AUTODESK UNIVERSITY

BU18897

COBie and Classification Systems in Revit

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Learning Objectives

- Learn what COBie data can be generated by the Revit model and how to collect that data quickly and efficiently
- Understand how to leverage the connectivity between COBie and major classification systems within your model
- Find out how easy it is to create your own classification system and apply the data directly to Revit elements
- See how to export COBie compliant worksheets directly from your Revit model

Description

Are you required to submit a COBie deliverable from your Revit model? Do you need to be able to apply classification data to Revit elements from systems such as UniFormat, MasterFormat, OmniClass, Uniclass, or even a custom database? This session will provide a deep dive into the two free tools to help you do this: The Autodesk COBie Extension for Revit and the Autodesk Classification Manager for Revit. Learn how to get them, how they work, and how you can configure them to meet your needs. Walk away with the expertise necessary to manage and track COBie and classification system data in your Revit models.

Your AU Experts

T.J. Meehan has recently learned to tie his shoes and is excited to be done with Velcro sneakers although he misses that “rip” sound they would make. He often stares into the infinite realm of the universe and contemplates the existence of all things; but primarily if “Crocs” are really a necessary footwear or can be used as a method to “thin the herd”.

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Jason Kunkel is a dynamic figure, often seen scaling walls and crushing ice. He has been known to remodel train stations on his lunch break. He has translated ancient Sanskrit, written award-winning operas, and can manage time efficiently. He can pilot bicycles up severe inclines with unflagging speed and cook Thirty-Minute Brownies in only twenty minutes. He is an expert in stucco, a veteran in love, and an outlaw in Peru. He plays bluegrass cello, was scouted by the Mets, and is the subject of numerous documentaries. Children trust him and the laws of physics do not apply to him. He balances, he weaves, he dodges, and all his bills are paid.

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COBie

Intro

Construction to Operations Building Information Exchange (COBie) is an exchange format typically used to export data for manageable assets from BIM design software into a data format that can be easily imported into FM and O&M software.

How Revit Plays a Role

As a database, the Revit model is an ideal place to collect and generate much of the COBie expected data. Typically, however, since Revit users are at the beginning of a design/construction process, they are unfamiliar with the specifics of how COBie works.

General COBie Considerations

When you Google “Cobie”, America actress COBie Smulders is usually what you get. But trust us, COBie the data exchange format is out there. Below are some things to keep in mind when working on a project that requires COBie data.

Warranty Information Requires Contacts

Since warranty information requires contacting the warranty provider, any time warranty information is filled out in Type worksheet, there must also be a corresponding Contact listed.

Attributes vs Added Columns

While the COBie standard has fields for much information, often extra data is needed for owner requirements. Many owners will expect this data to be added to the Type or Component or Systems tabs as extra columns. This is not COBie compliant. The proper method for collecting this information is to add rows to the Attribute tab that associate the item’s Name with the data to be collected.

Excel Export Limitation

Excel has a limitation with regards to the amount of data it can hold. It is approximately 1 million rows of data and can be reached very easily if you export every element in your model along with custom attributes. As an example, if you have just 100 additional parameters that you have selected (on the “Attributes” tab of the COBie Extension setup) and you try to export 10,000 elements (which is not difficult with a large model), then you’ve already reached the 1 million row limit. Also, the connection between Microsoft Excel and Autodesk Revit is not a terribly fast one, so exporting all that data and having it write to the Excel spreadsheet can take hours for very large models.

Here are some steps you can take to help remedy this situation:

- Make sure you are only selecting the items for COBie export that are necessary. The COBie standard is specific to managed assets in a building. In other words,

only elements that require maintenance from a building engineer: equipment, fixtures, devices, etc. Other building elements such as walls, floors, ceilings, piping, ductwork, structural elements, etc., do not typically qualify as managed assets. Because of this, you usually do not need to export the entire building to COBie, just those particular assets. This can significantly reduce your export and the time it takes. Every element in the model has a "COBie" yes/no parameter that controls whether or not it's exported and every family type has an equivalent "COBie.Type" yes/no parameter as well. You can use the Modify > Select Elements button to help with this on the COBie Extension ribbon.

- Only export the extra parameters you actually need. The COBie Standard includes some default fields for components, but many more are required to effectively manage those assets in a real building. Don't simply select every custom parameter in your model for export, but instead be very specific about the parameters that are actually necessary to manage that asset. This, too, can significantly reduce your export and the time it takes as well as ensures you are providing only the data necessary to the owner to be able to manage the building.
- Export in chunks. You don't have to export every COBie worksheet at once. Export just the Components worksheet. Then, export just the Attributes worksheet. Finally, do all the rest. You can use the "Append" option each time to continue updating one COBie spreadsheet.

The following link cover the limit and workarounds in detail:

http://www.caddmicrosystems.com/blog/2016/06/optimizing-cobie-deliverables-p2/

COBie Extension

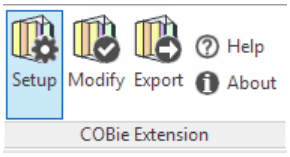
Overview

The Autodesk COBie Extension for Revit is an add-in for Autodesk Revit.

- It runs on Revit 2013, 2014, 2015, 2016, and 2017.
- It configures your Revit model to be able to hold and export data in the COBie standard format.
- It utilizes shared parameters to hold the data in the model.
- These parameters can be customized using the “Custom Parameter Mapping” feature.
- The COBie Extension scored a perfect score at the last COBie Challenge competition.

How to Use

Setup

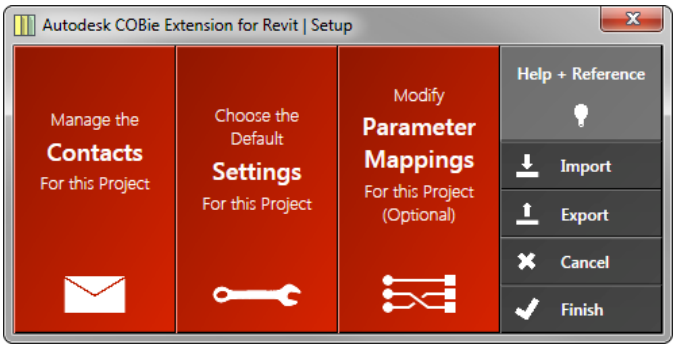


The Setup step will create the necessary parameters in Revit for COBie and apply those parameters to the pertinent elements.

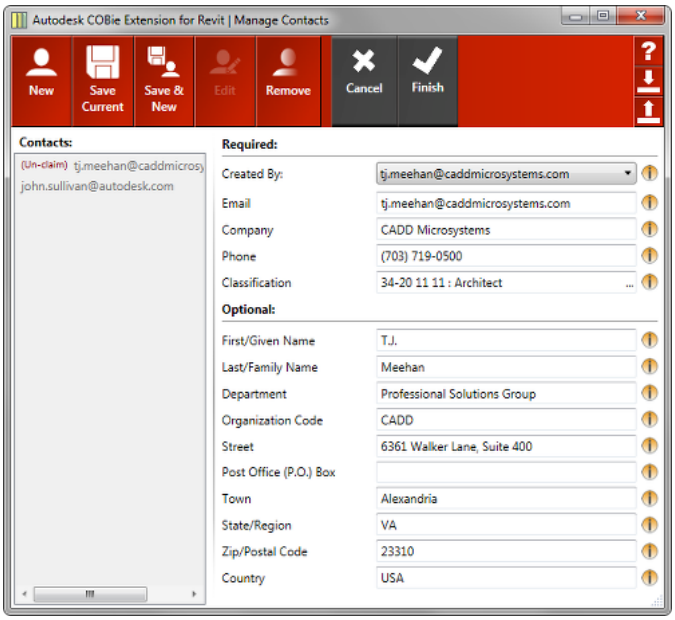
These processes will also import some schedules for COBie that will help with adding and modifying information in those parameters.

Typically, this step happens one time at the beginning of modeling.

Landing Page: Allows you to manage your contacts, define the COBie settings for your model, define your parameter mappings, and perform import/export operations.



Manage Contacts: Opens a dialog box for adding, editing, and deleting COBie contacts and is organized into three parts; the Ribbon spanning the top of the dialog, the Contact List aligned along the left of the dialog, and finally the Contact Details along the right of the dialog.

