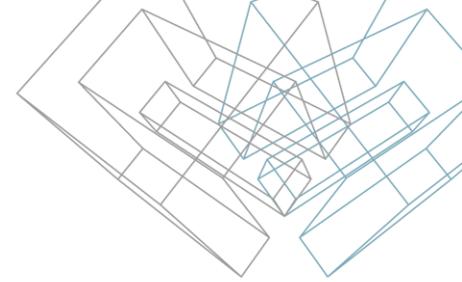




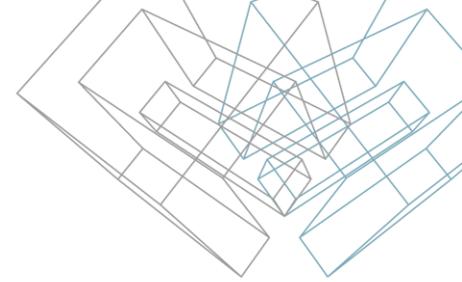
# CUT OPENING

Technical documentation



# Frequently Asked Questions

- How to cut holes in places where ducts, pipes, cable trays, or conduits are intersecting walls, floors, or ceilings? Do I need to cut them manually?
- Is it possible to place openings depending on MEP element? Can I manage required opening size for one or other type of MEP element?
- Is it possible to join (auto-join) openings?
- Is it possible to create openings if my MEP elements do not go through the structural element? This situation could be found in wall mounted air terminals and their connections with ducts.
- Do I change offsets by created openings a lot faster than doing it manually?
- Can I work with different groups of MEP elements and have different parameters for them? For example, Hot Water Pipes and Sanitary Pipes.
- How to create openings in walls, floors, or ceilings if they are in linked file?
- Is it possible to insert structural openings when my architectural walls, windows and doors are separated from the structural walls?  
How to create openings for imported IFC MEP elements in structural building elements?

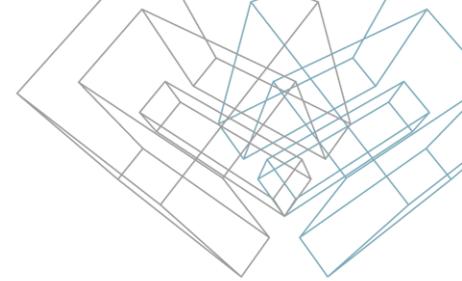


# Cut Opening

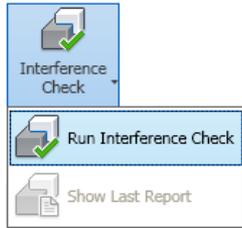
**Cut Opening** defines and reserves spaces in Revit® models for ducts, pipes, cable trays and conduits. Structural engineers and architects can then review, revise, and create the approved holes with just one click. Suitable openings are designed automatically based on the location and types of clashes detected in MEP elements in current, linked, or IFC files.

- Cut Opening utilizes Revit® „Interference Check“ results for adding openings.
- Automatically creates openings where ducts, pipes, cable trays or conduits intersect walls, floors or ceilings.
- Inserts openings with predefined opening shape.
- Inserts openings with predefined opening size.
- Inserts openings with predefined opening top or bottom offset.
- Joins openings with predefined auto join offset.
- Updates openings if changes with MEP elements were made.
- Ability to change/delete existing openings if needed.
- Works with linked files. Architectural project can be linked to MEP project, as well as MEP project can be linked to Architectural part.
- Adds structural openings to structural walls according to architectural windows and doors.

# Insert Openings. First Step – „Run Interference Check“



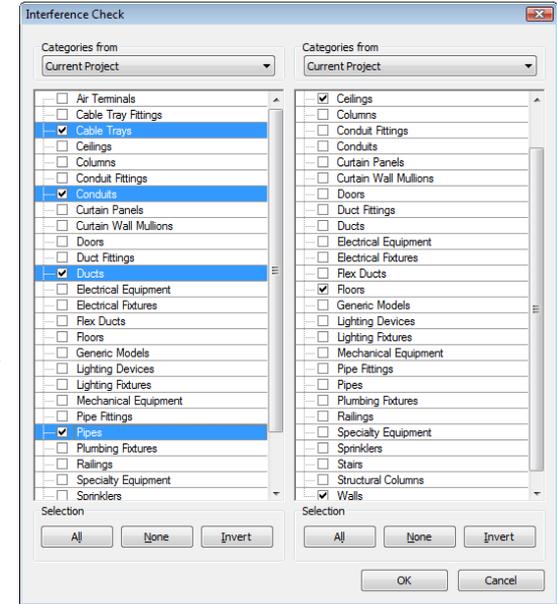
Before starting work with “Cut Opening”, select **Collaborate** → **Interference Check** → **Run Interference Check**.



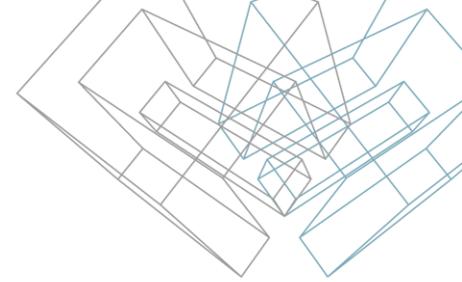
On one side mechanical categories must be selected – Cable Trays, Conduits, Ducts or Pipes.

On the other side structural categories must be selected – floors, walls, roofs, ceilings, beams, and columns.

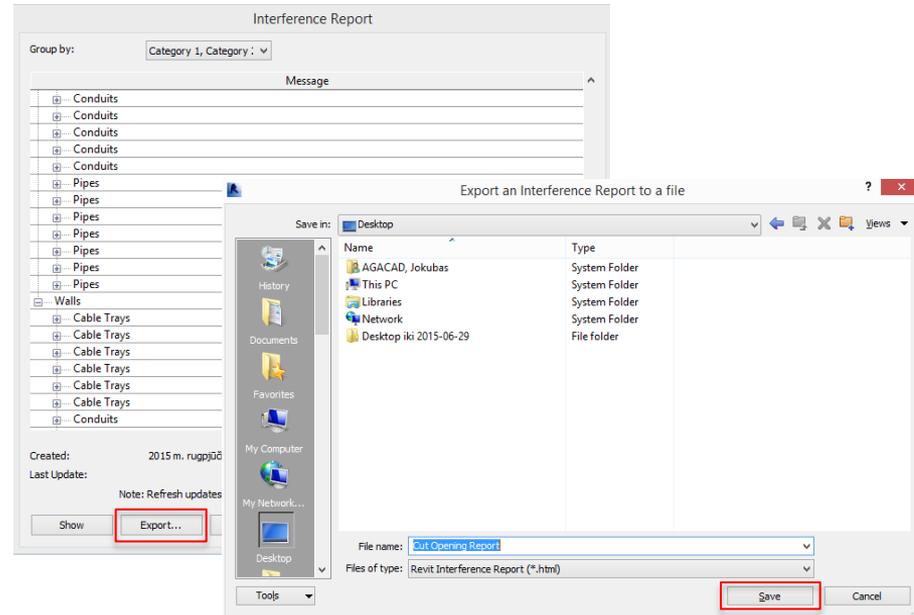
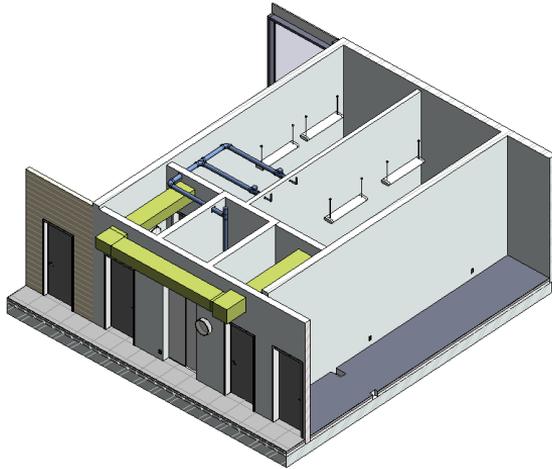
Note: It is possible to select categories from the current or linked ject.



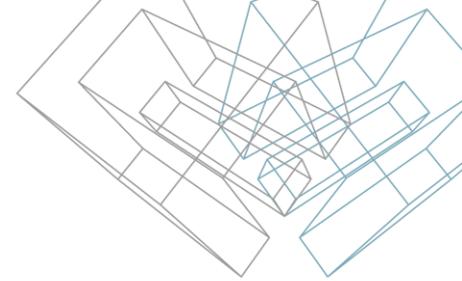
# Insert Openings. First Step – „Run Interference Check“



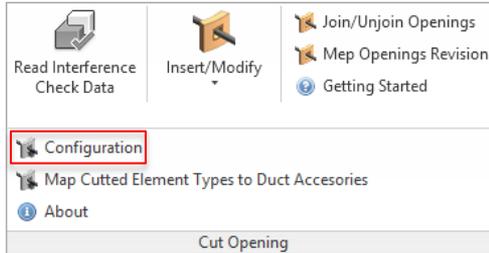
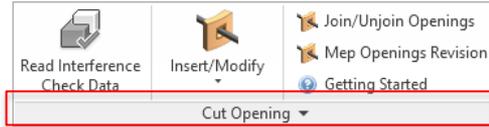
In “Interference Report” dialog, user has to select “Export” and save html file anywhere on computer.



# Insert Openings. Second Step – Run „Opening configurations“

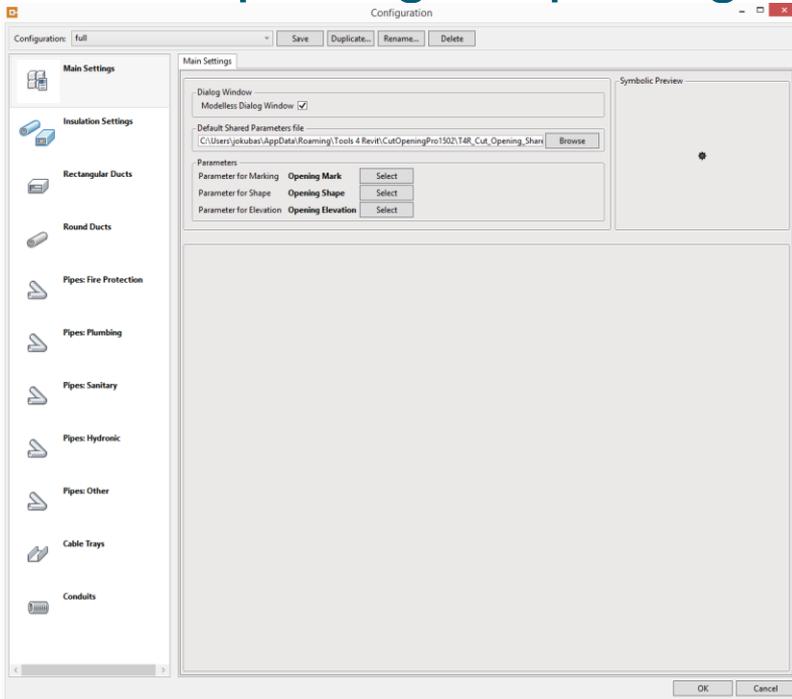


Before starting work with “Cut Opening”, select „Configurations“ from Cut Opening menu.



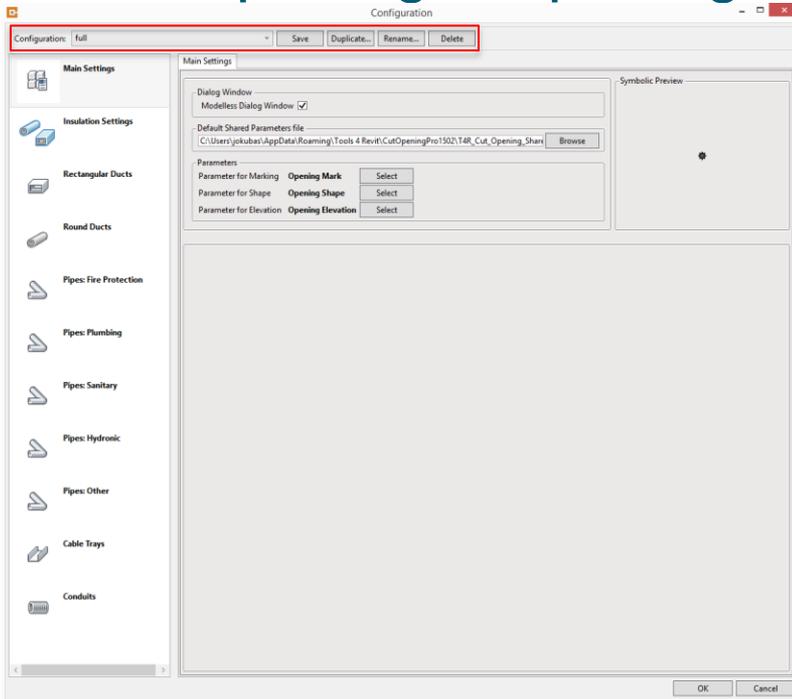
Here you will be given a set of tools and configurations for different categories of line based MEP elements as well as their opening configurations.

