

Icon	Description
	<i>Import from element</i>
	<i>Parallel offset</i>
	<i>Offset direction</i>

Describing and editing elements

	<i>Insert vertical section</i>
	<i>Automatic connection to the connectors</i>
	<i>Options for inserting elements</i>
	<i>Insert with rotation</i>
	<i>Tracking axes</i>
	<i>Tracking angles</i>
	<i>Element and section detection</i>
	<i>Reference</i>
	<i>Center between points:</i>
	<i>By percentage between points:</i>

When the element insertion window is active, an element symbol appears on the model's drawing field (view). Clicking on a chosen spot inside the drawing area inserts an object.

Insertion window elements:

Installation level – the user sets an item's characteristic point installation level (for example the angle, the bottom, etc.) in relation to the level of an active level.

Import from element – if the button is active, clicking on a previously inserted element (for example a vertical pipe) will import the installation level from its characteristic points and automatically add the inserted element (for example a valve) on a similar level (for example to one end of the vertical pipe - example below).

If the previously inserted elements are for example two pipelines on different levels, one above the other and if the *Import from element* button is active, it will allow the user to insert an item (for example a valve) to one of the levels at the intersection point. The element will be added to the pipeline whose level is closer to the inserted level value - example below.

Describing and editing elements

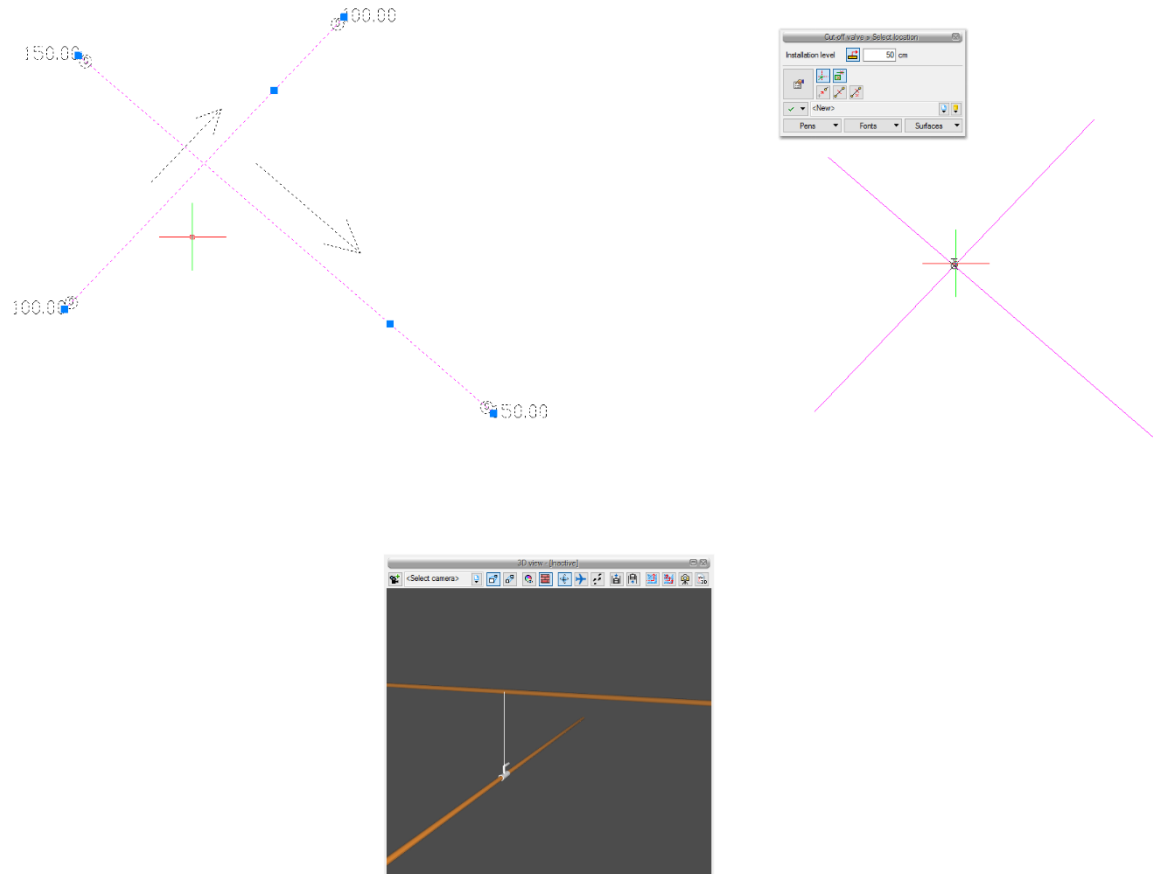


Fig. 60 Import from element function usage example while inserting a valve onto one of the intersecting horizontal pipelines

The *Import from element* feature should be used when the *Elements and sections detection* feature is activated.

Options for inserting elements – enabling this option opens the options window for inserting elements (Fig. 11). These options are described in 3.5.4.

Tracking function – incorporating it allows the user to track the ends of pipe sections and items away from the run route by using the on-screen dotted line connecting the end led to the detected pipeline (pipeline or item).

Detection function – a function that allows precise and deliberate inclusion in an existing element. Detecting an element is notified using a marker (x) that appears on the screen.

Element handle – depending on item type, the item handle allows the user to choose a point on its contour that will become a handle while inserting a given item.

Opening the properties window – activates a given inserted item properties window.

Reference – inserts an item at a distance from the selected point displaying an auxiliary tag - "ruler".

Center between points – inserts an item midway between two selected points.

Describing and editing elements

By percentage between points – inserts an item at a distance specified in percent in relation to the distance between two selected points starting from the first point.

Opening libraries – allows the user to choose equipment and items from the existing or updated type libraries. The drawing below shows a sample of the types of Radiators.

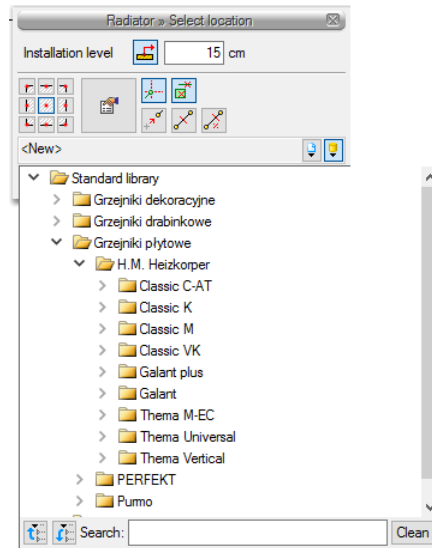




Fig. 61 The example of radiator library

Select the  button to display the contents of an item library for the current project structured on the basis of the subsequent levels of "tree" types.

Clicking the  button rolled up the element library rows to the basic level:

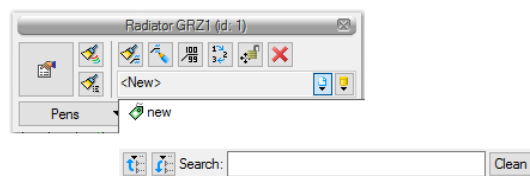



Fig. 62 Example of a rolled up type tree in the Radiator library

METHOD 2:

After selecting the appropriate icon from the **ArCADia-HEATING INSTALLATIONS** toolbar (Fig. 17, Tab. 3), the user should insert the item symbol using the item location function and finish the insertion operation. Next, after selecting the inserted item, use the displayed item modification window (Fig. 63). In the next step, proceed to modify the item parameters (as in the first method) by selecting the setting button .

Describing and editing elements

5.2 Object modification

5.2.1 Modification window and properties window

The object modification window allows the user to select the drawing elements changes and set the item parameters after selecting a particular item type from the software libraries.

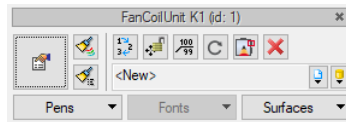


Fig. 63 The object modification window, general view

Tab. 6 Modification window options

Icon	Description
	<i>Go to the properties dialogue box</i>
	<i>Fonts and pens painter</i>
	<i>Type painter</i>
	<i>Insert description</i>
	<i>Object renumbering</i>
	<i>Move with connections</i>
	<i>Move without connections</i>
	<i>Object rotation</i>
	<i>Connectors editor</i>
	<i>Remove marked objects</i>
	<i>Global library</i>
	<i>Project library</i>

Each object can have its own icons (the additional icon field depends on the particular object) allowing the user to introduce appropriate changes intended solely for the given group of items. The number and type of icons may be different for a particular group of objects.

Describing and editing elements

5.2.1.1 Setting an object for selection

The modification insertion window for the items that are selected has a different look and has three modes of item insertion.

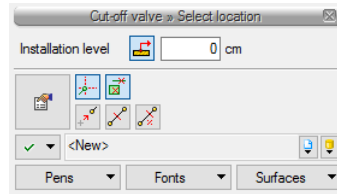





Fig. 64 The insertion window for an object selected in the program

The  icon shows the particular status of an object in relation to the active selection. After clicking on that icon, the user can change that status by selecting one of three possibilities:

✓ **Set type** – when this option is selected, the user can set the type of a given element (the type library field is unlocked).

 **Selection from selected catalogues** – when this option is selected, the objects are selected from the catalogues set in the Project options.

 **Selection from set catalogue** – when this option is selected, the catalogue selection field is unlocked and the user has the possibility to select one of the catalogues from the project library. The item will be selected from that catalogue irrespective of the Project settings options.

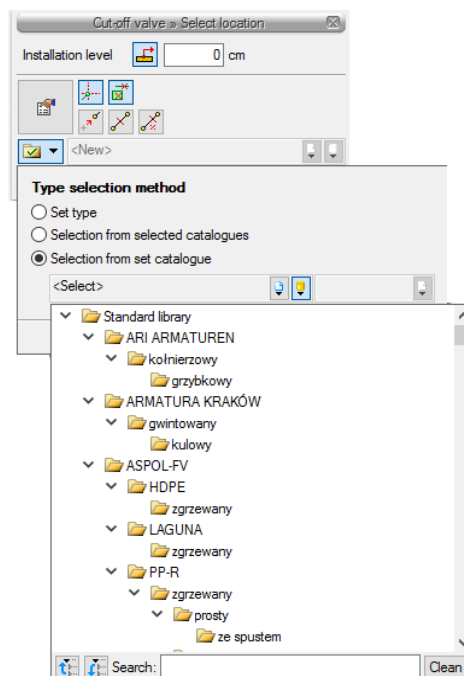



Fig. 65 The object modification window

Describing and editing elements**5.2.1.2 Object properties**

Entering object parameters editing (in the properties window – Fig. 67) allows the user to select the  button in the modifications window (Fig. 63).

An object properties dialogue box will then be displayed where you can set the item parameters. A Properties window with reduced control groups is shown below. You can expand them by clicking the bar containing the group name in the selected point.

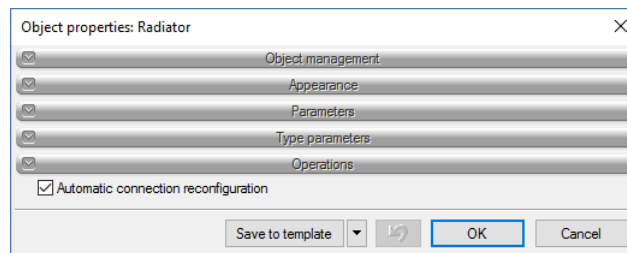
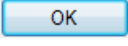


Fig. 66 The properties window with invisible (rolled up) control groups

After entering the settings, press the  confirmation button, which will take you back to the object insertion window where you need to click on the selected location in the drawing field with the object symbol (attached to the cursor). This procedure ensures that the parameter settings and fonts, pens and areas are saved for each subsequent object of the same group.

The object properties windows are divided individually for each object into control groups:

Describing and editing elements

Fig. 67 The object properties window, general view

Object management control group

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

Symbol – the default object designation and number that can be changed by the user is shown on the view. If the user does not implement any change in the active window, the name will be generated from the **Options** window.

Element ID – the number of the subsequent inserted element of a given type.

The active object mode icons are displayed here 5.2.1.1



– means that the **Fixed type** is selected



– means that the **Selection from selected catalogues** is selected



– means that the **Selection from a set catalogue** is selected.

Describing and editing elements

Type – allows the user to insert objects with shared parameters into the project library and the global library.

Group – common for every object. Allows the user to group selected objects and transfer them to the *Project Manager*.

Note: Division into groups relates to all objects and by using the default groups the user may define the purpose of the heating installation being drawn to be supply or return. While drawing the first object, the user will open the appropriate group editor window and the next object of that type will automatically be drawn in the same group.

Appearance control group

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

Angle – by changing the value in the editing field, the user can change the angle at which the object 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 on the drawing view.

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

Description – allows the user to open the description content settings and its organisation wizard. The user decides whether a description will appear on a view by marking the appropriate *Description* selection field.

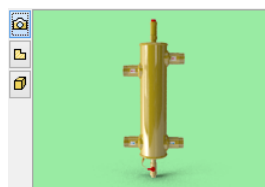



Fig. 68 The object appearance in the properties window

There are three view type switching buttons on the left side of the object view in the view window:



5.2.1.3 Objects renumbering in the modification window

In order to renumber installation elements, you should click on the  *Object renumbering* button from the object modification toolbar. A renumbering window will appear. In that window, the user can set:

- A symbol for the object from which the renumbering will start.

Describing and editing elements

- Renumbering method: Selecting the *Increase* field will cause the numbering to go up, starting from the number provided at the end of the item symbol. If the symbol does not end with a number but a letter, then letter numbering will increase in the same way, with subsequent letters of the alphabet. If the *Increase* field is not selected, the program will assign the same symbol to all objects of a given type.
- *Automatic renumbering*,
- *Direction*: From which corner of the document the renumbering will start and whether it should “run” vertically or horizontally.
- *Range*: Item renumbering in the whole building or at the active level only.

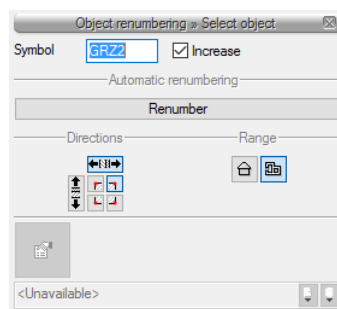


Fig. 69 The object renumbering window

5.2.2 Defining parameters and types in the object properties window

Parameters control group

A set of controls common to all objects. Allows the user to set the installation parameters to define the object location and additional equipment. Some of the objects from this group have an additional data field only for a given object type (for example a balancing valve set point, or the permissible pressure drop in a control valve).

Installation level – the user sets an object's characteristic point installation level (for example the angle, the bottom, etc.) in relation to the level of an active floor.

Additional equipment – a button opening a table where you can insert additional equipment, elements of which should be included in the material lists, is available for most of the objects.

Describing and editing elements

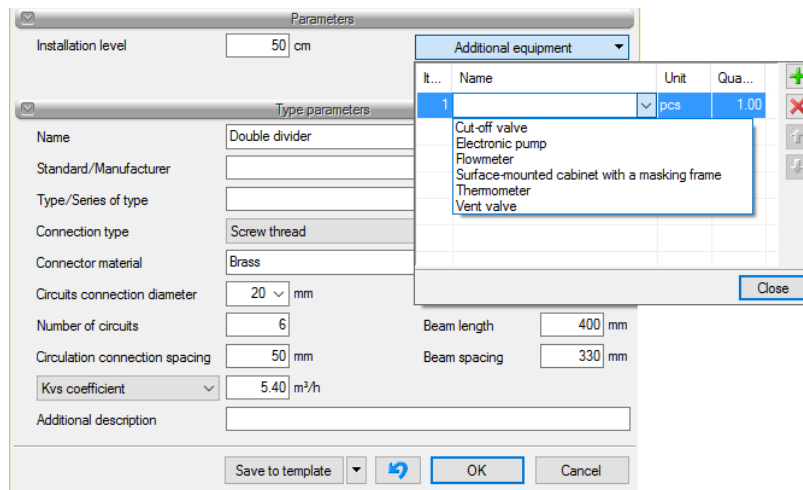






Fig. 70 Additional equipment window

The  sign may be used by the user to add a relevant object from the drop-down list. At the same time, you can insert your own entry into a table cell, changing the units and quantity. The  sign removes the marked element. The   arrows change the sequence of the marked element placement.

Type parameters control group

There is an Individual set of controls for each object. This allows the setting of specific parameters for a given object, for example technical or geometric parameters (diameter, material, connection type, manufacturer, etc.).

The fields are common to most of the objects (some elements also have individual parameters, which are discussed in the help topics describing a particular element):

Name – this is the object name taken from the *Type library* or input by the user to define a new object type. By default, several name types may be defined and each of them has a standardized drawing symbol assigned, e.g. boilers:

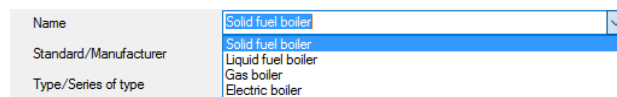


Fig. 71 The default boiler names view

Standard/Manufacturer – taken from the *Type library* or input by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object or selected from the list.

Type/Series of type – taken from the type library or input by the user in order to define a new type of object.

Shape – taken from the *Type library* or selected from the list by the user to define a new object type.

Describing and editing elements

The screenshot shows a 'Type parameters' dialog box. The 'Name' field is set to 'Heat source'. The 'Standard/Producer' and 'Type/Series type' fields are empty. The 'Shape' dropdown menu is open, showing a list with 'Cuboid' selected, followed by another 'Cuboid' and then 'Cylinder'. The 'Capacity' field is '5.00 dm³', 'Thermal Power' is '10 kW', and 'Kvs coefficient' is '1.90 m³/h'. On the right side, 'Width' is '400 mm', 'Depth' is '400 mm', and 'Height' is '1000 mm'. The 'Additional description' field is empty. At the bottom, there are buttons for 'Save to template', 'OK', and 'Cancel'.

Fig. 72 View of the list of available shapes

Capacity – taken from the *Type library* or input by the user to define a new object type.

Thermal power – taken from the *Type library* or input by the user to define a new object type.

Additional description – the user enters additional data that specify the object and are moved to the material list after selecting the *Description* row in the listings.

Connectors

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connectors will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object or selected from the list.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

Describing and editing elements

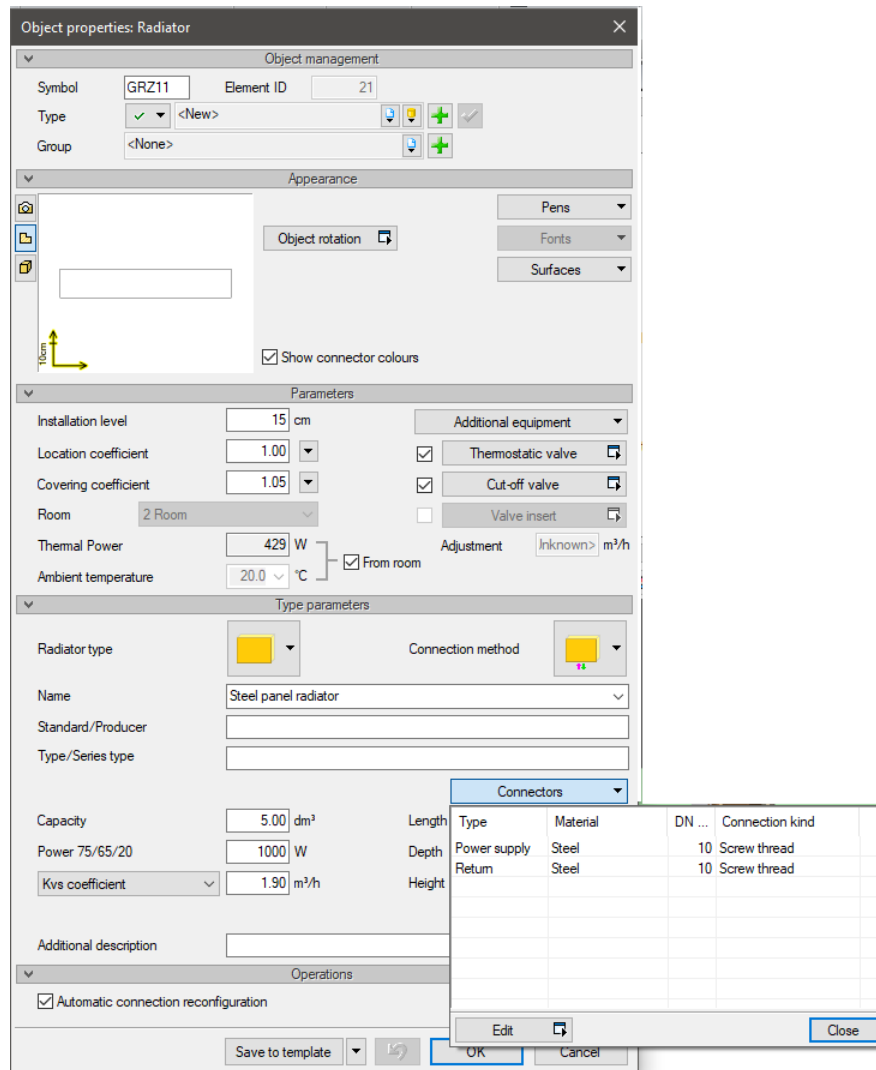


Fig. 73 View of the window for defining parameters of connectors

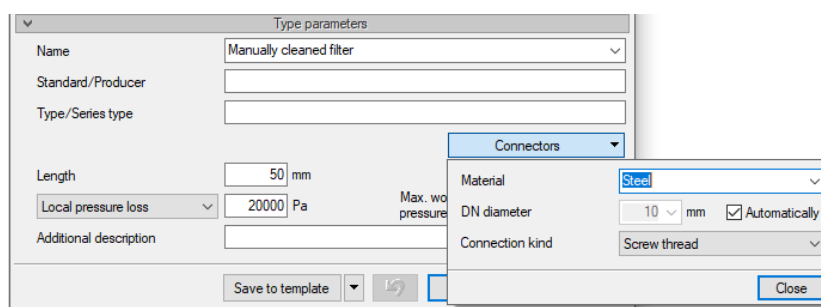
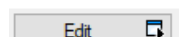


Fig. 74 View of the window for defining parameters of connectors with the option: Automatically

For some objects, e.g. valves, the *Automatically* option is also available. If this option is selected, the program will automatically match the object diameter to the pipeline diameter. If it is unchecked, then the diameter of the inserted element will be as set by the user.

 – This control allows you to go directly to editing connections (connectors) from the object window.

Describing and editing elements

OK/Cancel control group

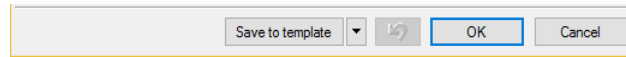


Fig. 75 Save or cancel buttons

Save to template – allows the user to save a default template for a particular object type.



– button which allows the user to restore the default settings for a type.


OK – confirms and implements changes.

Cancel – reverses the changes and returns to the previous window.

5.2.3 Adding elements to the Type library

The program includes a *Standard library* created on the basis of manufacturers' catalogues for most items. These are closed sets. Should the user change any parameter in the type of a particular element from the *Standard library*, after saving, it will be already in the *User library*. This way the user can also add new types and type catalogues, which will also be included in the *User library*.

The software uses a *Global library* and *Project library* (3.10) in the *Type library editor*.

The library content preview can be accessed by clicking on the button *Project library*  (current drawing) button.

You can add elements to a library by defining fields in the *Type parameters* control group.

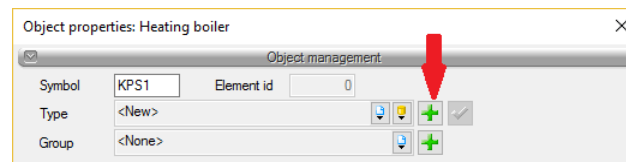



Fig. 76 Adding elements to a library

Next, using the  button, the user can open the elements adding window and type a name which will be saved for an object with the specified parameters.

After changing any of the *Type parameters*, in the *Type* field (in the *Object management* control group) a record will appear: *<New based on...>*. The item type will be named this way until it is saved with a new name in any of the libraries.

If the user wants to add a type to the project library with a name that already exists in a given library, an error message will appear:

Describing and editing elements

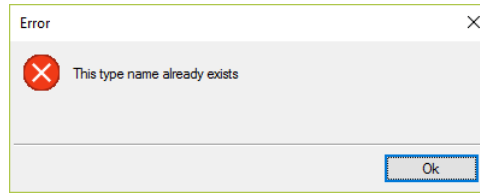


Fig. 77 The message about creating a type with already existing name

The newly inserted type name has to be changed.

5.2.3.1 Type tree

The type tree is a method for organising and arranging elements in libraries.

The tree type organisation method includes defining the object names using the name components depth on subsequent levels in order to facilitate finding an appropriate element and using it in a project.

Inserting an element to a *Project library* from the object level (properties window) includes defining the type name divided into depth levels by the means of the "/" (slash) sign, which will result in correctly placing it at the tree levels.

Below is an example of a name for a pipe and the method of finding the object in the tree:

Type name: PB pipe/AQUATHERM/in sticks/16x2.6

Tree location is shown on Fig. 78

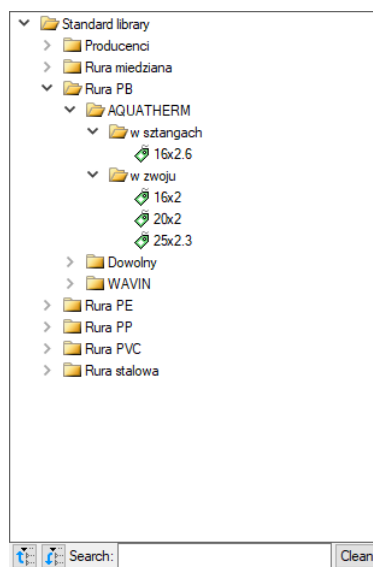



Fig. 78 The types tree – expanded

At the bottom of the type tree window, there is a toolbar:

which facilitates finding of elements and the  button which allows the user to roll up the list to show only the first row elements as shown below:

Describing and editing elements

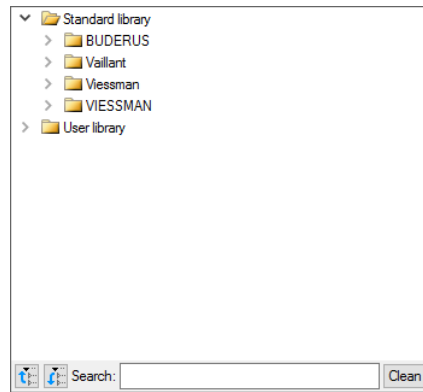


Fig. 79 The type tree – rolled up



The **Clean** button is used for clearing the field.

5.3 Description of installation elements

Every element from the heating installation can be described on the drawing.

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Insert description*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert description*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Insert description*

After selecting the command, the user is asked to indicate the element for which the description should appear. After clicking on an object, a link will appear. With the next click, the user specifies the location of the description in the drawing. An empty a description reference appears in the drawing.

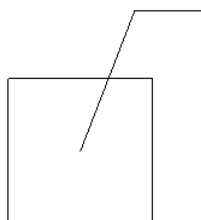


Fig. 80 Inserting a reference

After selecting the reference the object modification window appears.

Describing and editing elements

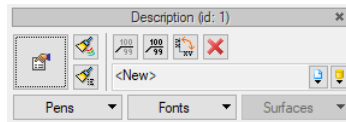


Fig. 81 The description modification window

5.3.1 Element description properties

After going to the description properties window, the user can choose what elements will be displayed on the reference.

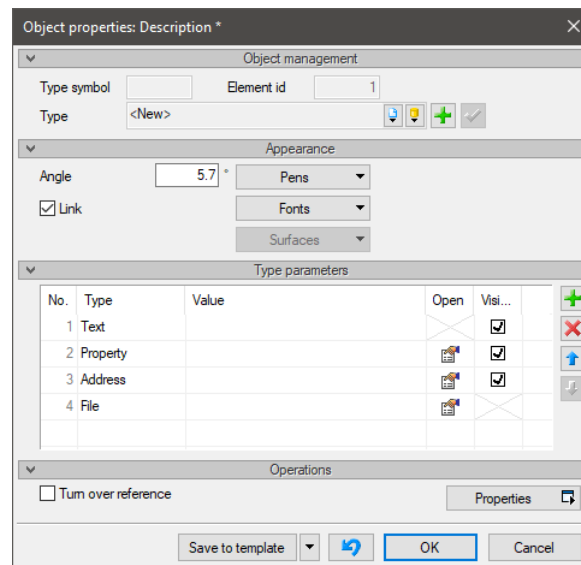


Fig. 82 Description element properties window

There are 4 types of description:

Text - after selecting this type, the user enters any text to be displayed in the **Value** column.

Property - after selecting this type, to display data in the **Value** column, click in the **Open** column. A window will open with the available properties to choose from (Fig. 83). The user selects one of them. If he wants, for example, an ordinal number to be displayed and selects that position. The other fields will be completed automatically according to the properties of the object. After confirming with **OK**, the selected values will be copied to the description properties window (Fig. 82).

Describing and editing elements

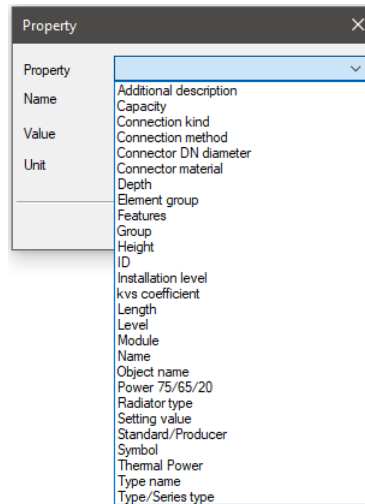


Fig. 83 Window with properties to choose from

Address – in the value column, the user can enter a web address or file location path. After clicking on the **Open** column, a website or file location folder will be opened automatically.