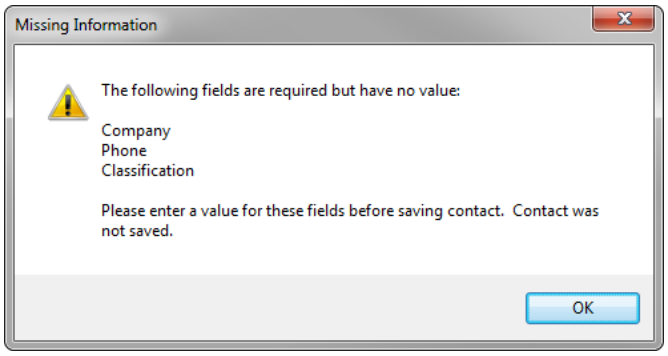


Features include:

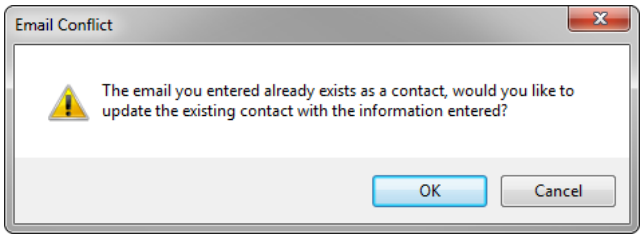
Contacts: List displays an alphabetical list of all contacts stored in the current model. Selecting any contact from this list will display the details for that contact within the Contact Details portion of the dialog. When managing COBie contacts it's important to note the designation between Required and Optional fields. Although any of the Optional fields may include incomplete data, the COBie Extension will not allow contacts with missing or incomplete data for any of the Required fields to be created. Picking the information icon Info Icon displayed to the right of any contact field will provide information describing the data required by a field, along with an example of the expected data for it.

New: Used to create a new contact. Once selected the contact detail fields will accept data allowing you to define a new project contact. Although many fields exist, to remain compliant with COBie requirements, the Email, Company, Phone, and Specification fields are required to create/save a new contact.

Save Current: Used to save the newly added or edited contact. Only complete contact records including data for Email, Company, Phone, and Specification can be saved. If any of these fields are blank, the following warning dialog will display:



In addition, since every e-mail address (which is the unique identifier for each contact) must be unique, if an e-mail is entered for a contact that is the same as another contact the following error dialog will open:



Save & New: Works the same as the "Save" button but also starts a new blank contact for editing.

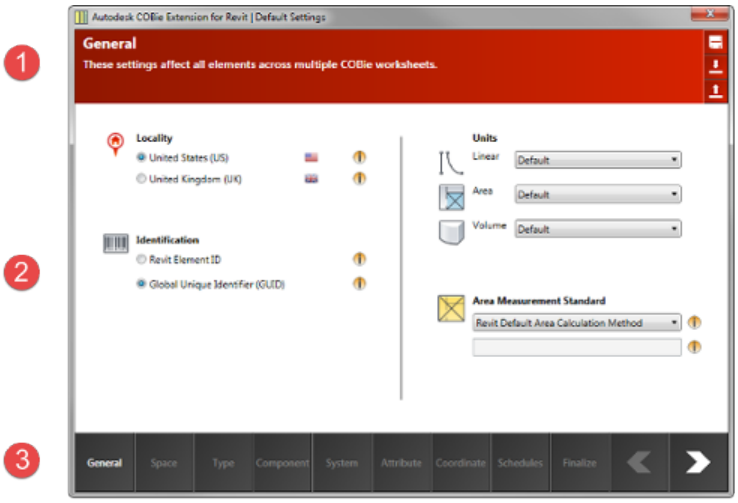
Edit: Selecting any existing contact from the Contact list will display the most up-to-date information for that individual. Select the 'Edit' button from the Ribbon to modify this information.

Remove: Should a contact leave the project team, they can be removed n by selecting their Contact entry within the Contact List on the left side of the Manage Contacts dialog, and then select the Remove button from the Ribbon. Since this will permanently delete the selected contact, a warning dialog will open asking you to confirm the operation.

Cancel: Selecting the 'Cancel' button will discard any unsaved changes to your contacts and close the Manage Contacts dialog.

Finish: Once you have created and saved your contacts, you must click the 'Finish' button to register the contact data in your Revit model.

Default Settings: Opens a separate dialog box that lets you set up defaults that the COBie Extension will use to populate the COBie parameters in your Revit model with the proper data



This dialog box is the most critical part of the setup process, as it:

- Introduces the standard COBie data fields.
- Allows you to choose the default values for those fields.
- Creates all the necessary parameters in the current Revit model as well as imports any necessary content (i.e. schedules, families, etc.)

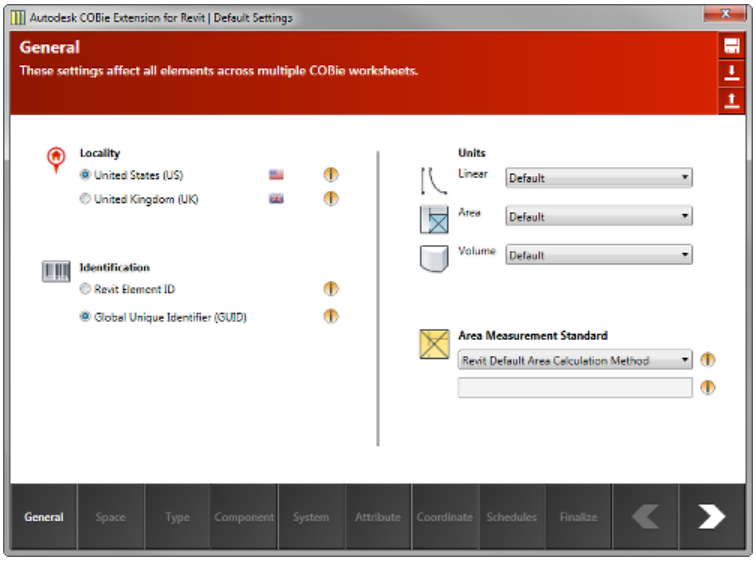
This dialog box is the first in a series of similar dialog boxes walking the user through a "wizard" format. The figure above represents step one of several in the wizard process, and illustrates both the layout and individual elements for these dialog boxes which include the following parts:

1. **Description Area**: Displays the name of the current step in the wizard process along with a brief description of what these settings control. In addition to this title information, three buttons on the right edge of the interface allow you to; Save your settings for the current model; Export your settings as an XML file; and finally Import settings from other projects (using the XML export).

2. **Settings Area**: This area contains the settings you can select for a particular step in the wizard process. Each of the dialog boxes will have different settings from which to choose.

3. **Navigation Bar**: Spanning the bottom, this interface includes a button for each step of the wizard process. Selecting any one of these buttons will jump you directly to that step in the setup process. Left and right arrow buttons complete the list, and will navigate you to the preceding or succeeding step.

Default Settings – General



The following options are available:

Locality: Provides the following options:

- **United States (US)**: This is the default setting, and will instruct the COBie Extension to apply the US template during the export process, and will also check the OmniClass schedules for import.
- **United Kingdom (UK)**: Choosing this option will instruct the COBie Extension to apply the UK template during export, and check the Uniclass schedules for import.

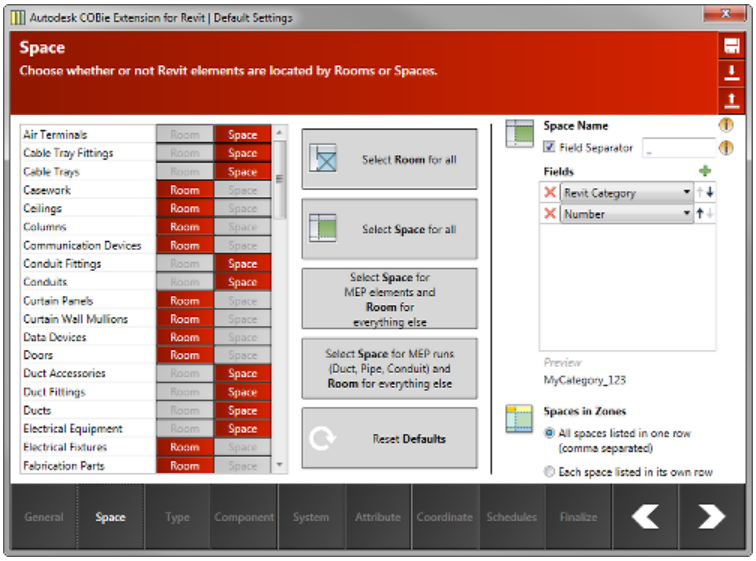
Although the Locality setting does affect the default scheduling system applied to your project, the Schedules page will allow you to override this setting; choosing between OmniClass or Uniclass.