# Insert Openings. Opening configurations



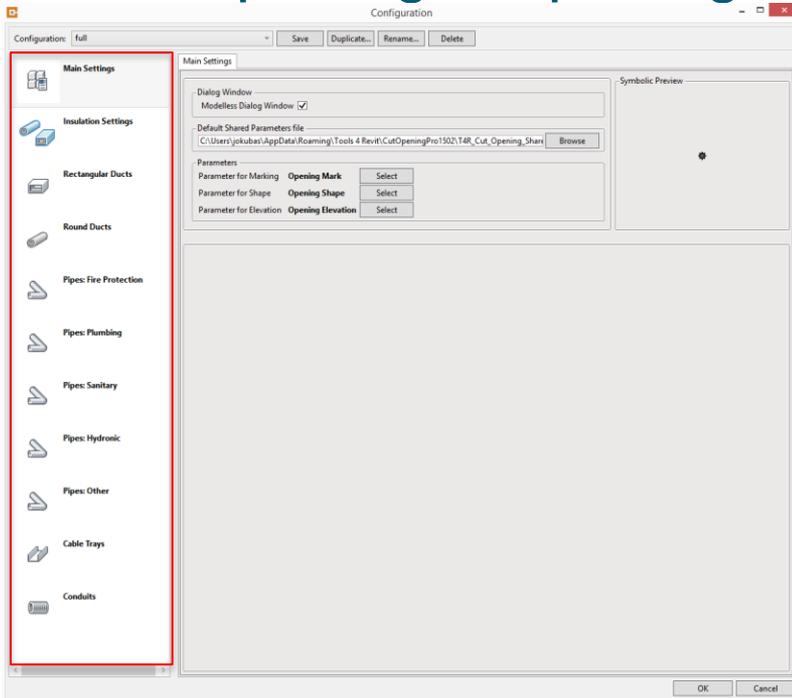
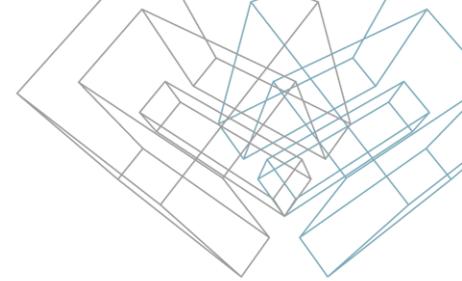
- Users will be given default configurations that will help users get started with Cut Opening;
- Users will get the default configurations that will include Main Settings, Insulation Settings, Cut Offset Settings, Join Openings Settings, Interference Settings for Round, Rectangular or Oval Ducts, Fire Protection, Plumbing, Sanitary, Hydronic or Other Pipes, Cable Trays, or Conduits;
- Users will be given the possibility to Duplicate and Save NEW configuration. These configurations can be Deleted or Renamed as well;
- Default configurations cannot be Renamed or Saved under the same name when you want to get all configurations to factory settings.

# Insert Openings. Opening configurations



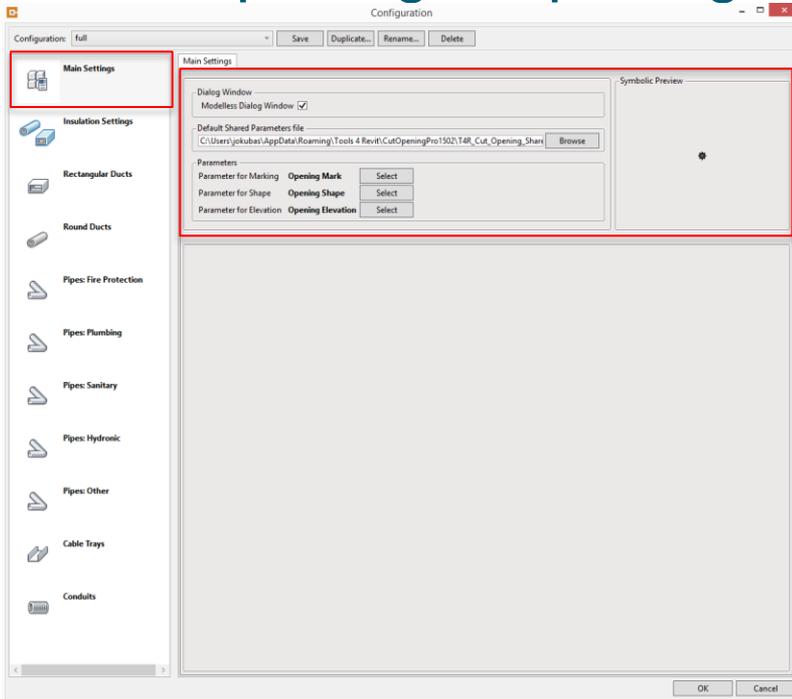
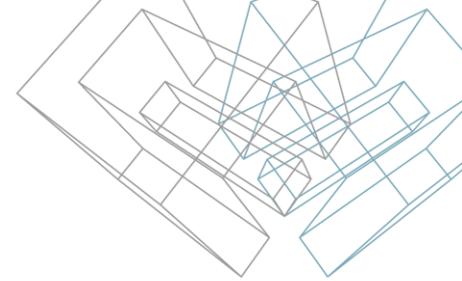
- Users will be given default configurations that will help users to get started with Cut Opening;
- Users will get default configurations that will include Main Settings, Insulation Settings, Cut Offset Settings, Join Openings Settings, Interference Settings for Round, Rectangular or Oval Ducts, Fire Protection, Plumbing, Sanitary, Hydronic or Other Pipes, Cable Trays, or Conduits;
- Users will be given the possibility to Duplicate and Save NEW configuration. These configurations can be Deleted or Renamed as well;
- Default configurations cannot be Renamed or Saved under the same name when you want to get all configurations to factory settings.

# Insert Openings. Opening configurations



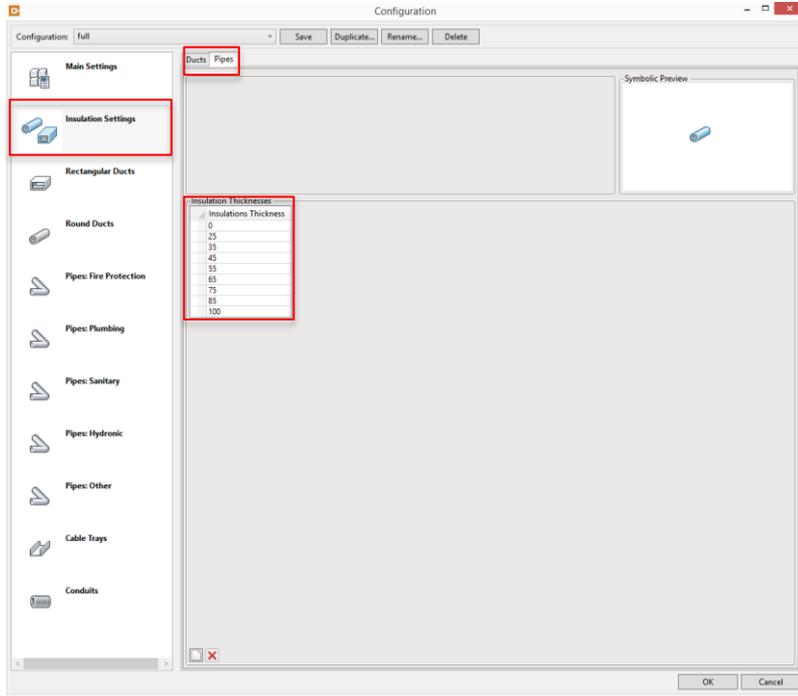
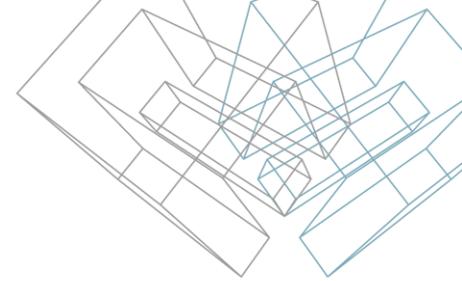
- Cut Opening configurations are divided into different segments that will allow user to set the Main Settings, Insulation thicknesses for Pipes and Ducts as well as individual settings for different MEP line based elements' system classifications.
- Cut Opening supports element categories and system classifications:
  - Duct: Rectangular, Round, Oval;
  - Pipe:
    - Fire Protection (Supports Fire Protection Dry, Fire Protection Other, Fire Protection Pre-Action, Fire Protection Wet system classifications);
    - Plumbing (Supports Domestic Cold Water, Domestic Hot Water system classifications);
    - Sanitary (Supports Sanitary, Vent system classifications);
    - Hydronic (Supports Hydronic Supply, Hydronic Return system classifications);
    - Other (Supports Other and all additionally created system classifications);
  - Cable tray;
  - Conduit;

# Insert Openings. Opening configurations



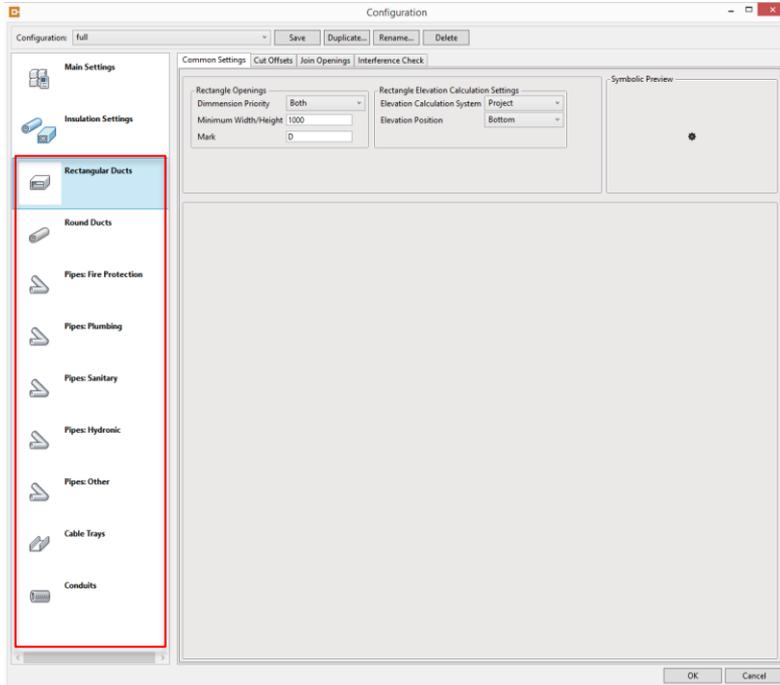
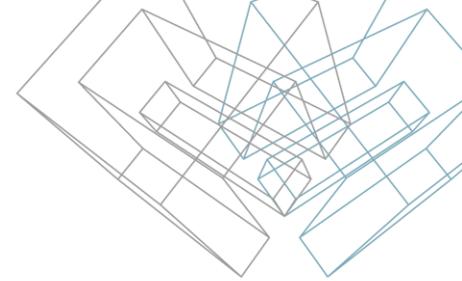
- Default Shared Parameters file – Shared parameter file path on user's computer. User is able to change the default shared parameter file or its path.
- Cut Opening automatically creates new parameters for marking, shape and elevation. Parameters:
  - Opening Mark – Parameter for Marking
  - Opening Shape – Parameter for Shape
  - Opening Elevation – Parameter for Elevation

# Insert Openings. Opening configurations



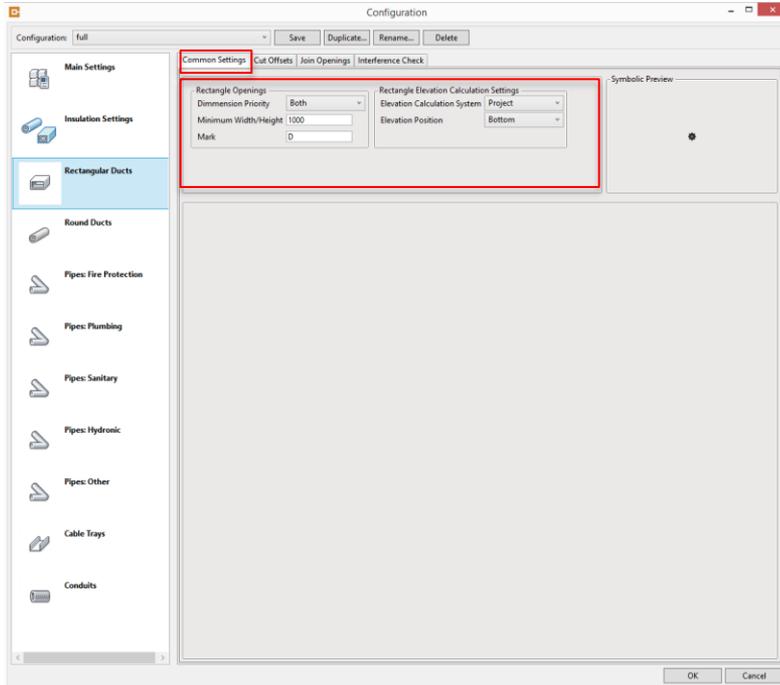
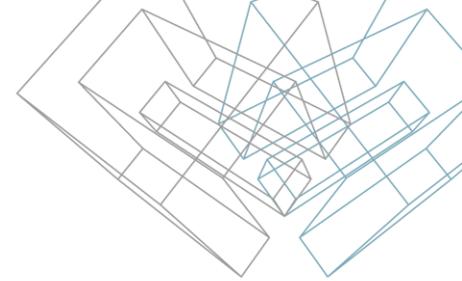
- Insulation settings is a setting bar where user can add different insulation thicknesses for Ducts and Pipes separately. User should create his own Insulation Thickness in case he wants to work with them.
- By clicking Add New – user will create new insulation types in Cut Opening software.
- By clicking Remove – user will remove any insulation types he wishes.

# Insert Openings. Opening configurations



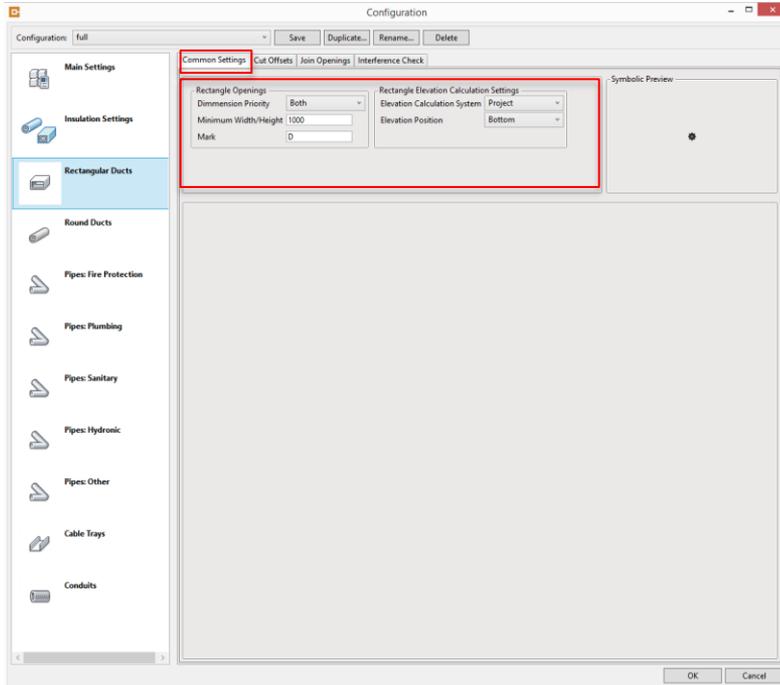
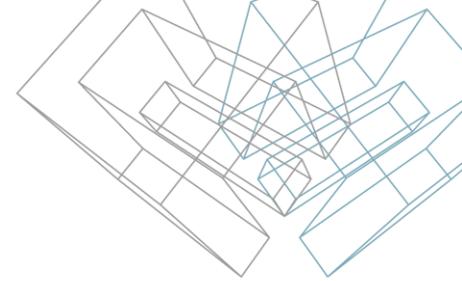
- User is given a set of tools and configurations for line based MEP element Categories and System Clasifications;
- Cut Opening supports Round, Rectangular or Oval Ducts, Fire tection, Plumbing, Sanitary, Hydronic or Other Pipes, Cable Trays and Conduits;
- User can define Common Settings, Cut Offsets, Join Opening offsets and full interference existence.