File – here the user can directly assign an external file to an object, e.g. a catalogue card. After clicking on the **Open** column, a new window will be opened, in which we indicate the location of the file.

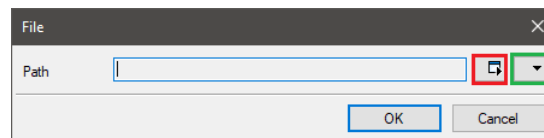


Fig. 84 The file location selection window

After clicking on the red button, a system explorer window will open. The user chooses the file of interest to him and clicks **Open**. The path will be saved. The green button **Start** opens the file.

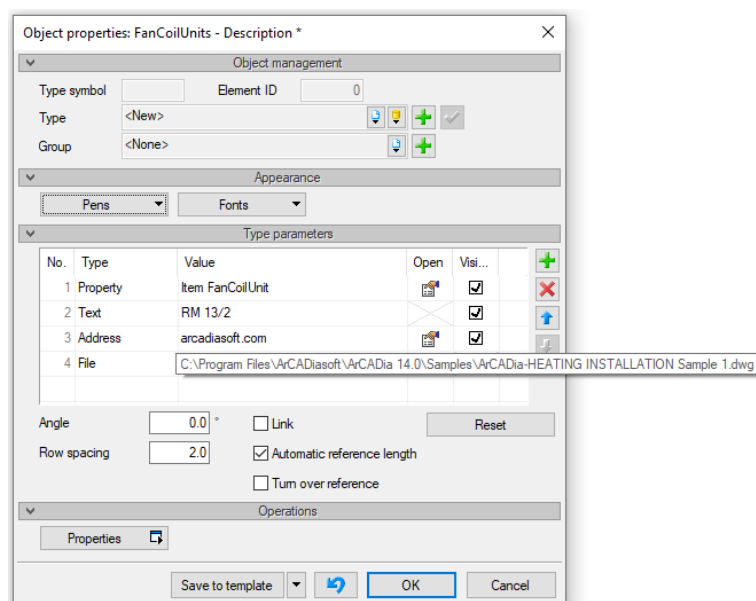


Fig. 85 A sample window with defined description properties

Describing and editing elements

Subsequent descriptions can be added or removed with "+" and "x", while the order of their display will be changed by arrows. Unchecking the checkbox in the *Visibility* column will not display the defined description. On the window it is also possible to go directly to the properties of the edited element via the *Properties* button.

The description font and colour can be defined by changing the *Appearance* - *Font* parameters and *Pens*. Additionally, there are several options available in the description modification window:



– *Enable/disable link*



– *Turn over reference*



– *Rotate*



– *Delete marked objects*



– *Fonts and pen painter*

NOTE: To insert a reference on a group of elements, select the elements first and then run the **Insert description** command. Description references will appear assigned to each element. Description properties can be changed as a group, but only for elements of the same type - e.g. ducts or tees.

6 HEATING INSTALLATION OBJECTS

Heating installation objects



6.1 Heating installation heat sources

6.1.1 Heating boiler

To insert a *Heating boiler* object into the model, select the following icon:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heating boiler*
- *ArCADia- HEATING INSTALLATIONS* toolbar ⇒  *Insert heating boiler*


ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heating boiler*

The object insertion window becomes active.

The window also allows the user to use the *Project libraries* or the *Global libraries*. The user can select a *Heating boiler* type and apply it to the project from the drop-down list of a particular library.

When the heating boiler insertion window is active, the *Heating boiler* symbol shows up on the drawing field of the model (view). Clicking on the desired spot inside the drawing area inserts an object.

The properties window is activated by selecting the  button and double-clicking the inserted element:

Heating installation objects

Fig. 86 The heating boiler element properties window

In the heating installations module, the *Heating boiler* is an initial object, like the *Heat source*.

In the *Heating boiler* object properties window, the user can set a given element's appearance reflecting it on the drawing as well as installation and technical parameters necessary to perform calculations later in the project.

Parameters control group

Installation level – as in point 5.2.2.

Outlet temperature – the user enters the boiler outlet temperature in the edit field. It will be the designated temperature for the supply pipelines of the installation.

Inlet temperature – the user enters the boiler inlet temperature in the edit field. It will be the designated temperature for the return pipelines of the installation.

Additional equipment – for a boiler, as shown on Fig. 87.

Heating installation objects

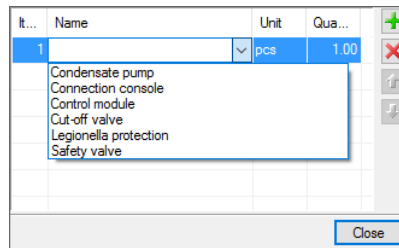


Fig. 87 Additional equipment window for the Heating boiler element

Medium – the user selects the medium for the designed installation. The selection is made from a drop-down list.

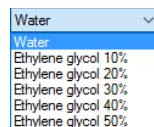


Fig. 88 The list of possible media for an installation design

Max working pressure – the value is entered by the user.

Type parameters control group

Name – the object name taken from the *Type library* or input by the user to define a new object type. Defined names have boiler drawing symbols assigned:

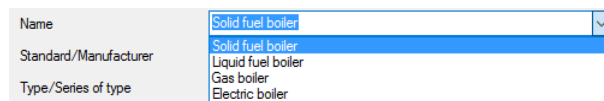


Fig. 89 The default heating boiler names view

Thermal power – taken from the *Type library* or input by the user to define a new item type.



Other Parameters – as in point 5.2.2.

6.1.2 Heat source

To insert a **Heat source** object into the model, select the following icon:

Activation:

ArCADia and ArCADia PLUS

- **Heating** ribbon ⇒ logical group **Heating Installations** ⇒  **Heat source**
- **ArCADia-HEATING INSTALLATIONS** toolbar ⇒  **Insert heat source**

ArCADia LT

- **Heating** ribbon ⇒ logical group **Heating Installations** ⇒  **Heat source**

Heating installation objects

The window also allows the user to use the *Project libraries* or the *Global libraries*. From the drop-down list of a particular library, the user can select a *Heat source* type and use it in the project.

When the *Heat source* insertion window is active, the *Heat source* symbol shows up on the drawing field of the model (view). Clicking on the desired spot inside the drawing area inserts an object.

The properties window is activated by selecting the button and double-clicking the inserted object.

The dialog box 'Object properties: Heat source' is divided into several sections:

- Object management:**
 - Symbol: ZC1
 - Element id: 0
 - Type: <New>
 - Group: <None>
- Appearance:**
 - Angle: 0.0°
 - Buttons: Pens, Fonts, Surfaces, Description (checked).
- Parameters:**
 - Installation level: 0 cm
 - Outlet temperature: 75 °C
 - Inlet temperature: 65 °C
 - Additional equipment: (dropdown)
 - Medium: Water
 - Max working pressure: 0.30 MPa
- Type parameters:**
 - Name: Heat source
 - Standard/Manufacturer: (empty)
 - Type/Series of type: (empty)
 - Connection type: Screw thread
 - Connector material: Steel
 - Shape: Cuboid
 - Connector diameter DN: 10 mm
 - Capacity: 5.00 dm³
 - Thermal Power: 10 kW
 - Kvs coefficient: 1.90 m³/h
 - Width: 400 mm
 - Depth: 400 mm
 - Height: 1000 mm
 - Additional description: (empty)

Buttons at the bottom: Save to template, OK, Cancel.

Fig. 90 The designed heat source element parameters defining window

Parameters control group

Additional equipment – for a heat source, as shown on Fig. 91 The heat source additional equipment window.

The 'Additional equipment' window shows a list of equipment items with columns for 'It...' (quantity), 'Name', 'Unit', and 'Qua...' (quantity). The first item is selected:

It...	Name	Unit	Qua...
1	Circulation pump for central heating	pcs	1.00

Other items in the list include: Control valve, Damper between flanges, Dial pressure gauge with a valve, Dial thermometer, Heat meter, Mesh filter, Plate heat exchanger soldered with copper, Screwed ball cut-off valve, Screwed plate heat exchanger, Shell-and-tube heat exchanger, Strainer, Weather controller, and Welded ball cut-off valve.

Buttons: Close.

Fig. 91 The heat source additional equipment window

Heating installation objects

Other type parameters as for the *Heating boiler* object in the point 6.1.1.

Type parameters control group

Name – the object name taken from the *Type library* or input by the user to define a new object type.

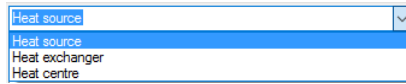


Fig. 92 The default heat source names view

Other type parameters as for the *Heating boiler* object in the point 6.1.1.

6.2 Heat receivers



6.2.1 Radiator

6.2.1.1 Radiator dialogue box

To insert a *Radiator* object into the model, select the following icon:


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Radiator*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒ *Insert radiator* 

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Radiator*

By choosing the  button in the insertion window (that will be updated first) or double clicking the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

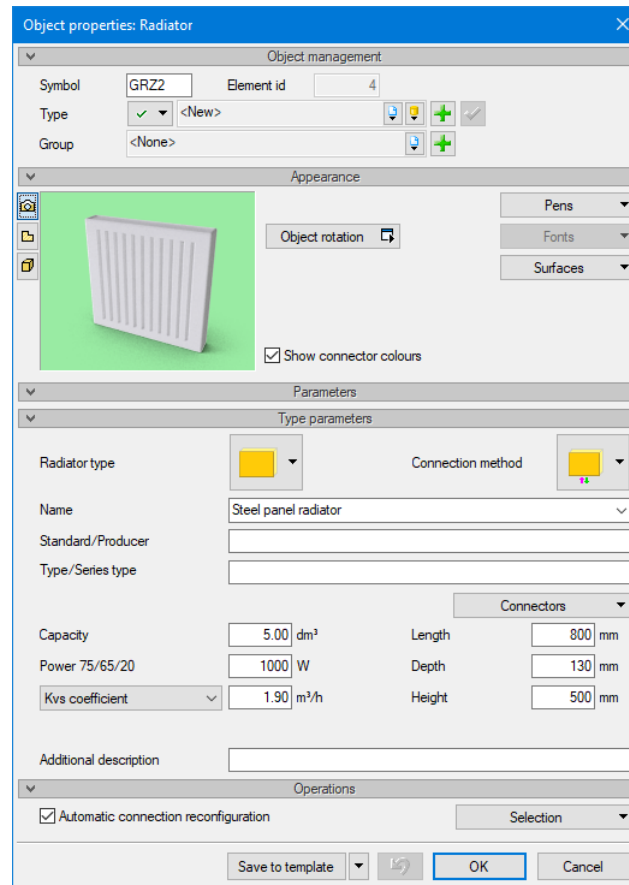


Fig. 93 The radiator object properties window

A Radiator, just like other receivers, is an element which creates a circuit. There must be at least one receiver in the installation in order to enable calculations, selections, etc.

Parameters control group

Location coefficient – a correction factor for the design efficiency of the radiator, depending on its location in the room.

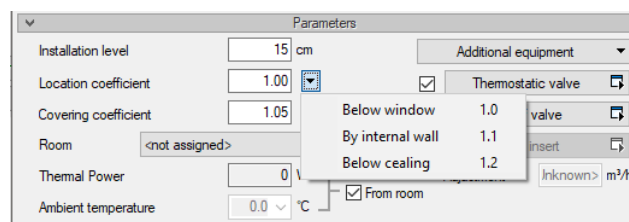


Fig. 94 The location coefficient selection window

Covering coefficient – correction factor for the radiator's design efficiency, taking into account the influence of the heater's covering

Heating installation objects

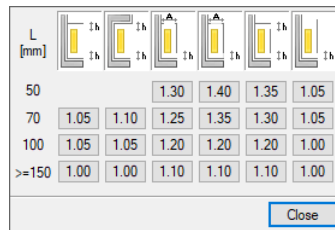


Fig. 95 The covering coefficient selection window

Room – name of the room where the Radiator is located, loaded automatically if the room is created in the ArCADia-ARCHITECTURE module. The user can manually insert the rooms into the project using the *Room manager*.

Thermal power – radiator power taken into account in calculations, entered by the user or taken from the room after selecting the option *From room* [W].

Ambient temperature – design temperature in the vicinity of the heater. If the radiator is located in a room defined in the program, after selecting the *From room* option, the value will be assigned automatically.

Adjustment – setting of the thermostatic valve or valve insert, [m³/h]. The value is automatically taken from the parameters set in the thermostatic valve or valve insert.

Thermostatic valve – ticking this checkbox causes a thermostatic valve to be connected to the Radiator and included in the calculations, selections, lists and material lists, as well as enables the option to edit the valve parameters. After ticking the checkbox, click the active button ☒ **Thermostatic valve** . Then the thermostatic valve properties window will be available, as in 6.7.4. It will not be possible to tick the checkbox if the user previously ticks the *Valve insert* checkbox.

Cut-off valve – ticking this checkbox causes a shut-off valve to be connected to the Radiator and included in the calculations, selections, lists and material lists, as well as enabling the option to edit the valve parameters. After ticking the checkbox, click the active button ☒ **Cut-off valve** then the properties window will be available, as in 6.5.1.

Valve insert checkbox – ticking this checkbox causes a valve insert to be connected to the Radiator and included in the calculations, selections, lists and material lists, as well as enabling the option to edit the valve parameters. After ticking the checkbox, click on the active button ☒ **Thermostatic valve** . Then the valve insert properties window will appear as in 6.7.6. It would not be possible to tick the checkbox if the user checked the *Thermostatic valve* checkbox before.

Other parameters - as in section 5.2.2.

Type parameters control group

Radiator type – Radiator type is imported from the Type library or selected by the user in order to define a new type of object. In order to select a different *Radiator type*, please click the button. A drop-down list, as in 90, will appear.

Heating installation objects

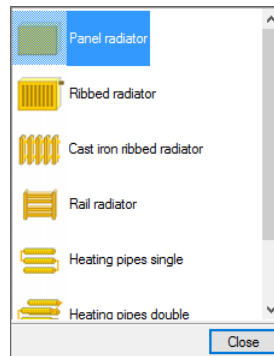


Fig. 96 The radiator type drop-down list view

The user can choose between: panel radiator, ribbed radiator, cast iron ribbed radiator, rail radiator, heating pipes single, heating pipes double and channel radiator.

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Manufacturer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series of type – taken from the *Type library* or entered by the user to define a new object type.

Capacity – taken from the *Type library* (if it was introduced) or entered by the user [dm³].

Power 75/65/20 – the nominal power of a radiator provided in the manufacturer's catalogues as the power value with the temperature of the supply at 75°C, and the return temperature 65°C and the ambient temperature at 20°C. After calculations, the software verifies whether the *Thermal power* for any installation conditions is as provided by the manufacturer.

Kvs coefficient or optionally **ζ coefficient** or **Local pressure loss** – the values adopted from the *Type library* (if they were introduced) or entered by the user in the units displayed next to the field.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connectors will open:

Type	Material	DN ...	Connection kind
Power supply	Steel	10	Screw thread
Return	Steel	10	Screw thread

Fig. 97 The connectors definition window

Power supply – taken from the *Type library* or entered by the user to define a new type of object, or selected from the list.

Return – taken from the *Type library* or entered by the user to define a new type of object or selected from the list.

Length – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Heating installation objects

Depth – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Other Parameters - as in point 5.2.2.

Operations control group

Automatic connection reconfiguration – checking this checkbox results in the automatic reconfiguration of the radiator and pipeline connections. If the user inserts a bottom-supplied panel radiator and connects it with pipelines with the connection wizard enabled, in case of any changes of the radiator type or its connection, the software will maintain the connection between the radiator and the pipes by means of remodeling the existing ones.

Selection – the program enables automatic selection of heaters from the program library. If the user would like to limit the dimensions of the selected radiator, you can define the minimum and maximum values for its length, width and depth.

The dialog box titled 'Selection' contains a table for defining boundary dimensions:

	Min.		Max.
Length	0	mm	2000
Depth	0	mm	1000
Height	0	mm	2000

A 'Close' button is located at the bottom right of the dialog.

Fig. 98 The window for defining the boundary dimensions of a radiator for automatic selection

Depending on which radiator is selected in the *Radiator type* field, it will have different views in the 3D view and axonometry and it has various additional type parameters.

- **Panel Radiator**

Parameters are the same as the general parameters for the *Radiator* element.



Fig. 99 Panel radiator- the view

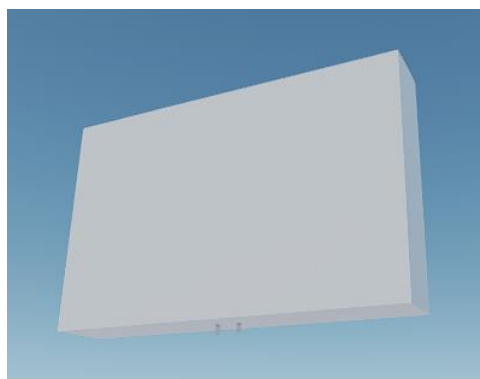


Fig. 100 Panel radiator- the 3D view

Heating installation objects

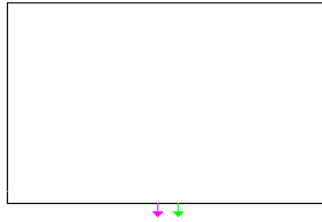


Fig. 101 Panel radiator- the axonometry view

- **Ribbed Radiator**

It is not possible to select a valve insert in the ribbed radiators properties window. The **Number of ribs** control is available in type parameters – imported from the **Type library** or input by the user in order to define a new type of object. The number of ribs will be visible in the following views: View, 3D and Axonometry.

Fig. 102 The steel ribbed radiator element properties window view



Fig. 103 Ribbed radiator - projection view

Heating installation objects

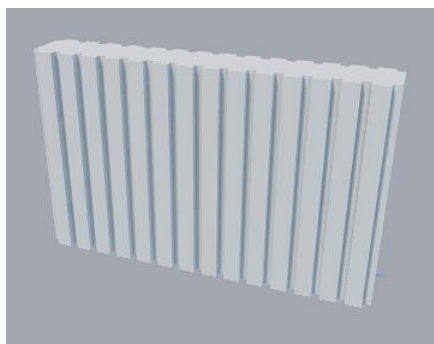


Fig. 104 Ribbed radiator - 3D view

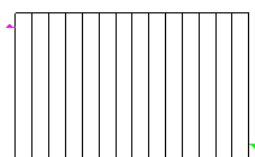


Fig. 105 Ribbed radiator - axonometry view

- *Cast iron ribbed Radiator*



Fig. 106 Cast iron ribbed radiator - projection view

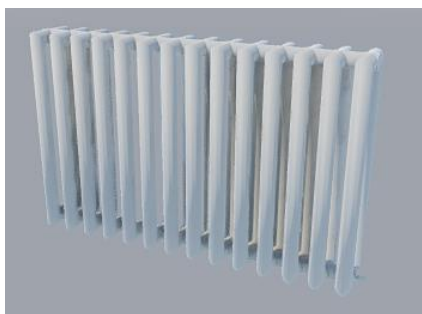


Fig. 107 Cast iron ribbed radiator -3D view

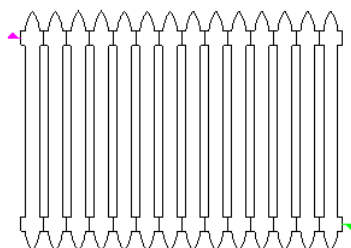


Fig. 108 Cast iron ribbed radiator - axonometry view

Heating installation objects

- *Rail Radiator*

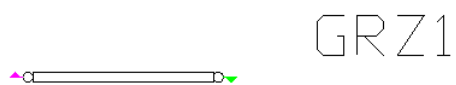


Fig. 109 Rail radiator - projection view



Fig. 110 Rail radiator - 3D view

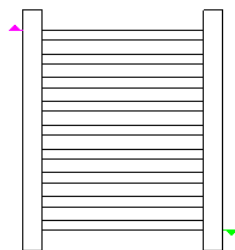


Fig. 111 Rail radiator - The axonometry view

- *Heating pipes single*



Fig. 112 Heating pipes single - projection view

Heating installation objects

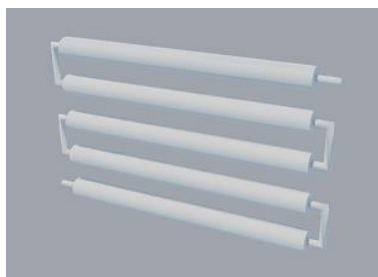


Fig. 113 Heating pipes single - 3D view

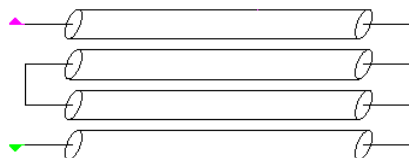


Fig. 114 Heating pipes single - the axonometry view

- Heating pipes double

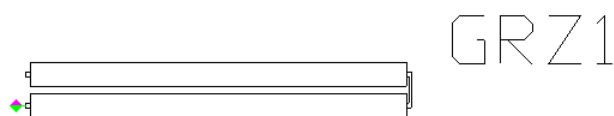


Fig. 115 Heating pipes double - projection view

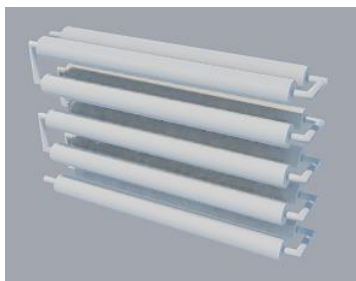


Fig. 116 Heating pipes double – 3D view

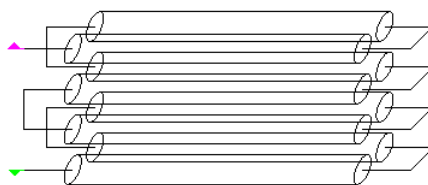


Fig. 117 Heating pipes double - the axonometry view

Heating installation objects

- *Channel Radiator*

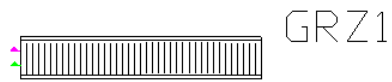


Fig. 118 Channel radiator - projection view

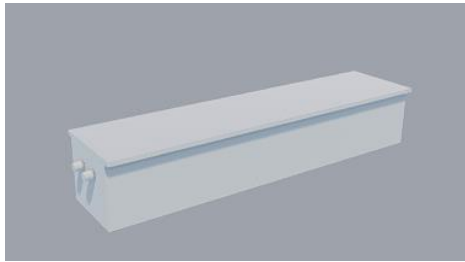


Fig. 119 Channel radiator – 3D view

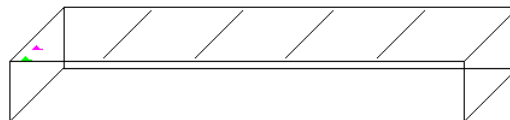


Fig. 120 Channel radiator – axonometry view

6.2.1.2 Inserting Radiators into view

When compared with other receivers, radiators are receivers that have additional editing and inserting options in the ArCADia–HEATING INSTALLATIONS module. A Radiator has defined (at constant altitudes) connectors. It enables the user to automatically connect pipelines to Radiators and to use the connection wizard. The user may select a connector (supply or return) downstream of which a radiator will be inserted in the radiator insertion window. Moreover, after clicking the Radiator icon, before the user inserts the radiator, a preview of the inserted element is available. This Radiator preview displays additional arrows that denote supply or return, depending on the arrow direction (towards the Radiator's connector – supply, from the Radiator's connector – return).

Heating installation objects

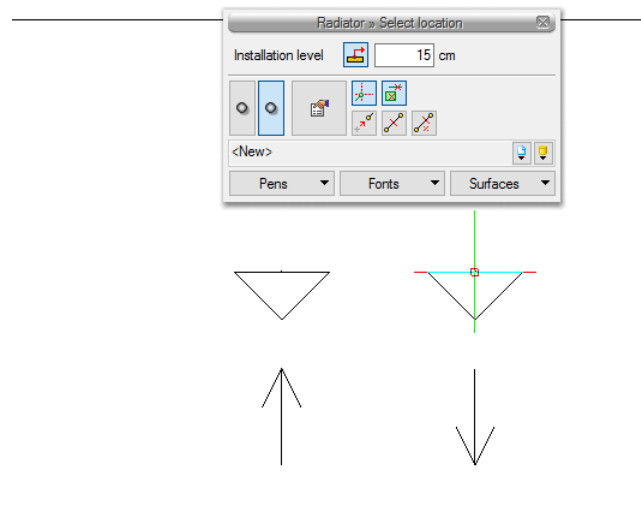




Fig. 121 Preview of the radiator inserted into the view

6.2.2 Heater

To insert a *Heater* object into the model, select the following icon:


Activation:

ArCADia and ArCADia PLUS

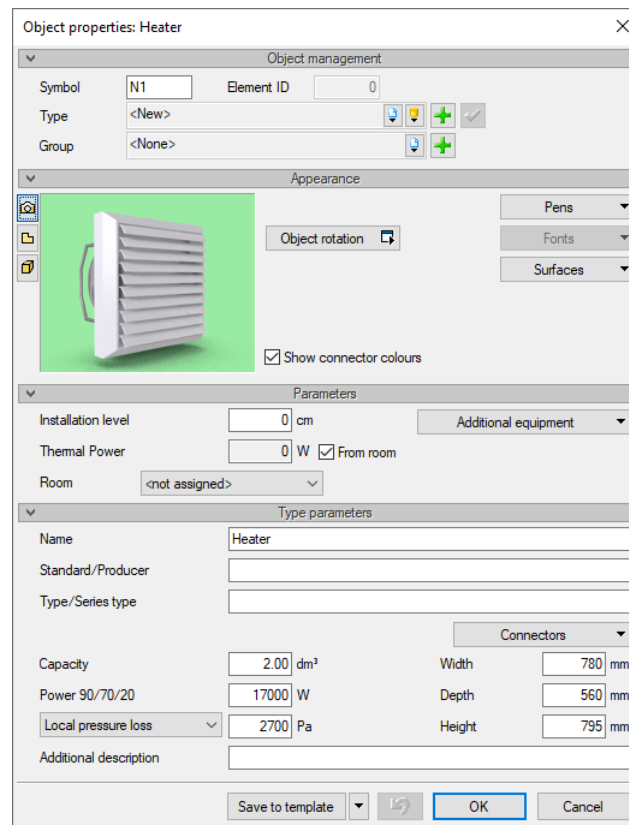
- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heater*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert heater*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heater*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed item properties defining window.

Heating installation objects



The dialog box 'Object properties: Heater' is divided into several sections:

- Object management:** Contains fields for Symbol (N1), Element ID (0), Type (<New>), and Group (<None>).
- Appearance:** Features a 3D model of a heater, a checkbox for 'Show connector colours' (checked), and dropdown menus for Pens, Fonts, and Surfaces.
- Parameters:** Includes fields for Installation level (0 cm), Thermal Power (0 W), and Room (<not assigned>). It also has a checkbox for 'From room' (checked) and an 'Additional equipment' dropdown.
- Type parameters:** Contains fields for Name (Heater), Standard/Producer, Type/Series type, Capacity (2.00 dm³), Power 90/70/20 (17000 W), Local pressure loss (2700 Pa), Width (780 mm), Depth (560 mm), and Height (795 mm). There is also a 'Connectors' dropdown.

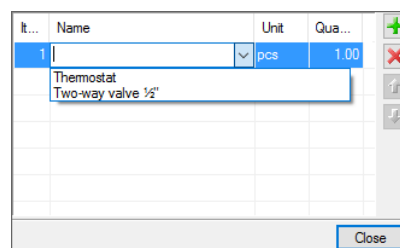
At the bottom, there are buttons for 'Save to template', 'OK', and 'Cancel'.

Fig. 122 The heater object properties window

Parameters control group

Room – name of the room where the receiver is located is downloaded automatically if the room is created in ArCADia-ARCHITECTURE module. The user can manually insert the rooms into the project using the *Room Manager* (detailed description available in point 4.2).

Additional equipment – for *heater*.



The 'Additional equipment' window displays a table with the following columns: It..., Name, Unit, and Qua... (Quantity). The first row shows '1' in the 'It...' column, 'Thermostat' in the 'Name' column, 'pcs' in the 'Unit' column, and '1.00' in the 'Qua...' column. Below this, there is a dropdown menu showing 'Two-way valve 1/2"'. At the bottom right, there is a 'Close' button.

Fig. 123 The additional equipment window for a heater object

Other Parameters - as in point 5.2.2

Heating installation objects

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Manufacturer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series of type – taken from the *Type library* or entered by the user to define a new object type.

Capacity – taken from the *Type library* (if it was introduced) or entered by the user [dm³].

Power 90/70/20 – taken from the *Type library* (if it was introduced) or entered by the user [W].

Local pressure loss or **ζ factor** or optionally – the values adopted from the *Type library* (if they were introduced) or entered by the user in the units displayed next to the field.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connectors will open:

Material – taken from the *Type library* or entered by the user to define a new type of object, or selected from the list.

DN diameter – taken from the *Type library* or entered by the user to define a new type of object, or selected from the list.

Connection kind – taken from the *Type library* or selected by the user to define a new object type, or selected from the list.

Length – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Depth – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type library* (if it was introduced) or entered by the user, [mm].