Identification: Allows only a choice between "Revit Element ID" (which means every COBie element in the model will use its Revit Element ID as its COBie ExternalIdentifier value) or "GUID" (which will generate a unique Globally Unique Identifier (GUID) for each COBie element in the model).

Units: Allows you to override the Revit unit settings for the Facility COBie worksheet. Changing these settings has no impact on your Revit model, simply the exported field that is documented in the worksheet.

Area Measurement Standard: Choose the standard used for area measurements in this project. If the standard you are using is not in the list, choose the "Other" option and type in your own value. Changing this setting does not affect the exported values - it simply documents the method of measurement you are using.

Default Settings – Spaces



The Spaces dialog allows you to configure whether Revit elements remember the Room or the Space in which they are located for the Space column (column E) of the "Component" COBie worksheet.

The scrolling window on the left side will be a list of all the pertinent Revit categories with a toggle to designate whether the Room or Space data is used to track their location.

The five buttons on the right will change the toggles based on their descriptions.

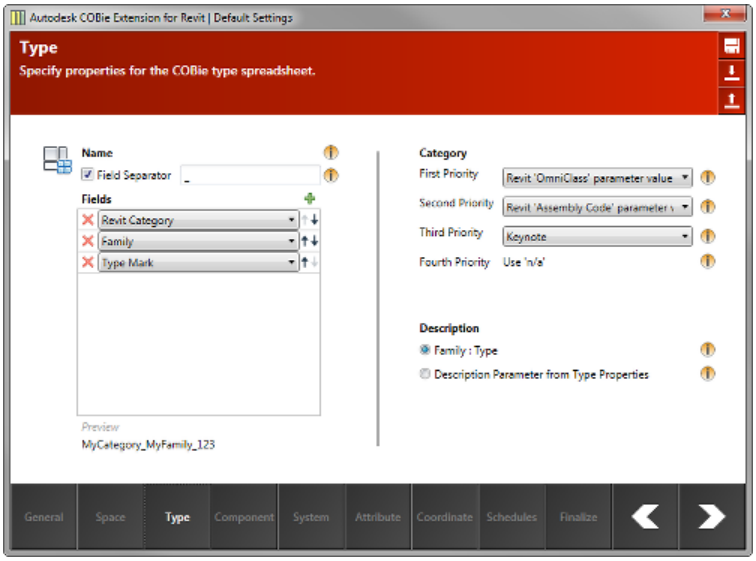
All MEP Elements = any category that is considered MEP.

All MEP Runs = just MEP categories that are used as carrying paths (duct, pipe, conduit, cable tray).

Default = Same as All MEP Elements, except anything that is considered more MEP equipment is assigned to Spaces and MEP devices and fixtures are assigned to Rooms (as an architect will often initially place these).

> **Space Name**: Using the table, you can configure how the COBie.Name field is constructed for exported spaces in your model. You can add, remove, and reorder fields, include manual text, and have a field separator to build the name. A preview below the table shows you what the output name will be.
>
> **Spaces in Zones**: This area gives two options to allow you to decide whether the spaces listed for each zone on the COBie Zone worksheet are listed in one cell, comma-separated, or listed as a separate row for each space.

Default Settings – Type



The following options are available:

Name: Configure how the COBie.Name field is constructed for family types in your model. You can add, remove, and reorder fields, include manual text, and have a field separator to build the name. A preview below the table shows you what the output name will be.

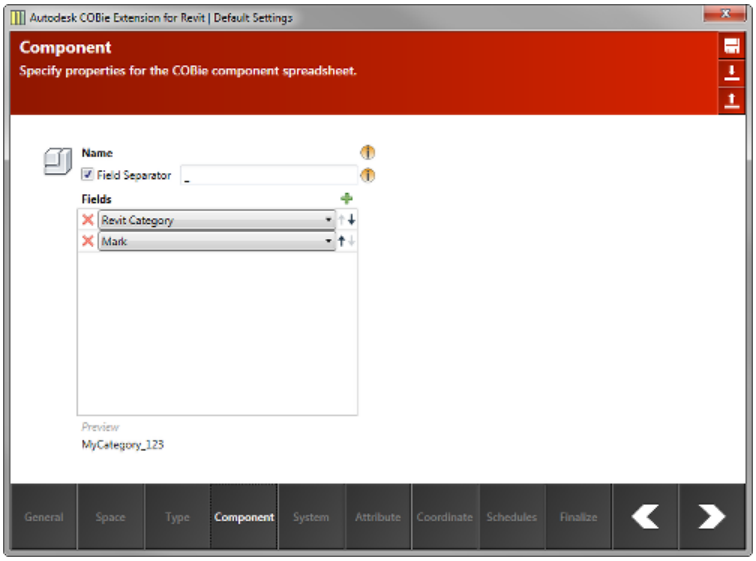
Category: The 'Category' items contain drop-down lists with varying options, organized by priority; meaning, the COBie Extension will attempt to find a value in your first priority, and if no data is found in that field, it will look for data in the second priority, and so on, ultimately ending with "n/a" if no appropriate data is found in the model's parameters.

Description: The 'Description' item also allows only a choice between two options:

Description Parameter from Type Properties Default: This setting will take the value from the Description parameter in the Type properties of the element to use for its COBie Description value.

Family_Type: This setting is selected, and then the family name of the element will be concatenated with the name of the Type within that family (with an underscore in between) as its COBie Description value.

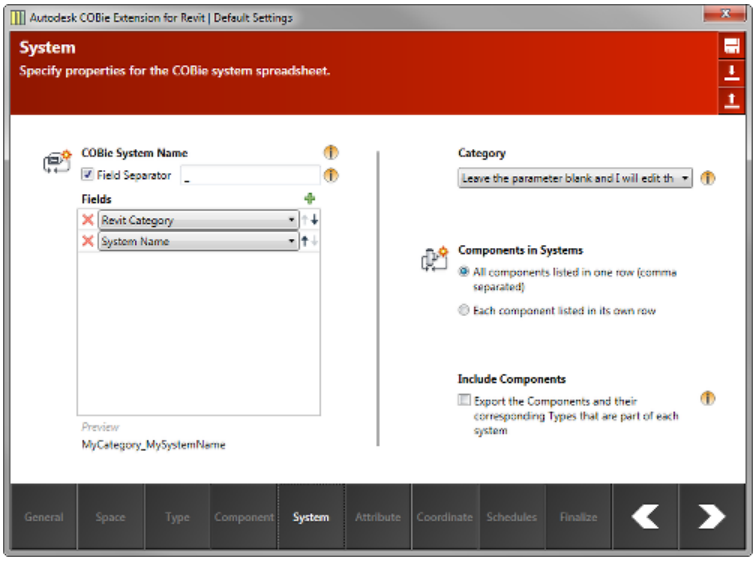
Default Settings – Component



The following options are available:

Name: Configure how the COBie.Name field is constructed for family types in your model. You can add, remove, and reorder fields, include manual text, and have a field separator to build the name. A preview below the table shows you what the output name will be.

Default Settings – System



The following options are available:

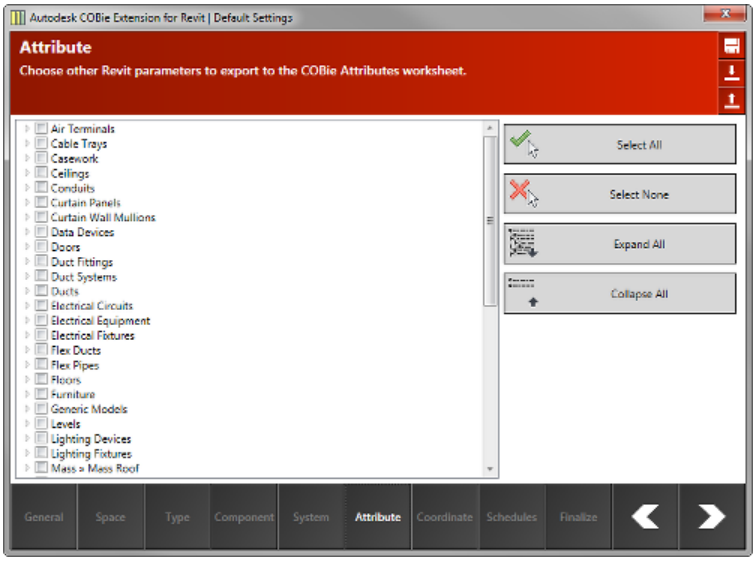
Name: Configure how the COBie.Name field is constructed for family types in your model. You can add, remove, and reorder fields, include manual text, and have a field separator to build the name. A preview below the table shows you what the output name will be.