# Insert Openings. Common Settings



- Dimension Priority and Minimum Width/Height
  - Here user can set minimal opening size to be created. Dimension priority shows the dimension according which the software will choose minimal opening size. There are three possibilities – Width, Height and Both.
  - Minimum Width/Height – minimum opening size to be created according to Dimension Priority

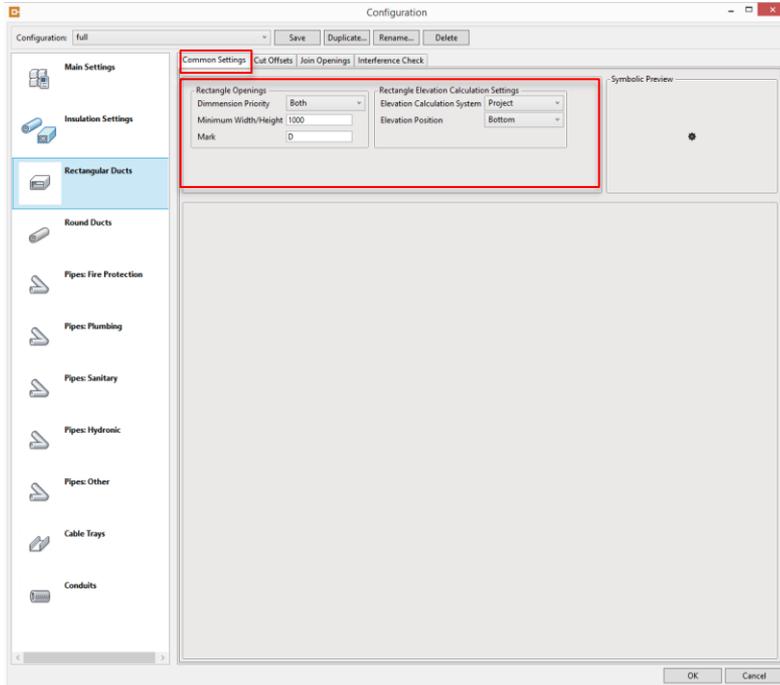
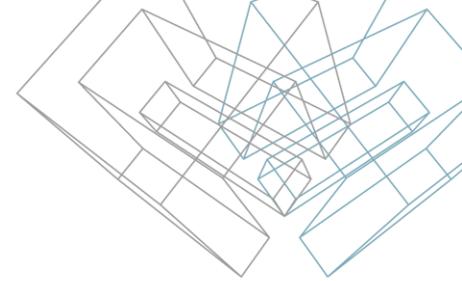
# Insert Openings. Common Settings



- Mark
- After insertion of openings, they will be marked with user predefined marks. User could use any mark for different opening types.

Example – Rectangular Duct – D  
Roun Duct – RD  
Oval Duct – OD

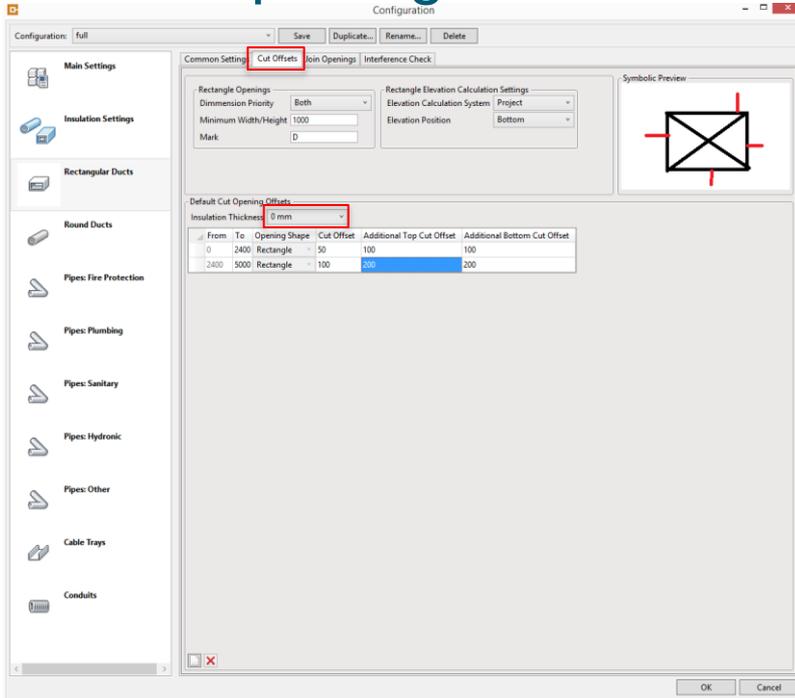
# Insert Openings. Common Settings



- Rectangle Elevation Calculation Settings

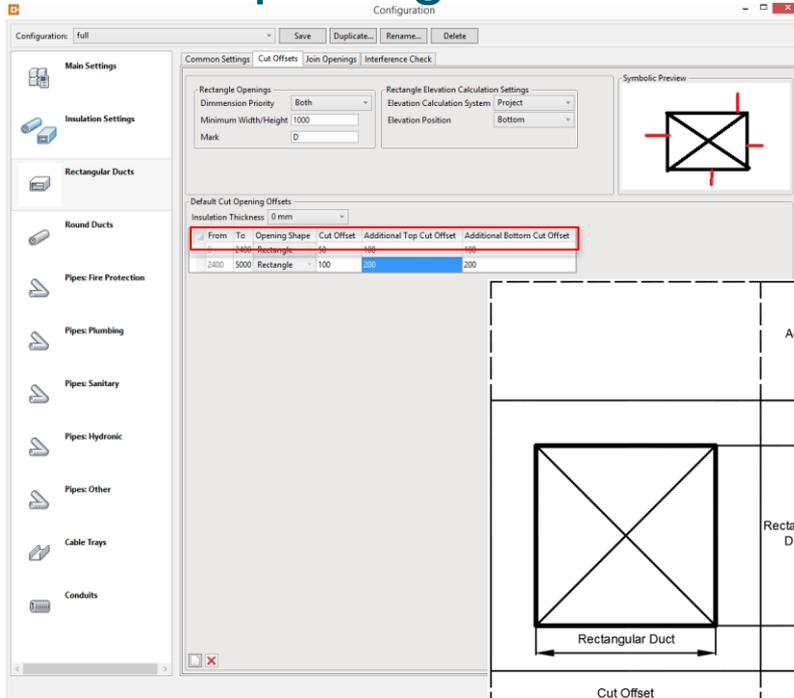
- Cut Opening automatically calculates elevation of opening. User can define the elevation calculation system:
  - Level
  - Project
  - Shared
- Elevation calculation position :
  - Top
  - Center
  - Bottom

# Insert Openings. Cut Offsets



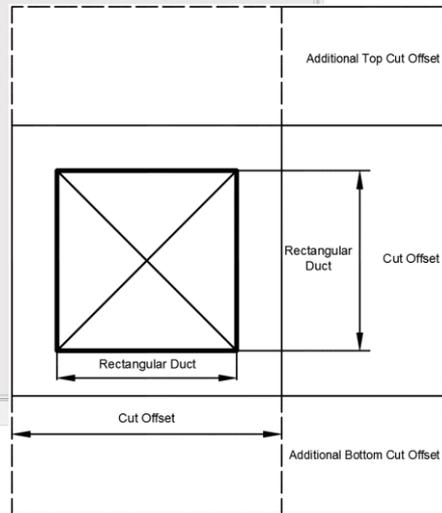
- Cut Offsets defines the opening offset value from the real element. User can set different Cut Offsets for different ranges of element sizes.
- User can define different configurations for different insulation thicknesses.

# Insert Openings. Cut Offsets

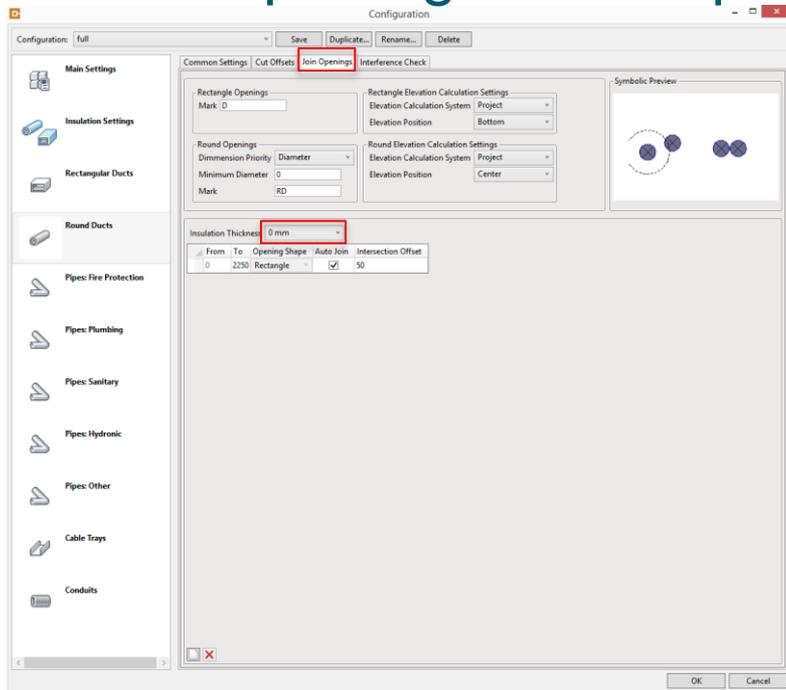
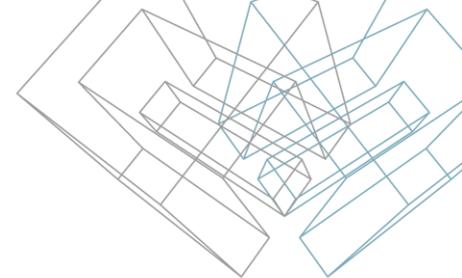


## • Parameter values:

- From / To – parameter defines the range of element sizes for which offset functionality will be applied;
- Opening Shape – defines shape of the opening – possible to use Rectangle and Round openings;  
**Note: Rectangle elements can't have Round openings**
- Cut Offset – offset value from element to opening enclosure;
- Additional Top / Bottom Cut Offset - offset value from element to opening Top or Bottom enclosure;

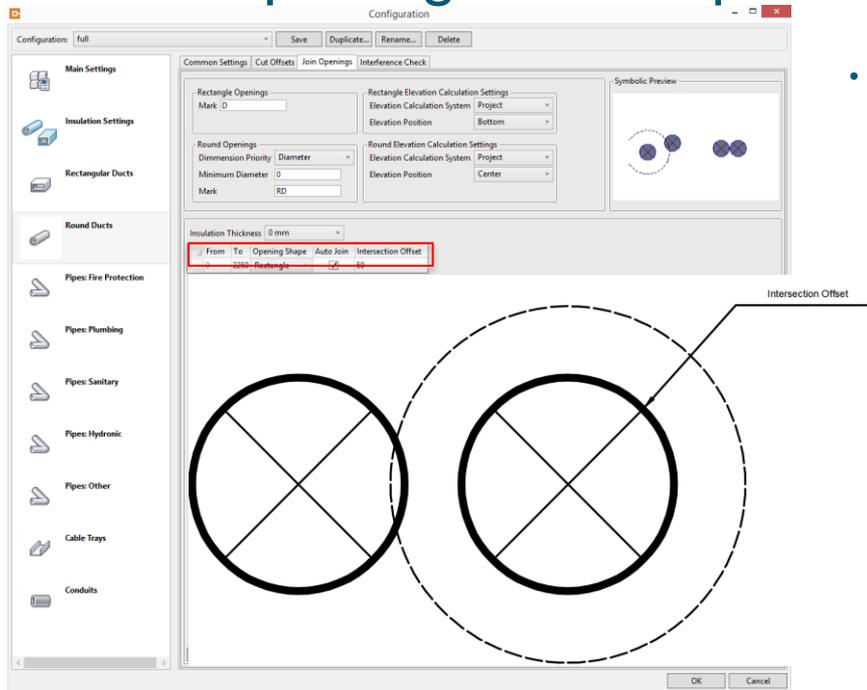
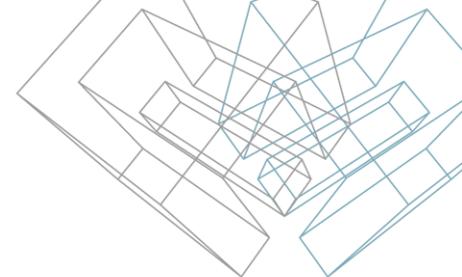


# Insert Openings. Join Openings



- Join opening lets user join several nearby standing openings into one big opening with predefined configurations;
- User can define different configurations for different insulation thicknesses.