Other Parameters - as in point 5.2.2

6.2.3 Fan coil unit

To insert a *fan-coil unit* object into the model, select the following icon:

Activation:


ArCADia and ArCADia PLUS

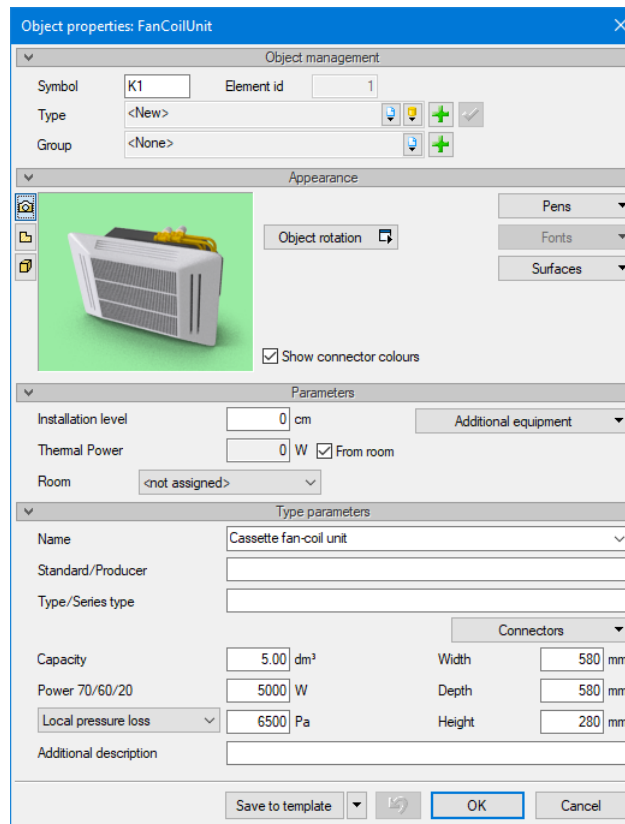
- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Fan coil unit*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒ *Insert fan coil unit* 

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Fan coil unit*

Heating installation objects

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed item properties defining window.



The dialog box 'Object properties: FanCoilUnit' is divided into several sections:

- Object management:** Contains fields for 'Symbol' (K1), 'Element id' (1), 'Type' (<New>), and 'Group' (<None>).
- Appearance:** Features a 3D model of a fan coil unit, a 'Show connector colours' checkbox, and dropdowns for 'Pens', 'Fonts', and 'Surfaces'.
- Parameters:** Includes 'Installation level' (0 cm), 'Thermal Power' (0 W), 'Room' (<not assigned>), and a checkbox for 'From room'.
- Type parameters:** Contains fields for 'Name' (Cassette fan-coil unit), 'Standard/Producer', 'Type/Series type', 'Capacity' (5.00 dm³), 'Power 70/60/20' (5000 W), 'Local pressure loss' (6500 Pa), 'Width' (580 mm), 'Depth' (580 mm), and 'Height' (280 mm).

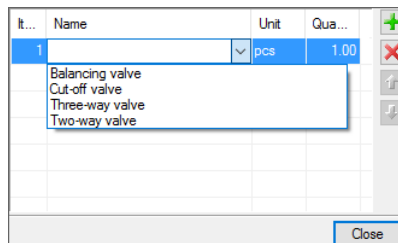
Buttons at the bottom include 'Save to template', 'OK', and 'Cancel'.

Fig. 124 The fan coil unit object properties window

Parameters control group

Room – name of the room where the receiver is located is downloaded automatically if the room is created in ArCADia – ARCHITECTURE module. The user can manually insert the rooms into the project using the *Room Manager* (detailed description available in point 4.2).

Additional equipment – for a fan coil unit.



The 'Additional equipment' window displays a table with columns: 'It...', 'Name', 'Unit', and 'Qua...'. The first row shows '1' in the 'It...' column, 'Balancing valve' in the 'Name' column, 'pcs' in the 'Unit' column, and '1.00' in the 'Qua...' column. A dropdown menu is open below the first row, listing 'Balancing valve', 'Cut-off valve', 'Three-way valve', and 'Two-way valve'. A 'Close' button is at the bottom right.

Fig. 125 The additional equipment window for a fan-coil unit element

Other Parameters - as in point 5.2.2.

Heating installation objects

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

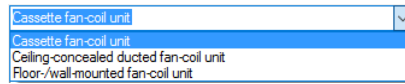


Fig. 126 The default fan coil unit names view

Standard/Manufacturer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series of type – taken from the *Type library* or entered by the user to define a new object type.

Capacity – taken from the *Type library* (if it was introduced) or entered by the user [dm³].

Power 90/70/20 – taken from the *Type library* (if it was introduced) or entered by the user [W].

Local pressure loss or **ζ factor** or optionally **Kvs coefficient** – the values adopted from the *Type library* (if they were introduced) or entered by the user in the units displayed next to the field.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Width – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Depth – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Additional description – the user enters additional data specifying the object and, when selecting the *Description* line, in the components of the statement, transferred to the list of materials.

6.2.4 Radiant heating

To insert a *radiant heating* object into the model, select the following icon:

Activation:

ArCADia and ArCADia PLUS


- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Radiant heating*

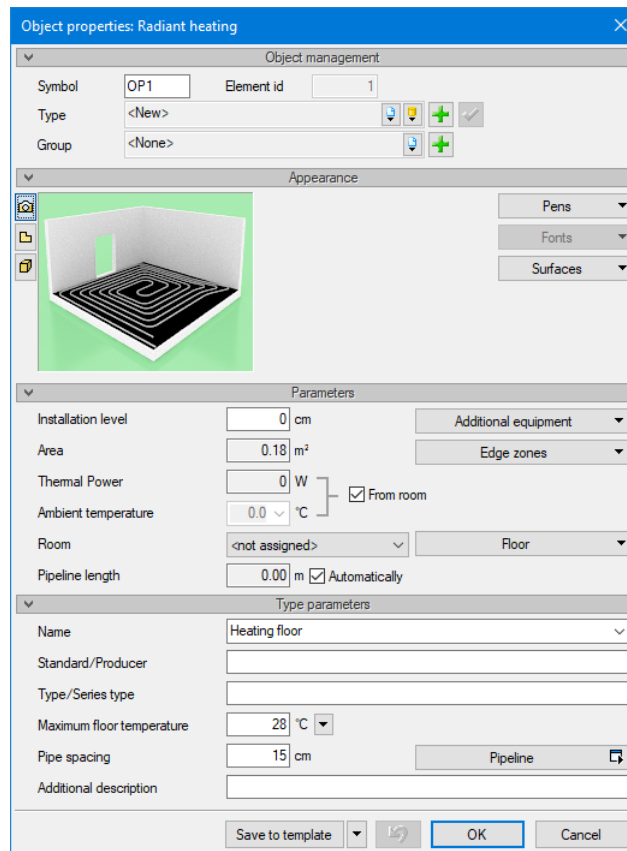
Heating installation objects

- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert radiant heating*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Radiant heating*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed element properties defining window.



The image shows a software window titled "Object properties: Radiant heating". It is divided into several sections: "Object management" with fields for Symbol (OP1), Element id (1), Type (<New>), and Group (<None>); "Appearance" with a 3D preview of a radiant floor and dropdowns for Pens, Fonts, and Surfaces; "Parameters" with fields for Installation level (0 cm), Area (0.18 m²), Thermal Power (0 W), Ambient temperature (0.0 °C), Room (<not assigned>), Pipeline length (0.00 m), and checkboxes for "From room" and "Automatically"; and "Type parameters" with fields for Name (Heating floor), Standard/Producer, Type/Series type, Maximum floor temperature (28 °C), Pipe spacing (15 cm), and an Additional description field. At the bottom are buttons for "Save to template", "OK", and "Cancel".

Fig. 127 The radiant heating element properties window

Parameter control group

Thermal power – the power taken into account, entered by the user or absorbed from the room after selecting the option *From room* [W].

Ambient temperature – design temperature in the vicinity of the heater. If the radiator is located in a room defined in the program, after selecting the *From room* option, the value will be assigned automatically.

Room – name of the room where the receiver is located is downloaded automatically if the room is created in ArCADia – ARCHITECTURE module. The user can manually insert the rooms into the project using the *Room Manager* (detailed description available in point 4.2).

Heating installation objects

Pipeline length – number of meters of cables designed in radiant heating. After selecting the **Automatically** option, the value is completed based on calculations.

Additional equipment – is completed by the user.

Edge Zones – after selecting this option, a window with information on the designed edge zones of radiant heating will open. Data concerning: **Symbol**, **Area**, **Maximum floor temperature** and **Pipe spacing** cables in the edge zone are collected directly from the project and the user cannot edit them from this window.

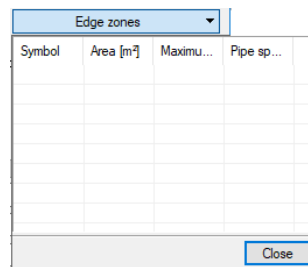


Fig. 128 The edge zones parameter window

Floor – after selecting this option, a window with information of the floor construction in a room with radiant heating will open. The calculations taken into account are: the thickness of the screed layer placed above the coil and the thickness of the finishing layer (along with thermal conductivity coefficients). If the project has a model created in ArCADia-ARCHITECTURE, after selecting the **From room** option, the fields will be automatically completed with the data saved in the partition.

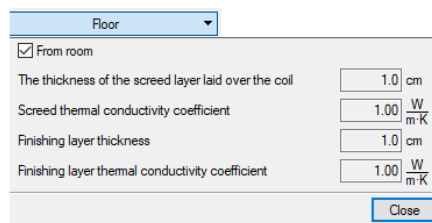


Fig. 129 The parameters window for a floor designed in a room with a radiant heating

Other Parameters - as in point 5.2.2.

Type parameters control group

Name – the object name taken from the **Type library** or entered by the user to define a new object type. You can select from the drop-down list: **Floor heating**, **Ceiling heating**, **Wall heating**.

Standard/Producer – taken from the **Type library** or entered by the user to define a new object type.

Type/Series of type – taken from the **Type library** or entered by the user to define a new object type.

Maximum floor temperature – assumed floor temperature with underfloor heating.

in the zone where people are present; the value taken into account in calculations and automatic selection.

Heating installation objects

Pipe spacing – the value specifying the spacing between the designed underfloor heating cables. If the selection of radiant heating parameters by ArCADia BIM software is performed, this value will be completed automatically.

Pipeline – the button allows you to open the pipeline properties window from which the surface heating will be designed.

After clicking on it, the heating pipe window opens

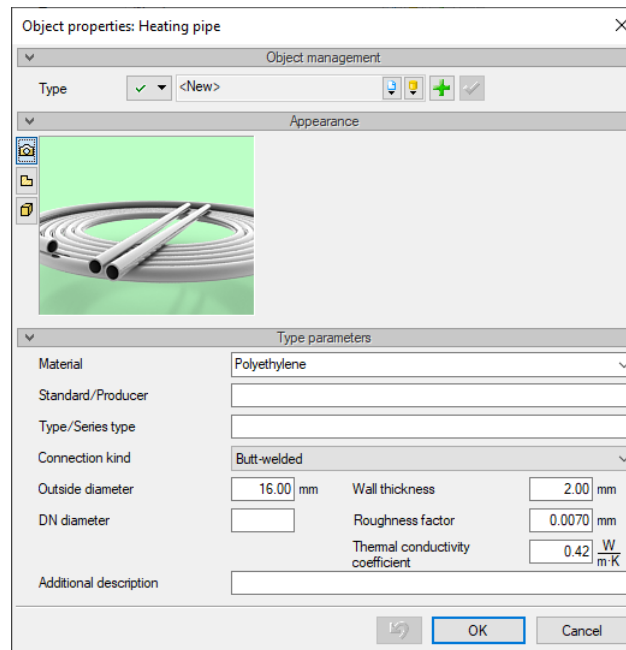


Fig. 130 The radiant floor pipelines properties window

Connection type – taken from the **Type library** or entered by the user to define a new object type.

Wall thickness – wall thickness of the radiant heating pipe. After selecting the type from the library, the value is completed automatically.

Roughness factor – roughness coefficient of the radiant heating. After selecting the type from the library, the value is completed automatically

Thermal conductivity coefficient – coefficient of thermal conductivity of the radiant heating pipe. After selecting the type from the library, the value is completed automatically

Additional description – the user enters additional data specifying the object and, when selecting the **Description** line, in the components of the statement, transferred to the list of materials.

6.2.5 Inserting and editing radiant heating

Inserting an element **Radiant heating** differs from the insertion of other objects.

After calling the **Radiant heating** command, the insertion window becomes active. Inserting an underfloor heating plane consists in indicating subsequent points - the vertices of the plane. The plane

Heating installation objects

must consist of at least 3 points. When inserting underfloor heating, further options appear in the insertion window - *Angle*, *Length*, *Close* and *Parallel*.

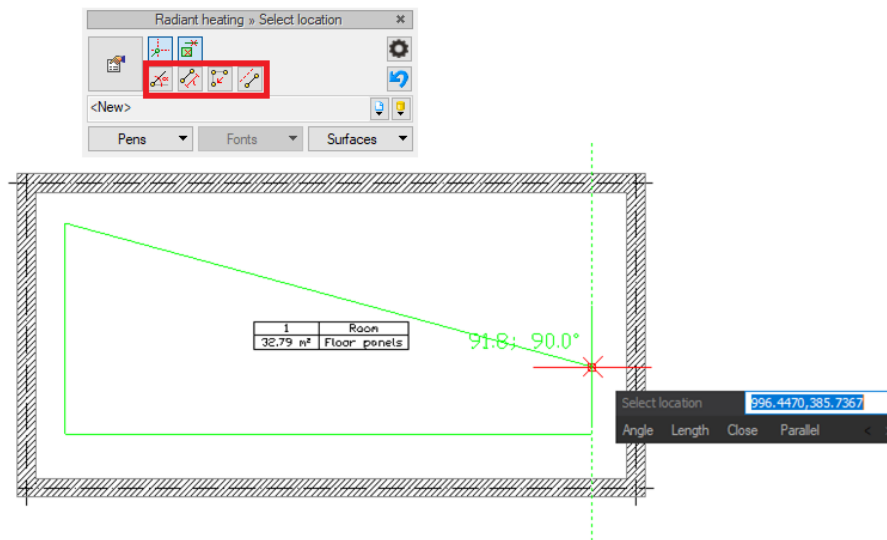


Fig. 131 Inserting an underfloor heating plane in a room

- *Angle* – inserts a point at a defined angle.
- *Length* – inserts a point offset by the specified length.
- *Close* – closes the drawn contour leading the plane to the starting point and ends the command.
- *Parallel* – allows you to enter an element parallel to the selected one.

After drawing the plane and selecting it again, the modification window will appear.

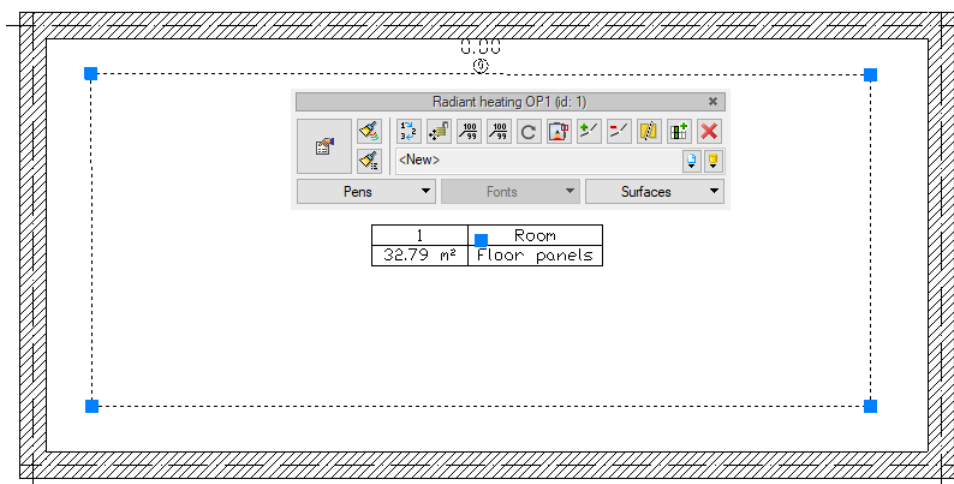






Fig. 132 The radiant heating modification window

Heating installation objects

In addition to the previously described options, the user receives additional options:

Tab. 7 Additional options in the modification window

	<i>Add point</i>	Adds another vertex to the radiant heating contour.
	<i>Remove point</i>	Deletes the selected vertex of a radiant heating contour.
	<i>Divide a solid</i>	Repositions layers by rotating them by a selected edge or axis.
	<i>Insert edge zone</i>	Opens the Element <i>Properties window</i> , eg <i>Walls</i> .

To add a point, after selecting the *Add point* command, indicate the location of a new point on the contour. Extra points will be inserted until the command is closed. The added vertices can be freely moved.

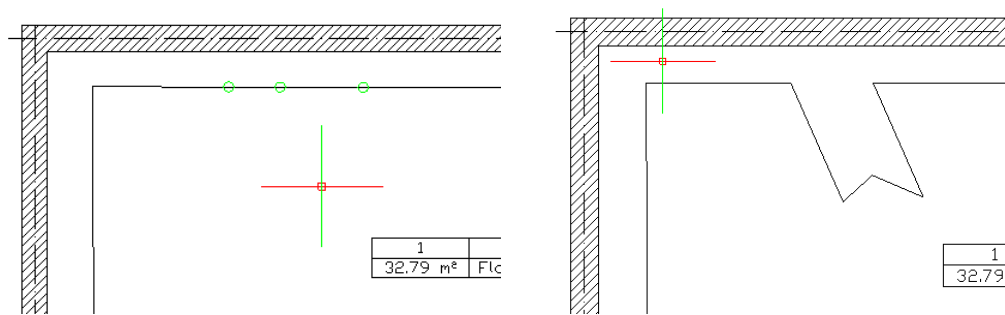


Fig. 133 Adding further vertices of the radiant heating

To delete a vertex, after selecting the *Delete point* command, indicate the location of the deleted point on its contour and confirm. The heating plane will automatically adapt to the new geometry.

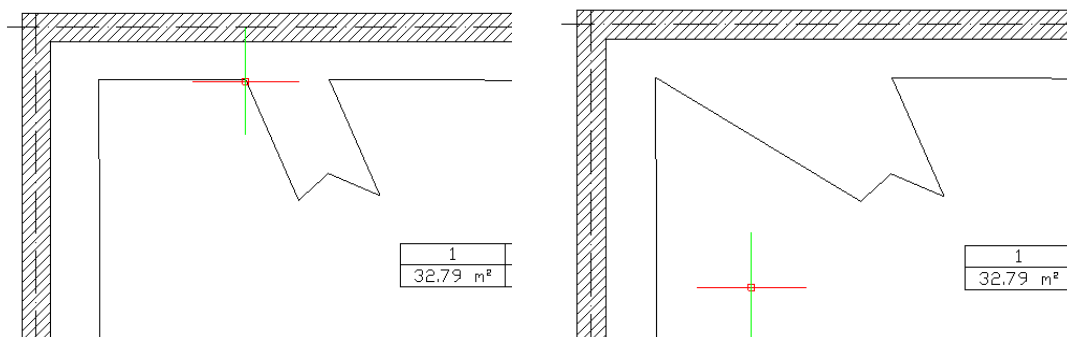


Fig. 134 Removing vertices of the radiant heating

Heating installation objects

If the drawn plane is too large, it can be split. To do this, select the *Divide a solid* command and indicate the division line of the plane.

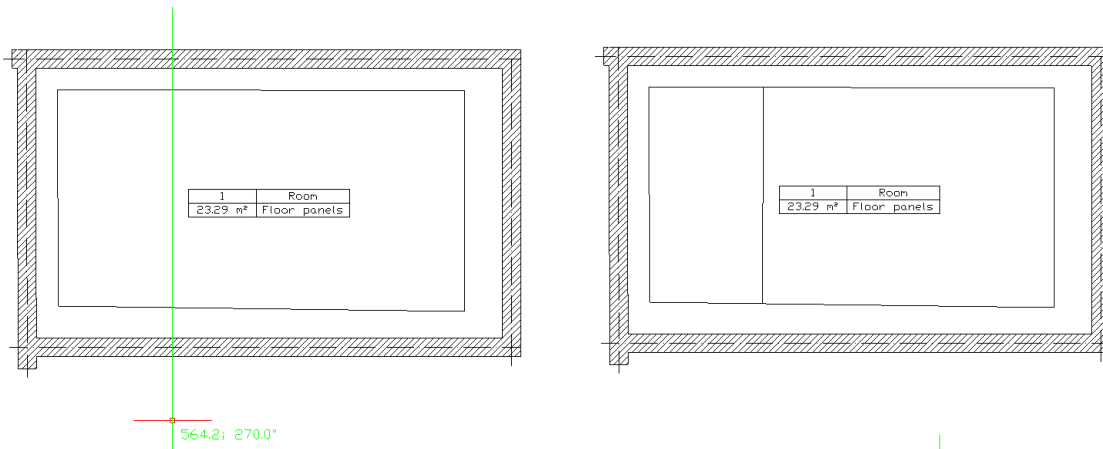


Fig. 135 The division of the radiant heating

The radiant heating can also be designed with an edge zone - the surface with a smaller spacing between the arrangement of heating pipes and a higher maximum allowable temperature. Its parameters are defined in the properties window, but the surface is indicated directly in the drawing. After selecting the *Insert edge zone* command, indicate the outline of the edge zone. If the indicated area exceeds the outline of the radiant heating, it will be trimmed to its limits. You can define more than one edge zone on a given radiant plane.

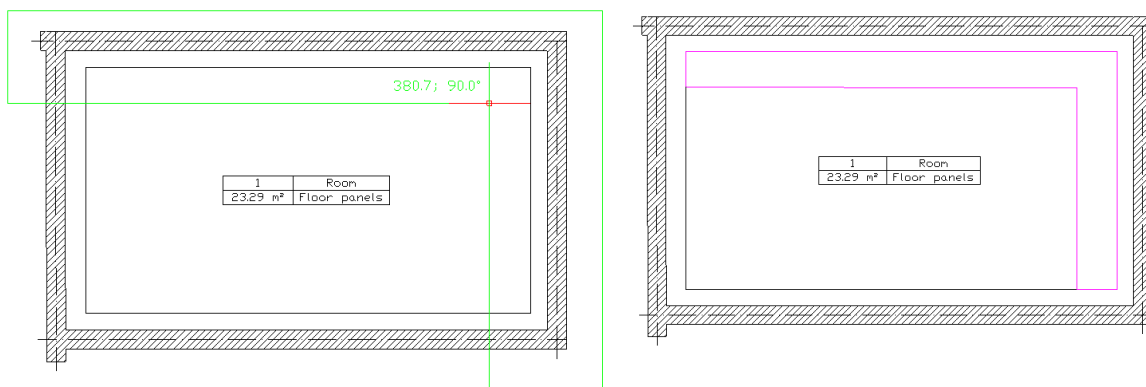


Fig. 136 Inserting an edge zone of the radiant heating

After entering the properties of the *Edge zone*, a window will open where the user can modify its parameters - the maximum floor temperature and the spacing of cables. These values will be taken into account in the calculations and in the automatic selection.

Heating installation objects

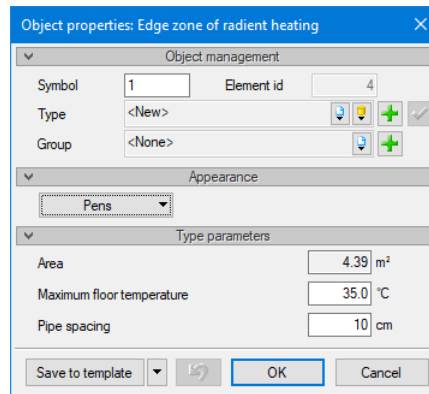


Fig. 137 The edge zone of the radiant heating properties window



6.3 Control and safety devices

6.3.1 Expansion vessel

To insert an *expansion vessel* object into the model, select the following icon:


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Expansion vessel*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert expansion vessel*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Expansion vessel*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

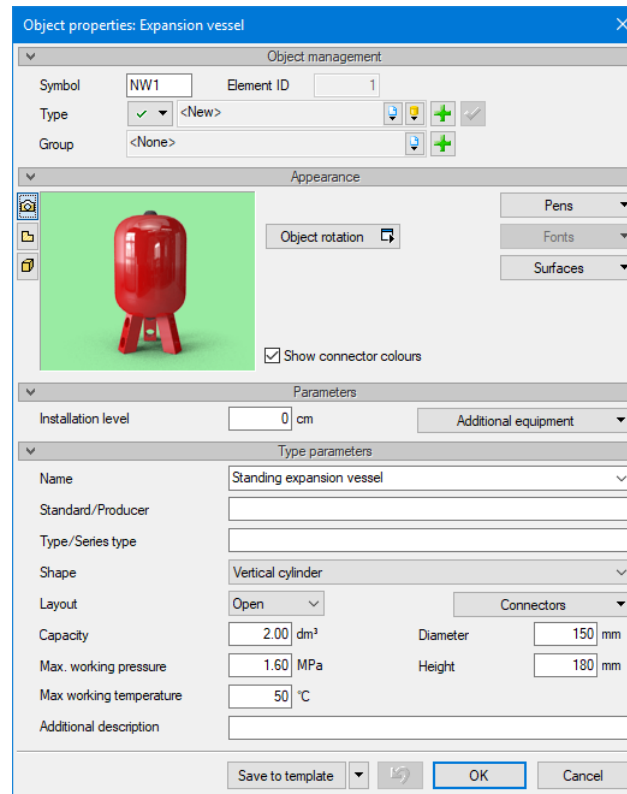


Fig. 138 The expansion vessel object properties window

Parameters control group

Additional equipment – for an Expansion vessel

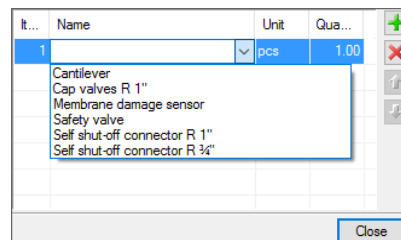


Fig. 139 The additional equipment window for an expansion vessel object

Other Parameters - as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series of type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Heating installation objects

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Shape – the user selects from the drop-down list: vertical cylinder, horizontal cylinder, cuboid.

Capacity – taken from the *Type library* (if it was uploaded) or entered by the user to define a new object type [dm³].

Layout – taken from the *Type library* (if it was uploaded) or selected by the user, depending on the system in which the designed installation will operate.

Diameter – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Max. working pressure – taken from the *Type library* (if it was introduced) or entered by the user, [MPa].

Max. working temperature – taken from the *Type library* (if it was introduced) or entered by the user, [°C].



Note: The dimension controls depend on the selected shape of the **Expansion vessel**.

Additional description – the user enters additional data that specify the object and are moved to the material list after selecting the *Description* row in the listings.

6.3.2 Divider


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Divider*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert divider*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Divider*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

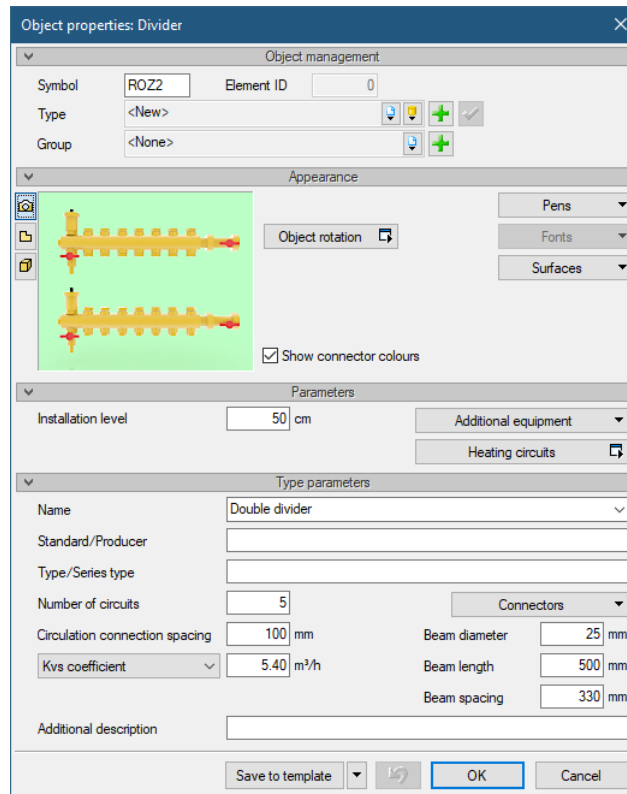


Fig. 140 The divider object properties window

Parameters control group

Additional equipment – for a *Divider*.

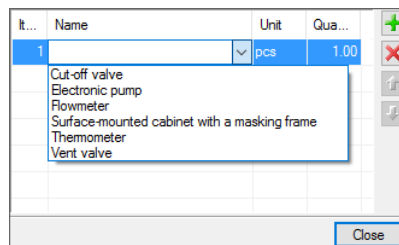


Fig. 141 The additional equipment window for the Divider object

Heating circuits – once the user clicks on the button, a window opens where the user may select which heating circuits will be created by inserting a divider. The user defines heating circuits in the *Project options* in the *Calculations* tab, point 3.5.

Heating installation objects

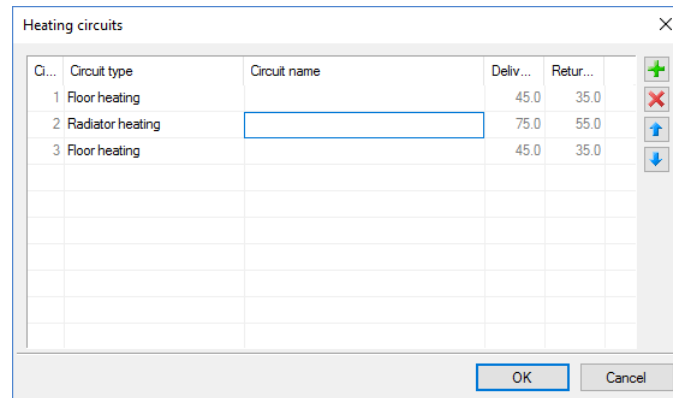


Fig. 142 The heating circuits selection window

The sign may be employed by the user to add another room. The sign removes the marked item. The arrows change the sequence of the marked element placement.