Category: Leaves the COBie.System.Category parameter blank for manual entry, or, if you have the Autodesk Classification Manager for Revit installed, will use the values from the corresponding Classification Manager fields to populate the 'Category'.

Components in Systems: This toggle will export each component of a system either in a single row per system, or each component will get its own row.

Include Components: Checking this box will automatically add each element of an exported System, and its corresponding type, to the Component and Type worksheets. If you do not check this option, your exported COBie spreadsheet may not be valid, as components may be referenced on the System worksheet that are not listed on the Component and Type worksheets.

Default Settings – Attributes

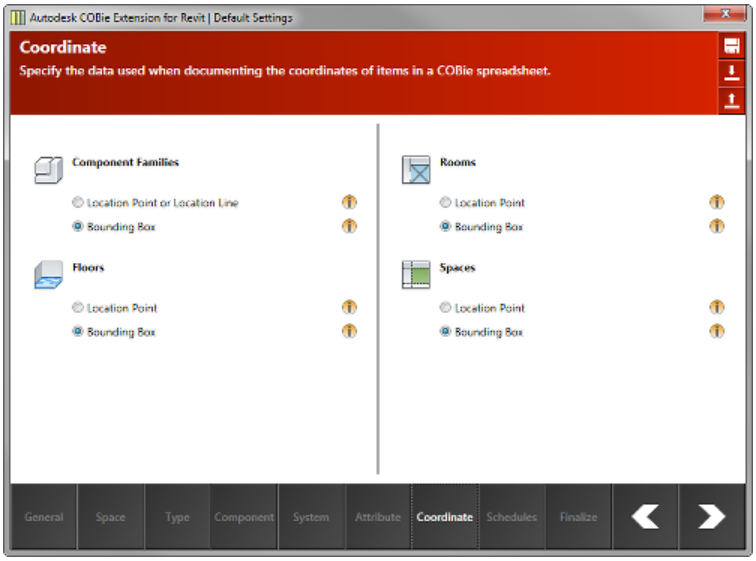


The Attributes dialog box gives you the ability to select other type and instance parameters from families to be exported to the Attribute worksheet in the COBie spreadsheet.

The organization is shown above, but it includes all the Revit family categories as the top level, followed by “Type Parameters” and “Instance Parameters” as the second level, and all the pertinent parameters for each as the third level.

This list will include all the parameters of the current model – both Revit standard parameters and those added to the model (project and shared).

Default Settings – Coordinates



The Coordinates dialog controls what data is used from Revit to populate certain fields on the “Coordinate” COBie worksheet.

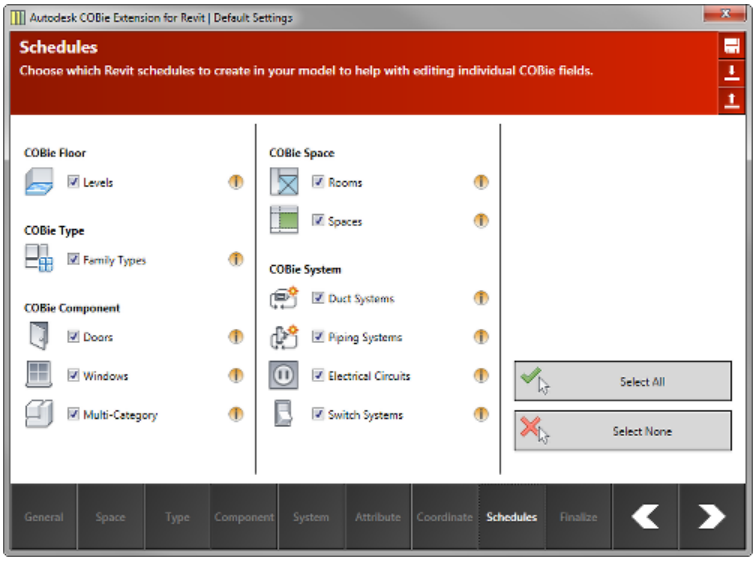
Those data fields include:

- CoordinateXAxis
- CoordinateYAxis
- CoordinateZAxis
- ClockwiseRotation
- ElevationalRotation
- YawRotation

The default option for each coordinate type is “Bounding Box”.

More than likely, this will not be a COBie worksheet / data table in COBie v3.0.

Default Settings – Schedules

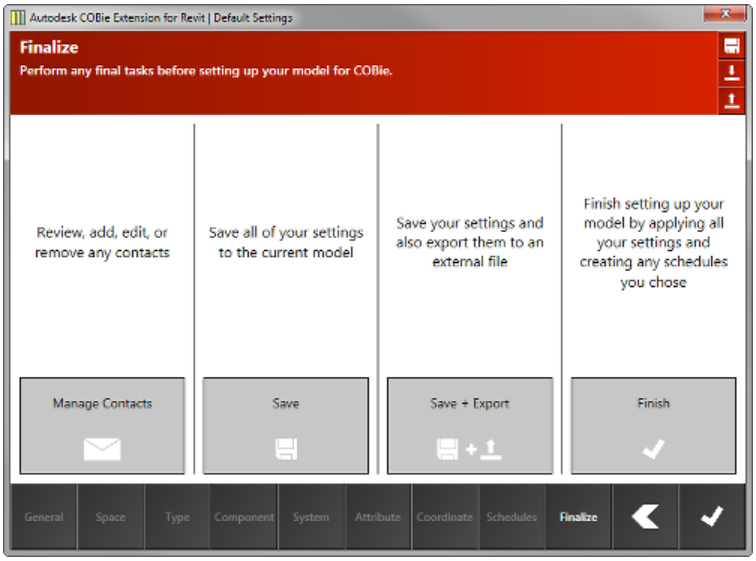


The Schedules dialog represents the standard Revit schedules and key schedules that will be imported from the Revit Resource Model.

The Resource Model is part of the COBie Extension installation, and can be located in the extensions installation folder on your computer:

```
C:\Program Files (x86)\Autodesk\COBie Extension\201x\
COBie Extension Resource Model 201x.rvt
```

Default Settings – Finalize



The Finalize dialog box gives you one last chance to do any final changes to the settings before clicking the “Finish” button (designated by a check symbol).

Each of the first three buttons – Manage Contacts, Save, Save + Export – are features already explained in previous sections.

The “Finish” or a (check) button will perform two functions:

Save all the settings chosen to the current model in the extensible data area

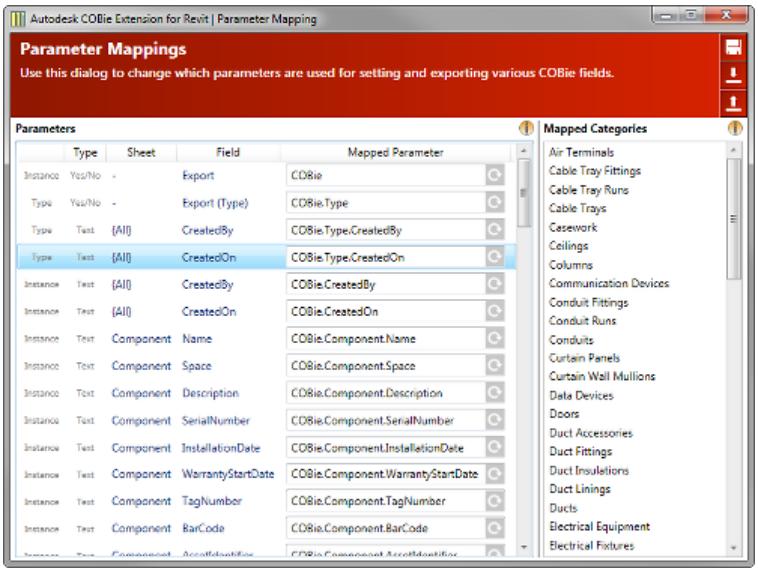
Begin to execute the changes to the current model designated by the settings by:

Creating all the necessary shared parameters and applying them to the appropriate elements

Import the schedules chosen during the Step 6 – Schedules step

During this process, a progress bar will appear showing the progress for each step as well as the overall progress.

