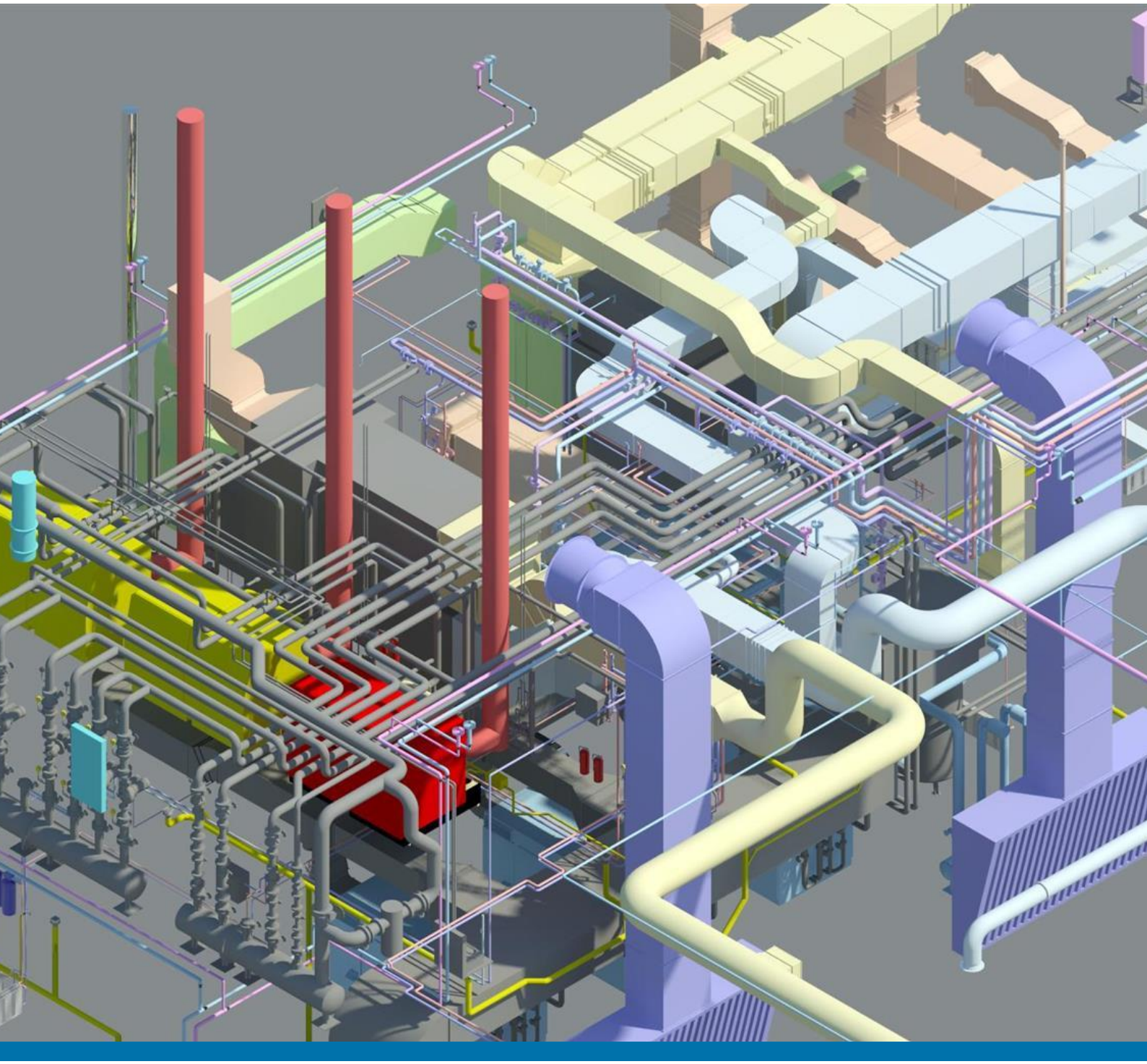
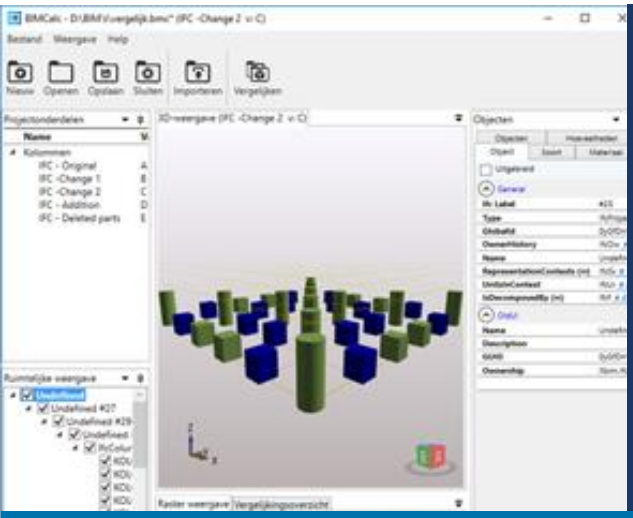


BIMCalc

Quickstart

Calcsoft BV

Version 1.4 • 4 juni 2020



Project	: BIMCalc
Onderdeel	: Quickstart
Opgesteld door	: ir. A.S. Vonk MRICS (Arno)
Gecontroleerd door	: ir. D.D.D. van Laar (Djordy)
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Opdrachtgever	: IGG Bouweconomie
Contactpersoon	: A.S.Vonk
Versie	: A,
Datum	: 4 juni 2020

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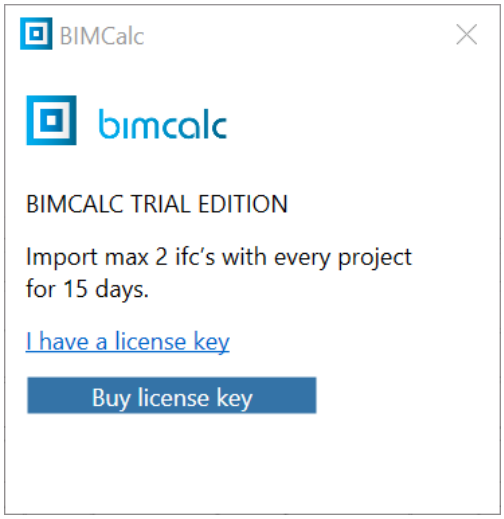
Index

1. BIMCalc Trial Edition

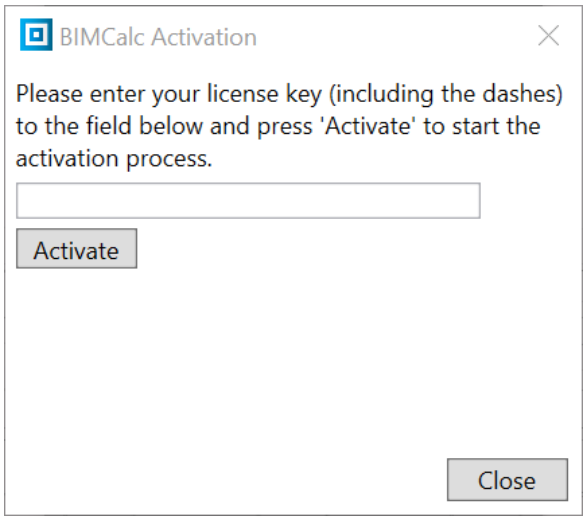
After installing and running BIMCalc, it will be started as a trial edition. The following dialog will be presented to you:



The trial edition has the following limitations applied:

- The trial version of BIMCalc allows the users to create projects, but only import 2 IFCs into one project.
- The trial version of BIMCalc does not allow users to save created projects.
- The trial version of BIMCalc does not allow to compare project files.
- The trial version of BIMCalc can only be used for 15 days after first start.