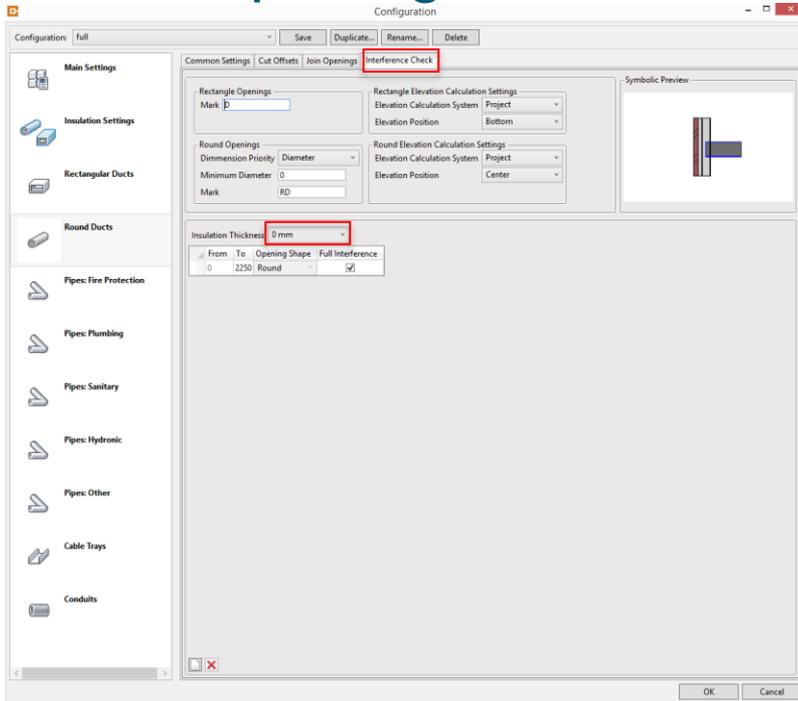
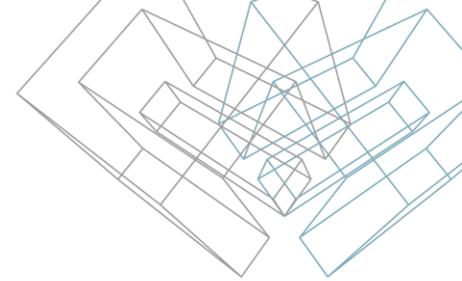
# Insert Openings. Join Openings



## Parameter values:

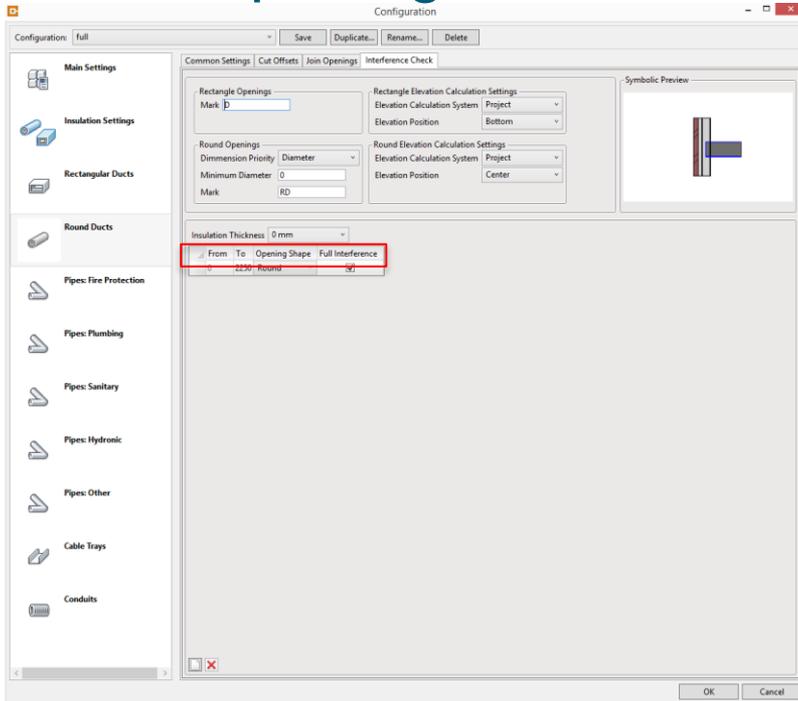
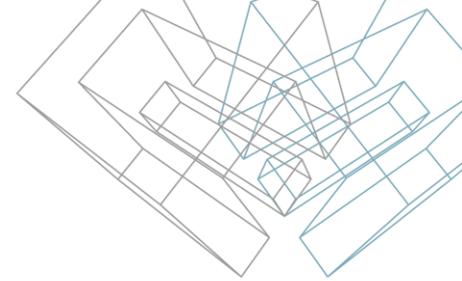
- From / To – parameter defines the range of element sizes to which offset functionality will be applied;
- Opening Shape – defines the shape of opening – possible to use Rectangle;  
**Note:** After joining openings the only possible opening shape is rectangular. Openings finds the extremuma of several openings and creates one opening instead.
- Auto Join – functionality that turns on or turns off auto join functionality for a range of element sizes;
- Intersection Offset – maximum offset distance in between openings

# Insert Openings. Interference Check



- Interference check turns on or turns off possibility to cut openings where line based MEP objects do not go through the structural element;
- User can define different configurations for different insulation thicknesses.

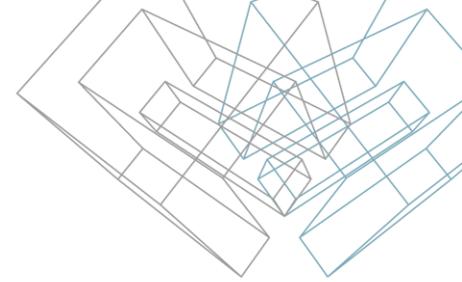
# Insert Openings. Interference Check



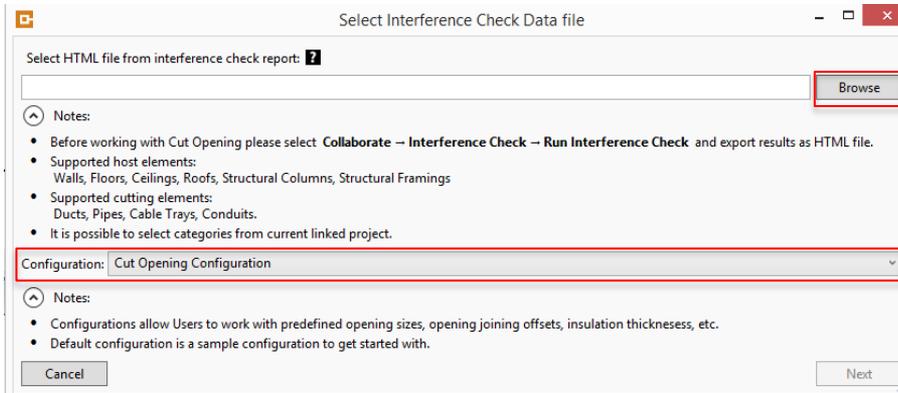
## Parameter values:

- From / To – parameter defines the range of element sizes to which offset functionality will be applied;
- Opening Shape – defines the shape of opening – possible to use Rectangle;
- Full Interference – parameter that grants or denies creation of openings then MEP element does not cross over the structural element. If this is turned ON – then full interference is required (MEP element should fully cross the structural element) if OFF – not full interference is allowed.

# Insert Openings. Third Step – Read Interference Check Data

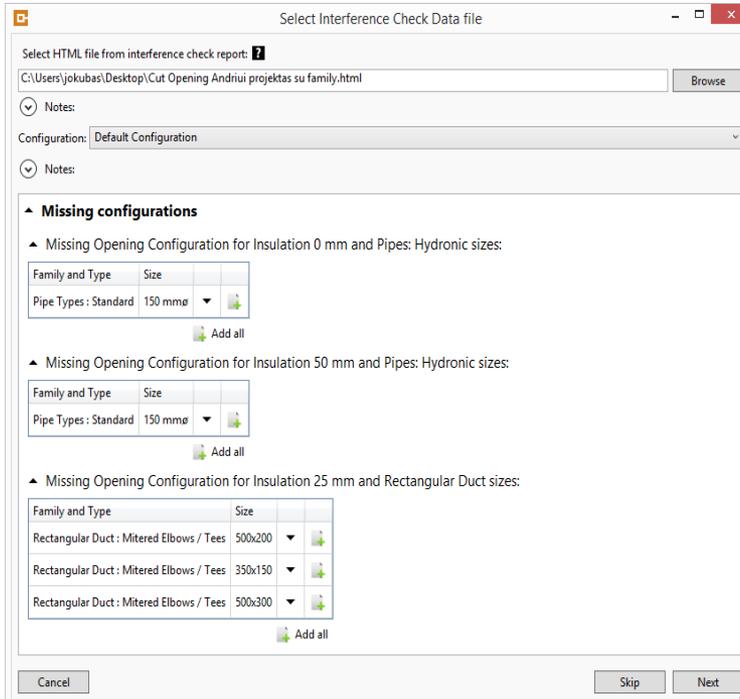
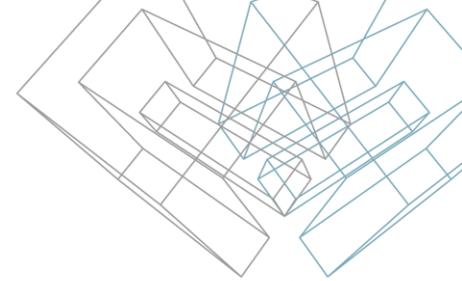


After all configurations are set – Read interference Check Data from exported .html file



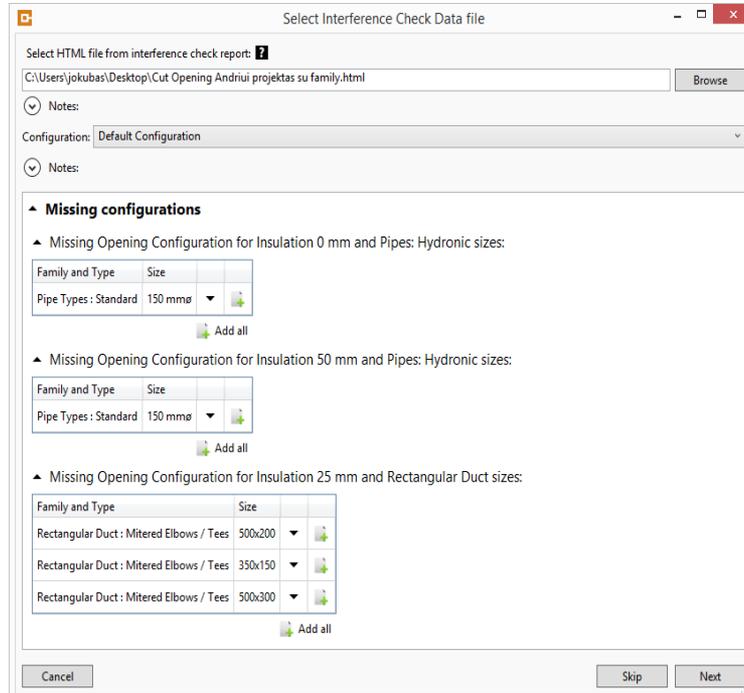
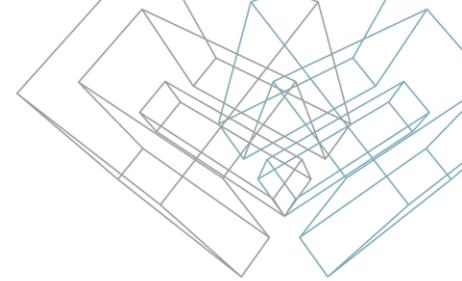
- Use Browse function to find required .html file on your computer. This file should be saved using Revit Interference Check data export functionality.
- Select your configurations using Configuration button. Here user will find all saved configurations as well as Default Configuration that comes from producer.

# Insert Openings. Third Step – Read Interference Check Data



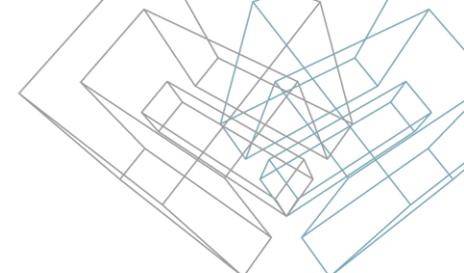
- After .html file and configurations will be chosen, user may get the messages about missing configurations, rejected elements, etc. These messages shows that some of the elements do not have configurations for openings. All possible messages are listed below:
  - Rejected by Configuration because full interference expected for {0} sizes – Elements are rejected because elements do not cross over the wall. This can be managed in Opening Configurations tab Interference Check;
  - Intersection not found for {0} sizes – this messege says that there is no intersection between selected categories in Interference Check Report;
  - Invalid intersection. Vertical element is required for intersection with host for {0} sizes – Vertical element is required when intersecting floor or ceiling with vertical MEP elements;
  - Invalid intersection because of "Slanted Wall" intersection for {0} sizes – Openings could not be inserted into sloped walls;
  - Invalid intersection because of intersection's location line with cylindrical face for {0} sizes – Opening could not be inserted due to intersection in between MEP element and Curved/Cylindrical structural element;

# Insert Openings. Third Step – Read Interference Check Data



- All possible messages are listed below:
  - Invalid intersection because of parallel location lines for {0} sizes – rejected openings because MEP element and structural openings lay on the same line – they are parallel;
  - Invalid intersection because of "Ruled Face" intersection for {0} sizes – Openings could not be inserted into curved walls;
  - Rejected by Configuration because Opening is too small for {0} sizes – Cut Opening rejected opening insertion due to too small MEP element. The minimum opening (MEP element's) size that could be set in Opening Configurations tab – Minimum Diameter (for round MEP elements) and Minimum Widht/Height (for rectangle MEP elements);
  - Missing Opening Configuration for {0} sizes – no opening configuration for this element size or for opening size and insulation. Possibly no configurations for opening offsets, joining distances, etc. All configurations could be reached in Opening Configurations tab.
  - Host element not found for {0} sizes – Cut Opening solution cannot find a host. Host could be deleted or moved after Interference Check was runned.