Parameter Mapping: The COBie Extension has functionality to create and manage its own parameters in your Revit model. However, you might have already created your own parameters to store some COBie or related data. The Parameter Mapping function allows you to bypass the default COBie Extension parameters and use your own.

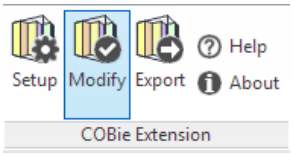


The following options are available:

- The extension will then use these mapped parameters for data storage and exporting to your final COBie spreadsheet.
- Working from left to right, the Parameters table has columns that show you if the parameter needs to be an Instance or Type parameter, what the data type is, which COBie spreadsheet that data shows up on, and the field on the COBie spreadsheet.
- The final field will have the COBie Extension parameter in there by default. This is where you will type in your parameter to bypass the default.
- Each field has a reset button that will return the parameter setting to the default COBie Extension parameter.
- If you use your own parameters, they MUST match all the settings outlined in the Parameters table (instance vs. type, data type) and the parameter name must be typed exactly as it is in the model
- In addition, you must make sure that your parameter is assigned to the appropriate categories before using it.
- Selecting a row in the Parameters table will bring up a list of the required categories in the Mapped Categories table on the right of the dialog box.

Once you have your parameters mapped properly, use the save button in the upper right to save your settings. Here you can also import a preconfigured Parameter Mapping, or export the current settings to use in other projects.

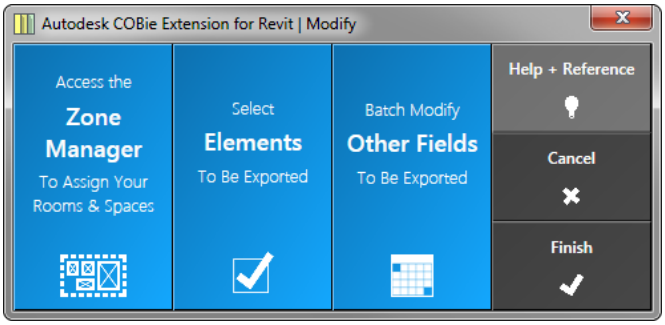
Modify



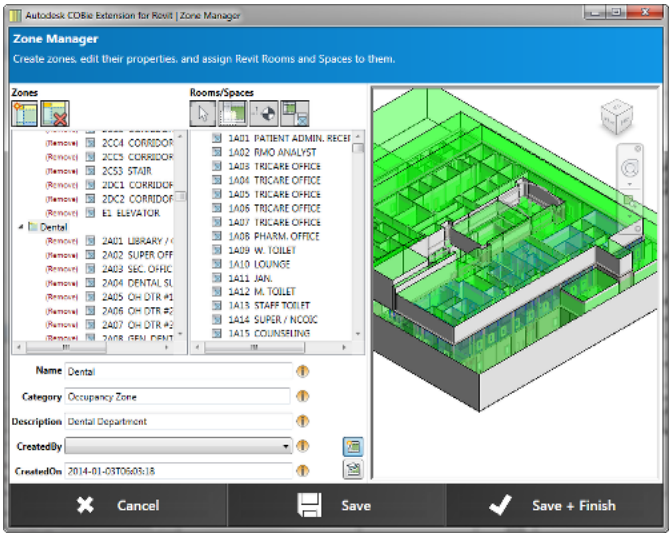
The Modify step allows the COBie data applied to elements during the life of the Revit model to be edited.

This process can be completed manually, or by using a batch-updating tool included with the COBie Extension.

Landing Page: Similar to the Setup process, choosing the Modify button from the COBie Extension panel on the Ribbon will open a Landing Page.



Zone Manager: Based on the taxonomy of Revit elements, COBie Zones may be defined by Revit Rooms, Revit Spaces, or some combination of the two.



Features include:

- The Zone Manager allows COBie Zones to be created in a hierarchical manner.
- Once created, those Zones may be mapped to any of the Revit Rooms or Spaces present in the current model.
- The Zone Manager dialog is organized into three columns; Zones, Rooms/Spaces, and the model preview
- On the left side of the Zone Manager is the Zones column that includes a toolbar with three buttons with a tree view listing each zone defined for the current project. The three toolbar buttons at the top of the Zone column perform the following:

Create Zone: Defines a new COBie Zone for the current project.

Delete Zone: Removes an existing COBie Zone from the current project.

Below the Zone toolbar is a tree view that will display each of the COBie Zones present in the current project. Selecting on any one of these COBie Zones will allow its Name, Category, and a Description to be specified in the fields that display along the bottom of the dialog. Expanding the tree node of any COBie zone will display a list of Revit Rooms and Spaces already associated to it.

The center column within the Zone Manager provides tools for managing Revit Rooms and Spaces. Similar to the Zones column, the Rooms/Spaces column includes a toolbar with four buttons, and a list box below toolbar. The four toolbar at

the top of this column function as filters for the Revit Rooms and Spaces in the current model:

Show All Filter: Resets the Rooms/Spaces list to its default state and displays all Revit Rooms/Spaces in the current model.

COBie Zone Filter: Shows which Rooms/Spaces have NOT been assigned to one of the COBie Zones defined within the current project. Revit Rooms or Spaces currently assigned to a COBie Zone will not be displayed.

Sort by Level Filter: Updates the list view to organize all Revit Rooms and Spaces in the current model by the Revit Level they are hosted by within the current model.

Show Spaces/Rooms/Rooms & Spaces Toggle: This button is a three-way toggle that will update the list view to only display Revit Spaces; only display Revit Rooms; or display both Revit Rooms and Spaces concurrently.

Custom filters may be composed by combining the above buttons; for example, you might use the COBie Zone filter in tandem with the Show Spaces toggle to update the Rooms/Spaces list so it only displays Revit Spaces that have not been assigned to a COBie Zone.

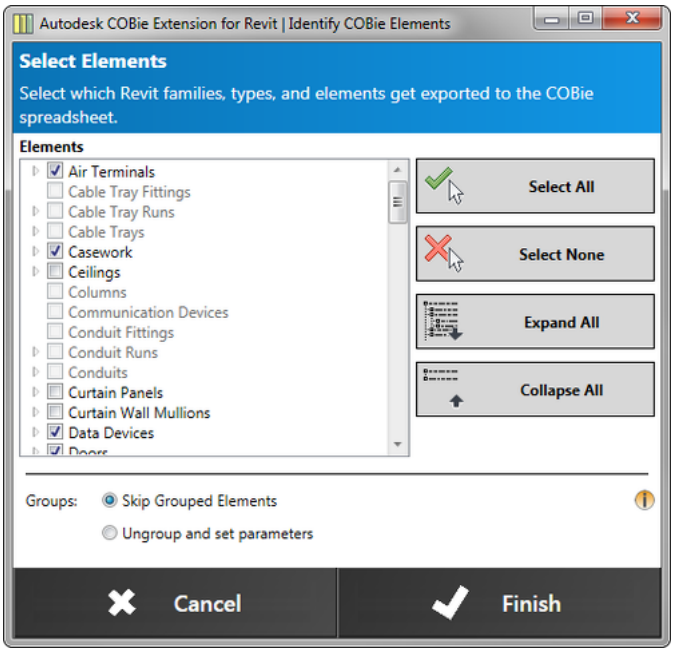
The list box below the toolbar will display all Revit Rooms and Spaces present in the current model. Since both Revit Rooms and Spaces may be used to define COBie Zones, special attention should be taken to ensure a compliant COBie export without duplicate names. Please refer to the COBie with Revit section of this Getting Started Guide to learn more about how to manage the relationship between Revit Rooms and Spaces.

Once you have created the appropriate Zones, you can simply drag and drop a room or space from the center column to the zone in the left hand column. The (Remove) link next to the room or space will allow you to remove it from the zone. To comply with COBie requirements, you are able to add a room or space to multiple zones.

The final column on the right side of the Zone Manager dialog displays a preview of the current model. Intended for reference purposes, Revit Rooms or Spaces selected from the list will highlight in the preview. Additionally, the View Cube in the upper-right corner of the preview window allows for basic navigation tasks to be performed.