If you already have a BIMCalc license key, you can click the 'I have a license' link presented in blue to activate the product. You will be presented with the following dialog:



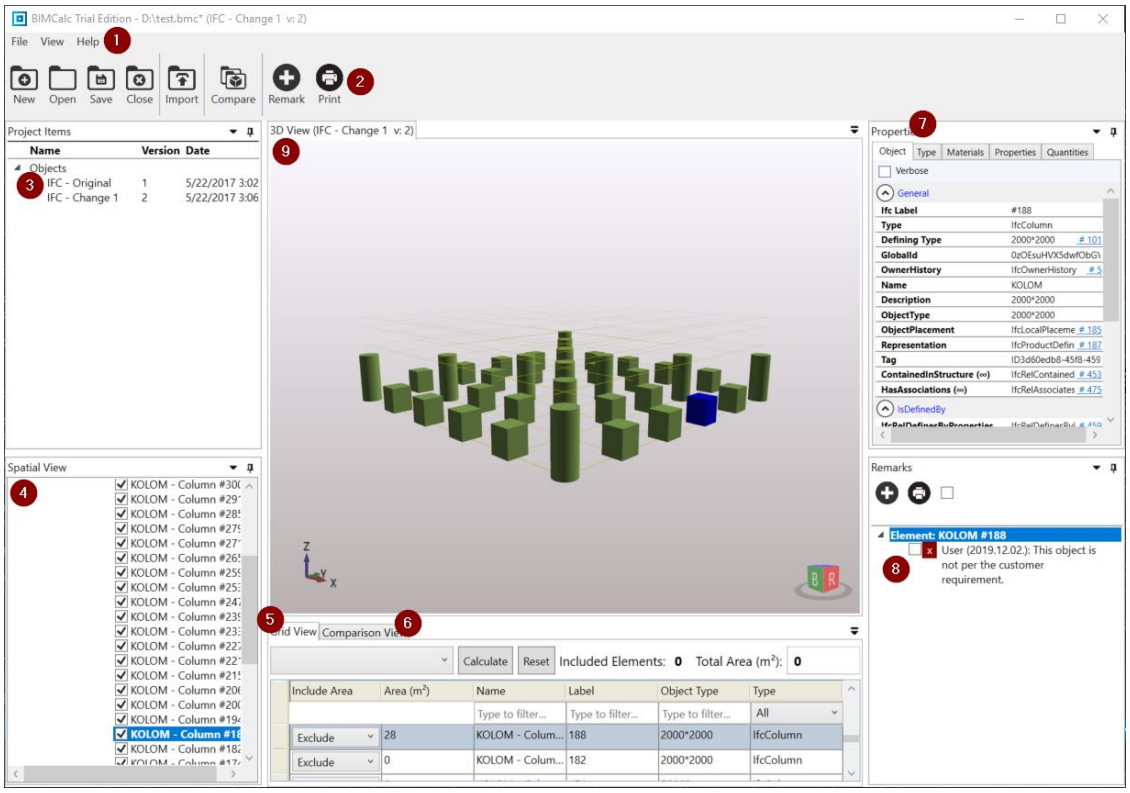
By typing in your activation key, BIMCalc will then check it's validity and activate your product if the validation process is successful. You can then close the dialog and continue to use BIMCalc without the trial limitations.

If you do not have a license key and just want to try out BIMCalc, you can close the trial edition dialog with the close dialog button on the top right.

For simplicity stake, the quick-start guide will continue to use BIMCalc Trial Edition throughout the document.

2. BIMCalc main application layout

After closing the trial edition window or activating BIMCalc, you will be presented with the main layout of the application. The application consists of separate segments which implement different kind of features to work with the imported IFC models, but they are also linked together. The following image consists of an example of the application layout. Please note the counters which will be described throughout the quick-start guide.



The counters represent the different segments of the main layout, in order they are: - 1. The horizontal application menu bar - 2. The project management bar - 3. The project item tree - 4. The IFC model element tree - 5. The IFC model element table - 6. The Comparison element table - 7. The selected IFC model element properties - 8. Project remarks - 9. 3D model viewer

2.1. Application Menu Bar

The application menu bar consists of the following menu items:

1. File
2. View
3. Help

Most of the menu items also have shortcuts. You can view the shortcut key for a menu item next to the menu item name. If there is no key combination after the menu item name, it does not have a shortcut.

1.1 File -> New project

This menu point allows you to create a new BIMCalc project. It's functionality will be described later in the Project management section.

1.2 File -> Open

This menu point allows you to open up an existing BIMCalc project. It's functionality will be described later in the Project management section.

1.3 File -> Open recent

BIMCalc registers projects which have been recently opened. If you want to re-open a project which was recently opened by BIMCalc, you can use this menu point to instantly open up the recent project.

1.4 File -> Close project

This menu point allows you to close an opened BIMCalc project. It's functionality will be described later in the Project management section.

1.5 File -> Save project

This menu point allows you to save a BIMCalc project. It's functionality will be described later in the Project management section.

1.6 File -> Save project as

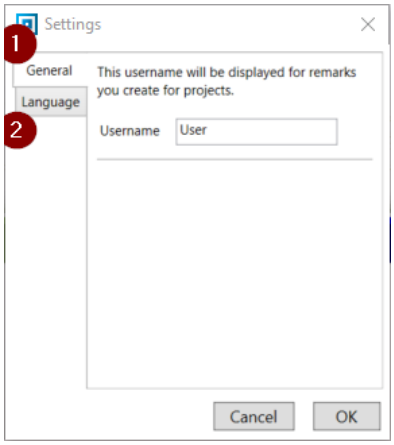
This menu point allows you to save a BIMCalc project to a different location. Clicking this menu item while there is an opened project presents a file saving dialog to you where you can choose a new location to the project and will continue with the saving process described later in the project management section.

1.7 File -> Autosave

If you click this menu item, automatic project saving will be enabled in BIMCalc. This means that any change which affects the project will be instantly saved. Please note that turning this feature on while using BIMCalc Trial Edition will not save the project.

1.8 File -> Settings

Clicking this menu item will open up the Settings dialog of BIMCalc.



The settings dialog consists of the following two vertical tabs:

1. General settings
2. Language

The first tab allows you to specify a username. This username will be used when you create remarks for a BIMCalc project item.

The second tab allows you to specify the language of BIMCalc. Currently Dutch and English options are available. Please note that the application language will only be changed after you restart BIM-Calc.

Changes made to these settings can be confirmed with the 'OK' button on the bottom, while with 'Cancel' you can close the dialog without changes made to BIMCalc.

1.9 File -> Exit

Clicking this menu point will close BIMCalc. If there is a currently opened BIMCalc project which has unsaved changes and you are using an activated product, the application will allow you to save the changes made to the project before closing (or discard them if needed).