Other Parameters - as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type. The Divider may be a double or single type by default. Once a single divider is selected, it will not be possible to select the heating circuits. A single divider is assigned with the function of supply or return when the first pipeline is connected. Its connectors will then be in the color of the assigned function.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Number of circuits – taken from the *Type library* (if it was input) or entered by the user. It is the possible number of pipes that we connect to the divider, not including the main pipelines. In the case of a double divider, this number refers to supply and return separately, so it is the number of circuit pairs.

Circuit connection spacing – taken from the type *Type library* (if it was input) or entered by the user.

Kvs factor or optionally **ζ factor** or **Local pressure loss** – the values adopted from the *Type library* (if they were input) or entered by the user in the units displayed next to the field.

Heating installation objects

Beam diameter – taken from the type libraries (if it was input) or entered by the user, [mm].

Beam length – taken from the type libraries (if it was input) or entered by the user, [mm].



Beam spacing – taken from the type libraries (if it was input) or entered by the user, [mm].

Additional description – the user enters additional data that specify the object and are moved to the material list after selecting the *Description* row in the listings.

6.3.3 Hydraulic separators


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Hydraulic separator*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert hydraulic separator*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Hydraulic separator*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

Fig. 143 The hydraulic separators element properties window

Parameters control group

Temperature difference – a parameter entered by the user.

Other Parameters – as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

Shape – the user selects from the drop-down list: *Cylinder*, *Cuboid*.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

Heating installation objects

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Capacity – taken from the *Type library* (if it was introduced) or entered by the user, [dm³].

Thermal power – taken from the *Type library* (if it was introduced) or entered by the user, [kW].

Rated pressure – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Nominal temperature – taken from the *Type library* (if it was introduced) or entered by the user, [°C].

Maximum flow – taken from the *Type library* (if it was introduced) or entered by the user, [m³/h].

Installation length – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Diameter – taken from the *Type library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type library* (if it was introduced) or entered by the user, [mm].



Note: The dimension controls depend on the selected shape of the **Hydraulic separators**.

Additional description – the user enters additional data that specifies the object, and they are moved to the material list after selecting the *Description* row in the listings.

6.3.4 Pump


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Pump*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Pump*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Pump*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

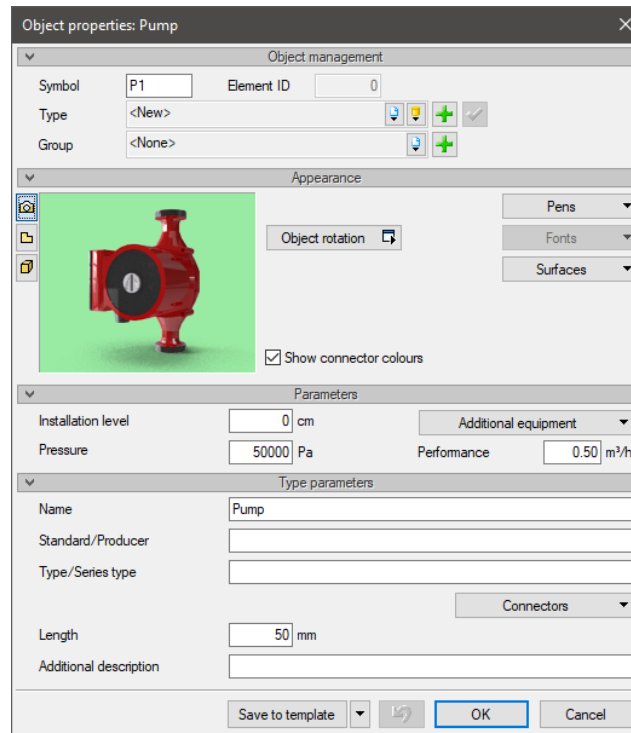


Fig. 144 The Pump object properties window

Parameters control group

Installation level – a parameter entered by the user, [cm].

Pressure – a parameter entered by the user, [Pa].

Additional equipment – user-entered parameters

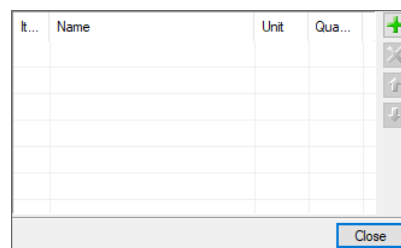


Fig. 145 The additional equipment window

Performance – a parameter entered by the user, [m³/h].

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

Heating installation objects

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].



Additional description – the user enters additional data that specifies the object and they are moved to the material list after selecting the *Description* row in the listings.

6.4 Measurement devices

6.4.1 Heat meter


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heat meter*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert heat meter*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heat meter*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

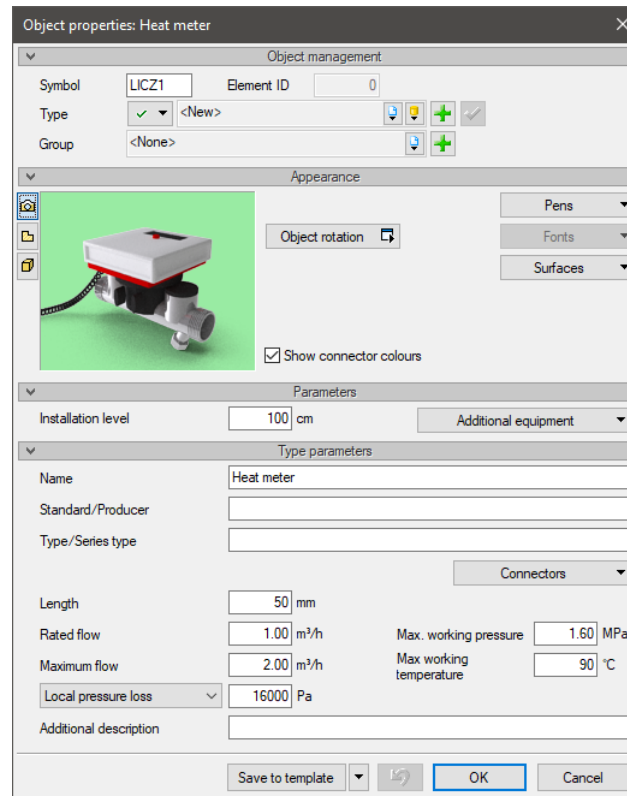


Fig. 146 The heat meter element properties window

Parameters control group – as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Rated flow – taken from the *Type Library* (if it was introduced) or entered by the user, [m³/h].

Maximum flow – taken from the *Type Library* (if it was introduced) or entered by the user, [m³/h].

Heating installation objects

Max. working pressure – taken from the *Type Library* (if it was introduced) or entered by the user, [MPa].

Max. working temperature – taken from the *Type Library* (if it was introduced) or entered by the user, [°C].



Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the type libraries (if they were input) or entered by the user in the units displayed next to the field.

Additional description – the user enters additional data that specifies the object, and they are moved to the material list after selecting the *Description* row in the listings.

6.4.2 Thermometer


Activation:

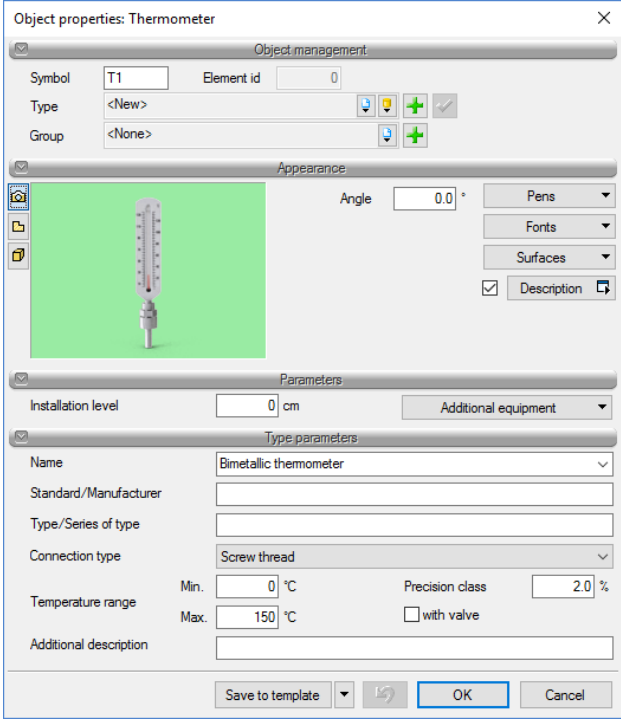
ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Thermometer*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert thermometer*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Thermometer*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.



The dialog box 'Object properties: Thermometer' is divided into several sections:

- Object management:**
 - Symbol: T1
 - Element id: 0
 - Type: <New>
 - Group: <None>
- Appearance:**
 - Angle: 0.0 °
 - Pens, Fonts, Surfaces, and Description (checked) dropdowns.
- Parameters:**
 - Installation level: 0 cm
 - Additional equipment: dropdown
- Type parameters:**
 - Name: Bimetallic thermometer
 - Standard/Manufacturer: empty field
 - Type/Series of type: empty field
 - Connection type: Screw thread
 - Temperature range: Min. 0 °C, Max. 150 °C
 - Precision class: 2.0 %
 - with valve: unchecked checkbox
 - Additional description: empty field

Buttons at the bottom: Save to template, OK, and Cancel.

Fig. 147 The thermometer element properties window

Heating installation objects

Parameters control group – as in point 5.2.2

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

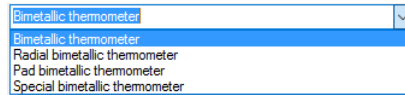


Fig. 148 The default thermometer names view

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

Connection type – taken from the *Type library* or entered by the user to define a new object type.

Temperature range – taken from the *Type library* or entered by the user to define a new object type. The user enters the minimum and the maximum range value from the manufacturer's catalogue, [°C].

Precision class – taken from the *Type library* or entered by the user to define a new object type, [%].



With valve – taken from the *Type library* or entered by the user to define a new object type. After ticking the checkbox on the symbol, the valve will be visible on the projection as well.

Additional description – the user enters additional data that specifies the object and they are moved to the material list after selecting the *Description* row in the listings.

6.4.3 Manometer


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Manometer*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert manometer*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Manometer*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

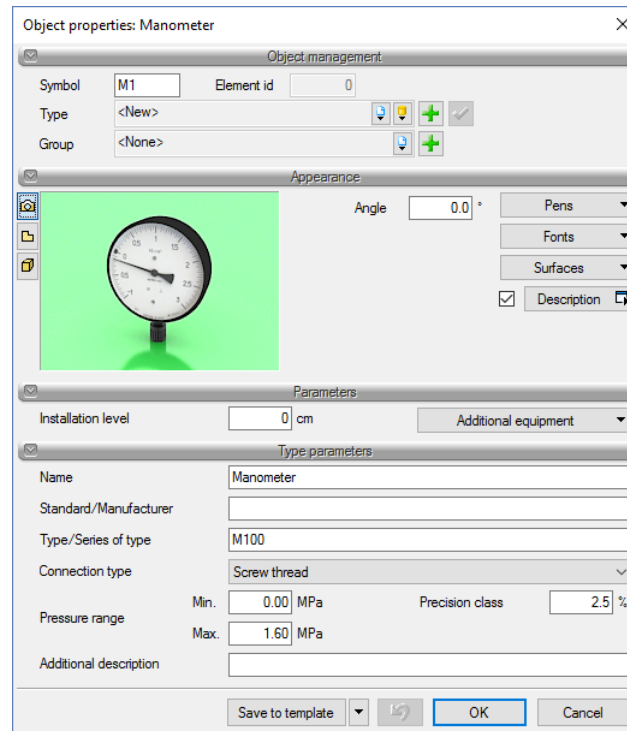


Fig. 149 The manometer element properties window

Parameters control group – as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

Pressure range – taken from the *Type library* or selected by the user to define a new object type. The user enters the minimum and the maximum range value from the manufacturer's catalogue, [MPa].

Precision class – taken from the *Type library* or selected by the user to define a new object type, [%].

Additional description – the user enters additional data that specifies the object, and they are moved to the material list after selecting the *Description* row in the listings.



Heating installation objects

6.5 Shut-off fittings

6.5.1 Cut-off valve


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Cut-off valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert cut-off valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Cut-off valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

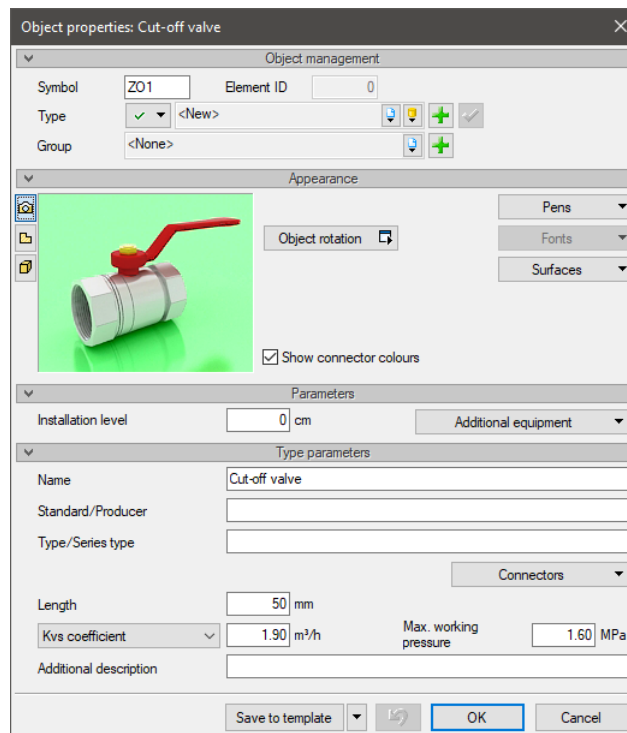


Fig. 150 The cut-off valve element properties window

[Parameters](#) control group – as in point 5.2.2

[Type parameters](#) control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Heating installation objects

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the type libraries (if they were inserted) or entered by the user in the units displayed next to the field.



Max. working pressure – taken from the *Type Library* (if it was introduced) or entered by the user, [MPa].

Additional description – the user enters additional data that specifies the object, and they are moved to the material list after selecting the *Description* row in the listings.

6.5.2 Non-return valve,


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Non-return valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert non-return valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Non-return valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

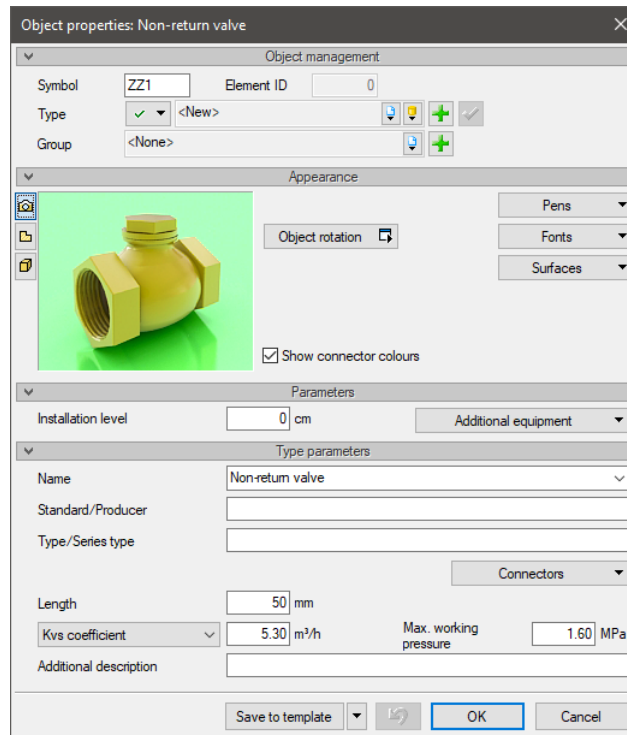


Fig. 151 The non-return valve element properties window

Parameters control group

Additional equipment – for a Non-return valve.

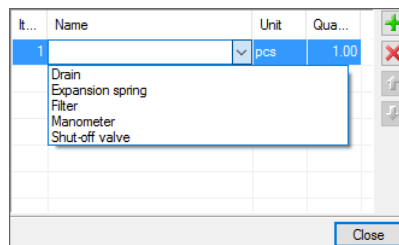


Fig. 152 The additional equipment window for a non-return valve element

Other Parameters - as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

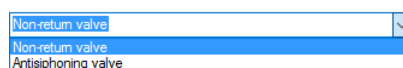


Fig. 153 The default non-return valve names view

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

Heating installation objects

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the type libraries (if they were inserted) or entered by the user in the units displayed next to the field.

Max. working pressure – taken from the *Type Library* (if it was introduced) or entered by the user, [MPa].



Additional description – the user enters additional data that specifies the object, and they are moved to the material list after selecting the *Description* row in the listings.

6.6 Filtering fittings

6.6.1 Filter


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Filter*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert filter*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Filter*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

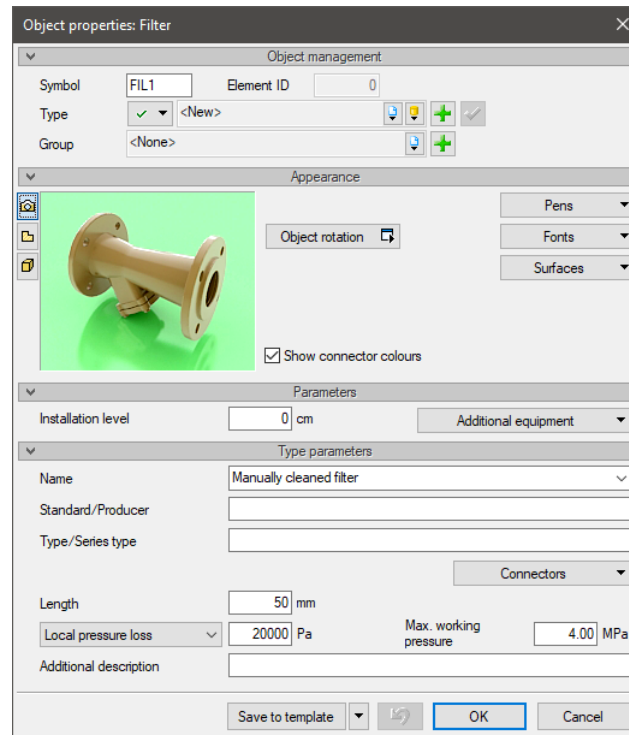


Fig. 154 The filter element properties window

Parameters control group – as in point 5.2.2.

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

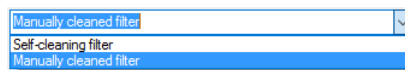


Fig. 155 The default filter names view

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Heating installation objects

Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the type libraries (if they were inserted) or entered by the user in the units displayed next to the field.



Max. working pressure – taken from the *Type Library* (if it was introduced) or entered by the user, [MPa].

Additional description – the user enters additional data that specifies the object, and they are moved to the material list after selecting the *Description* row in the listings.

6.6.2 Strainer


Activation:

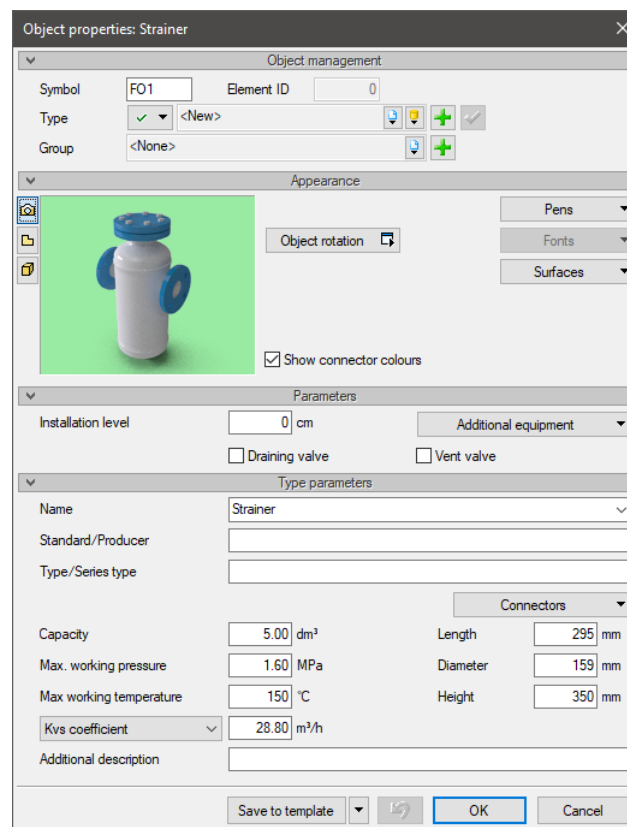
ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Strainer*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert strainer*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Strainer*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.



The image shows a software window titled "Object properties: Strainer". It contains several sections for configuring the strainer object:

- Object management:** Includes fields for Symbol (FO1), Element ID (0), Type (<New>), and Group (<None>).
- Appearance:** Features a 3D model of a strainer, a preview of the object rotation, and dropdown menus for Pens, Fonts, and Surfaces. A checkbox for "Show connector colours" is checked.
- Parameters:** Includes fields for Installation level (0 cm), Additional equipment, and checkboxes for Draining valve and Vent valve.
- Type parameters:** Includes fields for Name (Strainer), Standard/Producer, Type/Series type, Capacity (5.00 dm³), Length (295 mm), Max. working pressure (1.60 MPa), Diameter (159 mm), Max working temperature (150 °C), Height (350 mm), Kvs coefficient (28.80 m³/h), and an Additional description field.

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

Fig. 156 The strainer object properties window

Heating installation objects

Parameters control group

Draining valve – after ticking this checkbox, the *Strainer* will have a symbol including a draining valve in the axonometry. Moreover, the valve will be included in the bill of materials.

Vent valve – after ticking this checkbox, the *Strainers* will have a symbol including a vent valve in the axonometry. Moreover, the valve will be included in the bill of materials.

Other Parameters - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type[MPa].

Max. working temperature – taken from the *Type library* or selected by the user to define a new object type[°C].

Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the type libraries (if they were inserted) or entered by the user in the units displayed next to the field.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Diameter – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].



Additional description – the user enters additional data that specifies the object, and this description is moved to the material list after selecting the *Description* row in the listings.

Heating installation objects

6.6.3 Air separator


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Air separator*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert air separator*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Air separator*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

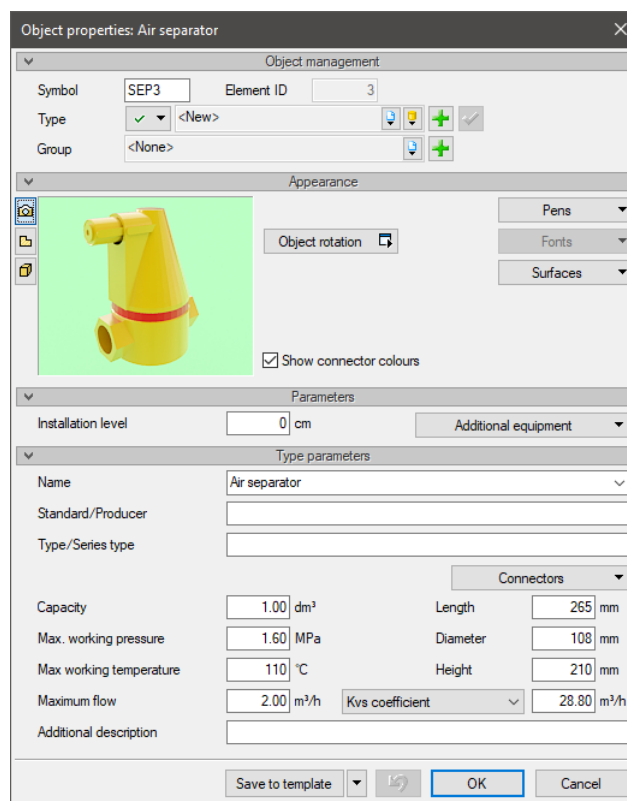


Fig. 157 The air separator object properties window

Parameters control group - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Heating installation objects

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type, [MPa].

Max. working temperature – taken from the *Type library* or selected by the user to define a new object type, [°C].

Maximum flow – taken from the *Type library* or selected by the user to define a new object type, [m³/h].

Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the type libraries (if they were inserted) or entered by the user in the units displayed next to the field.

Length – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Diameter – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].

Height – taken from the *Type Library* (if it was introduced) or entered by the user, [mm].



Additional description – the user enters additional data that specifies the object, and this description is moved to the material list after selecting the *Description* row in the listings.

6.7 Control and safety valves

6.7.1 Balancing valve

Activation:


ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Balancing valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert balancing valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Balancing valve*

Heating installation objects

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

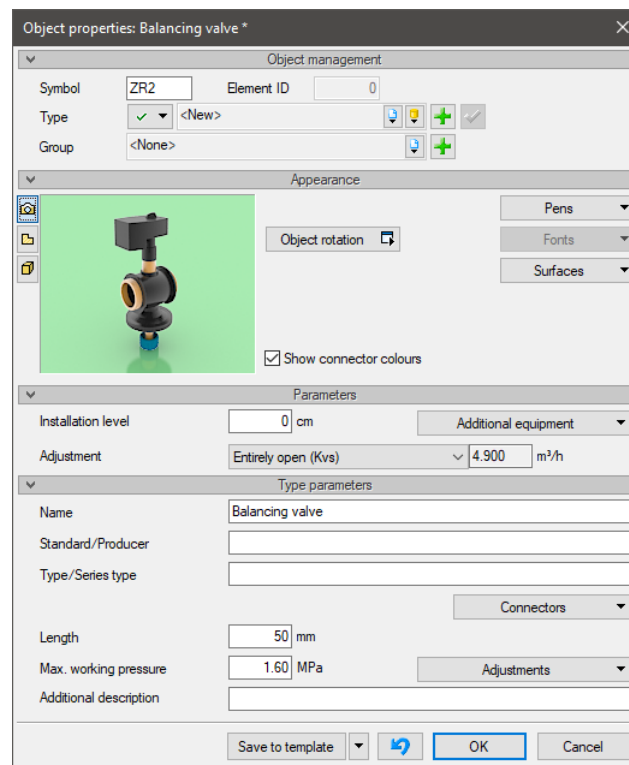


Fig. 158 The balancing valve object properties window

Parameters control group - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the [Type library](#) or entered by the user to define a new object type.

Standard/Producer – taken from the [Type library](#) or entered by the user to define a new object type.

Type/Series type – taken from the [Type library](#) or entered by the user to define a new object type.

After selecting the [Connectors](#) command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the [Type library](#) or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the [Type library](#) or selected by the user to define a new object type.

DN diameter – taken from the [Type library](#) or input by the user in order to define a new type of object, or selected from the list.

Heating installation objects

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type, [MPa].

Adjustments – pre-defined in the program or set by the user as a Kvs value [m³/h]; they are displayed after the defining process in the *Parameters* group selection window has been completed.

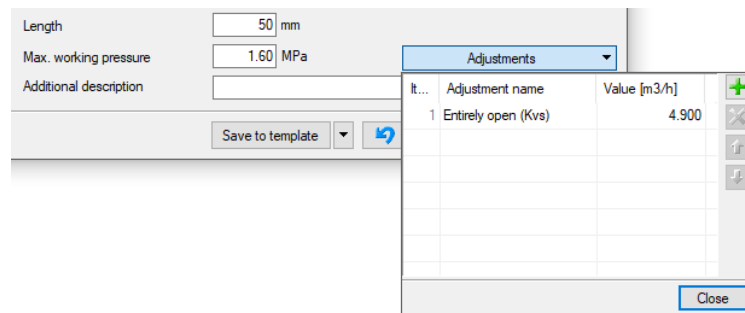


Fig. 159 Okno definicji nastawy zaworu

Fig. 159 The valve setting definition window



Adding lines with individual settings is done as described in point 5.2.2 (for adding additional equipment).

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.7.2 Control valve


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Control valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  Insert *control valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Control valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

Fig. 160 The control valve object properties window

Parameters control group

Circuit type – the user may select a circuit type pre-defined in the project options, point 3.5.

Delivery temperature, Return temperature – input automatically after selecting a circuit type.

Circuit name – the user may enter their own circuit name.

Other Parameters - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

Heating installation objects

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type, [MPa].

Max. working temperature – taken from the *Type library* or selected by the user to define a new object type, [°C].

Max. pressure drop – taken from the *Type library* or selected by the user to define a new object type, [kPa].



Kvs factor – values adopted from the *Type libraries* (if they were inserted) or entered by the user[m³/h].