# Insert Openings. Third Step – Read Interference Check Data



**Missing configurations**

▲ Missing Opening Configuration for Insulation 50 mm and Pipes: Hydronic sizes:

Family and Type	Size	
Pipe Types : Standard	150 mm	▼
Add all		

▲ Missing Opening Configuration for Insulation 25 mm and Rectangular Duct sizes:

Family and Type	Size	
Rectangular Duct : Mitered Elbows / Tees	500x200	▼
Rectangular Duct : Mitered Elbows / Tees	350x150	▼
Rectangular Duct : Mitered Elbows / Tees	500x300	▼
Add all		

Review Configuration

- Missing configurations could be added to the new configurations using “Add” or “Add all” button. These buttons automatically add new configurations to the Cut Opening.
- After your needed configuration will be added, new “Review Configuration” button will appear. This will let the user know what and where configurations were added. All newly added configurations will be marked with red bubbles.

Configuration

Configuration: Default Configuration Save Duplicate... Rename... Delete

Pipes: Plumbing

Pipes: Sanitary

**Pipes: Hydronic**

Pipes: Other

Cable Trays

Cut Offsets Join Openings Interference Check

Rectangle Openings  
Mark: PH

Rectangle Elevation Calculation Settings  
Elevation Calculation System: Project  
Elevation Position: Bottom

Round Openings  
Dimension Priority: Diameter  
Minimum Diameter: 0 mm  
Mark: PH

Round Elevation Calculation Settings  
Elevation Calculation System: Project  
Elevation Position: Center

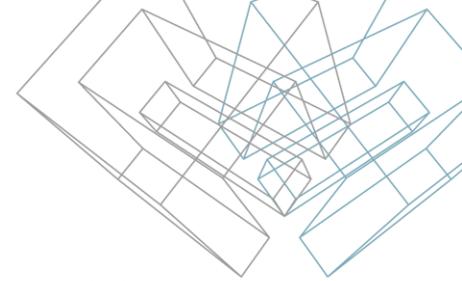
Symbolic Preview

Default Cut Opening Offsets  
Insulation Thickness: 0 mm

From	To	Opening Shape	Cut Offset	Additional Top Cut Offset	Additional Bottom Cut Offset
0 mm	100 mm	Round	0 mm	0 mm	0 mm
100 mm	200 mm	Round	0 mm	0 mm	0 mm

Close

# Insert Openings. Third Step – Read Interference Check Data



**Missing configurations**

Missing Opening Configuration for Insulation 50 mm and Pipes: Hydronic sizes:

Family and Type	Size		
Pipe Types : Standard	150 mmø	▼	+

+ Add all

Missing Opening Configuration for Insulation 25 mm and Rectangular Duct sizes:

Family and Type	Size		
Rectangular Duct : Mitered Elbows / Tees	500x200	▼	+
Rectangular Duct : Mitered Elbows / Tees	350x150	▼	+
Rectangular Duct : Mitered Elbows / Tees	500x300	▼	+

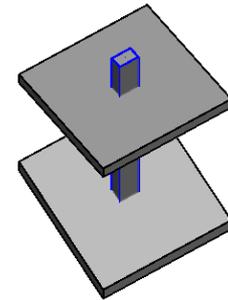
+ Add all

Review Configuration

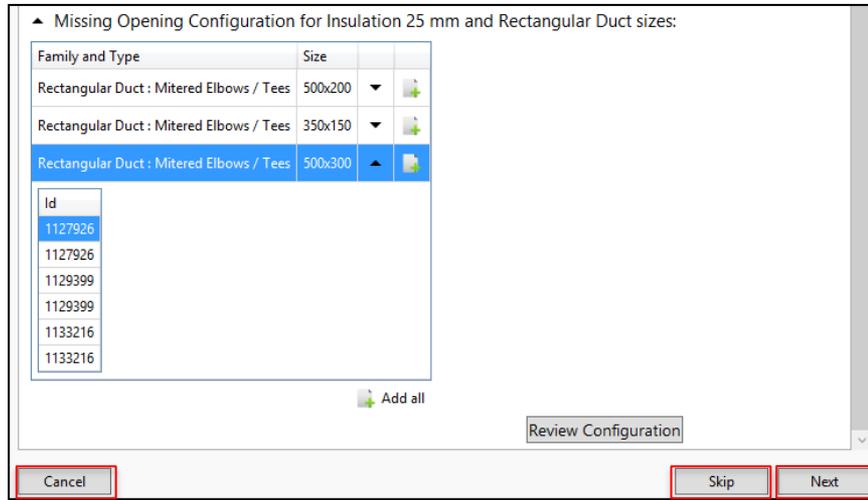
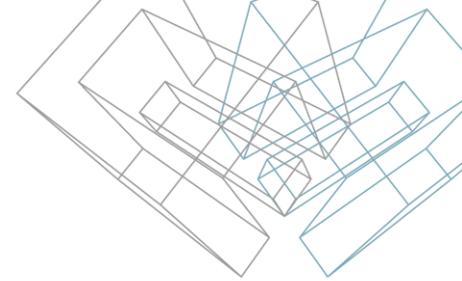
- All families, types and their sizes can be expanded, and all elements and their ID will be shown. Elements that are rejected or missing configurations can be reviewed by clicking on elements ID in this list. Elements will be shown in modeling window.

Family and Type	Size		
Rectangular Duct : Mitered Elbows / Tees	500x200	▼	+
Rectangular Duct : Mitered Elbows / Tees	350x150	▼	+
Rectangular Duct : Mitered Elbows / Tees	500x300	▲	+

Id
1127926
1127926
1129399
1129399
1133216
1133216

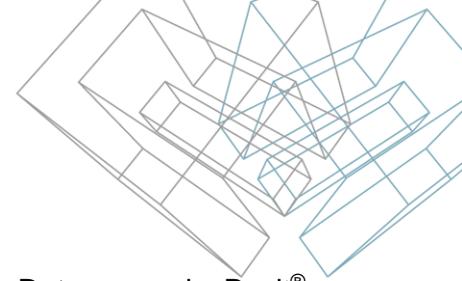


# Insert Openings. Third Step – Read Interference Check Data



- After all required configurations will be set, users will have to finish the work by choosing one of three different options:
  - Cancel - turns of this dialog window and all configurations will be lost;
  - Skip – skip allows Cut Opening solution to insert openings in all places where MEP elements clash with structural elements. That means it won't matter whether there are missing configurations – cut opening will insert opening in such places. Cut Opening will read the element size and insert opening with the same size as MEP element. This opening will have no offset or be joined with other openings;
  - Next – only inserts openings that are not excluded by configurations.

# Insert Openings. Read Interference Check Data



Read Interference Check Data

Interference Check Project Report: C:\Users\jckubas\Desktop\dw.html  
Created: 2015 rupp06e 25

Legend  
Grouped by Parameter Instance Parameter Type Parameter Shared Parameter No Parameter Add Delete  
Update Required Update Required

Category	Level	Family	Type	Insulation Thickness	Insulation Type	System Classification	Size	Cut Offset
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 1	Round Duct	Tees	0 mm		Exhaust Air	310ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 1	Round Duct	Tees	0 mm		Exhaust Air	310ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees	0 mm		Supply Air	400ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees	0 mm		Supply Air	400ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees	0 mm		Supply Air	400ø	50 mm

Change Value  
Select Column  
Filter by Selected Data  
Distinct Values in Column  
Remove All Filters  
Sort  
Copy to Clipboard  
Refresh View  
Show Element By ID  
Isolate Selected Elements In Active View  
Unhide Element

Export to Excel Add/Remove Columns

28 items

Save Data View as XML Close

**Read Interference Check Data** – reads Revit® “Interference Check Data” html file and shows clashes in convenient dialog. After review and some changes, it saves clashes in .xml file for future use. This file will contain clashing places as well cut offsets, joining distances, etc.

 Ducts-Pipes with Walls-Floors.xml

Note: This function must be selected in the project where ducts, pipes, cable trays or conduits are originally created.

# Insert Openings. Select data you want to see

Elements of selected category are conveniently grouped together in a tree where user can filter them by any configurable criterions. The criterions can be selected with “Configure Grouping”.

Elements with their parameters. Configurable criterions are displayed as yellow columns. Parameters can be selected with “Add/Remove Columns”. Instance parameters are displayed in white color while type parameters - in grey.

Interference Check Data

Path: C:\Users\yokubaa\Desktop\dw.html

Created: 2015...

Legend

- Grouped by Parameter
- Instance Parameter
- Shared Parameter
- No Parameter
- Add
- Delete
- Update Required
- Update Required

Dynamic Section Box  Show Host

Project Name

- Create New Opening

Category	Level	Family	Type	Insulation Thickness	Insulation Type	System Classification	Size	Cut Offset
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 1	Round Duct	Tees	0 mm		Exhaust Air	310ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 1	Round Duct	Tees	0 mm		Exhaust Air	310ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees	0 mm		Supply Air	400ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees	0 mm		Supply Air	400ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees	0 mm		Supply Air	400ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					

Configure Grouping

Export to Excel Add/Remove Columns

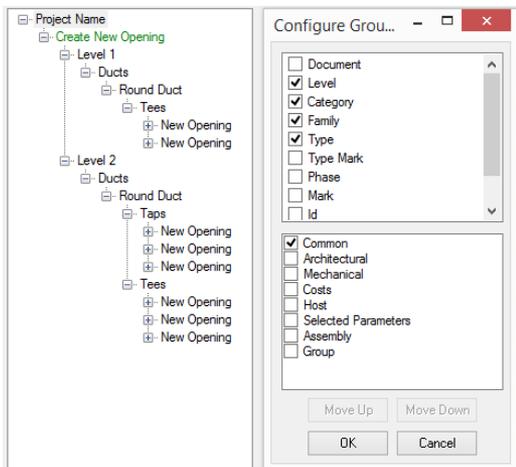
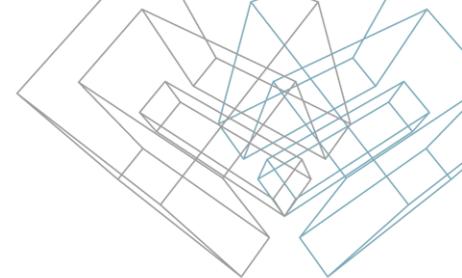
28 items

Change Value

- Select Column
- Filter by Selected Data
- Distinct Values in Column
- Remove All Filters
- Sort
- Copy to Clipboard
- Refresh View
- Show Element By ID
- Isolate Selected Elements In Active View
- Unhide Element

Save Data View as XML Close

# Insert Openings. Configure Grouping



If “Level”, “Category”, “Family” and “Type” are selected in “Configure Grouping”, then elements will be expanded and filtered under these criteria.



All possible parameters and other criteria. List of parameters is bigger than usually, because extension shows parameters that are not visible for Revit users. Elements will be expanded and filtered under these criteria.



All parameters and other criteria are grouped. By selecting one group, user can switch on parameters that can be used in element grouping.

# Insert Openings. Add/Remove Columns

Parameters can be selected with “Select Parameters”:

Read Interference Check Data

Interference Check Project Report: C:\Users\jokubas\Desktop\vdw.html  
Created: 2015 ruggiù 25

Legend

- Grouped by Parameter
- Instance Parameter
- Type Parameter
- Shared Parameter
- No Parameter
- Add
- Delete
- Update Required
- Update Required

Dynamic Section Box  Show Host

Category	Level	Family	Type	Insulation Thickness	Insulation Type	System Classification	Size	Cut Offset
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 1	Round Duct	Tees	0 mm		Exhaust Air	310ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 1	Round Duct	Tees	0 mm		Exhaust Air	310ø	50 mm
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees					
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees					
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees					
Walls	Level 1	Basic Wall	Generic - 90mm ...					
Ducts	Level 2	Round Duct	Tees					
Walls	Level 1	Basic Wall	Generic - 90mm ...					

Change Value

- Select Column
- Filter by Selected Data
- Distinct Values in Column
- Remove All Filters
- Sort
- Copy to Clipboard

Available Fields:

Name	Group	Type
Mark	Identity Data	Instance
Phase	BID Grouping	Instance
Phase Created	Phasing	Instance
System Name	BID Grouping	Instance
System Type	BID Grouping	Instance
Type Mark	BID Grouping	Instance

Selected Fields:

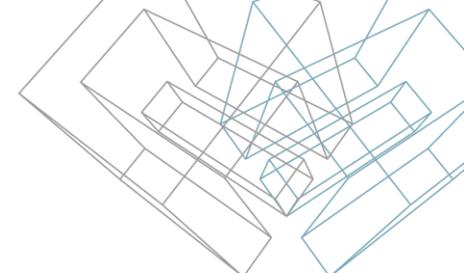
Name	Group	Type
Insulation Th...	Insulation	Instance
Insulation Ty...	Insulation	Instance
System Clas...	Mechanical	Instance
Size	Dimensions	Instance

Filter by:  Filter

Common Parameters

Buttons: Add ->, <- Remove, Move Up, Move Down, OK, Cancel

- On the left side are all available parameters from selected category.
- On the right side – all selected parameters.
- Adding new or removing existing parameters is available with “Add” and “Remove” commands.
- The order of parameters can be changed with “Move Up” and “Move Down”.