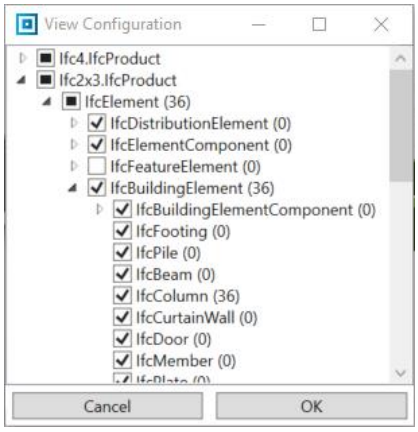
2.1 View -> Reset View

BIMCalc opens IFC files at a certain position calculated based on the IFC file. The camera of the 3D model viewer can be freely moved around in many different ways, which is later on described in the 3D model viewer section. If you would like to return the camera into this default opening position, you can use this menu point to do so.

2.2 View -> Configure View

BIMCalc is capable of rendering a large number of element types usually available in IFC models. However, in some cases, it might be optimal to turn off specific elements from rendering to boost the responsiveness and performance of the 3D model viewer (for example, turning off furniture because it is not used in any of the calculations we want to do with the IFC model).

Clicking this menu point will present you with the following dialog, containing a tree-like structure:



On the left side of the name of the IFC element type is a checkbox which controls whether to render that specific IFC element in the 3D model viewer. On the right side of the name in parentheses, the number of elements can be seen in the currently opened 3D model, which helps you choose elements which are present in large numbers in the IFC. If the checkbox is in a checked state, the element will be rendered in the 3D model viewer. If its in an unchecked state, the element will not be rendered in the 3D model viewer. Clicking the 'OK' button on the bottom will save the changes to these elements, and refresh the 3D model viewer which now will use the new settings to render the model. Clicking the 'Cancel' button will close the dialog without changes.

Use this menu point if you are having performance problems with your IFC model to optimize it's rendering. Please note however, that a minor knowledge of the IFC protocol structure and naming convention is needed to fully operate this menu item.

2.3 View -> Camera options

The camera settings for the camera of the 3D model viewer can be found below the 'Configure View' menu point. These are toggle menu items which will modify the behavior of the camera. The menu items should be self explanatory.

3.1 Help -> About

Clicking the 'About' menu point will present you with a dialog containing general information about BIMCalc. Among the version number of BIMCalc (which can be useful to know for troubleshooting purposes), if you are using a trial edition of the product, the trial limitations are also present to you, and also a link is available to visit to purchase a license key.

3.2 Help -> Activate BIMCalc

If you are using a trial edition of the product, this menu point allows you to activate BIMCalc using a license key. If the activation process is successful, the dialog can be closed and BIMCalc will switch to an activated state, lifting up the trial limitations.

3.3 Help -> Check for updates

BIMCalc features an automatic updating procedure. At every start the application will check for a newer version. If available, a dialog will be presented to you listing the new features and the option to download and install the updates. BIMCalc will try to download and install the update manually, however, depending on your current Windows installation, settings, current BIMCalc projects, the automatic installation might not start. You can manually download the installer package from this same dialog and start the installation procedure at your convenience at a later date.

2.2. Project management

The project management bar can be found below the menu bar. The bar contains the following features:

1. New project
2. Open existing project
3. Save project
4. Close project
5. Import IFC model into project
6. Compare imported IFC elements in the project
7. Add remark for the currently selected IFC model element
8. Create a printable PDF report of the remarks in the project

1. New project

Clicking this button will present you with a file saving dialog where you can select where you want to create a new BIMCalc project (.bmc file format). If you already have an opened BIMCalc project when you want to create a new one, BIMCalc will warn you that the existing project will be closed and offers you the option to save or discard changes made to that project before closing it and opening the new one. Please note that the BIMCalc Trial Edition will not save the project file to the desired location since project saving is disabled.

2. Open project

Clicking this button will present you with a file opening dialog where you can select the location of an existing BIMCalc project (.bmc file format). If you already have an opened BIMCalc project when you want to open a new one, BIMCalc will warn you that the existing project will be closed and offers you the option to save or discard changes made to that project before closing it and opening the new one.

After opening the project, BIMCalc will open the most recently opened IFC model from the BIMCalc project (or the first IFC model if this is the first opening). All other components of the main layout will change it's contents based on this new IFC model opening. The 3D model viewer will also display the 3D representation of the selected IFC model.

3. Save project

Clicking this button will save the current BIMCalc project to the selected location. A progress dialog will be presented to you which will show the progress of saving the project. The progress dialog will be automatically closed when the saving process finishes. Please note that depending on how many IFC models are imported to a project (and their file size), it can have a large impact on the time it takes to save the BIMCalc project file. Please wait out the progress patiently. Please note that the BIMCalc Trial Edition will not allow you to save your project.

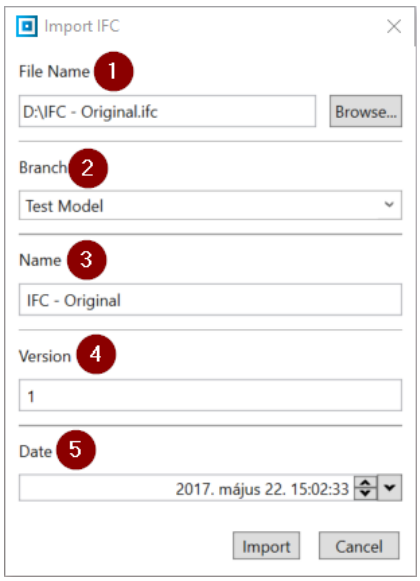
Tip: If in the title of the BIMCalc product window, you see an asterisk (*) after the BIMCalc project file name, that means that the project has unsaved changes.

4. Close project

Clicking this button will close the currently opened project. If the project has unsaved changes, BIMCalc will present you the option to save or discard these changes before closing the project.

5. Import

Clicking this button will present you with a dialog where you can select and import and IFC file into your BIMCalc project. The import dialog will ask you some information about the IFC model, such as:



1. The location of the IFC model on your computer. You can click the 'Browse' button to be presented with a file opening dialog where you can browse to and select your IFC model file.
2. The branch of your IFC model. A branch in essence is a collection of different versions of the same IFC model. You can select and existing branch in the project by clicking the arrow on the right of the input field, or you can freely specify a new one.
3. The display name of this IFC model. If you already selected and IFC model file, the name of that file will be pre-filled in this input field.

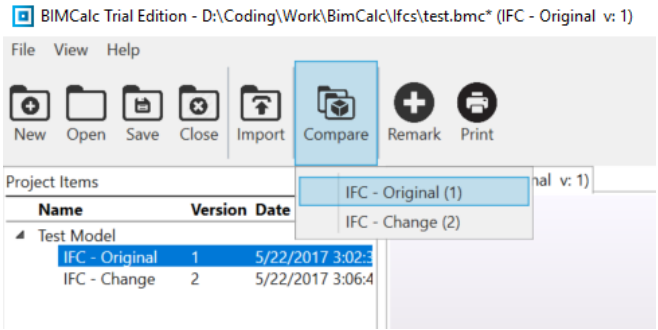
4. The version of this IFC model file. You can freely choose between using numbers or text to follow the versions of your IFC model files.
5. The date of the IFC model. If you already selected an IFC model file, the creation date of the IFC model will be pre-filled in this input field (either the creation date from the IFC protocol, or the creation date of the file). If you want to modify this, you can click the arrow on the right side to open up a date picker to choose a different date.