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.7.3 Safety valve


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Safety valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert safety valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Safety valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

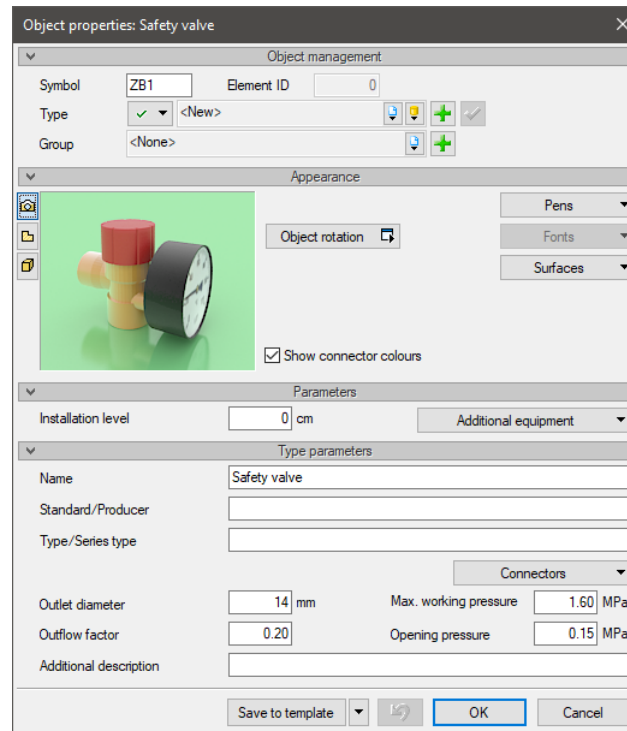


Fig. 161 The safety valve object properties window

Parameters control group - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type, [MPa].

Opening pressure – taken from the *Type library* or selected by the user to define a new object type.

Outlet diameter – an object-specific parameter taken from the *Type library* or input by the user to define a new object type.

Heating installation objects



Outflow factor – an object-specific parameter taken from the *Type library* or input by the user to define a new object type.

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.7.4 Thermostatic valve


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Safety valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert safety valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Safety valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

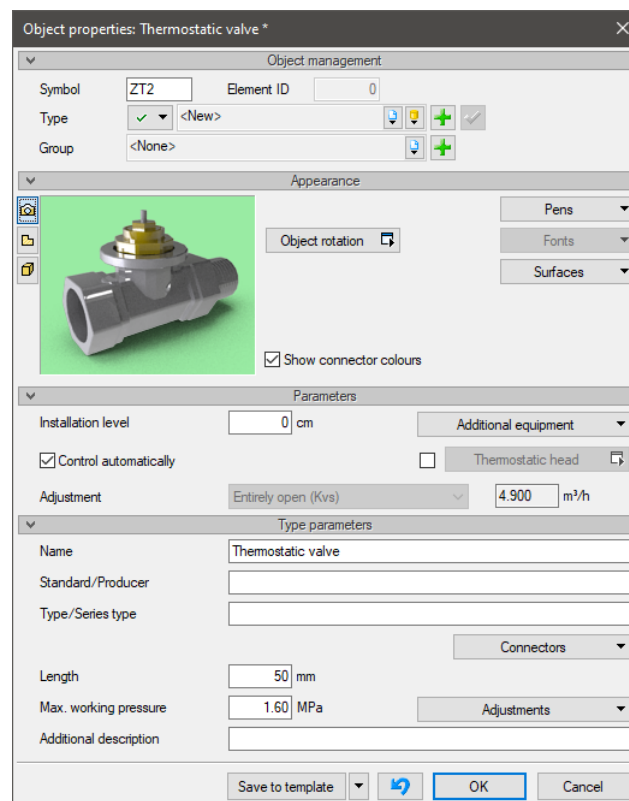


Fig. 162 The thermostatic valve object properties window

Heating installation objects

Parameters control group

Thermostatic head – after ticking the checkbox, the user may click on the **Thermostatic head** button and add a head to the valve.

Control automatically – after ticking this option and once the program performs the calculations, it will automatically set the valve and select the appropriate set point from those available for a particular valve.

Adjustment – from a drop-down list you can select a specific set point, the value of which will be shown in the adjacent editing window, [m³/h]. If the user ticks the **Control automatically** feature, the set point values will be automatically completed after the calculations are performed.

Other Parameters - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the **Type library** or entered by the user to define a new object type.

Standard/Producer – taken from the **Type library** or entered by the user to define a new object type.

Type/Series type – taken from the **Type library** or entered by the user to define a new object type.

After selecting the **Connectors** command, a window with the possibility of defining the parameters of connection pipes will open:

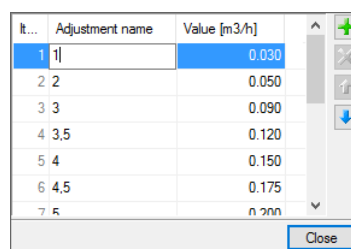
Material – taken from the **Type library** or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the **Type library** or selected by the user to define a new object type.

DN diameter – taken from the **Type library** or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the **Type library** (if that was introduced) or selected by the user to define a new object type.

Adjustment – pre-defined in the program or set by the user as a Kvs value [m³/h]; they are displayed after the defining process in the **Parameters** group selection window has been completed.



It...	Adjustment name	Value [m ³ /h]
1	1	0.030
2	2	0.050
3	3	0.090
4	3,5	0.120
5	4	0.150
6	4,5	0.175
7	5	0.200

Fig. 163 The adjustment name window


Heating installation objects

Adding a line with individual adjustments can be done according to the method described in 5.2.2. (adding additional equipment).

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.7.5 Thermostatic head

There are two ways to add a thermostatic head. The first way is to tick the *Thermostatic head* checkbox in the *Thermostatic valve* object properties window (Fig. 162). The second way is to tick the checkbox in the *Valve insert* element properties (Fig. 165).

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

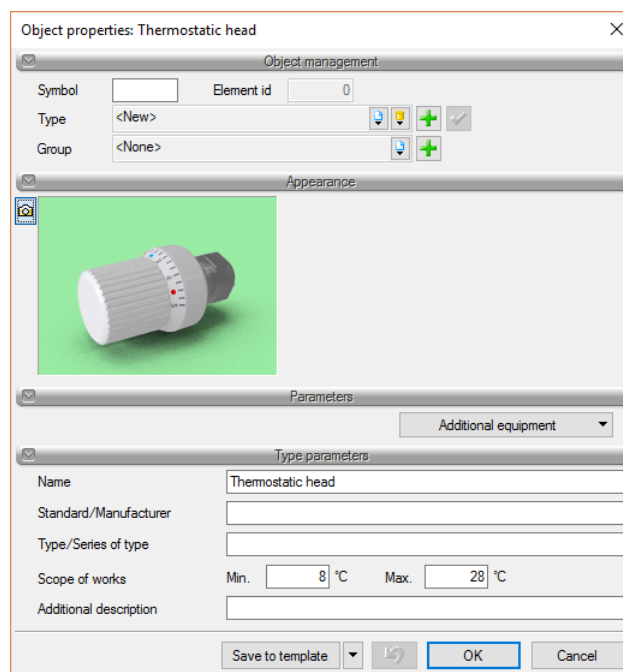


Fig. 164 The thermostatic head object properties window

Parameters control group - as in point 5.2.2

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.


Heating installation objects

Scope of work – taken from the *Type library* or entered by the user to define a new object type, provided as *Min.* and *Max.* temperature values from the manufacturer's catalogue, [°C].

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.7.6 Valve insert

To add a valve insert, tick the *Valve insert* checkbox in the *Radiator* element.

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

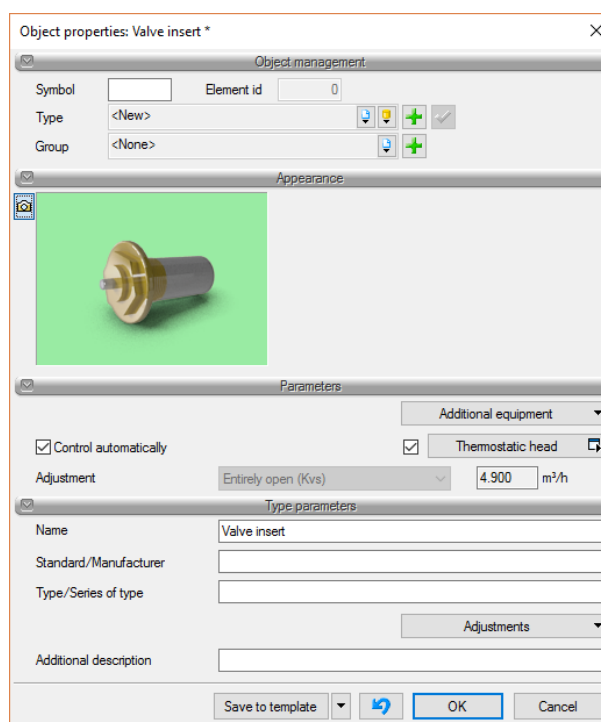


Fig. 165 The valve insert object properties window

Parameters control group

Thermostatic head – after ticking the checkbox, the user may click on the *Thermostatic head* button and add a head to the valve.

Control automatically – after ticking this option and once the program performs the calculations, it will automatically set the valve and select the appropriate set point from those available for a particular valve.

Adjustment – from a drop-down list you can select a specific set point, the value of which will be shown in the adjacent editing window, [m³/h]. If the user ticks the *Control automatically* feature, the adjustment values will be automatically completed after the calculations are performed.

Other Parameters - as in point 5.2.2

Heating installation objects

Type parameters control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.



Adjustment – pre-defined in the software or set by the user as a Kvs value [m3/h]; they are displayed after the defining process in the program group selection window has been completed. Adding lines with individual settings is done as described in 5.2.2 (for adding additional equipment).

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.7.7 Vent valve


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vent valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert vent valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vent valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

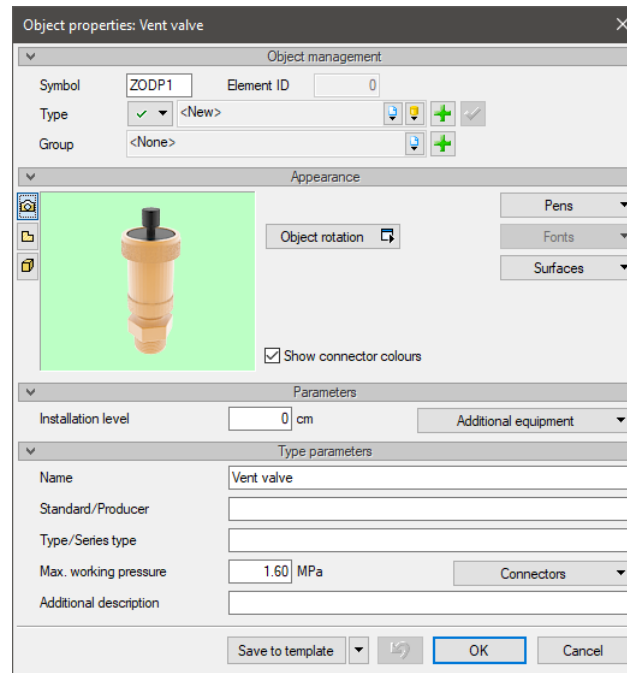


Fig. 166 The vent valve object properties window

Parameters control group - as in point 5.2.2

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type, [MPa].



Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

Heating installation objects

6.7.8 Draining valve


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Draining valve*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert draining valve*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Draining valve*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

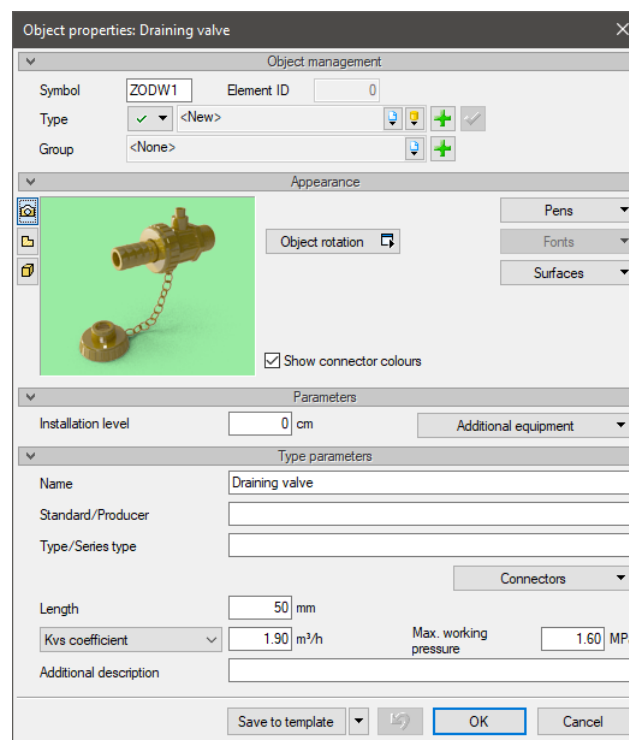


Fig. 167 The draining valve object properties window

Parameters control group - as in point 5.2.2

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

Heating installation objects

After selecting the *Connectors* command, a window with the possibility of defining the parameters of connection pipes will open:

Material – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Connection type – taken from the *Type library* or selected by the user to define a new object type.

DN diameter – taken from the *Type library* or input by the user in order to define a new type of object, or selected from the list.

Max. working pressure – taken from the *Type library* or selected by the user to define a new object type, [MPa].



Kvs factor or optionally *ζ factor* or *Local pressure loss* – values adopted from the *Type library* (if they were inserted) or entered by the user in the units displayed next to the field.

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

6.8 Fixture


Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Fixture*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert fixture*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Fixture*

By choosing the  button in the insertion window (which will be updated first) or double clicking on the already inserted element, the user can display a designed object properties defining window.

Heating installation objects

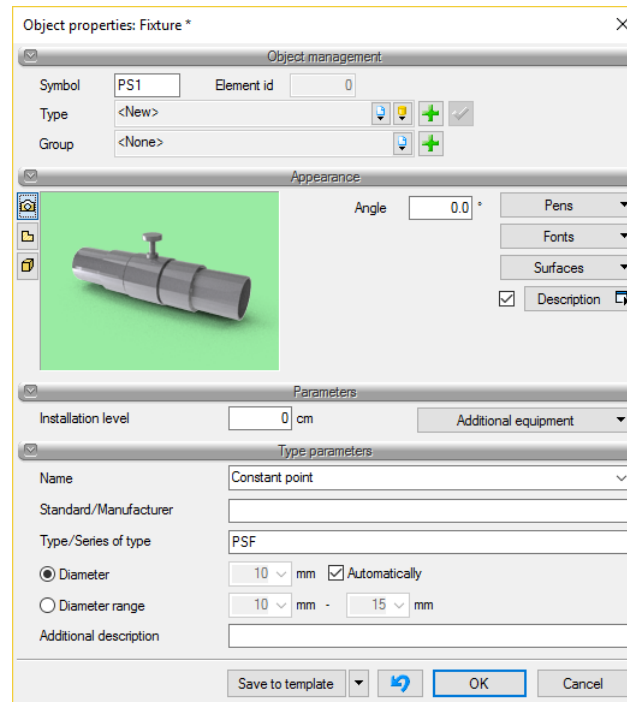


Fig. 168 The fixture object properties window

Parameters control group - as in point 5.2.2.

Type parameter control group

Name – the object name taken from the *Type library* or entered by the user to define a new object type.

Standard/Producer – taken from the *Type library* or entered by the user to define a new object type.

Type/Series type – taken from the *Type library* or entered by the user to define a new object type.

The next two controls can be used alternatively by the user - either using a specific diameter or a range of diameters.

Diameter – taken from the *Type library* (if it was input) or entered by the user [mm].

Diameter range – taken from the *Type library* (if it was input) or entered by the user, [mm].

Additional description – the user enters additional data that specifies the object and this description is moved to the material list after selecting the *Description* row in the listings.

7 PIPELINES

Pipelines



7.1 Inserting and editing horizontal pipelines

7.1.1 Inserting horizontal pipelines

To insert the *Power Supply* pipeline object, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Power supply*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert heating pipe - supply*



ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Power supply*

In order to insert a *Return* pipeline object, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Return*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert heating pipe - return*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Return*

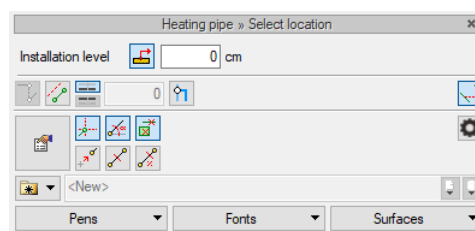


Fig. 169 The horizontal heating pipe beginning insertion window

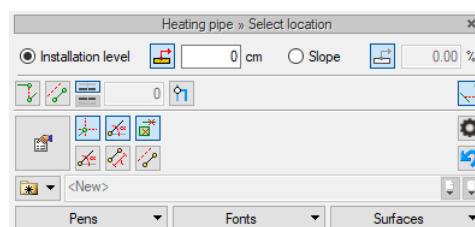







Fig. 170 The horizontal heating pipe end insertion window


The general insertion options are described in section 5.1.

Pipelines

An additional feature available for horizontal pipelines is *Parallel offset*. Pressing the button  allows you to draw the installation in parallel to other elements, e.g. a wall which is offset for the indicated distance. To select the direction of the offset from an object you can choose between two *Offset direction* buttons  and . Next to them there is an editing field where you can enter an offset value (the field is activated after clicking on the *Parallel offset* button).

Clicking on the *Automatic connection to Connectors* icon  causes the software to automatically connect the pipelines with the Radiators. The connections are created in such a way that vertical and horizontal pipe connections are made from the location of the last pipeline click to the Radiator connector, taking into account the location of the Radiator in relation to the pipeline.

Clicking on the *Connect pipes of various functions*  icon allows you to connect e.g. a hot water pipeline with a circulating water pipeline (allows you to connect pipes from two different groups).

Clicking on the *Insert vertical section* button  allows insertion without interrupting the horizontal and vertical pipeline command. After clicking on the button, the insertion window will change into the horizontal pipeline end insertion window without indicating a drop and indicating the installation level for the vertical pipeline end. Next, we draw the other horizontal sections. At any time the user can insert a vertical section by clicking on the *Insert vertical section* button.

7.1.2 Pipeline modification

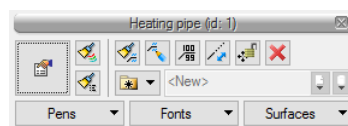






Fig. 171 The Pipelines modification window

The horizontal pipeline modification window is displayed after you click one or more than one horizontal pipeline. Apart from the features generally available for all the items in item 5.2, the following are also available for horizontal pipes:

Add description on ladder  – after marking several parallel pipelines you can insert a "ladder" description for all the selected pipelines (this feature is also available on the heating installation axonometric view).

Move with connections or *Move without connections* –  or  an open padlock indicates that the pipelines are going to be moved without disconnecting them from the other pipelines. A closed padlock allows moving and disconnecting them from other pipelines. To move several pipelines you need to select them, click on the open or closed padlock button and then use the cursor to grab the point on the pipeline outline, not the handle (blue square).

Lengthen/shorten pipe maintaining slope  – after clicking this icon a marker appears at the end of the pipeline that facilitates extension or shortening of the pipeline, at the same time maintaining the slope.

Pipelines

7.1.3 Heating pipe object properties

Fig. 172 The heating pipe properties window

Typical element properties described in item 5.2 are available in the heating pipes properties window.

Additional properties characteristic for heating pipes:

Parameters control group

Actual length and Length in the projection – as in the 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 end of the pipeline installation levels. The slope can be set in the section ending insertion window (Fig. 170).

Insulation – a checkbox with the description **Insulation** allows the insertion of thermal insulation on the particular pipeline. After clicking on the **Insulation** button a **Pipe insulation** properties window will open.

Pipelines

7.1.4 Insulation object properties

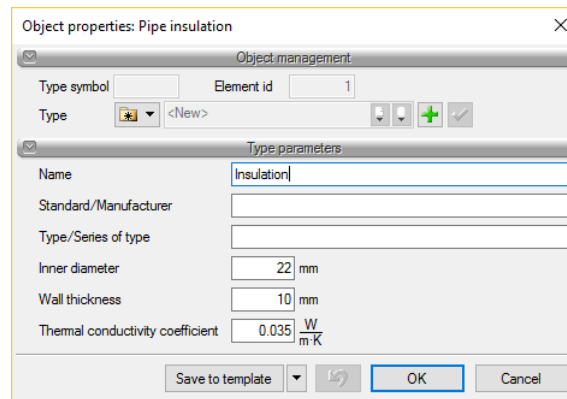


Fig. 173 The insulation properties window

Type parameters control group

Name, *Standard/Manufacturer*, *Type/Series of type* – in the editing field the user inputs data as in the controls names, appropriate for the particular type of insulation.

Inner diameter – in the edit field, enter the internal diameter of the insulation, [mm].

Wall thickness – in the editing field the user needs to insert the insulation wall thickness [mm].



Thermal conductivity coefficient – in the editing field the user must specify the insulation thermal conductivity coefficient characteristic for the particular material. The default value is 0.035 W/(m · K)

7.2 Inserting and editing vertical pipelines

To insert a *Vertical heating pipeline- supply* object into the model, select the following icon:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vertical heating pipe – supply*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert vertical heating pipe - supply*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vertical heating pipe – supply*


In order to insert a *Return* pipeline object, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vertical heating pipe – return*

Pipelines

- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert vertical heating pipe - return*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vertical heating pipe – return*

7.2.1 Inserting a vertical heating pipe

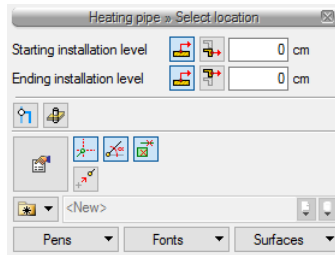




Fig. 174 The vertical heating pipe insertion window

While inserting a vertical pipe, the user can select additional insertion functions, including *Import from above level*  / *Import from below level* . Clicking on the *Import from above level* feature inserts the end of a vertical section at the maximum active level height (280 cm by default).

Pipelines

7.2.2 Inserting heating installation stacks

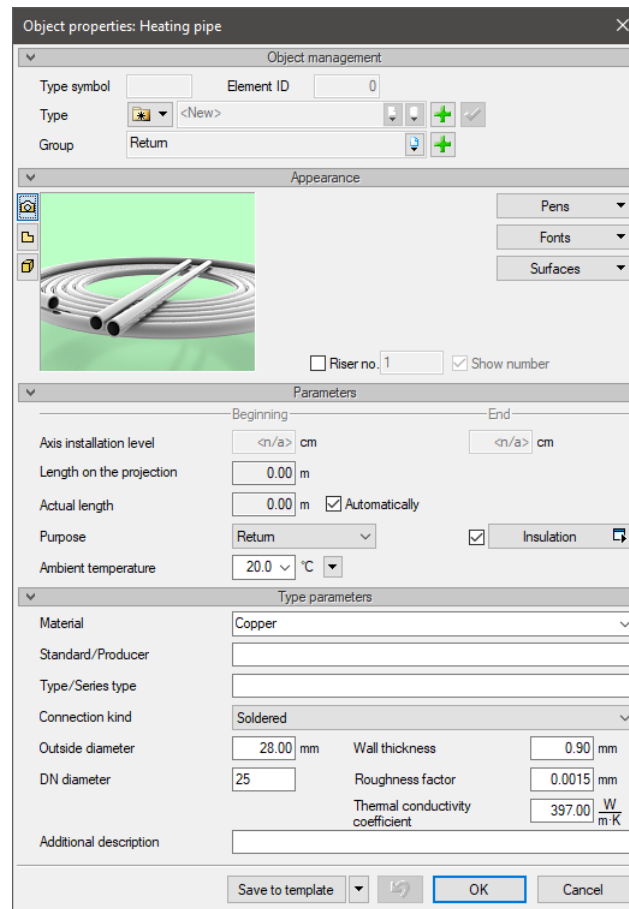


Fig. 175 The vertical heating pipe properties window

To insert a heating installation stack, the user can select the *Insert vertical section* icon or in the pipeline properties tick the *Riser* checkbox. Then the inserted vertical pipeline will become a riser and will have its number in a circle. In order to mark a vertical pipeline as a riser after inserting it you need to click on the vertical pipeline properties and then, in the *Appearance* controls group, you need to tick the *Raiser* checkbox and if necessary, the *Show number* checkbox. The user may assign any number by typing it in the editing window.

7.3 Change line into a heating pipe

The user can convert a line into a *Heating pipe* object.


In order to convert a line a *Heating pipe* to do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒ *Change line into a heating pipe – supply*

Pipelines

- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Change line into a heating pipe - supply*



ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Change line into a heating pipe – supply*

In order to insert a *Return* pipeline object, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Change line into a heating pipe – return*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Change line into a heating pipe - return*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Change line into a heating pipe – return*



A window will then become available where the user selects the installation level on which the new objects are to be installed (pipelines). The user may also select a type and method of selection for these pipelines. Then the user needs to select the lines that are to be converted into a heating pipe and press *Enter*.

7.4 Inserting a set of parallel pipelines

To insert a *Set* of parallel heating pipes object into the model, do the following:

Activation:

ArCADia and ArCADia PLUS



- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Set*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert parallel heating pipes*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Set*

To insert a *Vertical set* of parallel heating pipes object into the model, do the following:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Vertical set*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert vertical parallel heating pipes*

Pipelines

ArCADia LT

- [Heating](#) ribbon ⇒ logical group [Heating Installations](#) ⇒  [Vertical set](#)

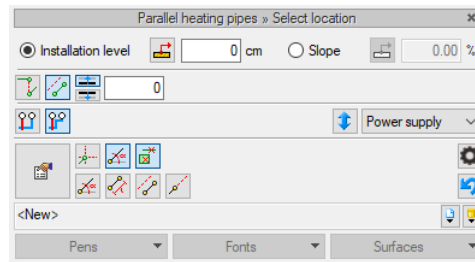


Fig. 176 The parallel heating pipes insertion window

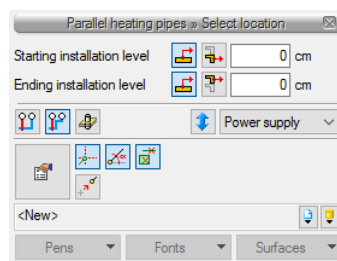


Fig. 177 The parallel vertical heating pipes insertion window

Inserting parallel heating pipes is similar to inserting single heating pipes. Additionally, in the insertion window the user may select a method of automatically connecting parallel pipelines. You can also reverse the order of the pipelines which are being inserted and change the leading pipeline. After clicking the black arrow on the [Power supply](#) button, the user can select one of the pipelines located in the series of parallel pipelines to be the leading pipeline.

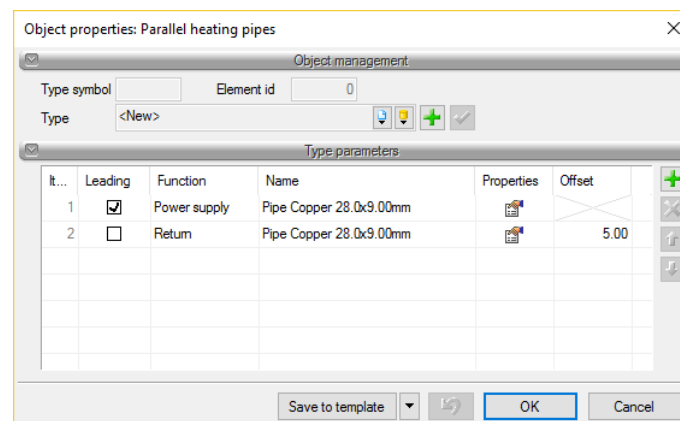


Fig. 178 The parallel heating pipes object properties window

The following elements are available in the [Parallel heating pipes](#) properties window:

[Object management](#) control group

[Type symbol](#), [Element Id](#) and [Type](#) – the controls are the same for all elements.

Pipelines

Type parameters control group

A table is available where each column has the following features:

Item – subsequent number.

Leading – in this column, the user ticks the checkbox next to the pipeline that will be the leading pipeline during the insertion of parallel pipes. The pipeline that was selected as the leading one will determine the insertion point and other pipelines will be inserted in the appropriate offset from this. Fig 149 shows the insertion of parallel supply and return heating pipes with the leading pipe being a supply pipe.

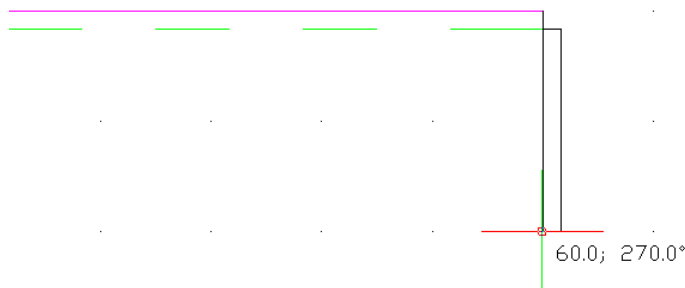
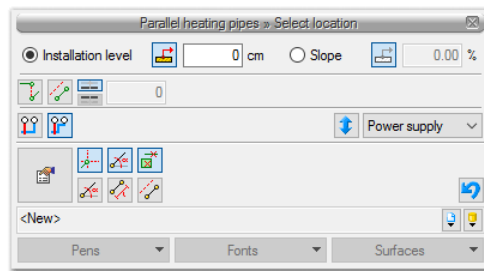


Fig. 179 The drawing showing the insertion of parallel heating pipes with the leading supply pipeline

Function – allows the user to select a function for the pipeline.


Name – in the case of parallel heating pipes, the name displayed in this column consists of the element designation, *Pipe* in this case, and the material of the inserted pipeline, e.g. *Steel*.

Properties – in this column, by clicking the *Properties* icon, the user can open the *Heating pipe properties* window which allows editing and the changing of parameters.

Offset – in this column, the user defines the offset value for the heating pipes that run parallel to each other. There is no possibility to enter the offset for the leading pipeline.

Pipelines

7.4.1 Automatic connection methods

Drawing parallel heating pipes, joining them, and connecting them to objects can be done manually or automatically. The user can perform automatic drawing using two methods, which are described below in items 7.4.1.1 and 7.4.1.2, whereby, at any moment, when inserting (drawing) parallel heating pipes, the user may change the drawing method. The user should disable elements detection if they do not want to use any of the automated features in the insertion window. 