The navigation bar at the bottom of the Zone Manager interface provides tools for the following:

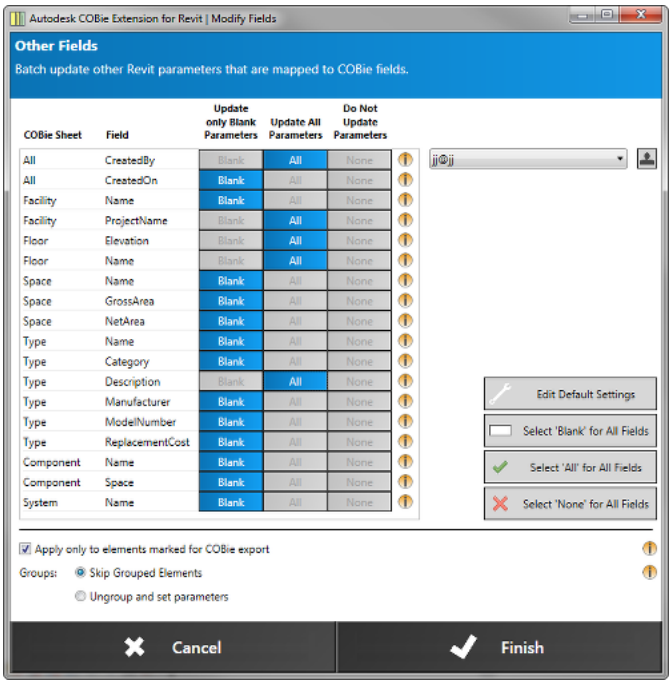
Select Elements: Which elements the COBie Extension exports are determined by the Select Elements dialog.



Features Include:

- At its highest level, the tree view list within this dialog lists each of the Revit Family Types available for export. Below each of these primary headers are the individual families, types, and elements present within the current model.
- Use the Select All button to export all possible model elements, or the Select None button to clear all checkboxes. By default, selecting a higher-level parent in the tree view list will also select all child entries below it. Override this behavior by unchecking any family, type, or element you wish to omit from the COBie export.
- Running this tool will "check" the COBie parameter for the instances of the selected categories, types, or families. If you have a properly mapped yes/no parameter to use in lieu of the COBie parameter, it will check that parameter.

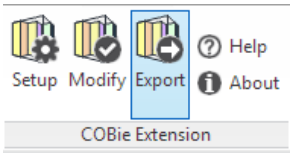
Batch Modify Other Fields: Using the settings defined in the Setup, the Batch Modify Other Fields window will then generate the appropriate data and assign that data to either the predefined COBie Extension parameter, or any properly mapped parameter.



Features include:

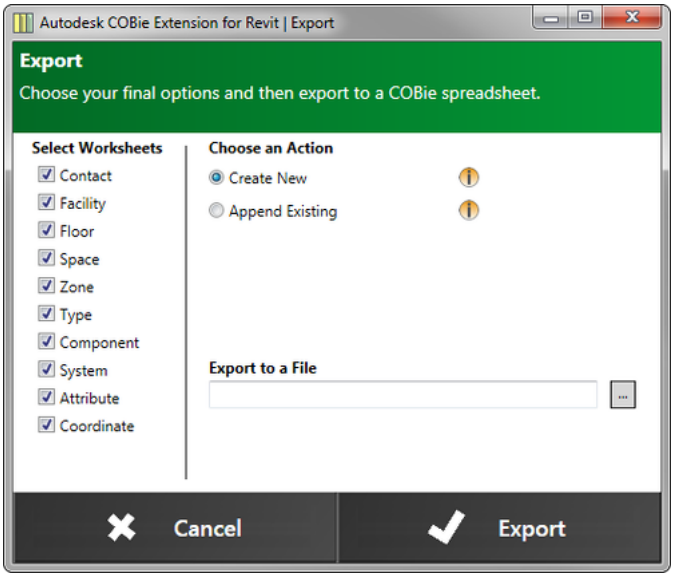
- In this window you can tell the COBie Extension to update only blank parameters, all parameters, or skip it.
- You also get control over model groups within your model, and how to manage those. The elements inside groups cannot have individualized data written to them properly, so the extension give you to option to either skip groups, or ungroup them first so the data can be written properly.

Export



Generates the necessary COBie spreadsheets as a Microsoft Excel document.

Uses the settings configured in the Setup.



The ‘Export’ dialog includes the following features:

Select Worksheets: You can specify which worksheets are exported from the current Revit model

Create New: This will generate a new Excel spreadsheet using the built-in COBie template.

Append Existing: This option will utilize an existing COBie spreadsheet generated by the COBie extension, and append any new information to it.

Export to a File: Use the browse button to find and name your exported spreadsheet.

Tips and Best Practices

Schedules

The COBie Extension will create schedules in the Revit model. These are NOT exported. They are simply there for reference to make collecting and editing the COBie data easier. They can be manipulated and updated like any Revit schedule and will have no impact on the exported COBie spreadsheet.

Parameter Mapping

Fields for Parameter Mapping MUST be in the model, not just the family.

Parameter Mapping is a two-way street – running the Batch Modify Other Fields function will update the mapped parameters.

Populating Data for Export

Using either the COBie Extension parameters or the mapped parameters, you can manually update the values in those fields like any other Revit parameter. This can be an effective way to update individual parameters or override batch updated parameters.

The extension also includes the functionality to update default or mapped parameters with predefined values. Under the Modify menu, the Batch Modify Other Fields function will reference the COBie Extension's Settings and update parameters based on those settings. The Batch Modify function can be set at run time to override all parameters, ignore blanks, or skip a group of parameters altogether.

Selecting Elements to Export

You do not want to export every element from your Revit model to your COBie worksheet. That amount of data is useless as an O&M handoff. The COBie Extension has functionality that can help select what elements in your Revit model need to be exported.

Once the COBie Extension setup is run all model instance elements will have a COBie parameter and all model types will have a COBie.Type parameter. These parameters are yes/no and this is how the COBie Extension decides what elements get exported into the COBie spreadsheet. You can manually toggle this checkbox parameter to manage individual elements, or control a small amount of elements either directly from the element or in a schedule.

To allow the COBie Extension to manage this yes/no parameter, you can use the Select Elements function under the Modify menu. This tool will allow you to select whole categories, types, or individual Revit elements in an expandable menu after which the Extension will toggle on and off the matching elements. Be aware that any manually toggled parameter will be overridden by running this tool.

Attributes

For exporting the COBie Extension can be configured to export individual parameters onto the Attributes tab in the COBie spreadsheet. The Attributes area in the Setup menu lists all parameters in the active model organized by Revit category. Selecting these parameters will export them to the spreadsheet. However, only parameters for matching exported elements will be on the final Attributes tab.

Some requirements expect extra columns to be added to other COBie spreadsheet tabs, however this functionality is not supported by the Extension.

Units

Exported dimensions look at the Project Units "Unit Symbol" so if that says "None" you get none.

COBie Spaces vs Revit Rooms/Spaces vs Areas

Revit has two different elements to track area and volumetric spatial data in buildings – Rooms and Spaces. Rooms are typically used by architects, while Spaces are typically used by mechanical/electrical/plumbing engineers. Both Rooms and Spaces contain parameters for identity data (like name, number, and associated level) and spatial data (like perimeter, area, and volume). Rooms also contain parameters for architectural data (like finishes for floor, baseboard, walls, and ceiling), whereas Spaces contain parameters for engineering data (like airflows, power and lighting loads, and energy analysis assumptions). Families placed in a Revit model – which are used to represent furniture, fixtures, and equipment – understand that they are contained within Rooms or Spaces and can report the data from them (for example, the name and number of the room they are in).

COBie only utilizes one element for spatial data, Spaces. Because of this, it is important that you define which Revit element – either a Room or a Space – a particular piece of equipment uses to report its location (since it could be located in both). The COBie extension handles this by providing an option in the Settings to choose, based on Revit category, whether spatial data is exported from the Room or Space. For example, you may choose that Door elements (Door being a Revit category) take their spatial data from Rooms, but VAV boxes (part of the Mechanical Equipment category in Revit) take their spatial data from Spaces.

Extensible Storage

The data for the ‘Contact’ and ‘Zone’ worksheets, since there is not a Revit equivalent element, is saved in the extensible storage of the RVT file. Because of this, it can only be accessed programmatically.

Integration with IFC Exporter

The IFC Exporter for Revit has been updated to accommodate the data for 'Contact' and 'Zone' in extensible storage.