All fields are mandatory to import an IFC. If every field is specified and and IFC file is selected, clicking the 'Import' button will start the import procedure. A progress dialog will be presented to you which tracks the progress of the import process. During this process other features are not useable. Please note that depending on the complexity and file size of the IFC model file, the importing process can take a while. Please wait patiently while the process is being done. If the process is completed, the progress dialog will automatically close and the IFC model will be displayed in the 3D model viewer. If this was your first import into the new BIMCalc project, a new dialog will also be presented to you, asking whether you want to import an additional IFC model into the project. Confirming the dialog will guide you through the same import process as described above.

Please note that the BIMCalc Trial Edition will only allow you to import 2 IFC model files into a project.

6. Compare

Clicking this button while at least two IFC model files are imported into the current project will present you with a dropdown where you can select the target IFC model which will be compared to the currently opened IFC model. Selecting the target IFC model from this list will start the comparing procedure between the two IFC models.



The comparison feature will be described in detail in the IFC model comparison section.

7. Add Remark

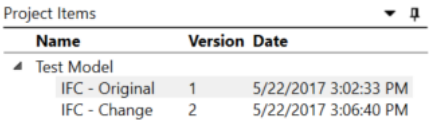
While there is an opened IFC model in your BIMCalc project and there is a currently selected IFC model element in the 3D model viewer, you can click this button to add a remark to this IFC model element. The remark feature will be described in the Project remarks section.

8. Print

Clicking this button will allow you to create a printable PDF document containing all the remarks in your BIMCalc project, covered in section 2. Print remark document.

2.3. Project Item Tree

The project item tree can be found on the left side of the BIMCalc main layout. This section of the main layout displays your imported IFC models in the currently opened BIMCalc project in a tree-like structure.



The root elements of the tree will be your branches created in the project. The child IFC models of a branch can be seen below the branch name. The branch can be opened or collapsed by clicking the arrow on the left side of the branch name.

Double clicking a row representing a branch will open or collapse that tree element. Right clicking a row will open a context menu where a number of features are available for a branch:

- Import IFC: This will start a new import procedure as per the flow described above.
- Delete branch: After a confirmation dialog, the branch and its child IFC models will be removed from the project.

The names of the IFC models, their version and their date can be seen below the branch name.

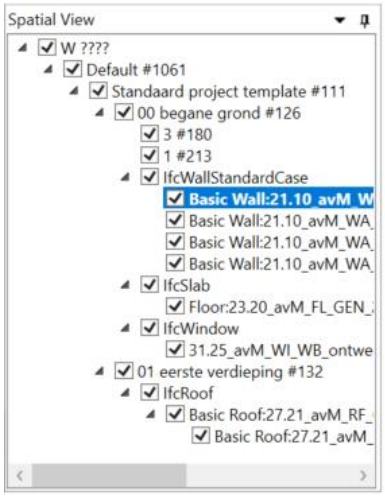
Double clicking a row representing an IFC model will open that IFC model. All other components of the main layout will change its contents based on this new IFC model opening. The 3D model viewer will also display the 3D representation of the selected IFC model. Right clicking a row will open a context menu where a number of features are available for an IFC model:

- Display item: Opening the IFC model can be achieved this way as well as double clicking a row.
- Delete item: After a confirmation dialog, the IFC model will be removed from the project.
- Compare this item: This will start a comparison procedure which will compare this selected IFC model with the currently opened IFC model. The comparison feature is described in the IFC model comparison section.

2.4. IFC model element tree

The IFC model element tree can be found on the bottom left corner of the BIMCalc main layout. This section of the main layout displays all IFC model elements contained in the currently displayed IFC model as a tree-like hierarchical structure.

In the IFC protocol every element can have one other related element to it. This is represented as a tree in this structure. Usually the root elements of the tree are IFC element types which hold other elements together, such as sites, buildings, building floors, spaces, etc. Also, the IFC model element tree groups same element types together which are located inside one container element into a single tree element. In these cases, the name of the element in the tree will be the IFC protocol type name (such as IfcWallStandardCase for wall elements).



Clicking an element in this tree will select this element in all other related main layout sections (IFC model element table, IFC Model element properties). If the selected element has visible graphics in the 3D model viewer, it will be also selected and highlighted with a blue color.

Double clicking a root element in the tree will collapse or show the child elements of that element. Double clicking a child element, if it has visible graphics in the 3D model viewer, will issue an attempt to rotate the camera to an angle where the double clicked element is visible. If at this point there is another double click on the same element, it will issue an attempt to hide all visible graphics until the selected element is clearly visible. Tip: After this state, if you want to return to the default state of the 3D model viewer, use the 2.1 View -> Reset View menu item or it's shortcut.

A checkbox is located on the left side of every element in the tree. This is a visual control indicator and switcher in the 3D model viewer. Unchecking a checkbox next to a child element in the tree will prevent that element from rendering in the 3D model viewer. Unchecking a checkbox next to a root element in the tree will prevent all child elements from rendering in the 3D model viewer. Every check and uncheck in the tree will cause a graphical redraw in the 3D model viewer, which, depending on the size and complexity of the displayed IFC model, could take a while. A progress windows is displayed until the changes are being made inside the 3D model viewer. Tip: The 2.1 View -> Reset View menu item will not revert the elements into a checked state. These have to be manually re-checked in the IFC model element tree.

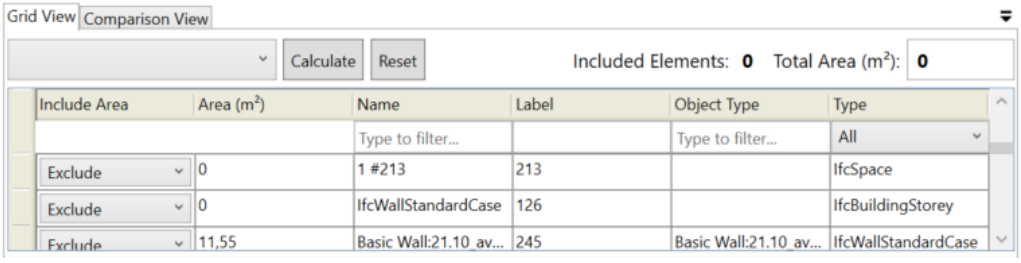
2.5. IFC model element table

The IFC model element table can be found on the bottom of the BIMCalc main layout. This section has to tab items on the top:

1. Grid View
2. Comparison View

1. Grid View

The top section of the grid view contains area calculation related components, while the bottom section of the grid view contains a data table which lists all IFC model elements in the currently opened IFC model (similarly to the IFC model element tree, but without hierarchy).



Clicking an entry in the data table will select the element in the data table and in all other related main layout sections (IFC model element tree, IFC Model element properties). If the selected element has visible graphics in the 3D model viewer, it will be also selected and highlighted with a blue color.

It is also possible to click the headers of the data table. Clicking a header will order the data table by that header. Multiple clicks change the ordering between ascending and descending. An input field is available below some of the headers. These are filtering input fields. Typing a value to one of these text boxes will filter the table based on the typed value after a delay. The filtered data table has an additional feature. The IFC model elements which got excluded from the data table by the filtering will be displayed in a transparent color in the 3D model viewer. Until this graphical redrawing takes effect, a progress dialog will be presented to you, which will automatically disappear when the progress is completed. Similarly to this, for the 'Type' column in the data table, a dropdown is available instead of a text box. Opening the dropdown will present you a list of all available IFC element types in the currently opened IFC model. Selecting a type in this dropdown will filter the data table so that only those elements are displayed which have the selected type. Tip: to return the data table to its unfiltered state, remove the text from the input fields, and select the 'All' option for the 'Type' dropdown filter.