# Insert Openings. Add/Remove Columns

Parameters can be selected with “Select Parameters”:

Read Interference Check Data

Interference Check Project Report: C:\Users\jokubas\Desktop\Cut Opening Webinar.html  
Created: 2015 rugpjūcio 26

Legend  
Grouped by Parameter Instance Parameter Type Parameter Shared Parameter  
No Parameter Add Delete Update Required Update Required

Dynamic Section Box  Show Host

Project Name  
Create New Opening

Level	Category	Family	Type	Insulation Thickness	Insulation Type	System Classification	Size
Level 1	Ducts	Round Duct	Tees	0 mm		Exhaust Air	310
Level 1	Ducts	Round Duct	Tees	0 mm		Exhaust Air	310
Level 2	Ducts	Round Duct	Taps	0 mm		Supply Air	100
Level 2	Ducts	Round Duct	Taps	0 mm		Supply Air	100
Level 2	Ducts	Round Duct	Taps	0 mm		Supply Air	100
Level 2	Ducts	Round Duct	Tees	0 mm		Supply Air	400
Level 2	Ducts	Round Duct	Tees	0 mm		Supply Air	400
Level 2	Ducts	Round Duct	Tees	0 mm		Supply Air	400

Change Value  
Select Column  
Filter by Selected Data  
Distinct Values in Column  
Remove All Filters  
Sort  
Copy to Clipboard  
Refresh View  
Show Element By ID  
Isolate Selected Elements In Active View

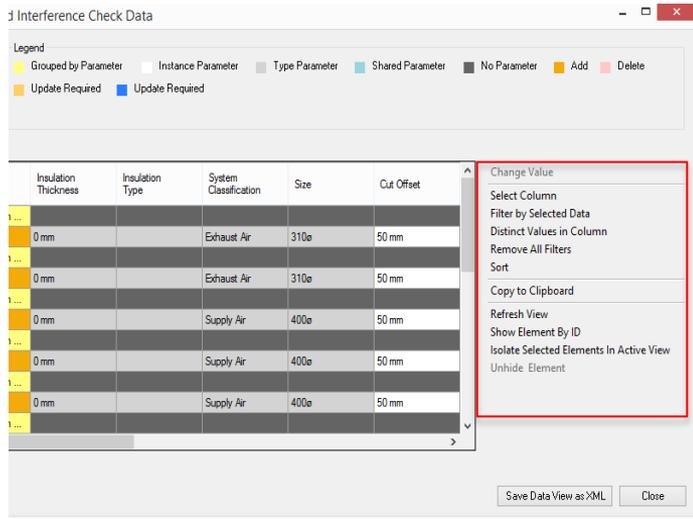
Configure Grouping  
Export to Excel Add/Remove Columns  
8 items

- Export to Excel – allows user to export charts into Excel without any additional work.

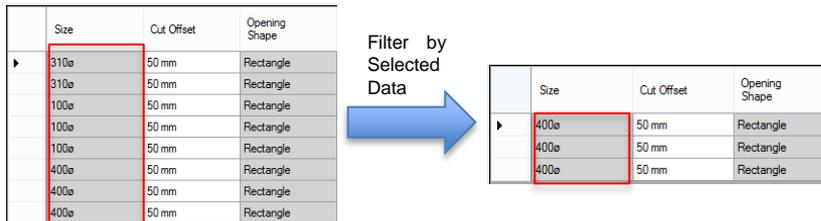
	A	B	C	D	E	F	G	H
1	Level	Category	Family	Type	Insulation	System Classification	Size	Cut Offset
2	Level 1	Ducts	Round Duct	Tees	0 mm	Exhaust Air	310	10
3	Level 1	Ducts	Round Duct	Tees	0 mm	Exhaust Air	310	20
4	Level 2	Ducts	Round Duct	Taps	0 mm	Supply Air	100	50
5	Level 2	Ducts	Round Duct	Taps	0 mm	Supply Air	100	50
6	Level 2	Ducts	Round Duct	Taps	0 mm	Supply Air	100	50
7	Level 2	Ducts	Round Duct	Tees	0 mm	Supply Air	400	100
8	Level 2	Ducts	Round Duct	Tees	0 mm	Supply Air	400	200
9	Level 2	Ducts	Round Duct	Tees	0 mm	Supply Air	400	100

# Insert Openings. Additional functionality

Parameters can be selected with “Select Parameters”:



- Change Value – allows user to change the value of one or several selected rows;
- Select Column – allows user to select all parameters in a column;
- Filter by Selected Data - feature filters elements according to the selected values;



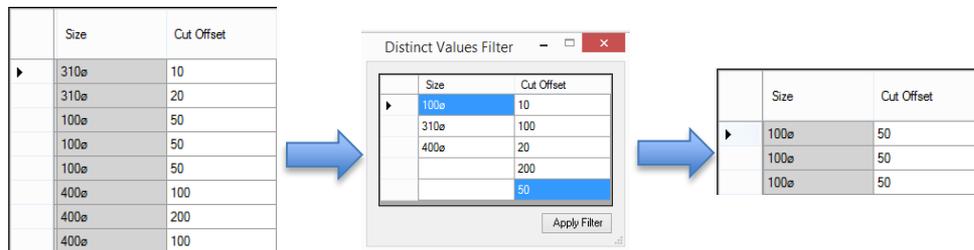
# Insert Openings. Additional functionality

Parameters can be selected with “Select Parameters”:

The screenshot shows a window titled "Interference Check Data" with a legend and a table. The legend includes: Grouped by Parameter (yellow), Instance Parameter (white), Type Parameter (grey), Shared Parameter (light blue), No Parameter (dark grey), Add (orange), Delete (red), Update Required (orange), and Update Required (blue). The table has columns: Insulation Thickness, Insulation Type, System Classification, Size, and Cut Offset. A context menu is open over the table, listing options: Change Value, Select Column, Filter by Selected Data, Distinct Values in Column, Remove All Filters, Sort, Copy to Clipboard, Refresh View, Show Element By ID, Isolate Selected Elements in Active View, and Unhide Element.

Insulation Thickness	Insulation Type	System Classification	Size	Cut Offset
0 mm		Exhaust Air	310e	50 mm
0 mm		Exhaust Air	310e	50 mm
0 mm		Supply Air	400e	50 mm
0 mm		Supply Air	400e	50 mm
0 mm		Supply Air	400e	50 mm

- Distinct Value in Column - shows different values of select columns at a separate convenient window, where user can apply the filter by selecting values;



- Remove All filters – removes all added filters;
- Sort – allows user to sort elements by selected categories;

# Insert Openings. Additional functionality

Parameters can be selected with “Select Parameters”:

Interference Check Data

Legend

- Grouped by Parameter
- Instance Parameter
- Type Parameter
- Shared Parameter
- No Parameter
- Add
- Delete
- Update Required
- Update Required

Insulation Thickness	Insulation Type	System Classification	Size	Cut Offset
0 mm		Exhaust Air	310e	50 mm
0 mm		Exhaust Air	310e	50 mm
0 mm		Supply Air	400e	50 mm
0 mm		Supply Air	400e	50 mm
0 mm		Supply Air	400e	50 mm

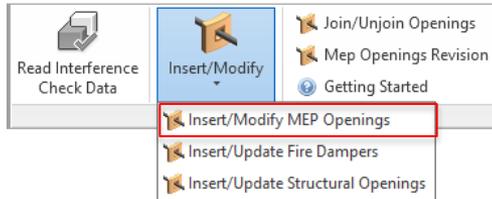
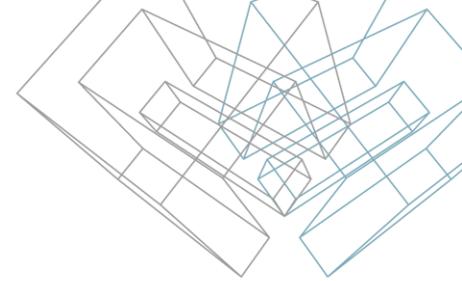
Change Value

- Select Column
- Filter by Selected Data
- Distinct Values in Column
- Remove All Filters
- Sort
- Copy to Clipboard
- Refresh View
- Show Element By ID
- Isolate Selected Elements in Active View
- Unhide Element

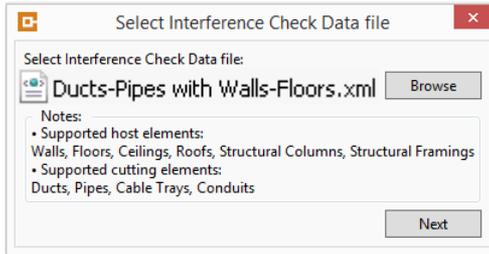
Save Data View as XML Close

- Copy to Clipboard - Copies to clipboard selected values. Users will be able to Paste this information anywhere;
- Refresh View - During the selection process, the user should see selected elements. In case when user does not sees the selection, press “Refresh View”;
- Show Element by ID – shows and selects element in model by element ID;
- Isolate Selected Elements in Active View – isolates selected elements in active view;
- Unhide Element – unhides all elements after Isolated Selected Elements in Active View is used.

# Insert Openings. Fourth Step – Insert / Modify MEP Openings



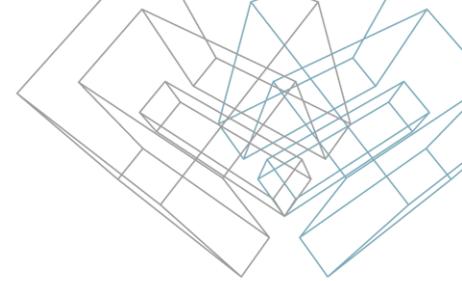
**Insert/Modify MEP Openings** – inserts openings according Revit® “Interference Check Data” results. Results should be saved as .xml file. This file supports information of opening placement (coordinates and elevations) as well as additional information, such as cut offsets, opening joining configurations, information about full interference.



Please browse .xml file and press Next button. This will lead you to the next steps of insertion of openings.

Note: The function must be selected in the project where walls, floors or ceilings are originally created.

# Insert Openings. Insert / Modify MEP Openings



Interference Check Project Report : C:\Users\jokubas\Desktop\aved.xml.xml  
Created : 2015.nupp0206.26

Legend  
Grouped by Parameter Instance Parameter Type Parameter Shared Parameter No Parameter Add Delete Update Required  
Update Required

Dynamic Section Box Show Host

Project Name  
Create New Opening

Level	Mark	System Classification	Insulation Thickness	Insulation Type	Family	Cut Offset	Opening Shape	Additional Top Cut Offset	Additional Bottom Cut Offset	Marking
Level 1	34	Exhaust Air	0 mm		Round Duct	20 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 1	35	Exhaust Air	0 mm		Round Duct	10 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	36	Supply Air	0 mm		Round Duct	100 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	37	Supply Air	0 mm		Round Duct	200 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	38	Supply Air	0 mm		Round Duct	100 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	50	Supply Air	0 mm		Round Duct	50 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	51	Supply Air	0 mm		Round Duct	50 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	52	Supply Air	0 mm		Round Duct	50 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					

Agree with last changes  
Undo last changes  
Join Openings  
Unjoin Openings  
Change Value  
Delete Selected Elements  
Select Column  
Filter by Selected Data  
Distinct Values in Column  
Remove All Filters  
Sort  
Copy to Clipboard  
Refresh View  
Show Element By ID  
Isolate Selected Elements In Active View  
Unhide Element

Configure Grouping  
Export to Excel  
Add/Remove Columns  
16 Items  
Insert/Modify  
Close

- This dialog can be used to review openings that will be inserted into the BIM model;
- User can use functions of Dynamic Section Box and Show Host to find elements in the model;
- After review, openings go to Insert / Modify button and are inserted in accordance with .xml file.

# Insert Openings. Insert / Modify MEP Openings

Interference Check Project Report : C:\Users\jokubas\Desktop\aved.xml.xml  
Created : 2015.rugpj010.26

Legend

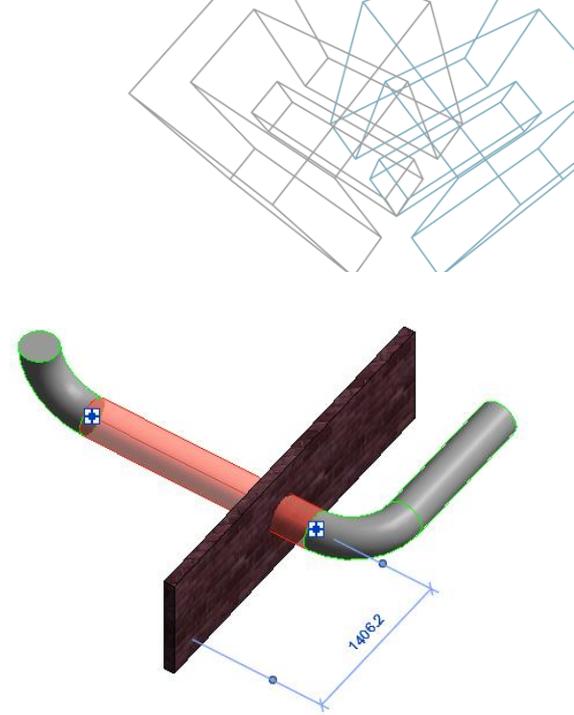
- Grouped by Parameter
- Instance Parameter
- Type Parameter
- Shared Parameter
- No Parameter
- Add
- Delete
- Update Required
- Update Required

Level	Mark	System Classification	Insulation Thickness	Insulation Type	Family	Cut Offset	Opening Shape	Additional Top Cut Offset	Additional Bottom Cut Offset	Marking
Level 1	34	Exhaust Air	0 mm		Round Duct	20 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 1	35	Exhaust Air	0 mm		Round Duct	10 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	36	Supply Air	0 mm		Round Duct	100 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	37	Supply Air	0 mm		Round Duct	200 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	38	Supply Air	0 mm		Round Duct	100 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	50	Supply Air	0 mm		Round Duct	50 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	51	Supply Air	0 mm		Round Duct	50 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 2	52	Supply Air	0 mm		Round Duct	50 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					

16 Items

Export to Excel | Add/Remove Columns

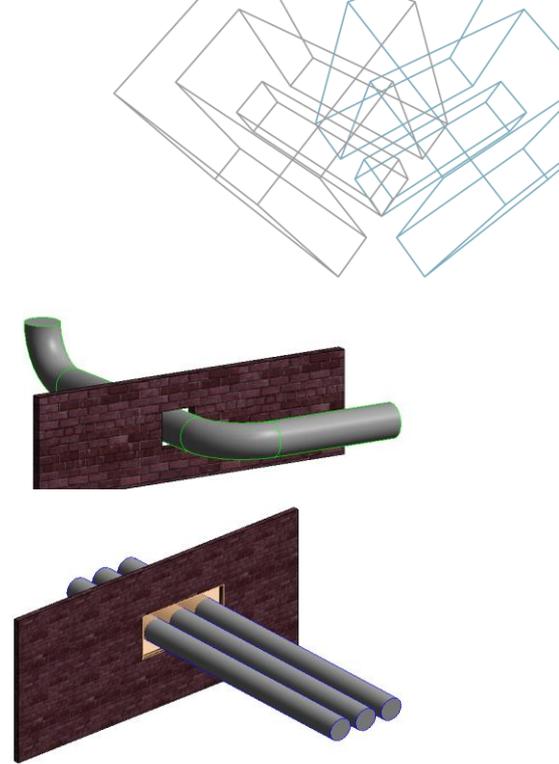
Insert/Modify | Close



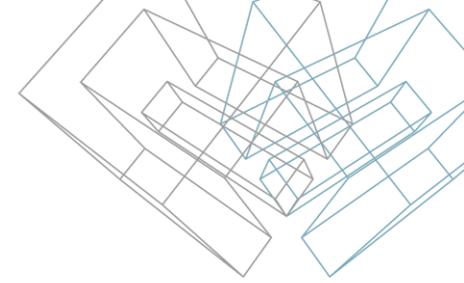
Dynamic Section Box – function that allows user find clashing elements as a place where opening will be inserted. This feature crops the view to see only those elements that user needs;  
Show Host – toggles host element’s visibility, element to which the opening will be inserted.