Duplicate parameter fields

The COBie Extension has one parameter for each COBie field, even if there's a Revit equivalent. For example, the Type parameter 'Cost' is identical to the COBie Type parameter 'ReplacementCost'. In an effort to minimize confusion – having some COBie data in standard Revit parameters and other data in custom parameters – it was decided early on in the development to have a parameter for

There is a section on the web site about how Revit items related to COBie:

http://www.biminteroperabilitytools.com/cobieextension/help/withrevit.html

- Revit Rooms / Spaces Verses COBie Spaces
- Zones
- Picklists
- Unique Row Names
- Custom Parameters for Overrides

Out of date version

The most frequent support issue, by far, is related to users running an old build. Always make sure you have the latest build as your first troubleshooting step.

Identifying COBie Elements

The Identifier item allows only a choice between two options and the default choice is shown in the graphic above. Choosing "Revit Element ID" means every COBie element in the model will use its Revit Element ID as its COBie ExternalIdentifier value. If "GUID" is selected, then the COBie Extension will generate a unique Globally Unique Identifier (GUID) for each COBie element in the model.

Parameters

If you would like a list of all the default parameters and the categories they map to, please contact us and we'd be happy to send you a spreadsheet with all of this information.

Classification Systems

Overview

As the need to share data has increased over the years, the need to organize and categorize building systems, materials, and components of construction has increased as well. To this end, the AECO industry has come to rely more on classification systems that organize the different parts of how to construct and operate a building into a structured hierarchy that can be referenced and used by any party.

Prominent Systems

In the US, the classification systems most often referenced are OmniClass, UniFormat, and MasterFormat. In the UK, Uniclass 2015 is being put forward as the most relevant system to support the UK BIM Initiative.

Each of these systems has different components that they classify, typically divided by tables. The chart below lays out the primary classification systems and their relationships to each other.

CATEGORY	TITLE	DESCRIPTION	VERSION	AUTHOR
Facilities	OmniClass Table 11	Construction Entities by Function	February 2013	OmniClass Construction Classification System (OCCS) Development Committee
	Uniclass Table D	Facilities	Version 1.4	Construction Project Information Committee (CPIC)
	Uniclass Table En	Entities	2015	Construction Project Information Committee (CPIC)
Spaces	OmniClass Table 13	Spaces by Function	May 2012	OCCS Development Committee
	Uniclass Table F	Spaces	Version 1.4	CPIC
	Uniclass Table Sp	Spaces	2015	CPIC
Systems	UniFormat	Construction Systems and Assemblies	2010 Edition	Construction Specifications Institute (CSI)
	OmniClass Table 21	Elements	May 2012	OCCS Development Committee
	Uniclass Table G	Elements	Version 1.4	CPIC
	Uniclass Table Ee	Elements	2015	CPIC
Work Results	MasterFormat	Master List of Numbers and Titles Classified by Work Results	2010 Edition	Construction Specifications Institute (CSI)
	OmniClass Table 22	Work Results	May 2012	OCCS Development Committee
	Uniclass Table J	Works Sections for Buildings/Civil Engineering Works	Version 1.4	CPIC
Products	OmniClass Table 23	Products	May 2012	OCCS Development Committee
	Uniclass Table L	Construction Products	Version 1.4	CPIC
	Uniclass Table Pr	Products	2015	CPIC
Roles	OmniClass Table 34	Organizational Roles	October 2012	OCCS Development Committee
	Uniclass Table C	Management	Version 1.4	CPIC

Other Systems

In addition to the main systems listed above, other notable standard systems include BOMA (US), NBS, and Natspec (AUS).

In addition to standard industry wide classification systems, individual entities and organizations can generate their own classifications to fulfill specific needs within their own workflows. These may be related to rooms/spaces function, building function, occupant information, fire rating, etc.

Custom Classification Systems

The Classification Manager can be used in a way to help solve a deficiency in Revit. This is the fact that Revit does not allow you to build a list of values for people to choose from when editing parameters. You can certainly build a Key Schedule in Revit to do this, but Key Schedules are limited to custom project parameters (and cannot edit standard Revit parameters), only work on one family category at a time, and do not give you the flexibility to enter a value that isn't on the standard list.

A custom database with the Classification Manager will allow you to build a list of standard values that you can access within Revit, apply to any parameter (custom, shared, or even standard), and can apply to more than one family category.

For example, you could have a custom Classification Manager database for fire ratings. Often, users do now know if they should type in "1 HOUR", "1 HR.", "1-hour rating", etc. You can create a standardized list and users can select both the door and the wall that hosts that door at the same time and apply the standard value to the standard "Fire Rating" parameter on both elements.

Classification Manager

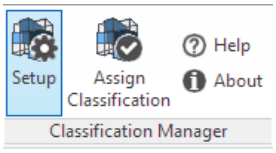
Overview

The Autodesk Classification Manager for Revit is an add-in for Autodesk Revit.

- It runs on Revit 2013, 2014, 2015, 2016, and 2017.
- It allows you to assign multiple classification system values to elements and types with one click.
- It references fully configurable Microsoft Excel files for its classification system database files.
- It integrates with the Autodesk COBie Extension for Revit by providing “category” data for Contact, Facility, Space, Type, and Component worksheets.
- You can control the naming of the parameters it uses by editing the database file.

How to Use

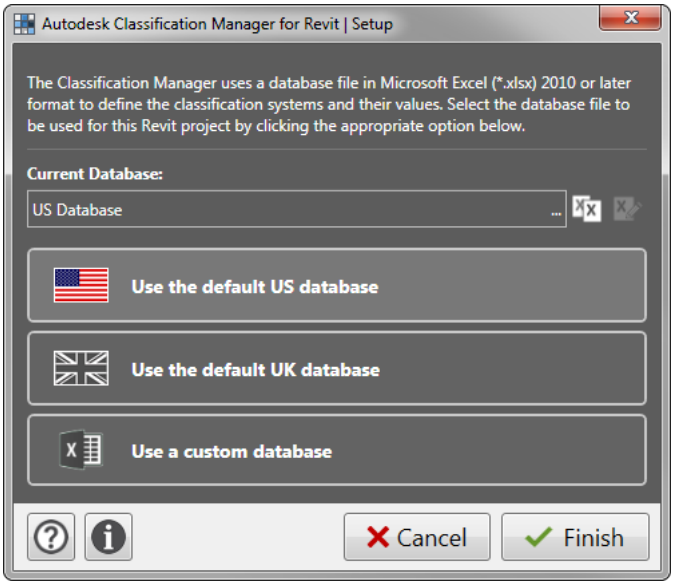
Setup



The first step in using the Classification Manager is to select a classification database.

Clicking Setup from the Classification Manager Panel located on the Add-Ins Tab, you can select a default dataset, create a new dataset from the default Excel file, or open the current dataset for editing.

Click one of the options to pick the database to use.

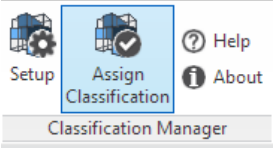


You can return to this screen to change your selection at any point during the project life cycle if necessary.

The name of the database chosen is saved in the extensible storage of the RVT file.

Instructions on creating a custom classification database can be found in the Excel file, "Classification Manager Database Custom" located in the Classification Manager installation folder.

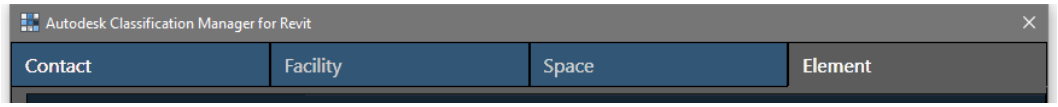
Assign Classification



For elements in the Revit model, select the elements, and then click the "Assign Classification" icon.