The first two columns of the data table, and the top section of the grid view contains area calculation features. Clicking an element in the data table, or clicking an element in the 3D model viewer, will start a process of surface area calculation for the selected element. BIMCalc will try to retrieve the surface area information for the element first from the IFC model file itself, or if it is not present, it will try to calculate the surface area by estimating the graphical model dimensions calculated by the 3D graphical model engine. Please note that the latter is a hard estimation and might not be precise information. The calculated surface area is displayed for the selected element in the second column of the data table in square meters.

The top right corner of the grid view contains a text field where the total area of the selected IFC model elements is displayed. To include an area into this sum, click the selected element in the data table, and in the dropdown located in the first column for the selected element, select 'Include'. It is also possible to subtract the area of a given element from the calculation. To achieve this, select 'Subtract' from the dropdown. If you do not want to include the area of an element into the calculation, revert the dropdown value back to 'Exclude'. To reset the sum area value, you can click the 'Reset' button located on the top center of the grid view. This will reset the state of all elements into 'Exclude' state and reset the sum value, but it will keep the calculated area information in the second column.

A dropdown is presented to you on the top left corner of the grid view. There are a number of available options in this dropdown which are essentially rules which will include a number of elements

in the data table into the area sum calculation. Selecting an option in the dropdown and clicking 'Calculate' will calculate the area information of all elements which match the rule, include them in the selection by setting their first column dropdown to 'Include'. Additionally, all elements which are excluded by the rule will have their first column dropdown set to 'Exclude', and they will be presented in a transparent color in the 3D model viewer. While this process is taking place, a progress modal will be presented to you, which will automatically disappear once the process is done. To reset the sum area value calculated by this process, you can click the 'Reset' button located on the top center of the grid view. This will reset the state of all elements into 'Exclude' state and reset the sum value, but it will keep the calculated area information in the second column.

The available options in the dropdown should be self explanatory, but from the technical point of view, the following rule is matched to the data table for the specific options:

- First floor slab elements: All IfcSlab type IFC elements which are located in the first hierarchically available IfcBuildingStorey element.
- All floor slab elements: All IfcSlab type IFC elements.
- Roof slab elements: All IfcRoof type IFC elements. If none are found, then all IfcSlab type IFC elements which are located in the last hierarchically available IfcBuildingStorey element.
- Facade elements: All IfcWallStandardCase type IFC elements.
- All window elements: All IfcWindow type IFC elements.
- All door elements: All IfcDoor type IFC elements.

Please note that these rules are suggestions which should help you in calculating different sum values for the IFC model. The displayed sum value for these rules should be manually overseen and corrected by using the 'Include', 'Exclude' and 'Subtract' first column options in the data table. There is no programmatically perfect automatic way of calculating required dimensions for IFC models, therefore BIMCalc aims to give features which help and fasten the manual work needed to calculate these.

Tip: An example approach on how to calculate ground surface area for an IFC model (Example 1). - From the bottom left IFC model element tree section of the BIMCalc layout, locate the first building storey tree element. - From the storey tree element, locate the next tree element called IfcSlab, which bundles up all IfcSlab type IFC elements on the first building storey. - Click through the IfcSlab child elements of the tree element. Clicking an entry here will automatically select the entry in the grid view data table and will also automatically calculate its area value. Oversee the element highlighted in blue in the 3D model viewer. If this element should be part of the ground surface area calculation based on your decision, select the 'Include' option for the element in the first column of the grid view data table. - Follow this procedure for every child element. - This approach is useful for buildings where the ground surface area can be calculated based on the first floor IfcSlab element area values.

Tip: An example approach on how to calculate ground surface area for an IFC model (Example 2). - In the IFC model element table section, on the grid view tab, select the 'All floor slab elements' option from the rule dropdown and click 'Calculate'. This will calculate the are values of all IfcSlab type IFC elements in the IFC model. - Once the process is done, click 'Reset' next to 'Calculate' in the grid view to reset the area calculation sum value. This will not remove the area values calculated for the elements. - For the 'Type' column filter dropdown located below the data table column header in the grid view, select the 'IfcSlab' option. This will filter down the data table to only show the IfcSlab

elements. - Click the 'Area' column header in the data table in the grid view two times. This will order the table based on the calculated area values in descending order (highest first). - Start and click through the data table entries. Every selected item will be highlighted in blue color in the 3D viewer. If the element should be part of the ground surface area calculation based on your decision, select the 'Include' option for the element in the first column of the grid view data table (usually, the bigger IfcSlab elements are for sure need to be a part of the calculation, so this approach can provide a good estimate value in a matter of minutes). - This approach is useful for non-traditional building layouts or more complex IFC models.

Tip: An example approach on how to calculate total surface area for an IFC model (Example 1). - In the IFC model element table section, on the grid view tab, select the 'All floor slab elements' option from the rule dropdown and click 'Calculate'. This will calculate the are values of all IfcSlab type IFC elements in the IFC model. - Click the 'Area' column header in the data table in the grid view two times. This will order the table based on the calculated area values in descending order (highest first). - Start and click through the data table entries. Every selected item will be highlighted in blue color in the 3D viewer. Oversee the element in the 3D model viewer. If the element should not be part of the surface area calculation based on your decision (for example, duplicated element, or the element is outside of the building), select the 'Exclude' option for the element in the first column of the grid view data table. - This approach is useful for more traditional IFC elements where the surface of every area can be calculated by just IfcSlab type IFC elements.

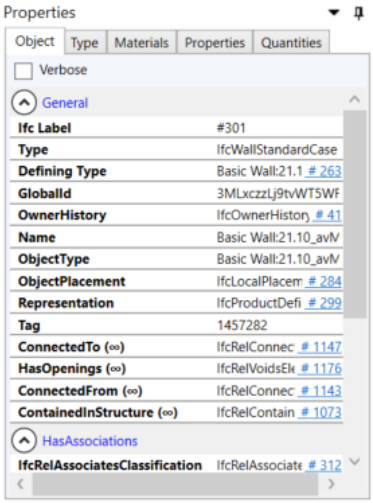
Tip: An example approach on how to calculate total surface area for an IFC model (Example 2). - In the IFC model element table section, on the grid view tab, select the 'All floor slab elements' option from the rule dropdown and click 'Calculate'. This will calculate the are values of all IfcSlab type IFC elements in the IFC model. - Once the process is done, click 'Reset' next to 'Calculate' in the grid view to reset the area calculation sum value. This will not remove the area values calculated for the elements. - For the 'Type' column filter dropdown located below the data table column header in the grid view, select the 'IfcSlab' option. This will filter down the data table to only show the IfcSlab elements. - Click the 'Area' column header in the data table in the grid view two times. This will order the table based on the calculated area values in descending order (highest first). - Start and click through the data table entries. Every selected item will be highlighted in blue color in the 3D viewer. If the element should be part of the surface area calculation based on your decision, select the 'Include' option for the element in the first column of the grid view data table (usually, the bigger IfcSlab elements are for sure need to be a part of the calculation, so this approach can provide a good estimate value in a matter of minutes). - This approach is useful for non-traditional or more complex buildings.