7.4.1.1 Drawing parallel pipelines with the spacing adjusted to the object

This automatic drawing method allows the routing of parallel pipelines with the spacing defined in the parallel heating pipes properties window. The spacing changes when approaching risers or objects such as Radiators and adapts to their spacing.

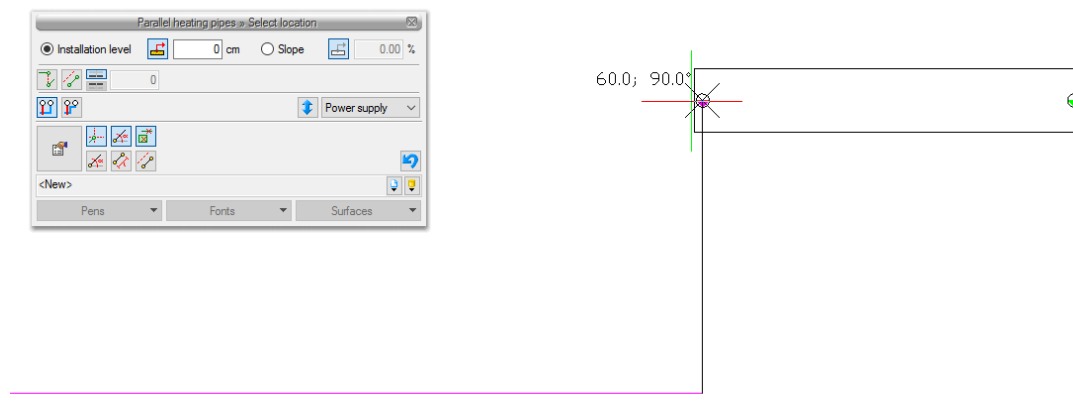


Fig. 180 An example of connecting parallel heating pipes with the use of the automatic connection method with the spacing adjusted to the spacing of Radiator connectors

7.4.1.2 Drawing parallel pipelines with fixed spacing

This automatic drawing method allows the routing of parallel pipelines with the spacing defined in the parallel heating pipes properties window. The spacing does not change if you connect pipes, stacks, or items with different connector spacing. In order to enable the connection, the software connects the elements by means of automatically generated pipelines.

Pipelines

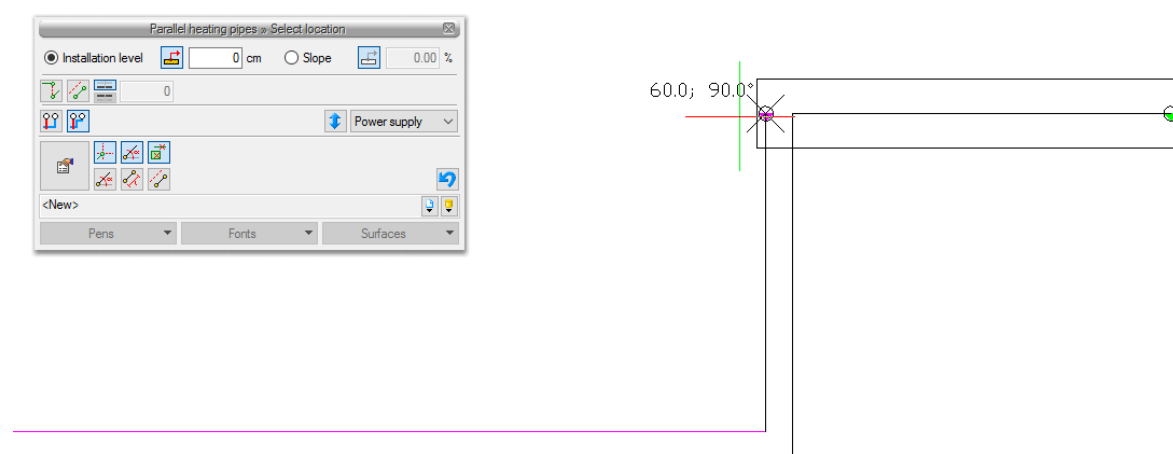


Fig. 181 An example of connecting parallel heating pipes with the use of the automatic connection method with fixed spacing

8 FITTINGS



Fittings

8.1 Fittings – introduction

The program allows you to generate fittings on pipelines automatically and place them in the list of materials.

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon \Rightarrow logical group *Heating Installations* \Rightarrow  *Fittings automatically*
- *ArCADia-HEATING INSTALLATIONS* toolbar \Rightarrow  *Insert fittings automatically*

ArCADia LT

- *Heating* ribbon \Rightarrow logical group *Heating Installations* \Rightarrow  *Fittings automatically*

The following changes are defined in the installation, with the following types of fittings assigned:

- direction change α° - "Elbow α° "
- diameter change DN1/DN2 – "Reduction DN1/DN2"
- 3-directional branch – "DN three-way fitting" ("DN1/DN2 reduction three-way fitting")
- 4-directional branch – "DN four-way fitting" ("DN1/DN2/DN3 reduction four-way fitting")
- branch x directions – "X pipes connection" (node to be modified by the user)
- material and connections change MAT1-POŁ1/MAT2-POŁ2 – "MAT1-POŁ1/MAT2-POŁ2 transition"
- pipeline end – "End cap"

If more than one change (multiple change) is being implemented at any one point, the software generates fitting sets for different combinations of settings in the options, from among which it then selects the one in accordance with the properties set in the project options. This enables the user to change the set for a particular installation point with requirements different than the options settings.

If the user generates the fittings automatically, then by default these will be displayed symbolically as circles with the diameter set in the project options and primarily without a description.

In order to gain access to the set content (or disable a description) the user needs to initiate the properties window by double-clicking on the symbol (circle) or clicking on the symbol and then in the modification window:

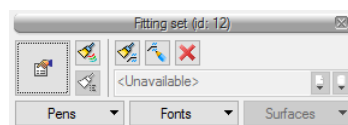


Fig. 182 The fitting set modification window

click the  button.

The fittings set properties window (described in section 8.2) will be displayed.

Fittings

The software assumes the following order of executing multiple changes:

If there is NO three-way or four-way fitting in the connection:

- 1) MAT1-POŁ1/MAT2-POŁ2 transition
- 2) elbow
- 3) reduction
- 4) end cap.

If there is a three-way or four-way fitting in the connection:

- 1) four-way fitting,
- 2) three-way fitting (and subsequent, if in the settings the options do not allow for four-way fitting generation).

Then the software inserts fittings towards the “pass-through” (the direction with the smallest node bend angle), followed by selecting sets for the particular branches in the same order:

- 1) MAT1-POŁ1/MAT2-POŁ2 transition
- 2) elbow
- 3) reduction
- 4) end cap.

The “start” fitting (from where the software starts the execution of changes) is located by default on the side of the pipeline with the largest node diameter, however, for the purposes of the user, the software also created a set that starts the changes from the side of the pipeline with the smallest diameter.

The MAT1-POŁ1/MAT2-POŁ2 transition type that is generated in the beginning is created based on the properties of the connected pipes. If an object is connected by means of a female, the software will create a transition fitting with a male thread.

Below is an example where the change of diameter and material (and connection) provides a general presentation of the sets of fittings generated by the software depending on the start fitting:

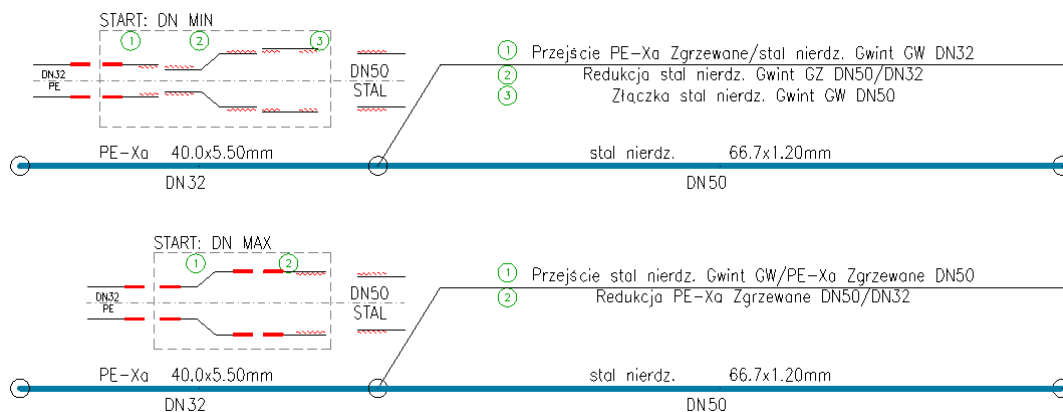


Fig. 183 The fitting sets for the STEEL-DN50/PE-DN32 transition

Fittings

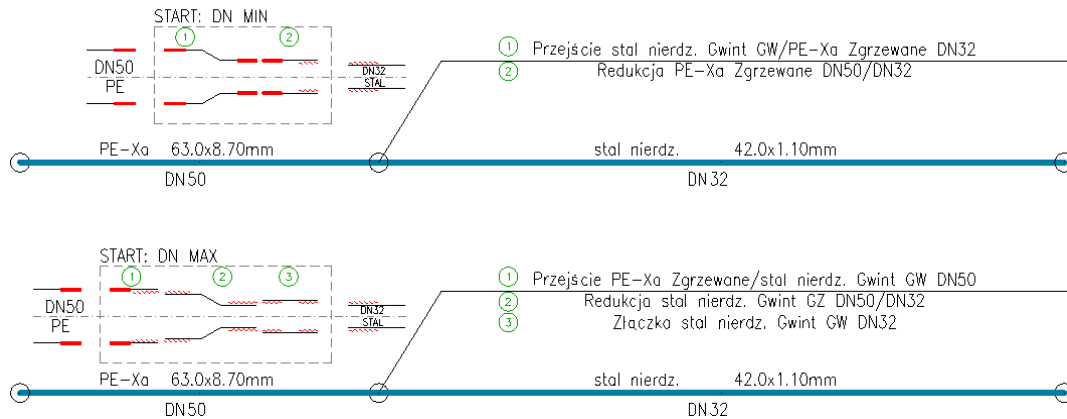


Fig. 184 The fitting sets for the STEEL-DN32/PE-DN50 transition

8.2 Installation fittings – Project options window

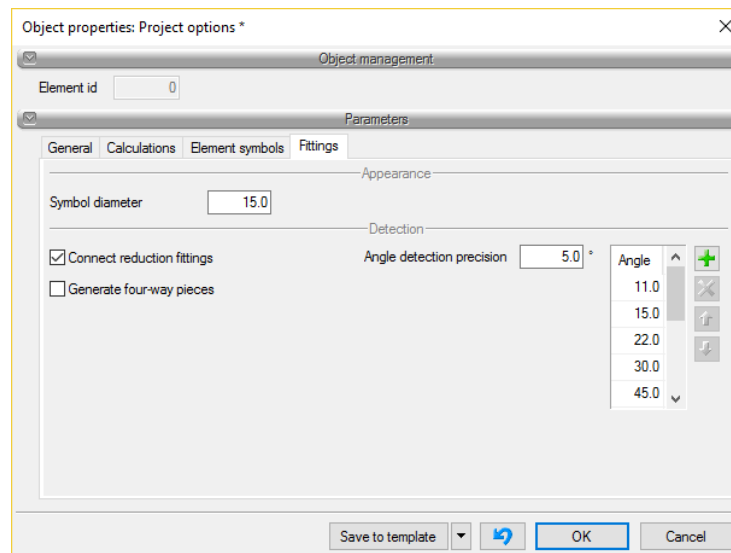


Fig. 185 The project options window, Fittings tab

The **Fittings** tab enables the determination of the manner of generating and presenting the fittings for installation geometry and material changes.

Symbol diameter – in this field the user determines the size of the symbol inserted at the point where the fittings set is generated (circle diameter).

Connect reduction fittings – checking this box means that a change of diameter and the direction or a change of diameter and a branch will be executed by means of a DN1/DN2 reduction elbow (three-way or four-way reduction fitting) and not by means of two separate fittings (DN1 elbow + DN1/DN2 reduction, three-way fitting or four-way mould DN1 + DN1/DN2 reduction).

Generate four-way fittings – checking this box means that four-way fittings will be generated for nodes where 4 pipelines meet, and not three-way fittings, as would be the case if the box is not checked.

Fittings

Typical angles and Typical angle detection precision – in this table the user determines the bends to be treated as typical in the installation (e.g.: 30°, 45°, 60°, 90°) and what angle value range (+/-) should be interpreted as a typical angle.

If in the case of the above example set of typical angles the user inputs 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°

The remaining turn angle will be represented by values read from element geometry.

To summarize, as per the example angle settings assumed above:

- a 30° elbow will be generated for a 31.5° route turn,
- a 78.4° elbow will be generated for a 78.4° route turn.

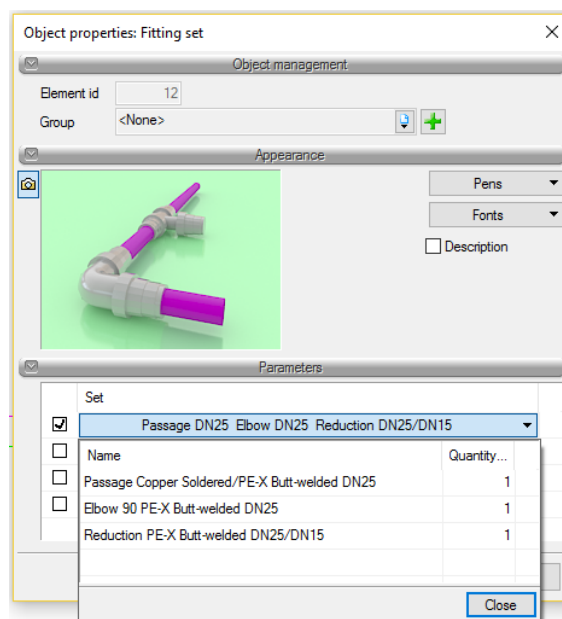


Fig. 186 The fitting set object properties window

9 PIPE FASTENINGS ARRANGEMENT WIZARD



Pipe fastenings arrangement wizard

9.1 Pipe fastening arrangement wizard

To use the *fastening automatically*, select the following icon:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Fastenings automatically*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert fastenings automatically*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Fastenings automatically*

The creator window will then appear with tabs available for pipeline materials used in the project.

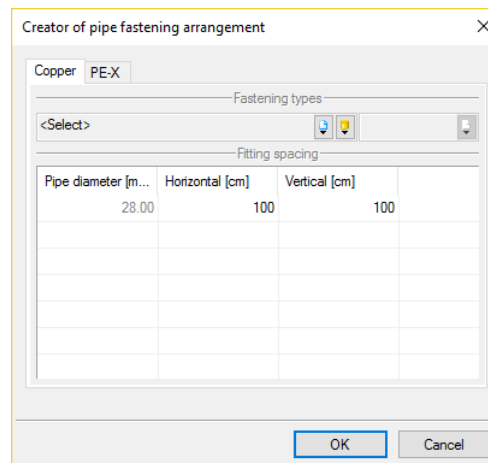


Fig. 187 The Pipe fastening arrangement creator window

In the top part of the tab window, the user can select a fixture catalogue from the *Global library* or the *Project library*. The user may assign the fastening spacing for a particular pipeline diameter (the entered diameters are those present in the view in the project) for vertical and other pipes. After confirming with the *OK* button, the software automatically inserts the fastening symbols with the appropriate spacing into the view.

10 INSTALLATION CHANGES AND CONNECTION WIZARD

10.1 Changing the height of elements in the installation

In order to change the height of installation elements, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Change installation height*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Change installation height*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Change installation height*

After drawing the whole or part of the installation, the user may change the height of the installation by the selected value. Press the *Change installation height* icon. Then enter the offset value in the insertion window and then select the objects to be offset.

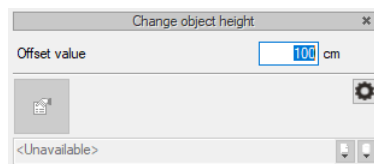


Fig. 188 The object height modification window



Then press *Enter*. The installation height of the selected elements is changed by the selected value.

10.2 Connection wizard

In ArCADia-HEATING INSTALLATIONS the user may automatically create the connections for the Radiators. In order to activate the *Connection wizard* window, click the icon:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Connection wizard*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Connection wizard*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Connection wizard*

After clicking on a particular icon, a window will become available, where you can insert and automatically create the connections for heating devices. The user clicks on one of the three icons representing the types of connections, selects the objects meant for connection and then presses enter or the right mouse button.

Installation changes and connection wizard

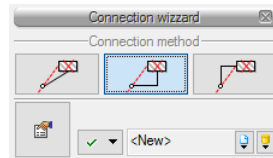





Fig. 189 The connection wizard window

The user has a choice of three types of connections:

Direct connection  – the wizard will automatically connect the selected Radiators with the pipelines. The connection will be executed at a right angle with a single pipeline section directly from a Radiator connector to the closest selected pipeline (Fig. 190 The 3D view of wizard connection methods, Connection 1).

Vertical connection to a point  – the wizard will automatically connect the selected heaters with the pipelines. The connection is created by means of two pipeline sections: a vertical section between the heater up to the installation height of the selected pipeline and then by means of a horizontal section perpendicular to the selected pipeline (Fig. 190 The 3D view of wizard connection methods Connection 2).

Horizontal connection to a point  – the wizard will automatically connect the selected heaters with the pipelines. The connection is executed by means of two pipeline sections: a horizontal section from the heater perpendicular to the point from which the vertical section will be routed to the selected pipeline (Fig. 190 The 3D view of wizard connection methods, connection 3).

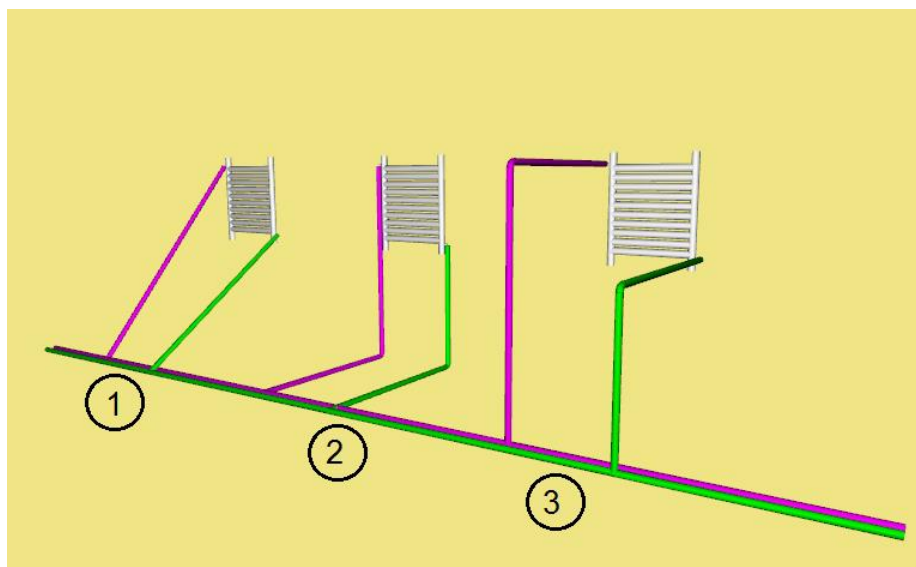


Fig. 190 The 3D view of wizard connection methods

11 AUTOMATIC PROPERTIES SELECTION FOR HEATING INSTALLATION ELEMENTS

11.1 General assumptions for automatic selection made by the software

The designer will find it extremely useful when carrying out process calculations that the technical parameters of the main elements in the water-supply installation can be automatically selected by the software.

The parameters are automatically selected for the following objects:

- supply and return heating pipelines with a division into distribution pipelines, stacks and branch lines.
- pipeline insulation
- stop valves
- control and balance valves
- flow measurement valves

The remaining objects are assigned based on the equal values of the nominal diameter and the nominal diameter of the pipeline in which the object was installed. The selection of objects was configured in a manner ensuring that all the threshold conditions determined by the user are met, i.e. minimum and maximum permissible velocity of the medium, unit hydraulic resistances. When it is necessary to increase the pressure, the user receives the following information: "Installation requires pressure increase – deficit upstream from GZ1". In this way the user is informed about the need to incorporate a pressure-increase device, e.g. a circulation pump. These devices are not selectable.

11.1.1 Introducing objects intended for selection

Each object intended for automatic selection is introduced by defining the state of its technical parameters. In the object insertion window and in the properties window in the *Object management* part you will find a button to extend the selection window – *Type selection method*.

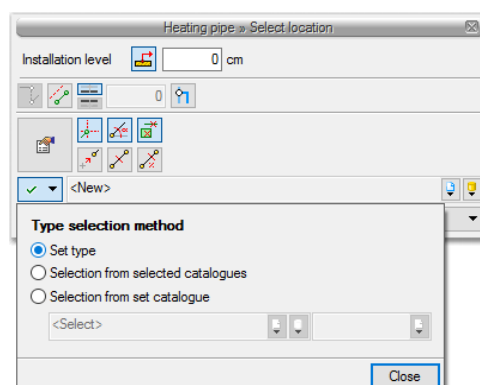


Fig. 191 The parameter selection method switching window – selection method for Set type

After clicking on the button, a list containing three methods of setting the parameter selection method is expanded.

Set type – in this method, the user determines the type of an object, i.e. selects exactly one type. In the case of a pipeline, it will be a type from the given catalogue PP 40x3.7 PN 10. Selecting this method

Automatic properties selection for heating installation elements

activates the *Project library* button. From a list of object types, the user selects one object type (one pipeline). After starting automatic selection, this object will be included in the calculations, however it will not change its parameters and will not be replaced, even if it does not meet the selection criteria. This way the user “freezes” the object.

Selection from selected catalogues – this method is the default for each object. This involves the full range of object selection.

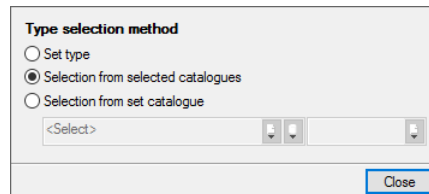


Fig. 192 The parameter selection method switching window – selection method for Selection from selected catalogues

The Project libraries lists are greyed out. Parameters are selected from the catalogue of objects selected in the *Selection options*, which is activated with the button on the toolbar.

Selection from set catalogue – this selection feature enables selecting an object from a single pre-determined catalogue, independent of the catalogues selected in the options.

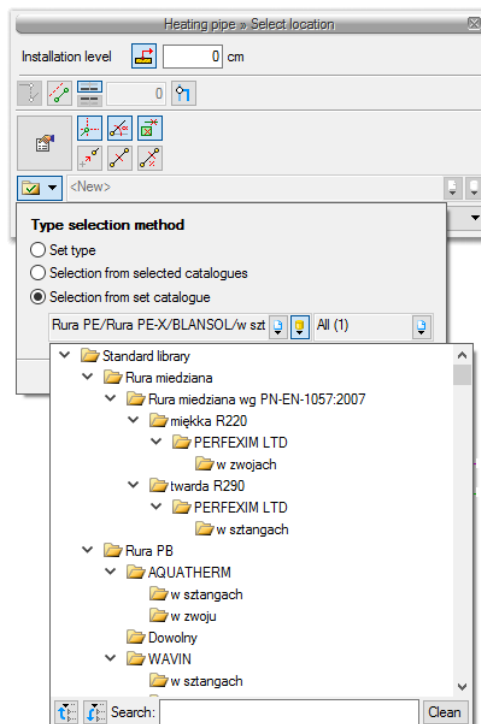


Fig. 193 The parameter selection method switching window – selection method Selection from a pre-determined catalogue

This method of selection enables the user to automatically select a type of object from a particular catalogue. In the case of pipelines, when using this selection option, the user may ensure that a section will be made of steel, regardless of the rest of the installation being made of pipes of a different material. Only the section diameter will be selected then, with the pre-determined material and series of type.


Automatic properties selection for heating installation elements

11.2 Starting installation item selection and setting up selection options

Once an installation is drawn and connections are verified, you can select pipelines and fittings. To start the process of automatic selection, click the icon from the toolbar:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Installation item selection*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Installation item selection*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Installation item selection*

11.3 Selection criteria determination

Once the icon is pressed, the following selection options window is activated:

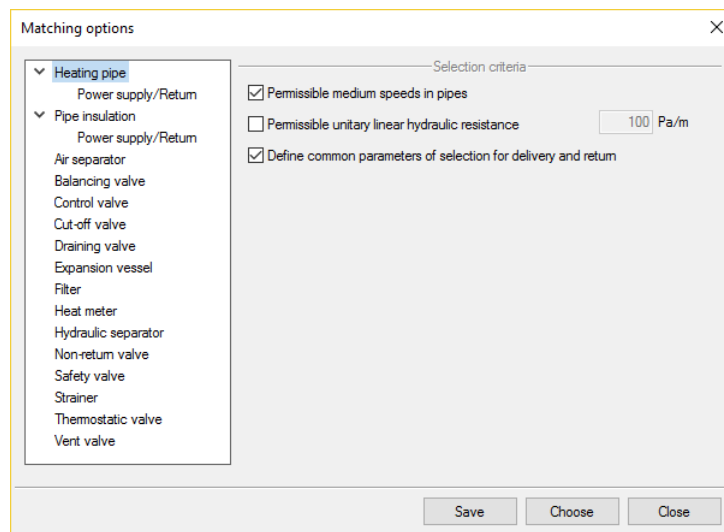


Fig. 194 The selection options window – determining velocity criteria

The user may use the default selection criteria or input their own object selection criteria. The basic criteria determined by the user are the velocity in the pipelines and the minimum insulation thickness values for each thermal conductivity coefficient.

Selection criteria include:

- Permissible flow velocity in the ducts;
- Permissible unit linear hydraulic resistance (by default 100 Pa/m);
- Definition of common selection parameters for supply and return.

The user may tick the checkboxes on the left. The selection criteria can be freely configured by ticking selection by velocity or resistance, or by selecting both checkboxes, in which case the software will take both options into account during the selection.

Automatic properties selection for heating installation elements

The last checkbox facilitates the insertion of further data. When it is ticked, the user will simultaneously assign the same selection parameters for supply and return. If the *Define common selection parameters for supply and return* option is not selected by the user, supply and return pipelines will be specified separately on the list on the left.

The user may determine the velocity criteria after selecting the *Heating pipe* object from the items tree. The same applies to the user selecting *Pipe insulation* ⇒ *Supply + Return*, in this window the user will be able to determine the minimum thickness parameters with the pre-determined thermal conductivity coefficient.

Velocity criteria for water in the pipelines are determined based on the purpose of the particular pipeline in the installation (*Distribution*, *Risers*, *Branches*) and the material. Changing the selection criteria for objects other than pipes and insulation is not available to the user. Should the user make a full selection of pipelines or other items, they must indicate the catalogues or objects for selection from the *Project library*.

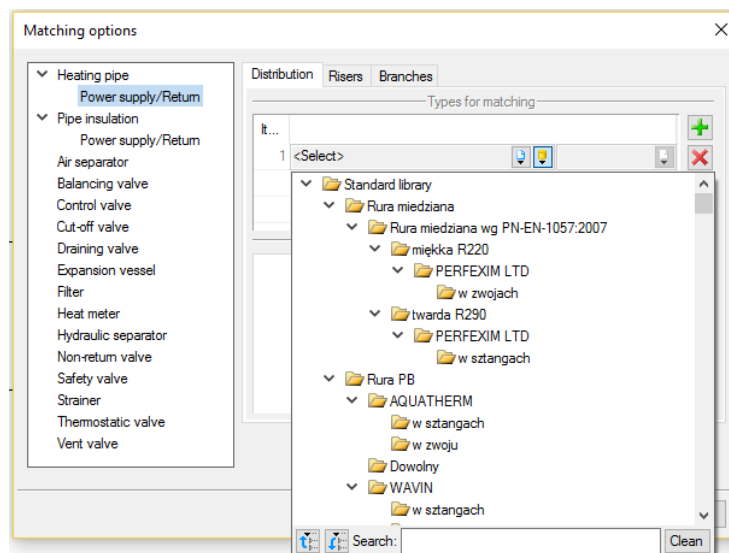


Fig. 195 The options selection window – selecting object types for selections

Once a particular group of items is selected (e.g. *Heating pipe* ⇒ *Supply*), the user may add catalogues to the particular position using the green plus sign. In the case of pipelines, it must be remembered that the user can select pipelines separately, divided by their purpose (tabs: *Distribution*, *Risers*, *Branches*).

Then from the drop-down list available on the left, the user selects the items catalogue, whereas in the drop-down list on the right, the user can select the required pipe types by marking them. An item in the table corresponds to the sequence of approximations in case of a lack. If the user would like to give priority to a particular catalogue, he should put it in a higher position. Positions can be changed with the arrows. After setting all the objects included in a project and pressing the *OK* button, an object will be selected.

The user acts in a similar way when selecting the parameters of radiant heating. Additional criteria taken into account in this case are: cable spacing - min. and max. and the pitch.