# Insert Openings. Insert / Modify MEP Openings

Level	Mark	System Classification	Insulation Thickness	Insulation Type	Family	Cut Offset	Opening Shape	Additional Top Cut Offset	Additional Bottom Cut Offset	Marking
Level 1	34	Exhaust Air	0 mm		Round Duct	20 mm	Rectangle	0 mm	0 mm	RD
Level 1					Basic Wall					
Level 1	35	Exhaust Air	0 mm		Round Duct	10 mm	Rectangle	0 mm	0 mm	RD
Level 1										
Level 2	36	Supply Air								
Level 1										
Level 2	37	Supply Air								
Level 1										
Level 2	38	Supply Air								
Level 1										
Level 2	50	Supply Air								
Level 1										
Level 2	51	Supply Air								
Level 1										
Level 2	52	Supply Air								
Level 1										

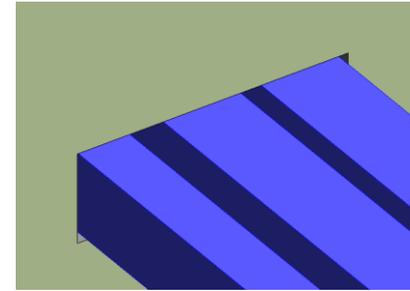
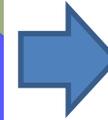
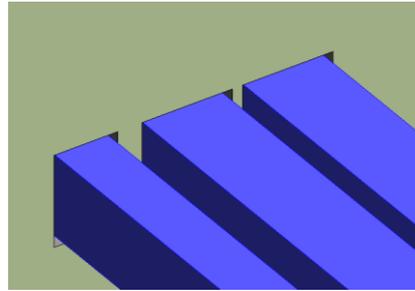


After inserting openings into model using Insert / Modify button, openings will be distributed in the project. User will be given the report about inserted and joined openings.

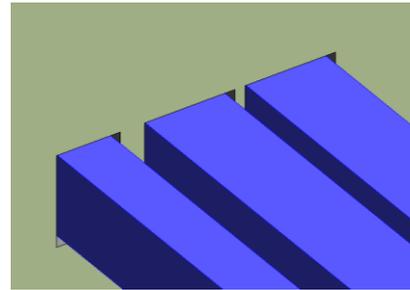
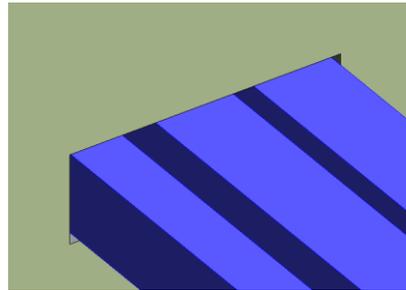


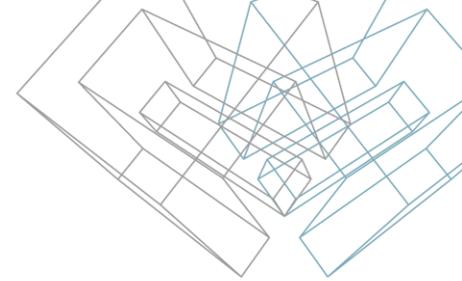
# Modify Openings. Join / Unjoin Openings

**Join Openings** – joins separate selected opening into one.



**Unjoin Openings** – splits one opening into separate ones.





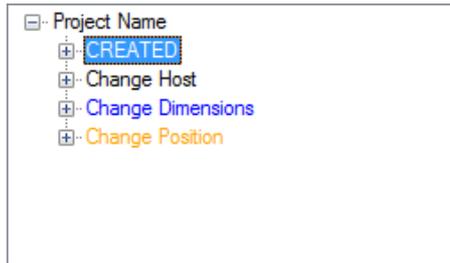
# Modify Openings. MEP Opening Revision



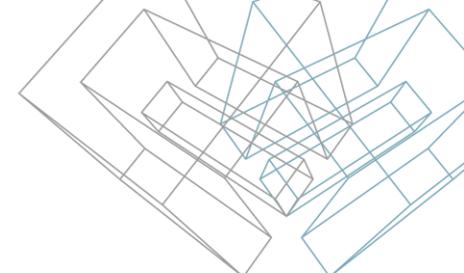
When changes are made in the project to openings, then in Insert/Modify MEP Openings you can see statuses of the openings.

The statuses that can be found in the grouping:

- **Created** – the opening is already created in the project and is changed;
- **Change Host** – the opening was placed to other host;
- **Change Dimensions** – dimensions of openings are changed;
- **Change Position** – the opening is moved from it's original position.
- **Create New Opening** – the opening that has to be created.



	Category	Family	Type	Cut Offset	Opening Shape	Insulation Thickness	Insulation Type
▶	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	20	Rectangle	0	
	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	20	Rectangle	0	
	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	30	Rectangle	0	
	Generic Models	M_Round Face Opening	Round Face Opening	30	Round	0	



# Modify Openings. MEP Opening Revision

To change the status of openings right-click on the status and select what has to be done:

The screenshot shows a tree view on the left with 'Project Name' expanded to 'CREATED'. A context menu is open over the 'Change Dimension' option. The main table displays the following data:

	Category	Family	Type	Cut Offset	Opening Shape	Insulation Thickness
▶	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	20	Rectangle	0

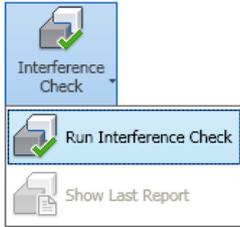
Then the opening size will be changed to its initial size and will be under “Created” status:

The screenshot shows the tree view with 'Project Name' expanded to 'CREATED'. The main table displays the following data:

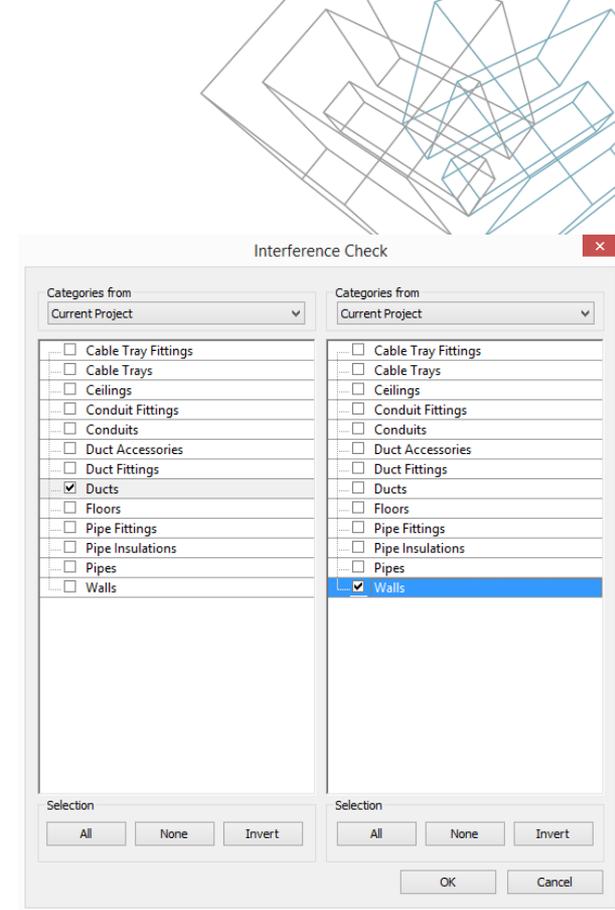
	Category	Family	Type	Cut Offset	Opening Shape	Insulation Thickness
	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	20	Rectangle	0
▶	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	30	Rectangle	0
	Generic Models	M_Round Face Opening	Round Face Opening	30	Round	0
	Generic Models	M_Rectangular Wall Opening	Rectangular Wall Opening	20	Rectangle	0

# Insert Fire Dampers. First Step – „Run Interference Check“

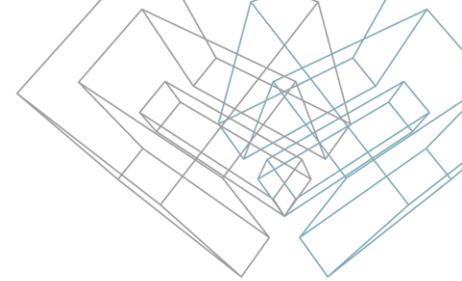
Before beginning to work with “Cut Opening”, insert Fire Dampers select **Collaborate** → **Interference Check** → **Run Interference Check**.



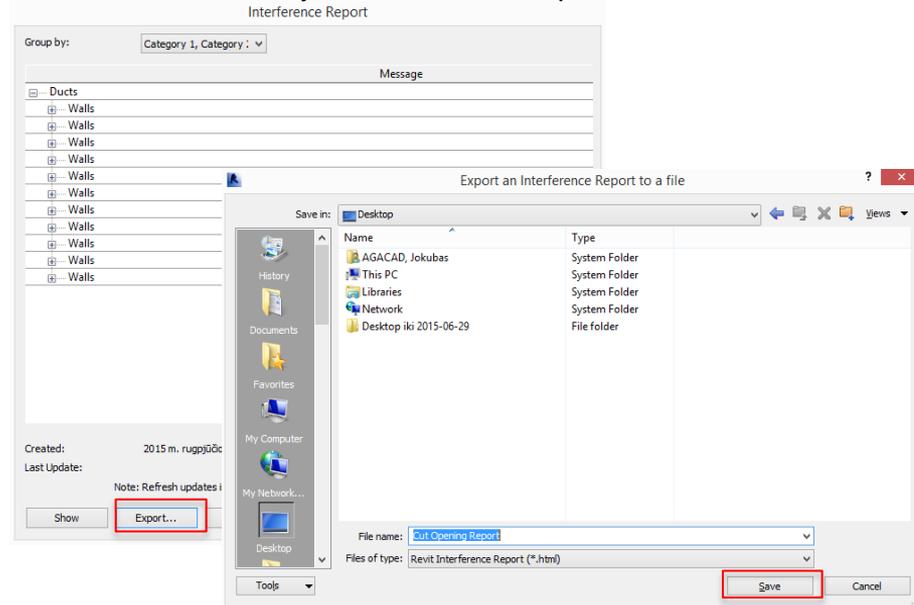
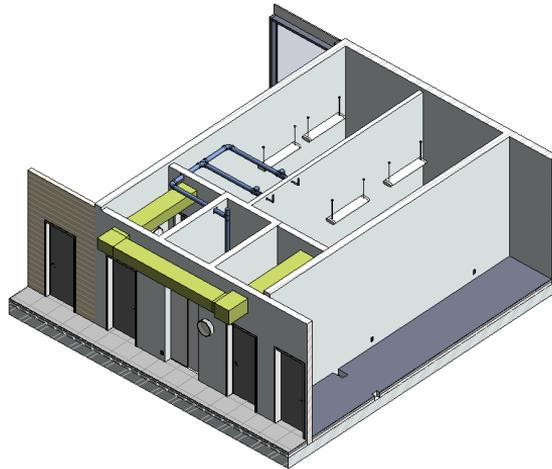
- On one side Ducts category must be selected;
- On the other side structural categories where Fire Dampers should be placed must be selected.



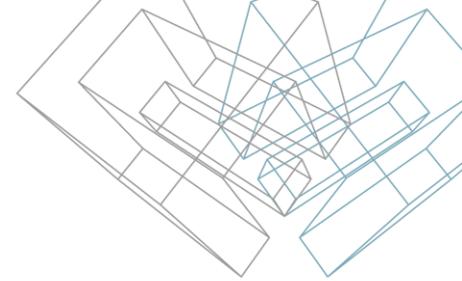
# Insert Fire Dampers. First Step – „Run Interference Check“



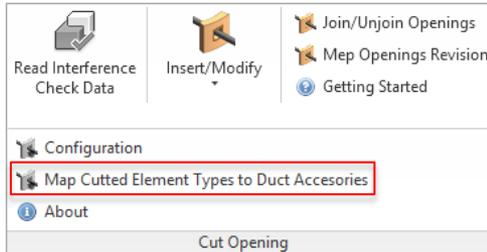
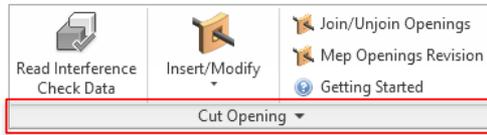
In “Interference Report” dialog user has to select “Export” and save .html file anywhere on the computer.



# Insert Fire Dampers. Second Step – Run „Map Cut Element Types to Duct Accesories“

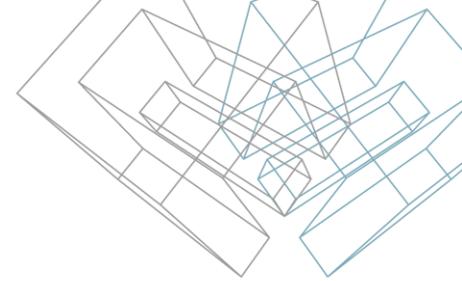


Before beginning to work with “Cut Opening” and inserting Fire Dampers, select „Map Cut Element types to Duct Accesories“ from Cut Opening menu.



Here user will be given a tool that will help Map Cut Element Types with Duct Accesories.