2.6. The Comparison element table

The comparison feature and its components will be described in detail in the IFC model comparison section.

2.7. IFC Model element properties

The IFC model element properties section can be found on the top right corner of the BIMCalc main layout. This section provides in-depth technical and IFC protocol information for the currently selected IFC model element.

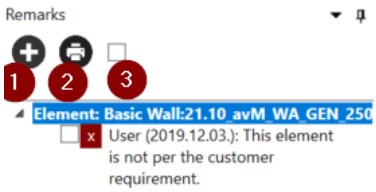


This section displays information for the currently selected IFC model element. This element can be selected from a range of different other components (IFC model element tree, IFC model element table, 3D model viewer). The displayed information is automatically refreshed if a new element is selected. The displayed information is grouped to separate tabs which are located on top of the properties section. Every information is read-only and is only available for information purposes, it can not be changed or removed.

The 'Verbose' checkbox on the top of all tab items also display properties for the element which do not have a proper value. The arrow icons on the left side of every property group can be used to collapse or show the child properties of that group.

2.8. Project remarks

The project remarks section can be found on the bottom right corner of the BIMCalc main layout. This section allows you to add remarks to specific IFC model elements for the BIMCalc project.



Three features are available on the top of this section:

1. Add remark
2. Print remark document
3. Show or hide completed remarks

1. Add remark

To add a remark, first you have to select an element in any of the other main BIMCalc layout sections (IFC model element tree, IFC model element table, 3D model viewer). After selecting an element, click the 'Add remark' button represented with a 'Plus' icon to add a remark to that element.

A text area will appear below the button where the remark comment can be added. Please note that the 3D model viewer changes its camera position to where the selected element is clearly visible and all other elements are not visible. Before saving the remark, fine tune the camera to your wishes. At the time of accepting the remark, a picture will be taken which will be visible when you create a printable remark PDF. The remark can be saved by clicking the 'Accept' button, or can be cancelled by the 'Cancel' button. Both buttons will reset the 3D model viewer into its default state. The remark will be added under the username set for BIMCalc in the 1.8 File -> Settings menu point.

Please note that while you can add remarks in the BIMCalc Trial Edition to try out the feature, you can not save the project, hence after closing the project, all remarks will be gone.

2. Print remark document

Clicking this button will allow you to create a printable PDF document containing all the remarks in your BIMCalc project.

You will be presented with a file saving dialog where you can select to where you want to save this PDF document. You will be presented with a progress dialog while the PDF document is in the making. The progress dialog will automatically close when the process is finished. The PDF document can after be opened and printed by your preferred software.

3. Show or hide completed remarks

Checking this checkbox will hide remarks in the BIMCalc project which have been marked as completed. Remarks can be marked as completed by checking the checkbox located on the left side of the remark.

4. Remark list

The remarks are grouped by IFC model elements in a tree like structure. Multiple remarks can be added to the same element. Double clicking the root remark group element will collapse or show the remarks for that element. Right clicking the root remark group element will present you with a context menu where you can initiate adding a new remark to the selected IFC model element.

The remark text contains the name of the user who added the remark, the date of the remark as well as it's content. Clicking a remark will select the element which is marked with it in all other BIMCalc main layout components. Right clicking the remark will present you with a context menu containing:

- Add a new remark to this element: Initiate adding a new remark to the selected IFC model element.
- Edit remark: Edit the contents of the remark. This option is only available to the user who originally created the remark. This will open up the same text area as when you would create a new one. The content of the remark can be changed there.
- Delete remark: Deletes the selected remark. This option is only available to the user who originally created the remark. After a confirmation dialog, the remark can be deleted.

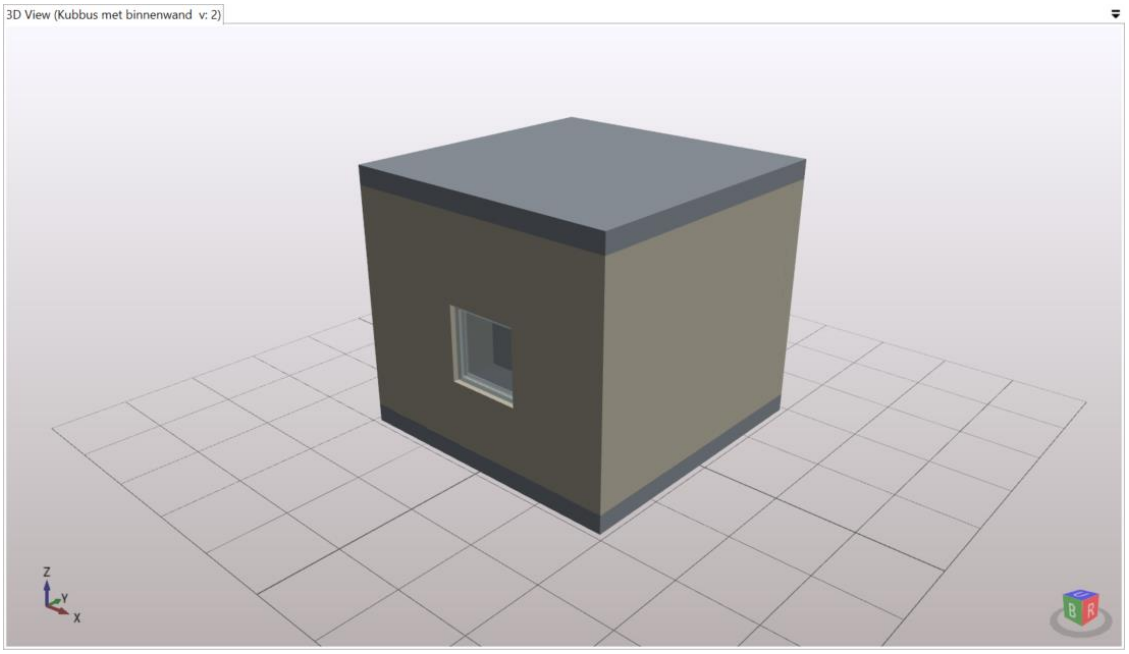
A checkbox can be found on the left side of the remark. Checking this checkbox will mark this remark as completed. The completion will be saved along inside the BIMCalc project (a project save is needed for it to stay permanent).

Please note that while you can mark remarks as completed in the BIMCalc Trial Edition to try out the feature, you cannot save the project, hence after closing the project, all remarks will be gone.

If you were the original creator of the remark, a red 'X' icon will also be available to you on the left side. This is a shortcut to delete a remark, with the same functionality as described above.

2.9. 3D model viewer

The 3D model viewer can be found on the center of the main BIMCalc layout. This is a graphical 3D representation of the currently opened IFC model.



The name of the currently viewed IFC model can be found on the top section of the 3D model viewer. A coordination navigator can be found on the bottom left corner, while a directional navigator can be found on the bottom right corner. The sides of the directional navigator can be clicked. This will rotate the camera of the 3D viewer to the selected orientation.

Operating the camera inside the 3D model viewer is done via mouse clicks and movements. Clicking and holding right click will rotate the camera around the point where the mouse click happened. Zooming in and out can be done using the mouse wheel. Pressing and holding the mouse wheel will move the camera without rotation.