Automatic properties selection for heating installation elements

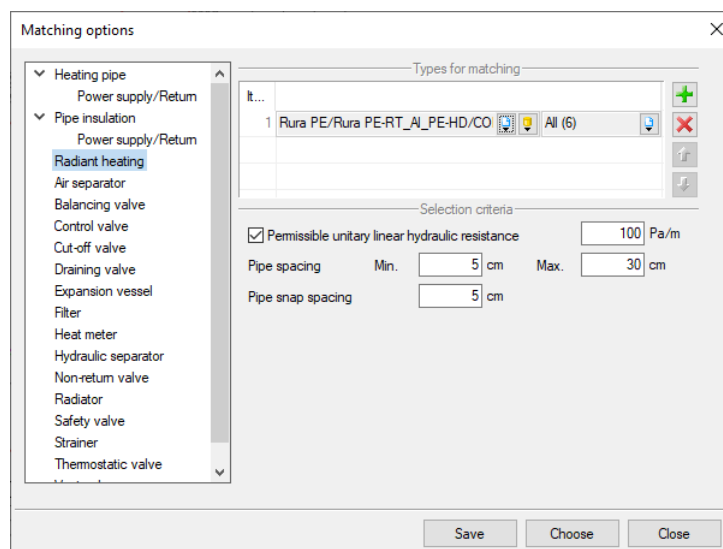


Fig. 196 The selection options window - radiant heating selection

The user may preview calculations in the calculations table, where he can introduce the necessary corrections.



12 CALCULATIONS AND RESULT INTERPRETATION

12.1 Verifying the validity of a drawn installation

In order to start the verification of the installation and the correctness of all the connections:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heating system verification*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Heating system verification*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Heating system verification*

A window containing an error table is displayed.

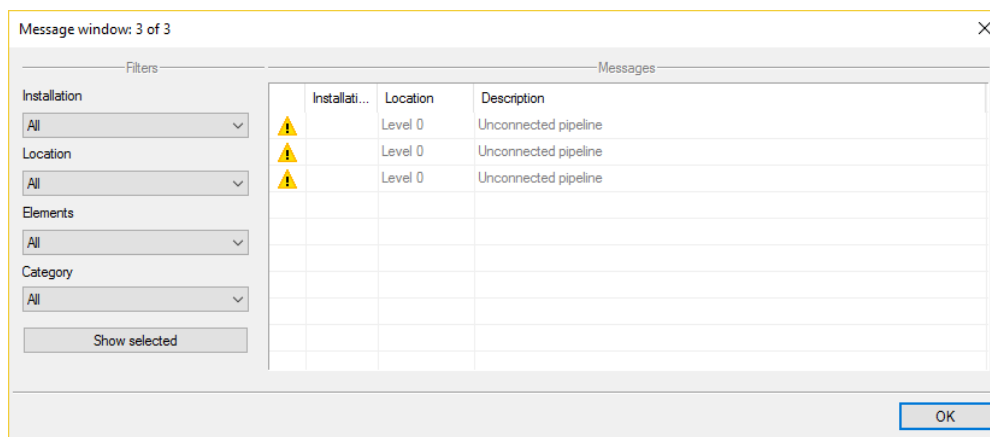


Fig. 197 Table – the heating installation report containing information about the validity of the designed installation

The table contains information concerning the number of gaps in the continuity of the installation. The program detects elements of the installation that are not connected or pipeline sections that are not connected to the boiler, the source, or the heater.

After clicking the error information, the user will activate the drawing error detection feature. The software will highlight the routes and elements where errors occur. The designer can correct the drawing by connecting elements 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 starting point of the *Installation* drop-down list: *Boiler* or *Heat source*.

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

The *Elements* drop-down list gives the user the possibility to choose one of the several element groups that were not connected. If there are connection errors in the groups of heaters, pipelines and heat meters, the user may select, for example, only the heaters.

Calculations and result interpretation

From the *Category* drop-down list the user selects the error type that occurs in the project: *Unconnected elements, Incorrect connection*.

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, click on the *Show selected* button. The installation view will then be moved to the particular part of the installation drawing that includes the group of connection errors and will mark it with dotted lines with a view of the handles.

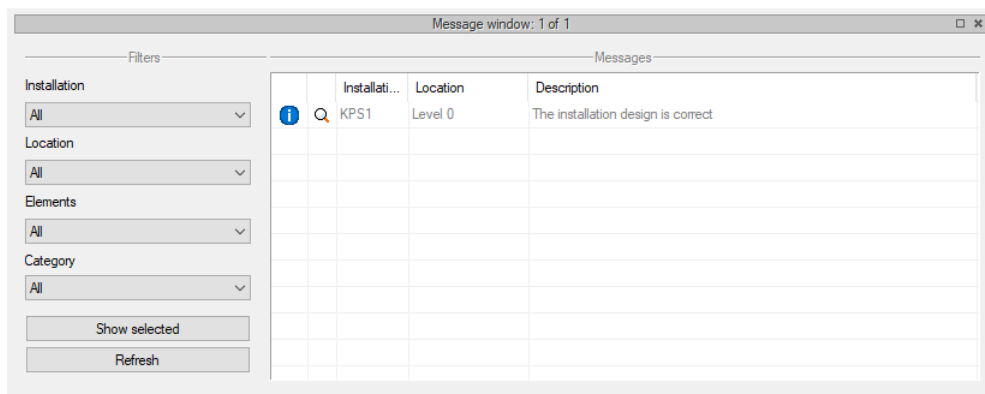










Fig. 198 Table –the heating installation verification with information on correctness of the built installation

Message types (message icons differ):

- Information 
- Warning 
- Error 

Message content - interpretation:

1.  *The installation design is correct*
This message appears when there is a starting point present in the installation and all the items which are directly or indirectly connected to that point are creating an installation that is correctly designed in terms of connections.
2.  *No heat source or hot water boiler*
This message appears when there is no connection nor a local connection point in the project.
3.  *Unconnected pipeline*
The message appears when there is an unconnected pipeline in the project.
4.  *Unconnected items*
The message appears when an item is not connected to any pipeline.
5.  *Items unconnected to any path*
The message appears when an object (also a pipeline) is not directly or indirectly connected to a starting point, e.g. boiler. (Can be connected to pipelines, although these pipelines will not be connected to the source or the boiler).

12.2 General assumptions for calculations

The calculations consist of verifying the drawn installation layout. The designer must finish introducing elements and accept their technological parameters. The software enables the verification of operational parameters for the installation and all its elements, as well as informing the user about errors and erroneously used elements. The user modifies parameters by controlling the results of calculations for the selected paths and elements at the same time.

Software calculation features:

1. Verifying the correct connections of items in the central heating installation.
2. Determining design heating medium flows in particular branches and design sections.
3. Verifying the pipeline diameters selected by the user as regards their hydraulic properties (verifying the velocity and unit pressure drop).
4. Calculating line losses and local losses in the paths selected by the user.
5. Determining the required differential pressure.
6. Determining gravitational pressure for each circuit.
7. Determining circulation pump parameters.
8. Verifying heating circulation circuits in the hydraulic scope.
9. Balancing the installation through thermostatic valve set point selection.
10. Introducing changes to the pipelines from the level of the calculation tables.

12.3 Calculation methodology

12.3.1 Design flows

Design flows are calculated for design sections divided on the basis of the installation geometry. The division into design sections comes from the change of one of the parameters that impacts on the calculation of the flow resistance through the pipeline: flow, roughness coefficient (pipeline material) or pipeline diameter.

The stream flowing through the pipe is calculated for every node, i.e. the place of the next calculation plot connection. The heating medium flow is calculated based on the power of the heating devices used in a particular design section (heaters, heat exchanger, fan-coil units, air heaters, Radiant heating, underfloor heating). Based on the measuring units set in the options, the flow value is calculated using the following formula:

$$G = \frac{\Sigma Q_{grz}}{c_w \cdot (t_z - t_p)} \text{ [kg/s]} - \text{mass water flow per second}$$

$$V = \frac{(\Sigma Q_{grz}) \times 3600}{c_w \cdot \rho_{sr} (t_z - t_p)} \text{ [m}^3\text{/h]} - \text{volumetric water flow per hour}$$

Q_{grz} – design thermal power of the heater, not including heat gains, [W];

c_w – heating medium specific heat (for water it is approximately 4196 J/(kg x K) or at the average temperature, e.g. 80 °C, with installation parameters 90/70);

Calculations and result interpretation

t_z – design supply water temperature, [°C], (e.g. 90);

t_p – design temperature of water returning from the installation, [°C], (np.70);

ρ_{sr} – density at the average temperature, [kg/m³];

$t_{sr} = \frac{(t_z + t_p)}{2}$ – average temperature based on which the values of specific heat and density are adopted.

12.3.2 Hydraulic calculations

Hydraulic calculations are carried out for the system supplying water to the water outlets and the circulation circuit. These consist of determining the pressure losses: linear (over the pipeline length), local (in connecting fittings and stop valves).

Unit **linear losses** are calculated with the use of the Darcy-Weisbach formulas.

$$\Delta h_i = \frac{\lambda}{D} \cdot \frac{V_{obl}^2}{2} \cdot \rho$$

The linear resistance coefficient λ was determined with the use of the implicit formula based on the outcomes of the Colebrook-White studies.

$$\frac{1}{\sqrt{\lambda}} = -2 \lg \left(\frac{2,51}{Re \sqrt{\lambda}} + \frac{k}{3,72 D_w} \right)$$

Total pressure losses in the design section are determined by multiplying the line pressure loss unit value.

$$\Delta h_{odc} = \Delta h_i l$$

The total line pressure loss value in the design path consists of the total of the section losses.

Local losses are determined using the Darcy-Weisbach and Colebrook-White formulas and the local resistance coefficients. Moreover, in the case of stop valves and measurement valves it is possible to determine the Kvs resistance coefficient or to have the local loss value input directly by the user.

Local losses for the item in the design section along with a determination of the resistance coefficient ζ :

$$Z_z = \left(\zeta \frac{V^2}{2} \rho \right)$$

Local losses for the item in the design section along with a determination of the resistance coefficient Kvs:

$$Z_k = \left(\frac{q}{k_{vs}} \right)^2$$

Regardless of the method use for their determination, local resistances for items in the particular design section are then summarized. Local resistances at the plot borders are included with the plot with the smaller flow if the design sections have the same flow rate values (two pipes with different

Calculations and result interpretation

diameters connected together), then local resistance shall be included in the section with the smaller internal diameter (possibly also greater velocity) with the same flow rate.

Designations used in the formulas:

$\Delta h_c = \Sigma \Delta h_{odc}$ [Pa],

Δh_l – unit pressure drop per pipeline linear meter [Pa],

Z_z – local pressure loss [Pa],

Z_k – local pressure loss [bar] – converted into the appropriate units by the software,

V – water velocity in the pipeline [m/s],

P – average water density [kg/m³],

k – material coarseness coefficient [mm],

D – pipeline internal diameter [mm],

Re – Reynolds number,

L – design pipeline length [m],

q – design flow [m³/h].

All the units are converted by the software into the units displayed in the dialogue boxes.



The program determines the total pressure loss on the paths selected by the user and determines the active geometric pressure for each receiver. This enables the determination of the critical path and comparing with the differential pressure defined at the [Connection point](#). It informs about the need to use a water pressure increasing device.

12.4 Calculating the central heating installation parameters

After verifying the validity of the installation model created and preliminarily selecting the diameters, the user can carry out calculations.

Activation:

ArCADia and ArCADia PLUS

- [Heating](#) ribbon \Rightarrow logical group [Heating Installations](#) \Rightarrow  [Calculation and report for the heating system](#)
- [ArCADia-HEATING INSTALLATIONS](#) toolbar \Rightarrow  [Calculation and report for the heating system](#)

ArCADia LT

- [Heating](#) ribbon \Rightarrow logical group [Heating Installations](#) \Rightarrow  [Calculation and report for the heating system](#)

Then a window with calculation tables will appear. The calculation window contains tabs with appropriate data sets.

Calculations and result interpretation

The screenshot shows the 'Heating system calculations' window with the 'General parameters' tab selected. The window is divided into several sections:

- System parameters:** A table with two columns: Parameter and Value.

Installation	KPS1
Medium	Water
Delivery temperature	55.0°C
Return temperature	45.0°C
Total power	11.90 kW
Radiator power	11.40 kW
Radiant heating power	0.51 kW
Power of remaining receivers	0.00 kW
System capacity	146.61 dm³
Required efficiency	1.0371 m³/h
Gravitational active pressure	112 Pa
Required active pressure	33141 Pa
Available active pressure	35000 Pa
- Heat sources:** A table with columns: Symbol, Name, Q [kW], Vzc [...], and Δp [Pa].

KPS1	Kocioł na paliwo stałe	35.0	1.0371	500
------	------------------------	------	--------	-----
- Circulation pumps:** A table with columns: Symbol, Name, Vw [m...], V [m³/h], pw [Pa], and p [Pa].

P1	Pompa	1.0371	0.5000	33141	35000
----	-------	--------	--------	-------	-------
- Expansion vessels:** A table with columns: Symbol, Name, Layout, Dtb [...], Drw [...], and Dtp [...]. It is currently empty.
- Messages:** A table with columns: No. and Description. It is currently empty.

At the bottom right, there are three buttons: 'Apply', 'Report', and 'Close'.

Fig. 199 The calculation table window – General parameters tab

System parameters table

Shows the assumed output parameters for calculations and the calculated process parameters to the user.

Heat sources table

Shows the user the output parameters of the heat sources entered into the project.

Circulating pumps table


Shows the user the output parameters of the circulating pumps entered into the project.

Expansion vessels table

Shows the user the output parameters of the expansion vessels entered into the project.













The **Messages** table is located at the bottom of the window.

Message types (message icons differ):



- Information 
- Warning 
- Error 

Calculations and result interpretation

Message content - interpretation:

1.  *No pump in the section with the highest flow – required pump pressure (highest required pressure value)*
This message is displayed when there are no circulating pumps in the installation. In such a case the software determines the required parameters.
2.  *ZC1 power is lower than the total power of the installation*
This message is displayed when the power of the heat source is lower than the total power of the heating devices operating in the installation and operated by the particular heat source.
3.  *No thermostatic valve for GRZ1 receiver*
This message is displayed if there is no thermostatic valve upstream from a receiver or if the user has not defined a thermostatic valve integrated with the receiver.
4.  *More than 1 thermostatic valve in the design section upstream from the GRZ 1 receiver*
This message is displayed when the user inserts two thermostatic valves on the path to a heating device or when the user inserts a thermostatic valve upstream from a heating device equipped with an integrated thermostatic valve.
5.  *The power of the receiver in the anteroom is 90% of the room power demand*
This message is displayed when the total of the power of the heating devices assigned to a particular room is smaller by 10% than the room power demand.
6.  *The power of the receiver in the anteroom is 120% of the room power demand*
This message is displayed when the total of the power of the heating devices assigned to the particular room is higher by 20% than the room power demand.
7.  *The thermal power of the GRZ1 heater is higher than the catalogue heater power for the particular temperature conditions by (e.g.) 32%*
This message is generated when the user sets the thermal power in the device parameters to be higher than the catalogue power converted to the temperature difference between supply and return.
8.  *ZT4 valve is not assigned to any receiver*
This message is generated when the user inserts a thermostatic valve on a different design section than the last section upstream from a heating device.
9.  *The ZT2 thermostatic valve set points do not meet the control conditions*
This message is generated when none of the set points of the selected thermostatic valve meets the range of authority condition.
10.  *The circulating pump pressure is lower than the required active pressure*
This message is generated when the pump delivery head is lower than the required pressure calculated by the software.
11.  *The ZT6 thermostatic valve set points do not meet the adjustment conditions*
This message is generated when the set points of a particular valve do not meet the authority range condition for the required flow through the heater.
12.  *The temperature downstream (the particular symbol of the adjusting element) is higher than the temperature in the heat source*
This message is generated when the supply and/or return temperature set by the user downstream from the control element is higher than the corresponding temperatures set in the heat source.

Calculations and result interpretation

13.  *Pressure loss at OP (item number) is (e.g.) 29 kPa and greater than 20 kPa*
This message is generated when the total pressure loss value for surface heating is exceeded.
14.  *OP (item number) pipelines length is (e.g.) 150 m and greater than 120 m*
This message is generated when the total pressure loss value for surface heating is exceeded.

After selecting the next tab, *Heating circulations*, the user will see two calculation tables.

By selecting the field on the left in the *Paths* table, the user selects a circuit for the hydraulic calculations analysis for particular design sections.

Heating system calculations

General parametersHeating circulationsReceiversRadiant heating

Paths

	Circulation	Delivery le...	Return len...	L [m]	hg [m]	ΔAfter [Pa]	Δpczg [Pa]	Δpczw [Pa]	Δpczd [Pa]	δ [%]	Report	
<input checked="" type="checkbox"/>	GRZ11	29.76	29.50	59.26	4.09	6772	233	11390	42000	0.00	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	GRZ3	24.92	24.48	49.41	0.09	6323	5	10450	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ2	21.82	21.38	43.20	0.09	6076	5	10203	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ6	28.25	27.61	55.85	0.09	6900	5	10030	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ15	18.14	18.01	36.15	4.09	5900	233	9922	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ12	18.51	18.39	36.90	4.09	5828	233	9850	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ7	18.59	18.25	36.84	4.09	5800	233	9836	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ14	6.97	6.93	13.90	4.09	3456	233	9828	233	0.00	<input type="checkbox"/>	
<input type="checkbox"/>	GRZ5	7.87	7.53	15.40	0.09	3862	5	9784	42000	0.00	<input type="checkbox"/>	

Calculations

Pressure lossesHeat losses

	Section name	ΣQ [W]	V [m³/h]	G [kg/s]	Pipe dimensi...	v [m/s]	R [Pa/m]	L [m]	RxL [Pa]	Z [Pa]	Fittings	RxL+Z [Pa]
<input checked="" type="checkbox"/>	ZC1	12420	1.0915	0.2964						2000		2000
<input checked="" type="checkbox"/>	ZC1 - z8	12420	1.0915	0.2964	40.00 x 3.50	0.3545	45	0.98	44	258		300
<input checked="" type="checkbox"/>	z8 - z7	10984	0.9653	0.2621	40.00 x 3.50	0.3135	36	5.76	209	159		360
<input checked="" type="checkbox"/>	z7 - z6	10292	0.9044	0.2456	40.00 x 3.50	0.2937	32	3.33	108	139		240
<input checked="" type="checkbox"/>	z6 - z5	9599	0.8436	0.2291	32.00 x 3.00	0.4414	90	1.72	154	200		350
<input checked="" type="checkbox"/>	z5 - z4	6105	0.5365	0.1457	32.00 x 3.00	0.2807	40	5.68	229	19		240
<input checked="" type="checkbox"/>	z4 - z3	5227	0.4593	0.1247	32.00 x 3.00	0.2403	31	1.71	52	14		60
<input checked="" type="checkbox"/>	z3 - z11	2795	0.2456	0.0667	25.00 x 2.50	0.2172	36	4.91	175	182		350

Sum of line pressure ...2349Sum of local pressur...4597Sum of pressure loss...6947

ApplyReportClose

Fig. 200 The calculations table window – Heating circulations tab

Additionally, the user may preview the particular circuit parameters available in the *Paths* table:

- *Characteristic lengths of the circuit*
- *Geometric height of the circuit*
- *Geometric pressure of the circuit*
- *Circuit resistance* – calculated as the difference between the total pressure losses (linear and local) and 75% of the geometric pressure. Circuit resistance does not include the pressure loss at the thermostatic valve and is a value that allows for evaluating the correctness of the critical circuit selection.
- *Active gravitational pressure of the circuit* – shows the pressure value resulting from the height difference between the heat source and the heating device.
- *Required active pressure of the circuit* – expressed as the total of the circuit resistance and the actual pressure loss at the thermostatic valve with a set point selected by the software and meeting the authority criterion. The highest value of required circuit

Calculations and result interpretation

pressure is the value of the pressure required for the entire installation. It is a minimum pressure value for the circulating pump with the required capacity, installed at the section with the highest flow, i.e. at the section next to the heat source.

- *Available active pressure of the circuit* – a value which is the total of the pressures of pumps inserted into the circuit and the geometric pressure for the particular circuit. The highest value is the available pressure for the entire installation.
- *Percentage error for installation balancing* – a relative error for circuit pressure losses and available active pressure in the installation.

After ticking a particular circuit in the *Paths* table, the user can trace the hydraulic calculation for the selected circuit in the *Sum of the pressure lost* table presented below. Heating medium flows and velocities are indicated in the table, together with linear and local losses for the particular circuit, whereby their total is generated below.

The designer can analyse the pressure losses present in the particular design section: a unit pressure loss per 1 linear meter of the pipeline, total line pressure loss in the design section, total local pressure losses and the total of the pressure losses in the design section. The designer may track the selection of pipeline parameters in each design section and estimate hydraulic parameters without including the thermostatic valve.

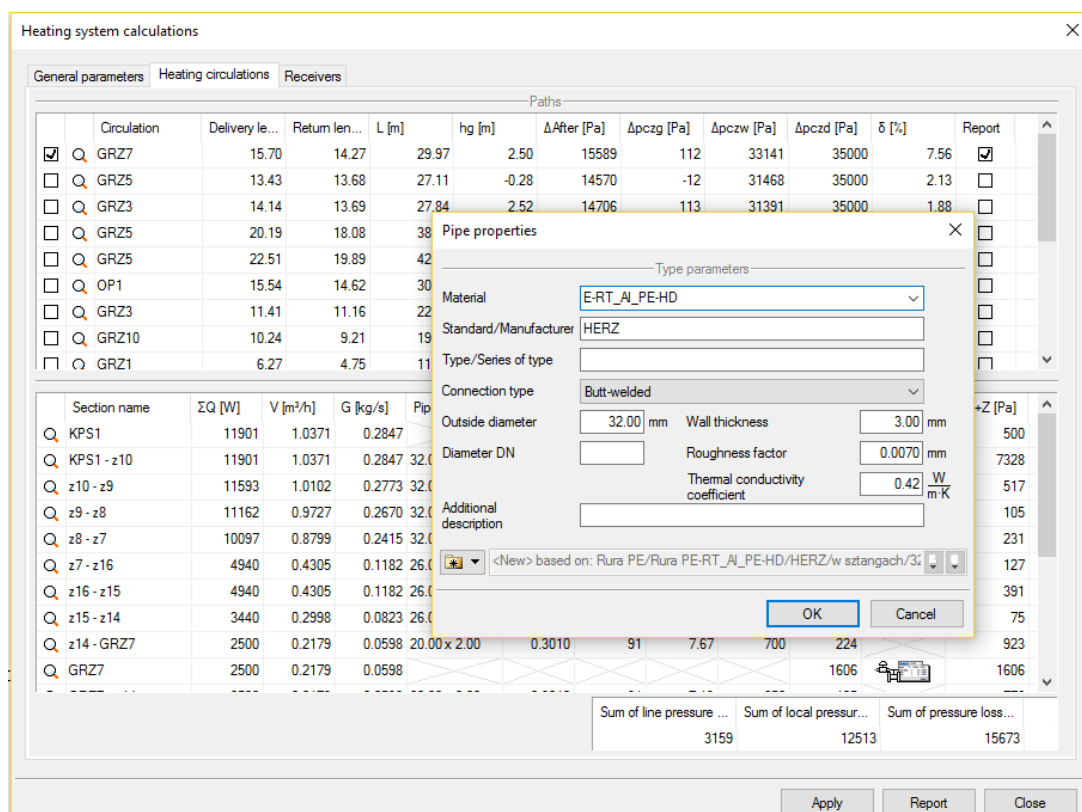


Fig. 201 The calculation tables window – changing the pipeline in the calculation section

Calculations and result interpretation

If the designer decides that it is necessary to change the pipeline diameters due to the high heating medium velocity, it is possible to do this from the level of the table. To do so you need to click the cell with the pipe diameter description (marked red – 25.00 x 4.20), which will open the pipe properties window for type parameters.

The user may change the type parameters, which results in the re-calculation of all the scores – velocities and local and linear losses.

The second tab, *Heat losses*, shows the heating water temperatures and heat losses for the individual circuits.

Heating system calculations

General parametersHeating circulationsReceiversRadiant heating

Paths

	Circulation	Delivery le...	Return len...	L [m]	hg [m]	ΔAfter [Pa]	Δpczg [Pa]	Δpczw [Pa]	Δpczd [Pa]	δ [%]	Report	
<input checked="" type="checkbox"/> Q	GRZ11	29.76	29.50	59.26	4.09	6772	233	11390	42000	0.00	<input checked="" type="checkbox"/>	↑
<input type="checkbox"/> Q	GRZ3	24.92	24.48	49.41	0.09	6323	5	10450	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ2	21.82	21.38	43.20	0.09	6076	5	10203	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ6	28.25	27.61	55.85	0.09	6900	5	10030	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ15	18.14	18.01	36.15	4.09	5900	233	9922	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ12	18.51	18.39	36.90	4.09	5828	233	9850	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ7	18.59	18.25	36.84	4.09	5800	233	9836	42000	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ14	6.97	6.93	13.90	4.09	3456	233	9828	233	0.00	<input type="checkbox"/>	
<input type="checkbox"/> Q	GRZ5	7.87	7.53	15.40	0.09	3862	5	9784	42000	0.00	<input type="checkbox"/>	↓

Calculations

Pressure lossesHeat losses

Section name	L [m]	Pipe dimensions [mm]	λ [W/m·K]	tp [°C]	tk [°C]	Qi [W]	
ZC1 - z8	0.98	40.0 x 3.50		0.43	75.00	74.97	33.09
z8 - z7	5.76	40.0 x 3.50		0.43	74.97	74.81	181.77
z7 - z6	3.33	40.0 x 3.50		0.43	74.81	74.71	105.15
z6 - z5	1.72	32.0 x 3.00		0.43	74.71	74.66	46.35
z5 - z4	5.68	32.0 x 3.00		0.43	74.66	74.61	842.32
z4 - z3	1.71	32.0 x 3.00		0.43	74.61	74.52	45.88
z3 - z11	4.91	25.0 x 2.50		0.43	74.52	74.32	54.82
z11 - z10	0.74	20.0 x 2.00		0.43	74.32	74.26	13.79
z10 - z9	1.28	20.0 x 2.00		0.43	74.26	74.13	23.87

Total path heat losses2550W

Total installation heat losses24853W

ApplyReportClose

Fig. 202 The calculation table window - Heating circuits tab- Heat losses

Note: In order for the changes introduced into the table to be reflected in the drawing, you need to click on the **Apply** button. Once this move is done, the change will be introduced in the drawing model in the design sections (the change may only apply to pipes consisting of at least a single design section).

The design sections for the particular installation have been denoted with a letter and the number of the connection node.

After opening the *Receivers* tab, the user can review the parameters of the inserted heating devices and balancing adjustment elements assigned to them (thermostats, thermostatic valves).

Calculations and result interpretation

Heating system calculations

General parameters Heating circulations **Receivers**


Paths

Symbol	Name	Type	Powe...	L x D x H [mm]	Δp [Pa]	Thermost...	Adjust...	a	Thermost...	Tz/...
Q GRZ7	Rury grzewcze pojedyncze		2500	1500 x 60 x 500	17552	Thermostatic v 7		0.57	Glowica termc 55/45	
Q GRZ5	Grzejnik płytowy stalowy	typ 21	1179	1200 x 60 x 550	16898	Thermostatic v 4		0.55	Glowica termc 55/45	
Q GRZ3	Grzejnik płytowy stalowy	typ 20	750	600 x 60 x 550	16685	Thermostatic v 3		0.54	Glowica termc 55/45	
Q GRZ5	Grzejnik płytowy stalowy	typ 21	900	900 x 60 x 550	14636	Thermostatic v 3,5		0.48	Glowica termc 55/45	
Q GRZ5	Grzejnik płytowy stalowy	typ 21	1287	1400 x 60 x 550	13511	Thermostatic v 4,5		0.44	Glowica termc 55/45	
Q OP1	Podłoga grzewcza		506	-	12450	Thermostatic v 2,5		0.40	Glowica termc 55/45	
Q GRZ3	Grzejnik płytowy stalowy	typ 20	750	800 x 60 x 550	16685	Thermostatic v 3		0.54	Glowica termc 55/45	
Q GRZ10	Grzejnik płytowy stalowy	Vertical Typ 20C	940	450 x 108 x 1950	15965	Thermostatic v 3,5		0.52	Glowica termc 55/45	
Q GRZ1	Grzejnik płytowy stalowy	typ 20	431	500 x 60 x 550	17435	Thermostatic v 2		0.57	Glowica termc 55/45	
Q GRZ6	Grzejnik płytowy stalowy	typ 20 Bautiefe	287	400 x 60 x 500	14808	Thermostatic v 1,5		0.48	Glowica termc 55/45	
Q GRZ9	Grzejnik drabinkowy	Leros LER1206M	506	600 x 28 x 1224	12450	Thermostatic v 2,5		0.40	Glowica termc 55/45	
Q GRZ7	Rury grzewcze pojedyncze		308	1500 x 60 x 500	17079	Thermostatic v 1,5		0.55	Glowica termc 55/45	
Q GRZ6	Grzejnik płytowy stalowy	typ 20 Bautiefe	263	400 x 60 x 500	12399	Thermostatic v 1,5		0.40	Glowica termc 55/45	
Q GRZ3	Grzejnik płytowy stalowy	typ 20	532	600 x 60 x 550	13767	Thermostatic v 2,5		0.45	Glowica termc 55/45	
Q GRZ2	Grzejnik płytowy stalowy	typ 20	532	600 x 60 x 550	13767	Thermostatic v 2,5		0.45	Glowica termc 55/45	
Q GRZ8	Grzejnik dekoracyjny stalowy	typ 20V	230	958 x 74 x 500	9474	Thermostatic v 1,5		0.31	Glowica termc 55/45	

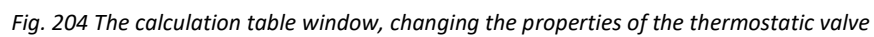
Apply Report Close

Fig. 203 The calculation table window, Receivers tab view

The designer can assess whether the parameters of the heating devices are correct and the actual resistances of the thermostatic valves with the selected set points. The software automatically selects the set points, which can then be changed by the user.