# Insert Fire Dampers. Map Cut Element Types to Duct Accessories



Map Cutted Element Types to Duct Accessories

Category	Family	Type	Fire Rating	Rectangular
Ceilings	Basic Ceiling	Generic		M_Fire Damp...
Ceilings	Compound Ceiling	600 x 600mm Grid		M_Fire Damp...
Floors	Floor	Generic 300mm		M_Fire Damp...
Roofs	Basic Roof	Generic - 400mm		M_Fire Damp...
Walls	Basic Wall	Exterior - Block o...		M_Fire Damp...
Walls	Basic Wall	Exterior - Brick on...		M_Fire Damp...
Walls	Basic Wall	Generic - 200mm		M_Fire Damp...
Walls	Basic Wall	Generic - 300mm		M_Fire Damp...
Walls	Basic Wall	Generic - 90mm ...		M_Fire Damper

Select Column  
Filter by Selected Data  
Distinct Values in Column  
Remove All Filters  
Sort  
Copy to Clipboard

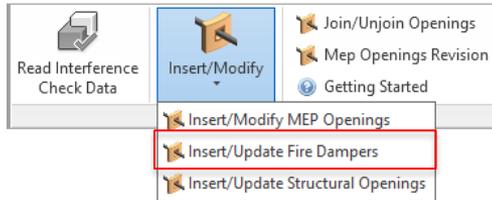
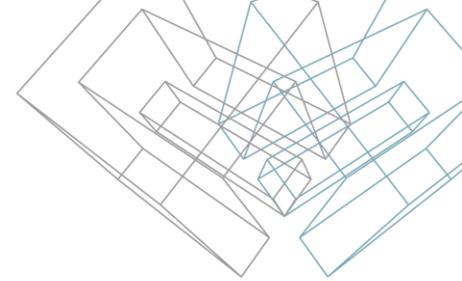
Configure Grouping Export to Excel Add/Remove Columns

9 items OK Cancel

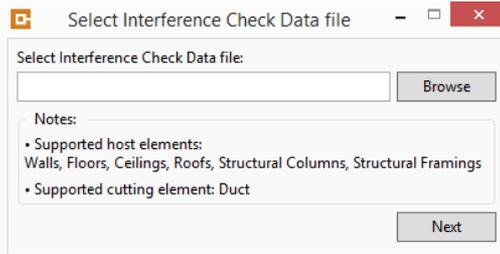
Map structural elements and their crossing elements to Duct Accessories such as Fire Dampers. After elements will be mapped – Fire Dampers will be distributed in these places.

User interface is just like in the paragraph before „Insert Openings“.

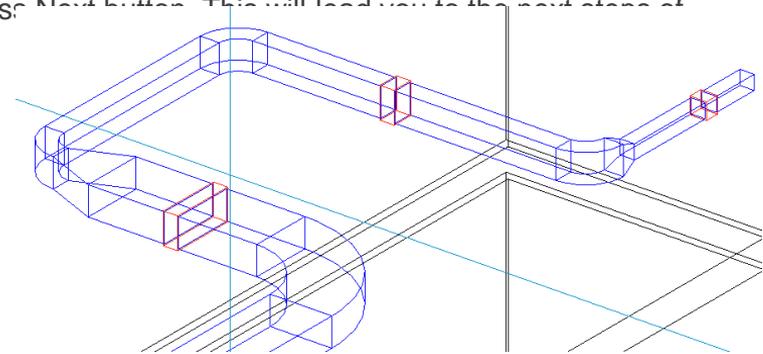
# Insert Fire Dampers. Insert / Update Fire Dampers



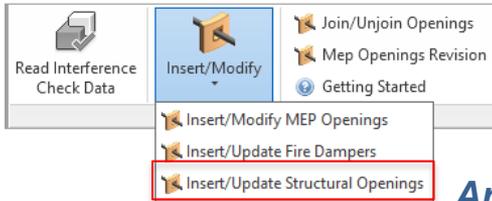
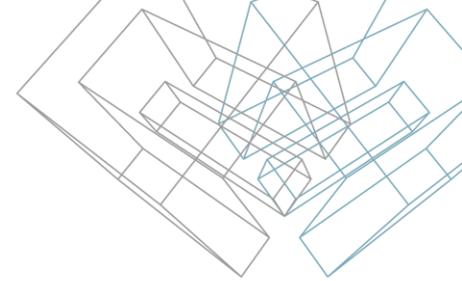
**Insert / Update Fire Dampers** – inserts Fire Dampers according Revit® “Interference Check Data” results. Results should be saved as .html file.



Please browse .html file and press Next button. This will lead you to the next step of insertion of openings.

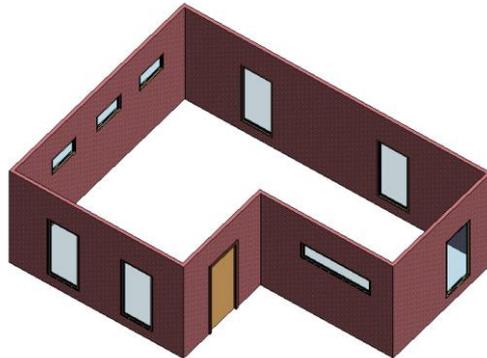


# Insert / Update Structural Openings

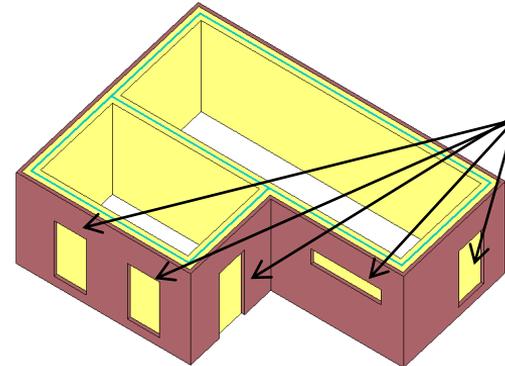


**Insert/Update Structural Openings** – function used to insert structural openings to the structural walls, in case when architectural walls, windows and doors are separated from the structural walls.

*Architectural file:*



*Structural file with linked architectural file:*

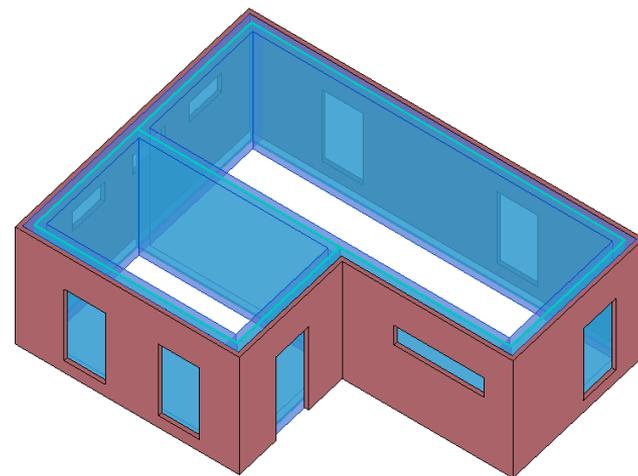
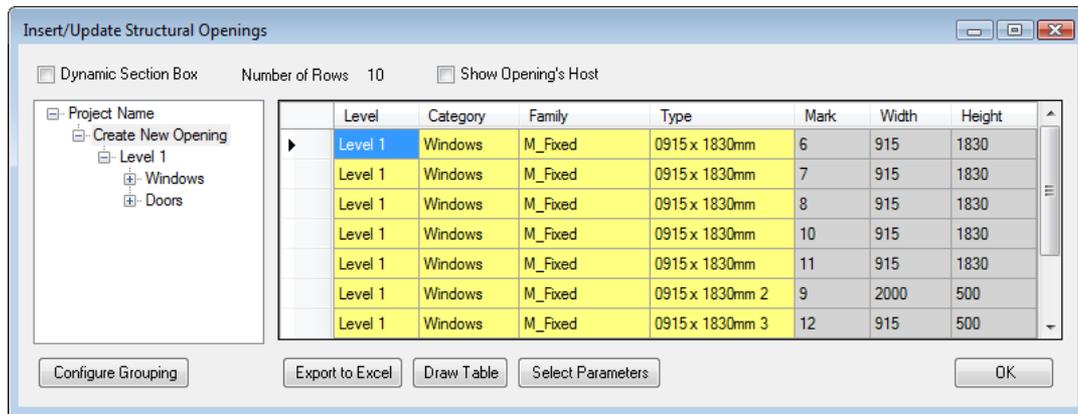


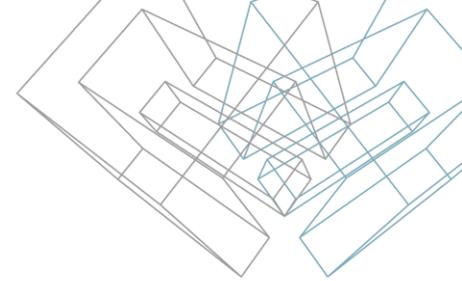
*It's required to add structural opening here:*

# Insert / Update Structural Openings

Select a link with architectural walls, windows and doors;

The list with windows and doors where openings have to be created;





# Insert / Update Structural Openings

To insert the openings to a structural wall, right-click on Create New Opening and select “Insert/Update”:

Select an opening family that will be used. The list of openings will come from the current project:

**Insert/Update Structural Openings**

Dynamic Section Box    Number of Rows: 10     Show Opening's Host

Project Name: [ ]    Level: [ ]    Category: [ ]    Family: [ ]    Type: [ ]    Mark: [ ]    Width: [ ]    Height: [ ]

Level 1

- Window
- Doors

Context Menu:

- Insert/Update
- Recheck Changes
- Group Openings by Host
- Show Element By ID
- Isolate Selected Elements In Active View
- Unhide Element

Buttons: Configure Grouping, Export to Excel, Draw Table, Select Parameters, OK

Level	Category	Family	Type	Mark	Width	Height
0915 x 1830mm	6		0915 x 1830mm	6	915	1830
0915 x 1830mm	7		0915 x 1830mm	7	915	1830
0915 x 1830mm	8		0915 x 1830mm	8	915	1830
0915 x 1830mm	10		0915 x 1830mm	10	915	1830
0915 x 1830mm	11		0915 x 1830mm	11	915	1830
0915 x 1830mm 2	9		0915 x 1830mm 2	9	2000	500
0915 x 1830mm 3	12		0915 x 1830mm 3	12	915	500

**Select Opening Type**

Windows

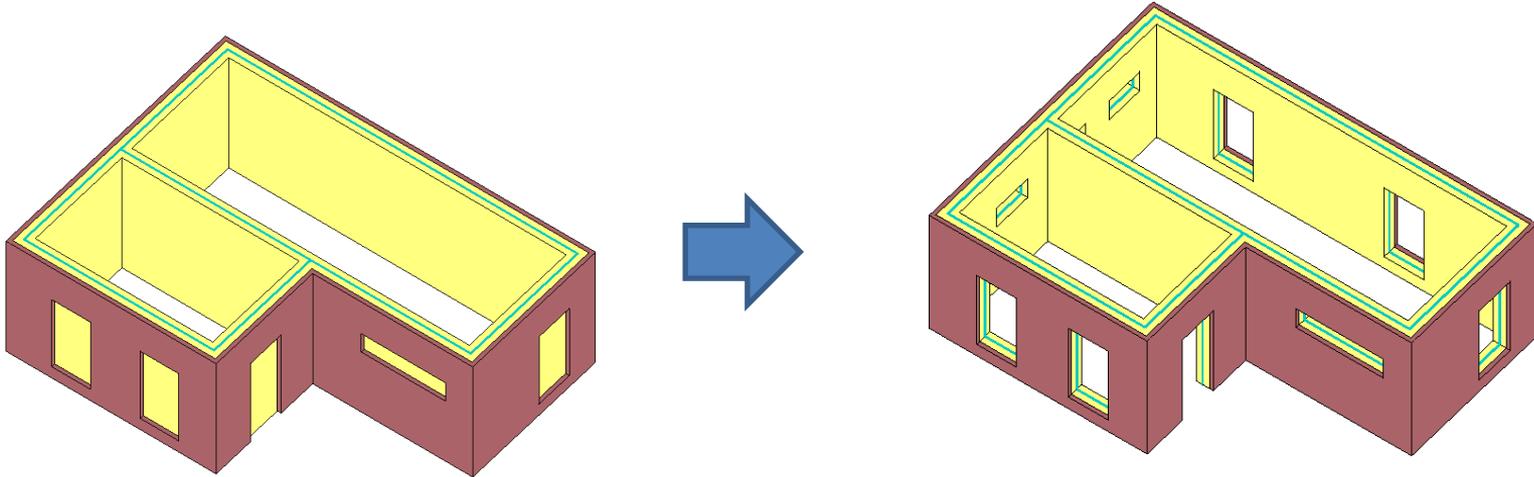
- M\_Window-Square Opening
  - 0900 x 1200mm
  - 0900 x 600mm
  - 0900 x 1800mm
  - 0600 x 1800mm
  - 0600 x 1200mm
  - 0600 x 600mm
  - 0400 x 600mm
  - 0400 x 1200mm
  - 0400 x 1800mm
  - 1000 x 2000mm
  - 500 x 1500mm

3D Preview: M\_Window-Square Opening: 0900 x 1200mm, M\_Window-Square Opening: 0900 x 600mm

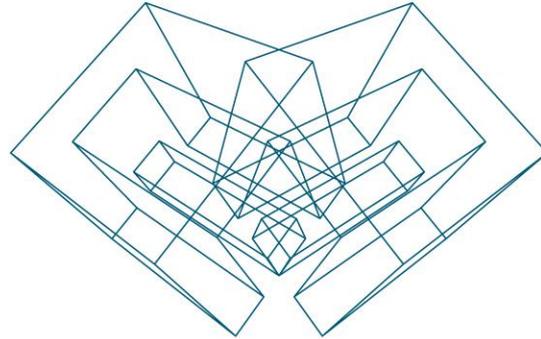
Filter by: Family Name, contains

Buttons: Filter, Type Name Configuration, OK, Cancel

# Insert / Update Structural Openings



When any change is made in architectural file, all the changes will be displayed in “Insert/Update Structural Openings” dialog.



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