An IFC model element can also be selected in the 3D model viewer by pressing left click on it. This will highlight the selected element in blue color, and it will also select the element in all other main layout components (IFC model element tree, IFC model element table, IFC Model element properties). Quickly right clicking an IFC model element in the 3D viewer brings up a context menu with the 'Hide selected element' option. This will remove the graphical rendering of the element from the 3D viewer (this change is also reflected in the IFC model element tree - the corresponding checkbox will be unchecked).

Since the camera movement is completely unrestricted in the 3D model viewer, it might happen that too much directional movement and rotation brings the camera into an inconvenient location.

To reset the camera to its default position, use the 2.1 View -> Reset View menu item, or its shortcut.

Graphical redrawing processes initiated from any main components will display a progress dialog inside the 3D model viewer, and the 3D model viewer will be unresponsive while these processes are being done. The progress window will automatically close when the process is completed. Please note that complex or large IFC files can take a while to be graphically rendered, and it can also impact the performance of BIMCalc. The process and performance can be boosted by unchecking unnecessarily rendered IFC elements using the 2.2 View -> Configure View menu item.

3. BIMCalc main features

3.1. IFC file importing and project management

BIMCalc provides features to import IFC files into separate collections to create a project bundle containing all your related IFC files. These are managed by BIMCalc's own file format. The application also provides a 3D model viewer to visually render your IFC models, and it also provides feature to quickly swap between the imported IFC files. Structural, hierarchical and metadata information on the elements inside the imported IFC file are all available across the main layout components of BIMCalc. For IFC file importing and BIMCalc project management, visit the 5. Import and Project management sections. For information on the 3D model viewer, visit the 3D model viewer section.

3.2. Area calculation

BIMCalc provides features to calculate surface areas of IFC model elements in the imported IFC files, and it also provides features to help create area calculations for an IFC model. For a detailed guide, visit the 1. Grid View section.

3.3. IFC model comparison

BIMCalc provides features to compare different versions of the same IFC models together. Project management provides you with tools to add these IFC models into the same branch. Please note that the comparison feature is not available in BIMCalc Trial Edition.

The project comparison always compares the currently opened IFC model with a target IFC model. The process can be started by two different ways:

- In the Project Item Tree, right click the IFC model which you want to compare the current model with.
- In the Application menu bar, click the 6. Compare button and select the target IFC model which you want to compare the current model with.

A progress dialog will be presented to you when the process starts and it will be visible until the comparison completes. After the comparison is done, the following changes will happen inside BIMCalc:

- You will still see the graphical representation of the currently opened IFC model, but the following changes will be applied to it:

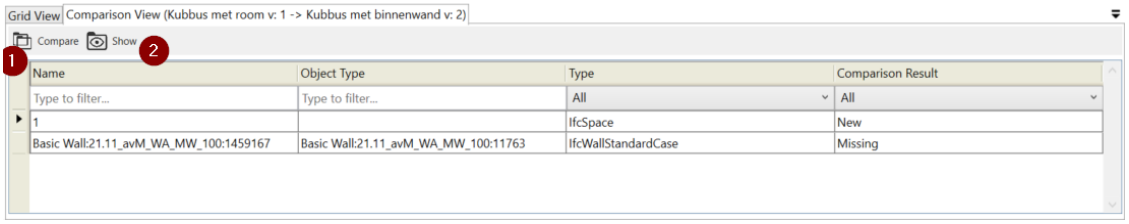
- If an IFC model element is unchanged between the two compared IFC models, the element will be rendered in a transparent color.
- If an IFC model element has been modified between the two compared IFC models, the element will be highlighted with a purple color.
- If an IFC model element is missing in the target IFC element, it will be highlighted with a red color.
- If an IFC model element has been newly added in the currently displayed IFC model (e.g. is missing in the target IFC model), it will be highlighted with a green color.

- The title of the 3D model viewer will represent the names and comparison direction of the two IFC models.
- The IFC model element table will switch to the Comparison view.

The functionality of the main layout components will stay the same, so IFC model elements can be selected from any main layout components after the comparison.

1. Comparison view

While in the 3D model viewer you can view the graphical result of the comparison, the Comparison view in the IFC model element table will contain the metadata information about the IFC model elements which are either modified, missing, or has been newly added to the current IFC model.



The top section of the Comparison view contain a data table containing the elements relevant for comparison. Clicking an entry in the data table will select the element in the data table and in all other related main layout sections (IFC model element tree, IFC Model element properties). If the selected element has visible graphics in the 3D model viewer, it will be also selected and highlighted with a blue color.

It is also possible to click the headers of the data table. Clicking a header will order the data table by that header. Multiple clicks change the ordering between ascending and descending. An input field is available below some of the headers. These are filtering input fields. Typing a value to one of these text boxes will filter the table based on the typed value after a delay. The filtered data table has an additional feature. The IFC model elements which got excluded from the data table by the filtering will be displayed in a transparent color in the 3D model viewer. Until this graphical redrawing takes effect, a progress dialog will be presented to you, which will automatically disappear when the progress is completed. Similarly to this, for the 'Type' and 'Comparison Result' columns in the data table, a dropdown is available instead of a text box. Opening the dropdown will present you a list of all available IFC element types in the currently opened IFC model, or comparison result types after the comparison. Selecting a type or result in these dropdowns will filter the data table so that only those elements are displayed which have the selected type or result. Tip: to return the

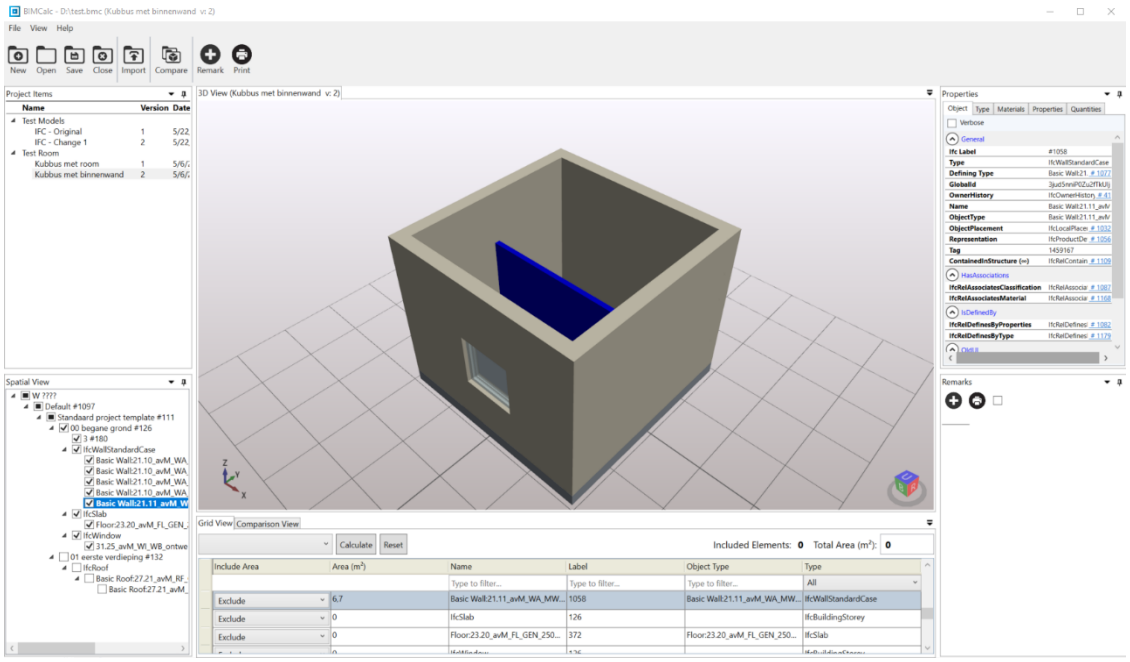
data table to its unfiltered state, remove the text from the input fields, and select the 'All' option for the 'Type' and 'Comparison result' dropdown filters.