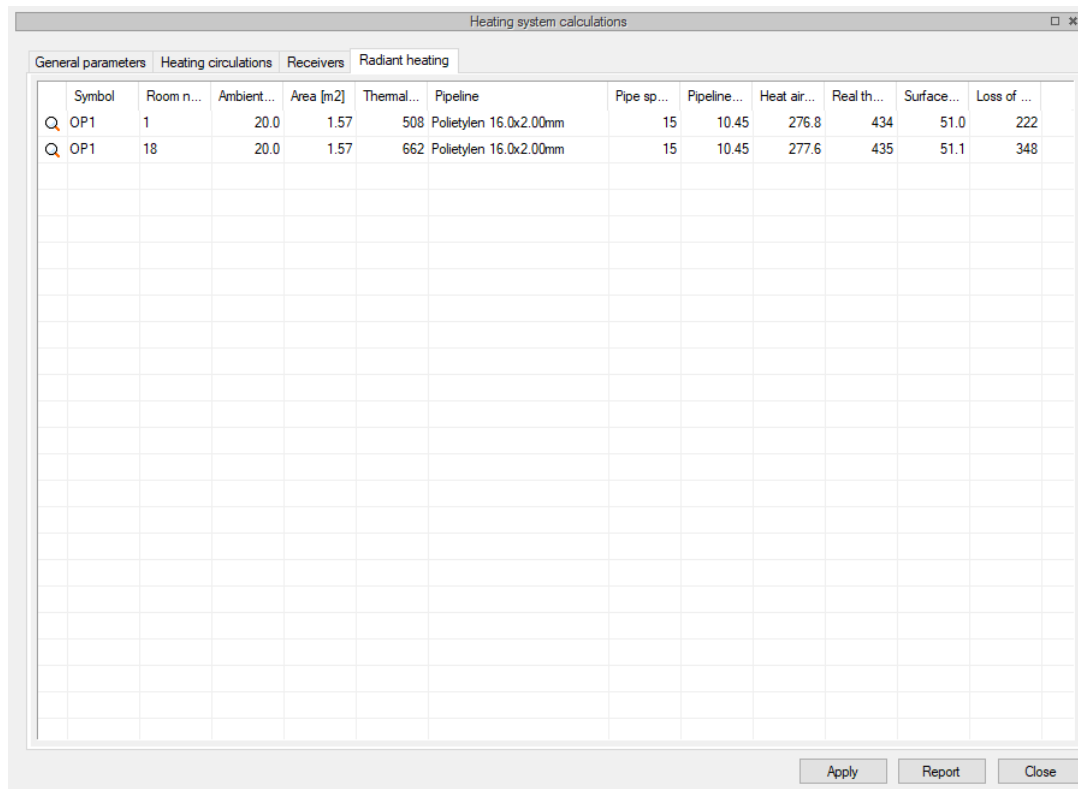
Clicking on the  symbol enables moving to the projection (drawing) with the heating device marked. This operation allows the user to easily locate the device and move to the properties editing dialogue box.

If the user enters a name in the *Thermostat type* column, a dialogue box will be opened, where you can change the thermostatic device properties.



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Calculations and result interpretation



Symbol	Room n...	Ambient...	Area [m2]	Thermal...	Pipeline	Pipe sp...	Pipeline...	Heat air...	Real th...	Surface...	Loss of ...
Q OP1	1	20.0	1.57	508	Polietylen 16.0x2.00mm	15	10.45	276.8	434	51.0	222
Q OP1	18	20.0	1.57	662	Polietylen 16.0x2.00mm	15	10.45	277.6	435	51.1	348

Fig. 205 Fig. 1 Window of the calculation tables, view of the Surface heating tab

12.5 RTF calculations report

After the designer introduces corrections or changes, the user should always click on the [Apply](#) button in the calculation tables in each tab and with each selected path. In order to exit the calculations, you need to press the [Close](#) button, which will close the window and take you to the drawing model. In the projection and the axonometry you will see descriptions of design sections (these need to be arranged not to overlap).

NOTE: *Introducing any changes that influence the calculation into the model may cause all the design points and calculations to be reset. The changes which were previously made in the calculations table window will remain unaffected.*

In order to obtain a complete set of all the required reports for the particular paths, the user should open the calculations table and then (for each tab) check the box in the [Report](#) column of the calculation paths selection table. The designer may either select reports only from critical paths or from other interesting paths. Once the relevant reports are selected by marking, you need to click on the [Report](#) button, which will activate a window where you can name the generated RTF file and save it in a selected folder.

13 AXONOMETRY



Axonometry

13.1 Inserting axonometry

For the entire installation:

Activation:

ArCADia and ArCADia PLUS



- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Axonometry*
- *ArCADia-Heating Installations* toolbar ⇒  *Insert axonometry of entire installation*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Axonometry*

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Branch axonometry*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert axonometry of installation branches*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Branch axonometry*

If the user wants to change the properties of the specific axonometry, they can click the axonometry frame. The axonometry modification window will be available then.

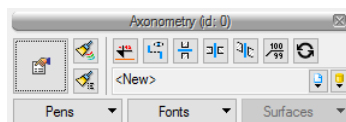



Fig. 206 The axonometry modification window

The object properties editing window appears after selecting the  button in the insertion window or by double-clicking the inserted element.

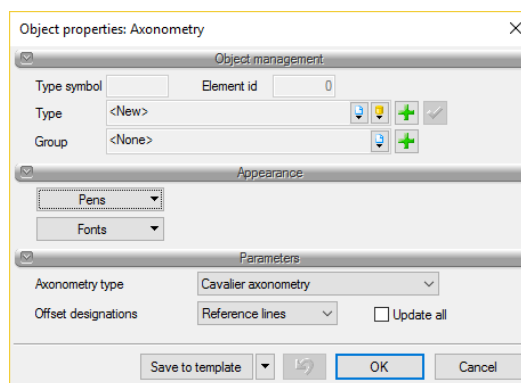


Fig. 207 The axonometry object properties window

Axonometry

Parameters control group

Axonometry type – the user can select four types of axonometry from a drop-down list. Installation axonometry is also available apart from the standard types such as *Isometry*, *Cavalier axonometry* and *Cavalier dimetry*. The former maintains the lengths from the views in the axonometric view and is recommended when drawing a view of the installation without loops.

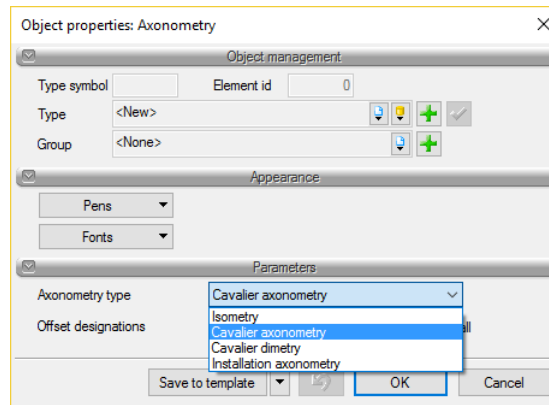


Fig. 208 The selection of the axonometry type

Offset designations – the user chooses one of the two offset insertion possibilities for the axonometry. These can be reference lines or reference symbols and the *Update all* checkbox. Once the checkbox is ticked, all the offsets introduced into the axonometry will change their reference markings and the subsequently introduced ones will already be those selected from the list.

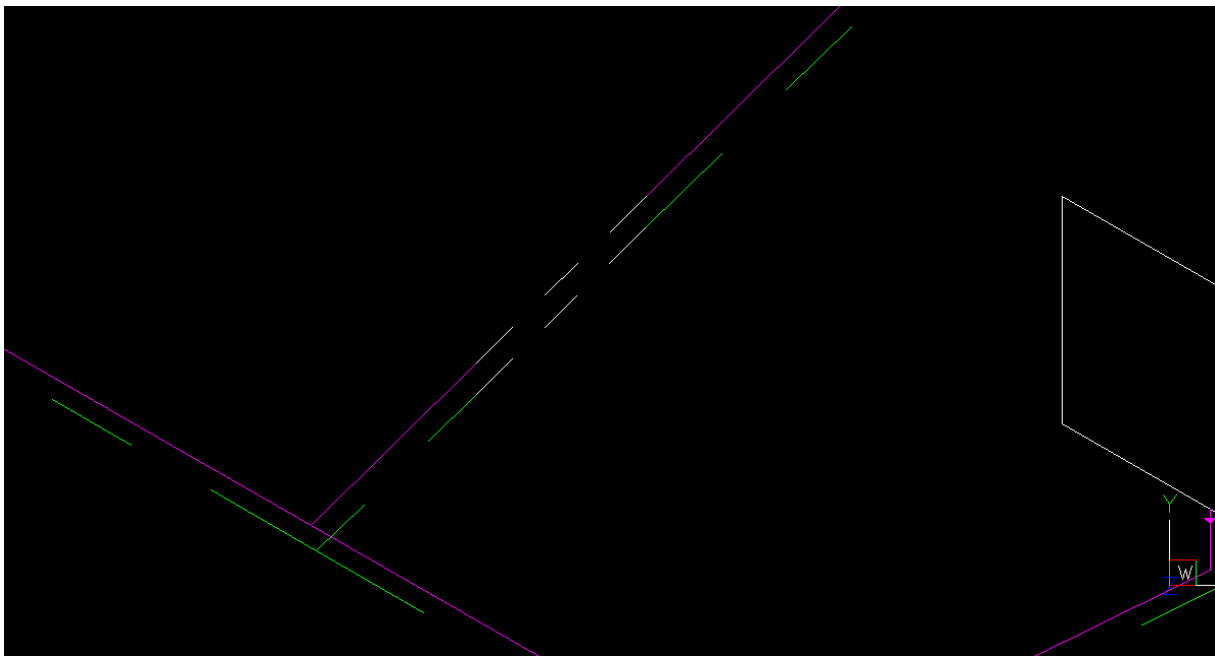


Fig. 209 An example of an offset with lines as reference

Axonometry

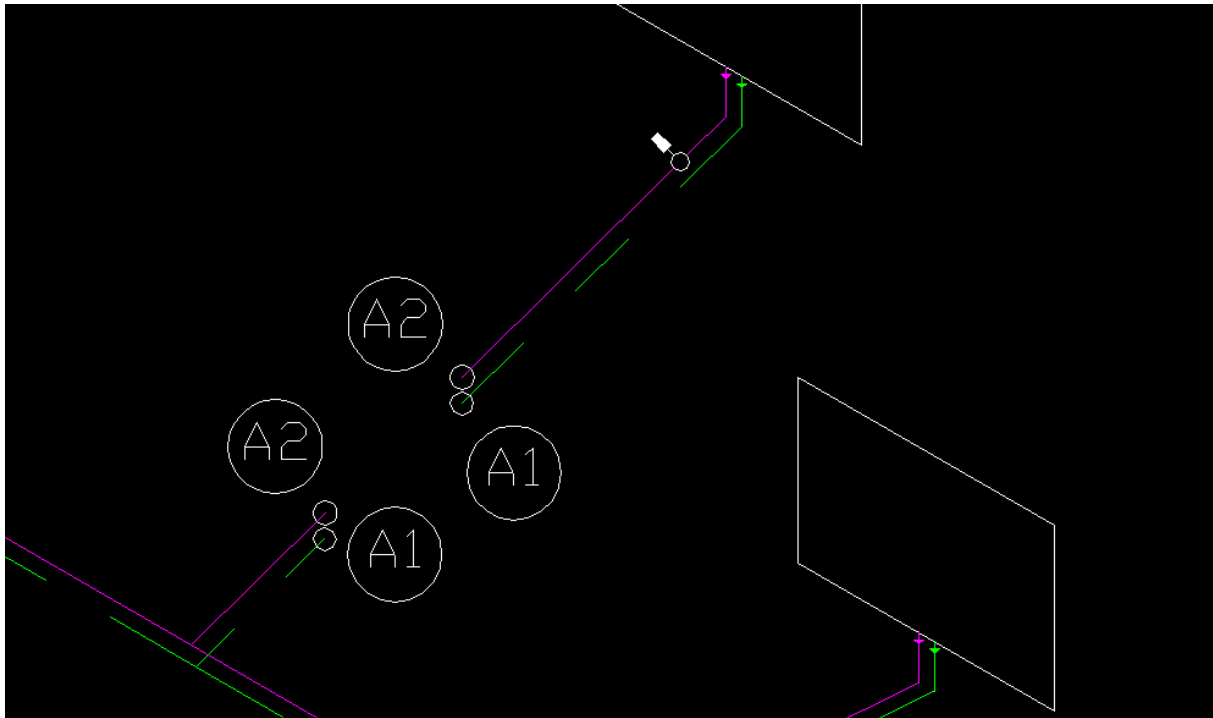




Fig. 210 An example of an offset with symbols as reference.


All offset reference markings can be changed or disabled from the heating pipe axonometry modification window for each pipe separately.

Other modifications of elements already drawn on axonometry are possible in addition to modifying the properties in the axonometry modification window (Fig. 206)

The user can click the [Enable/Disable offset designations](#)  icon in the axonometry modification window and disable or enable all the designations for the entire axonometry.

The user can click on the [Enable/Disable wall passages](#)  icon in the axonometry modification window and disable or enable all the symbols of wall passages for the entire axonometry.

The user can click on the [Enable/Disable ceilings passages](#)  icon in the axonometry modification window and disable or enable all the symbols of ceiling passages for the entire axonometry.

The user can click on the [Enable/Disable roof passages](#)  icon in the axonometry modification window and disable or enable all the symbols of roof passages for the entire axonometry.

13.2 Axonometry element edition and settings

Elements inserted into the axonometry can be modified. After clicking the pipeline the user can use the pipe modification window.

Axonometry

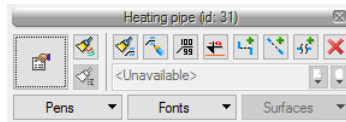


Fig. 211 The heating pipe modification window in the axonometry view

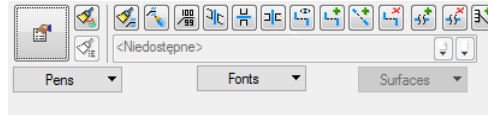




Fig. 212 The action window icons

Modification possibilities depend on the following factors:

- pipeline location,
- whether the pipeline is vertical or horizontal,
- whether the pipeline is displaced or not.

The content of the modification windows can differ depending on the selected pipeline and the number of selected pipelines. All the possible icons that can be displayed in the modification window are available in Fig. 212.

The *Fonts and pens painter*  icon is used to “paint” and transfer settings for the fonts and pens from one icon to another, without the need to change settings manually.

The *Description painter*  icon is used to “paint” and transfer description settings from one element to another, without the need to change settings manually. Then the user may select which description parameters should be transferred. This is done in the description painter window, where the user should mark the checkbox next to the appropriate parameter:

Visibility – the description is enabled or disabled,

Link – the description link is enabled or disabled,

Direction – vertical or horizontal link settings,

Offset from object – the distance and the location of the description against the object,

Content – description content setting from the description configurator.

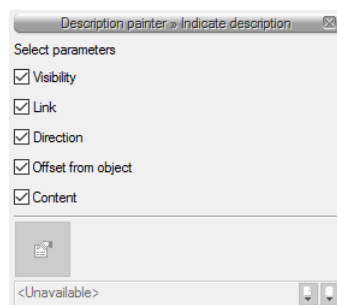






Fig. 213 The description painter window


Axonometry


The *Edit description*  icon is used for editing and modifying the description. Once the user clicks on the icon, they can determine in the modification window whether to add the link to a description or not and they can determine the description visibility.


The *Insert description*  icon is used for inserting the description in the link. After clicking on the icon, the function is available for a specific element type. You can select another element and set a description without interrupting the command. That way you can set a description on each pipeline during the execution of one command. Once you select an element, you need to click on the pipeline where the link will be anchored and then indicate the location of the description offset in relation to the element.


The *Enable/disable roof passages*  icon is used to enable or disable roof passages symbols for the specific pipeline or several selected pipelines.


The *Enable/disable level passages*  icon is used to enable or disable level passages symbols for the specific pipeline or several selected pipelines.


The *Enable/disable wall passages*  icon is used to enable or disable wall passages symbols for the specific pipeline or several selected pipelines.


The *Enable/disable displacement designation*  icon is used to enable or disable offset lines and symbols of the specific pipe.

The *Displace*  icon is used to insert installation displacements in order to make the axonometry drawing more legible. Once you click on the icon you need to position the cursor on the selected pipeline. Then, a marker will be displayed, which you can use to indicate the point where the displacement will begin. Then you need to indicate the position of the section which is being displaced.


The *Displace in parallel*  icon is used to introduce installation displacements in parallel to the displaced pipeline in order to make the axonometry drawing more legible. Once you click on the icon you need to position the cursor on the selected pipeline. Then, a marker will be displayed, which you can use to indicate the point where the displacement will begin. Then you need to indicate the position of the displaced section in the parallel extension of the divided section.

The *Remove displacement*  icon is used by the user to remove the displacement previously introduced into the pipeline.

The *Shorten apparently*  icon is used to introduce an apparent shortening of the pipeline or several pipelines in the axonometry view. Once the user selects this icon, using the modification marker they can select the starting and ending point. Instead of the section located between these points, an apparent shortening symbol will appear. The most frequent use of the apparent shortening is to create in the axonometry view an apparent cut of a pipeline part that does not have any fittings and branch lines in the longer section.

The *Remove shortening*  icon is used to remove a previously inserted shortening from the pipeline or from several pipelines.

Axonometry

The [Add description on ladder](#)  icon is used to insert a description common to several parallel pipelines, e.g. supply and return.

13.3 View options

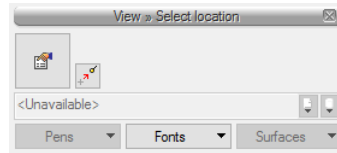



Fig. 214 The axonometry view insertion window

The view properties window appears after selecting the  button in the insertion window or by double-clicking on the axonometry view anchor. In the case of axonometry, it will be the axonometry view properties window.

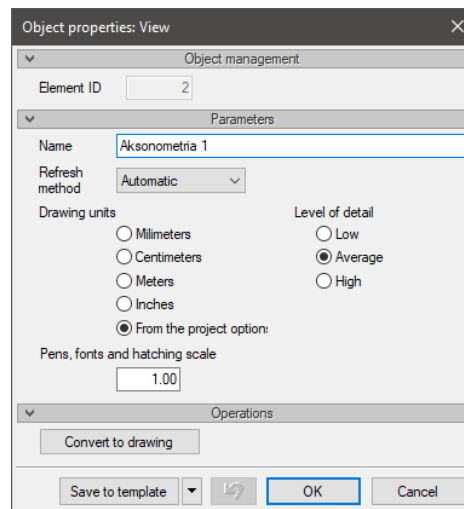


Fig. 215 The axonometry view properties window

Parameters control group

Name – here the user can name the specific axonometry view. The name will be displayed in the [Project manager](#) and next to the view anchor.

Refresh method – the user can set the automatic view update method that does not involve any user intervention or a manual method.

Drawing units – the user has the option of selecting drawing units by choosing the appropriate unit: millimeters, centimeters or meters.

Pens, fonts and hatching scale – the user can adjust the pens, fonts, and hatching scale to match their needs without changing the scale of the elements.

Level of detail – the user can select the level of detail of elements in a given view.

Axonometry

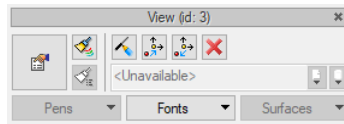






Fig. 216 The axonometry view modification window

The following functions are available in the axonometry view modification window:

Refresh view  – used to manually refresh the axonometry view.

Change handle location against view  – allows for changing the view anchor location in relation to the axonometry view.

Return the handle to its original position relative to the view  – allows you to reposition the view handle to its initial (original) setting.

Remove marked objects  – is used for removing the axonometry view.

14 LISTS AND BILLS OF MATERIALS



Lists and BILLS OF MATERIALS

14.1 Installation item list and bills of materials

In order to activate the *item list* used in the project, click the button in the toolbar:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Item list*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert item list*



ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installation* ⇒  *Item list*

In order to activate the *material list* used in the project, click the button in the toolbar:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Material list*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert material list*



ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Material list*

In order to activate the *selected elements list* used in the project, click the button in the toolbar:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Insert selected elements list*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert selected elements list*



ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *Insert selected elements list *

In order to activate the *list of selected element materials* used in the project, click the button in the toolbar:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *List of selected element materials*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert material list for selected element materials*

Lists and BILLS OF MATERIALS

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *List of selected element materials*

Then the appropriate table is generated in the drawing table. The table is anchored to the mouse cursor and by clicking anywhere you can insert it into the drawing field.

Tables may be edited by clicking on their frame, which activates an action window.

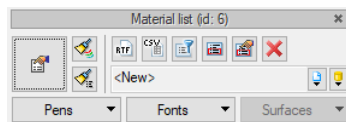


Fig. 217 The bill of materials list editing window

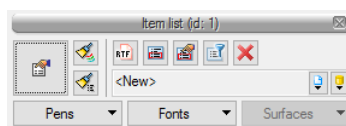




Fig. 218 The bill of elements list editing window

In these windows, the user may send an RTF or CSV format tables by clicking on the  or  icon. A window will be displayed where the user can provide a name for the file being generated and indicate its location.

Additionally, you can also filter the elements or paths for the *Material list*. Filtering types allows the user to limit they types of items used in the project to just those that are of interest to the designer. Clicking on the big button in the go to editing window or double-clicking the frame takes you to the table properties window.

Lists and BILLS OF MATERIALS

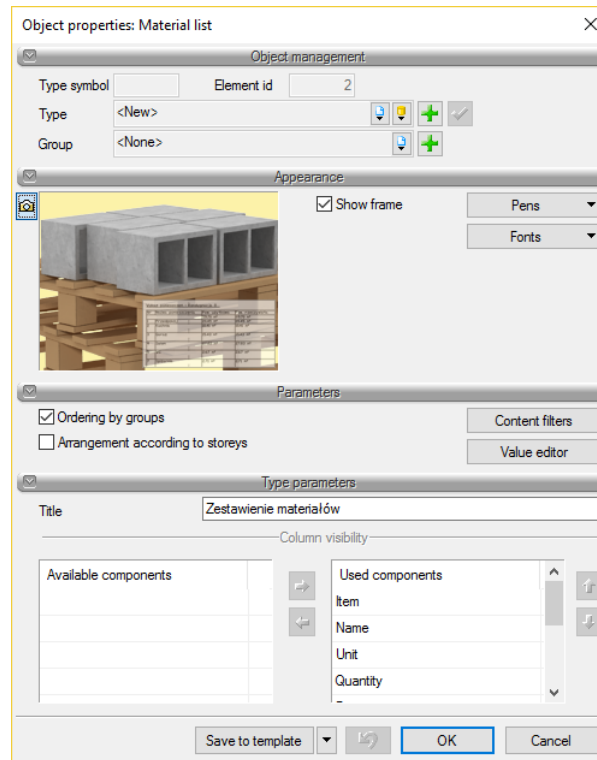


Fig. 219 The material list properties windows

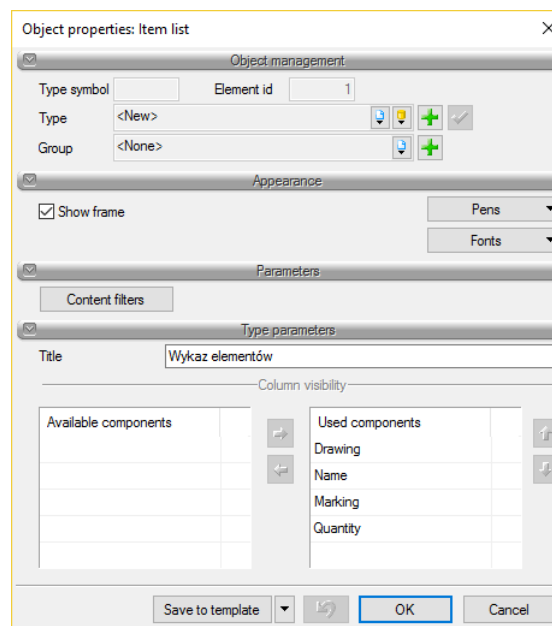


Fig. 220 The item list properties windows

In both cases you can edit the number of columns and their order the same way. By clicking the particular element, the user selects it. Then the user can transfer the element by clicking on the arrow that indicates the specific table (side arrows). You can set the order of columns using the up and down arrows. If you click the proper vertical direction with a component marked, it will move the used components in the table. The order of the rows in the table corresponds to the order of the columns in the material list table.

Lists and BILLS OF MATERIALS

A *Material list* or an *Item list* may be selected after insertion. In such a case, a modifications window with the *Mark selected elements on the view* icon becomes available. 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 view.

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

14.2 Lists of heating types, power and receivers

14.2.1 List of heating types and power

In order to activate the list of items used in the project, click the button in the toolbar:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒ *List of heating*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒ *Insert the list of heating and power type*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒ *List of heating*

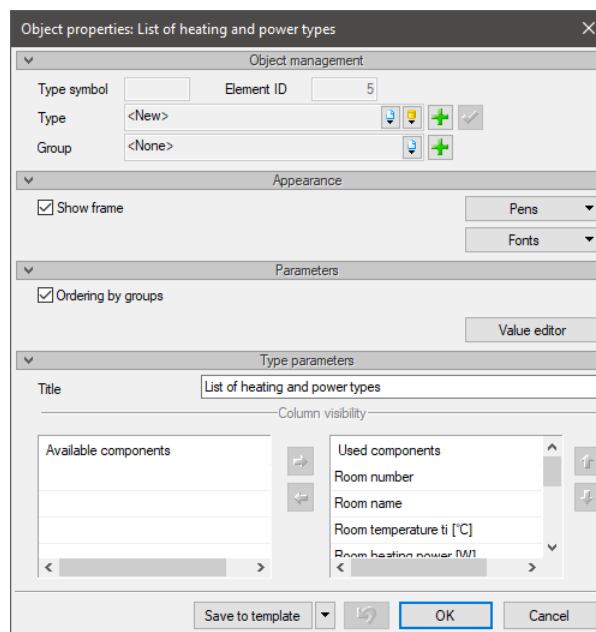


Fig. 221 The list of heating and power types



The properties are as in point 14.1.

14.2.2 List of receivers at rooms

In order to activate the *list of receivers at rooms* in the project, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *List of receivers at rooms*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert a list of receivers at rooms*

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *List of receivers at rooms*

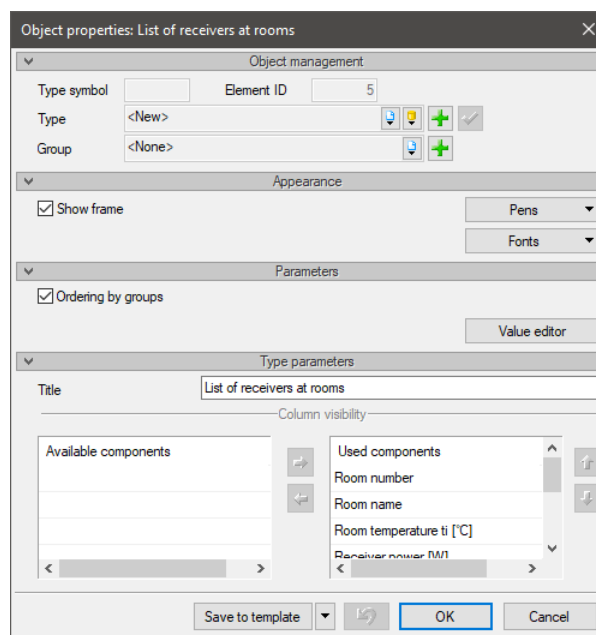


Fig. 222 The list of receivers at rooms properties window

The properties are as in point 14.1.

14.2.3 List of Radiant heating at rooms

In order to activate the *List of radiant heating at rooms* used in the project, do the following:

Activation:

ArCADia and ArCADia PLUS

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *List of radiant heating at rooms*
- *ArCADia-HEATING INSTALLATIONS* toolbar ⇒  *Insert a list of radiant heating at rooms*

Lists and BILLS OF MATERIALS

ArCADia LT

- *Heating* ribbon ⇒ logical group *Heating Installations* ⇒  *List of radiant heating at rooms*

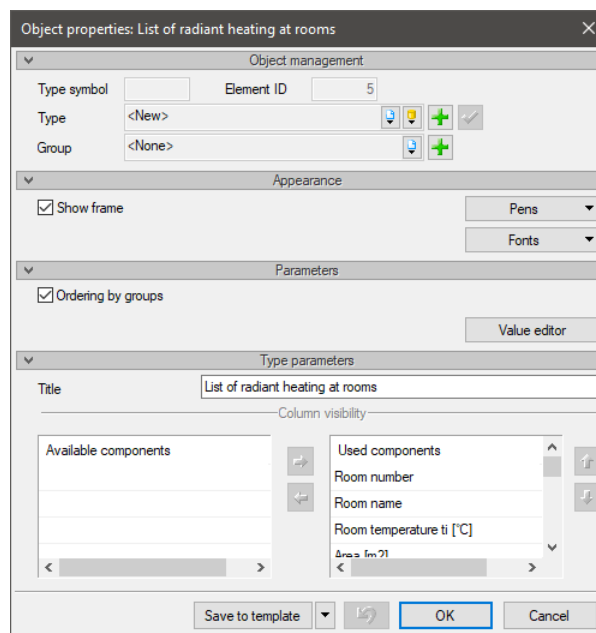


Fig. 223 The list of radiant heating in the room's properties window

The properties are as in point 14.1.