Two buttons are available on the top of the data table:

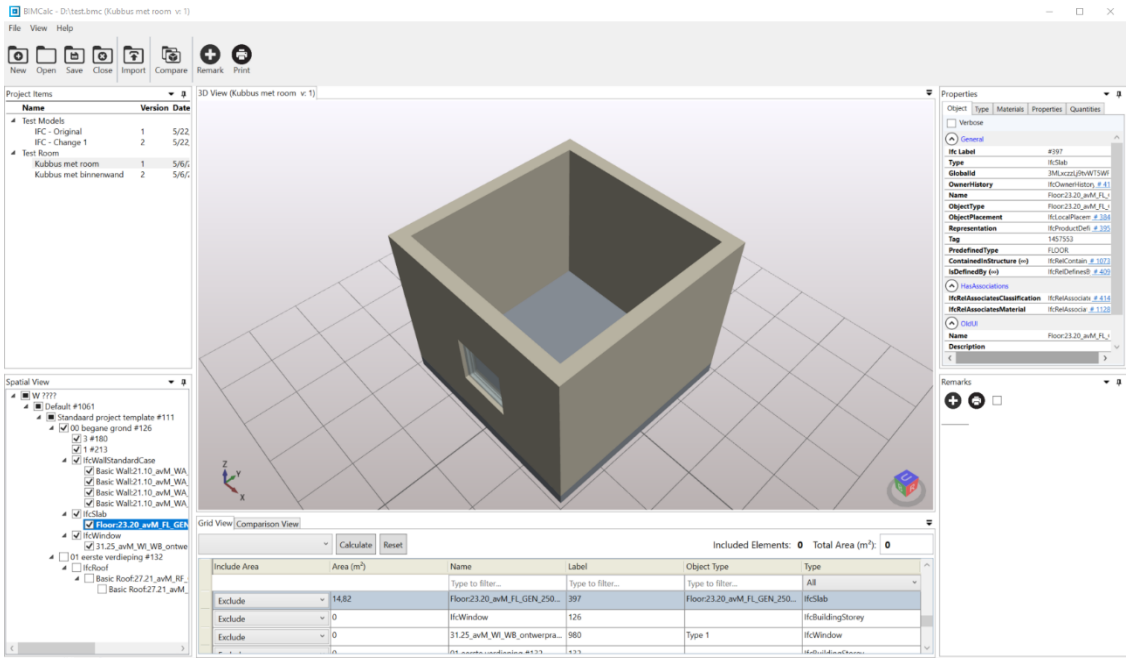
1. Compare: If a row is selected in the data table, a new dialog will be presented to you, which contains the metadata information for the selected IFC model element in both the current and the target IFC model. The two sections are in essence two copies of the IFC Model element properties section. The left side is the original metadata, while the right side is the metadata of the element inside the target IFC model. If the metadata is not present for one of the IFC models (i.e. the element has been removed or newly added), the section will be empty. Clicking any tab pages in ether of the sections will automatically switch the other section tab item as well.
2. Show: If a row is selected in the data table, then the camera inside the 3D model viewer will switch to a position where the IFC model element relevant to the selected row is clearly visible. Other IFC model elements are only displayed in a minimal fashion to achieve this. If the related IFC model element is not available in the currently displayed IFC model, a dialog will be presented to you informing you about this. A yellow information row on top of the 3D model viewer will also be presented to you informing you about this current camera position change. Closing the information row with the 'X' icon on the top right will revert the camera to its previous state.

2. Comparison Example

In this comparison example we will compare two very basic IFC models, a room with four walls and one window. One version of the room contains a smaller separation wall in the middle, while from the other IFC model, this has been removed.

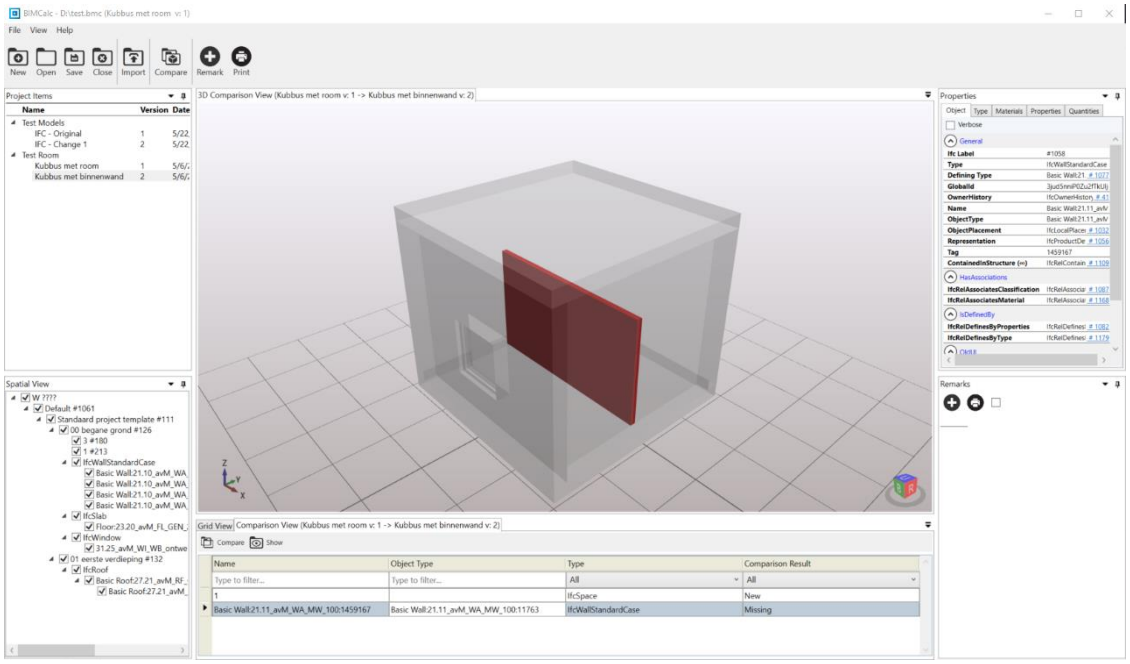


Version '2' of this IFC model has the separation wall inside.

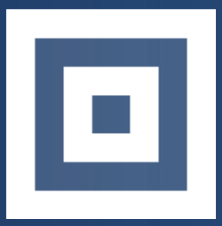


Version ‘1’ of this IFC model has this separation wall removed.

Using BIMCalc’s comparison feature, we see the following result, comparing the two IFC models, while having version ‘2’ of the IFC model currently displayed:



The 3D model viewer has changed all unaffected IFC model elements into a transparent color. The result of the comparison is, as expected, that the separation wall has been marked as ‘Missing’ in the data table of the Comparison view, and it has been highlighted in the 3D model viewer in a red color.



bimcalc