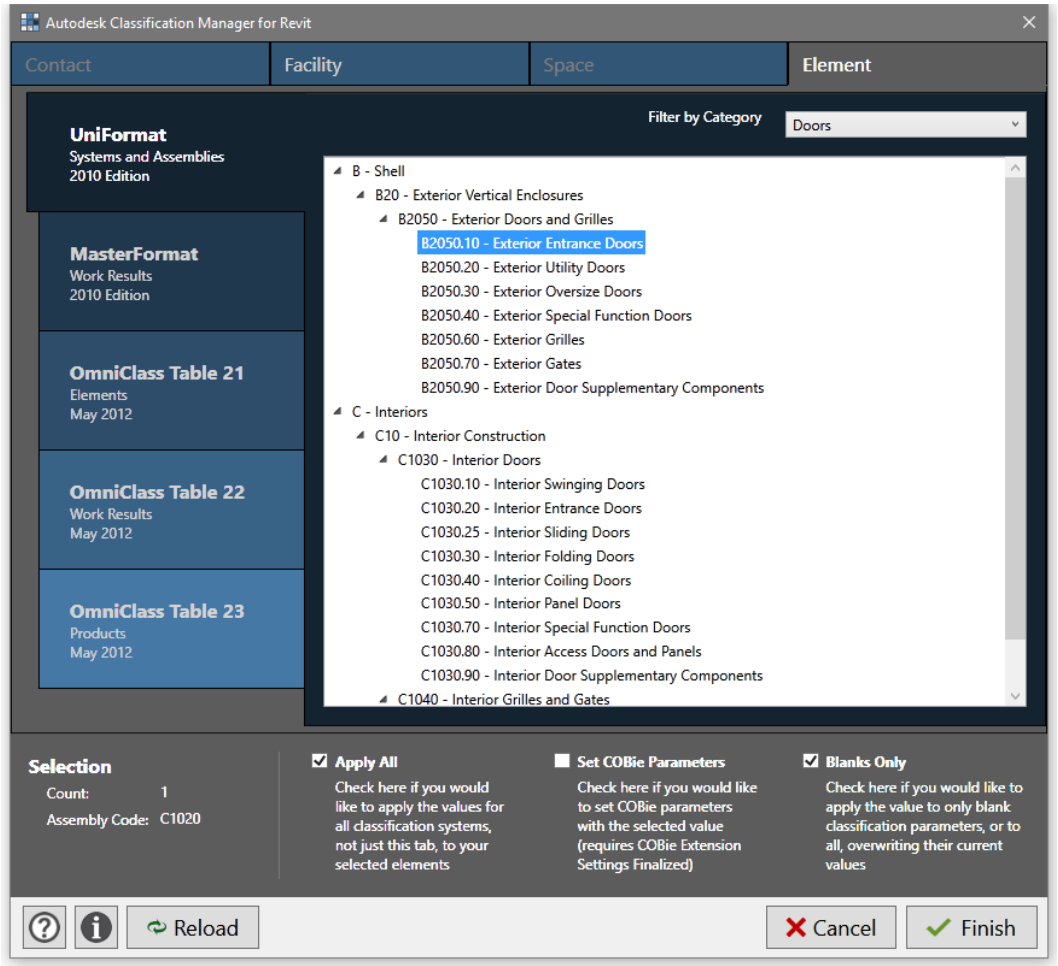
You can also select Family Types from the Project Browser.

Depending on what type of element you selected, the appropriate tab and filter will be applied to your list of classifications to use.



If you have no element selected, you will be given the option to assign Facility classifications, which get assigned to the Project Information.

The Contacts tab is used as integration with the Autodesk COBie Extension for Revit.



Simply navigate through the tree in the right hand window, select the classification you want to assign, and click the Finish button.

You can easily toggle between classification systems on the left, if your database supports multiple systems.

If your chosen database has been set up to support cross classifying, the "Apply All" checkbox will attempt to assign classifications across the systems available in your database.

"Set COBie Parameters" will assign the classification to the appropriate default parameter used by the Autodesk COBie Extension for Revit, if those parameters exist in the model.

The "Blanks Only" checkbox can keep you from overwriting any existing data already in the parameters used by the Classification Manager.

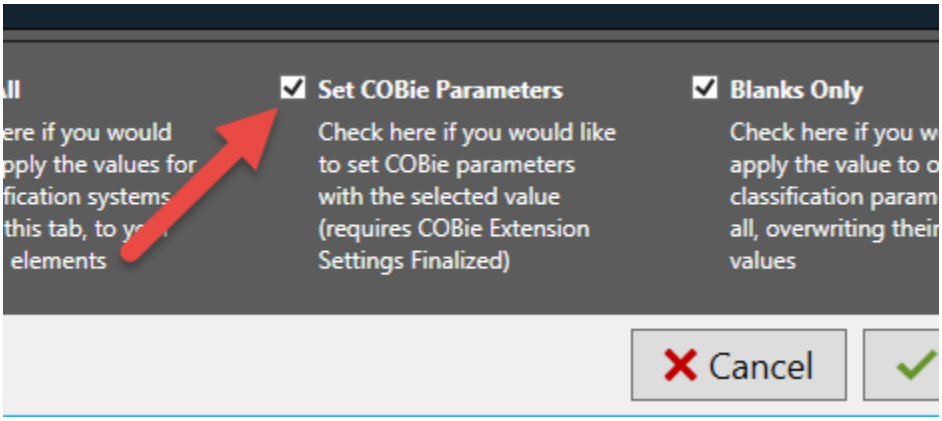
Tip and Best Practices

Integration with COBie Extension

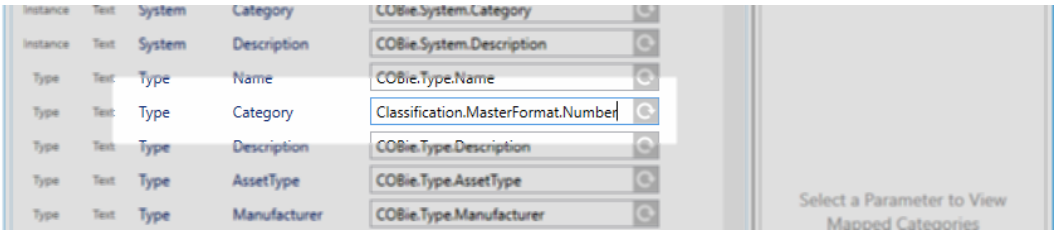
Since many COBie exports require the use of a classification system, the Classification Manager has been designed to work with the COBie Extension.

To successfully employ this integration, both the Classification Manager and the COBie Extension must have been already properly setup for the project in question. There are four primary methods of utilizing the Classification Manager data and database in the COBie Extension. The important thing to remember is to decide on a method that is effective for your workflow and use only that method. Confusion and bad data can occur if the techniques are mixed in any one project.

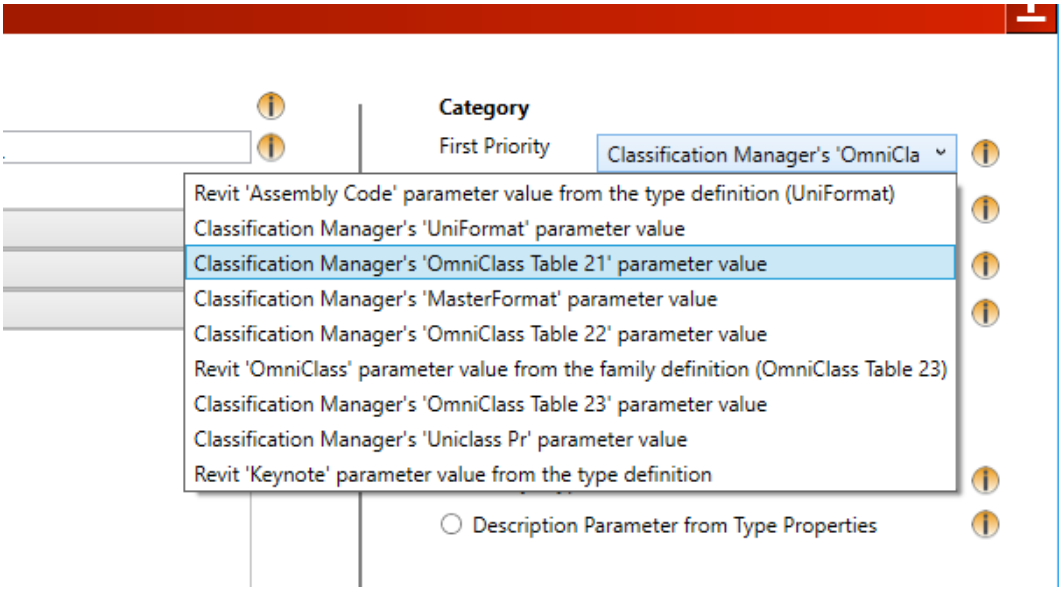
The first method is accomplished via the Classification Manager. When assigning a classification to an element, if you check the “Set COBie Parameters” checkbox, a combination of the classification’s number and description will be generated and fill in the COBie.Type.Category parameter.



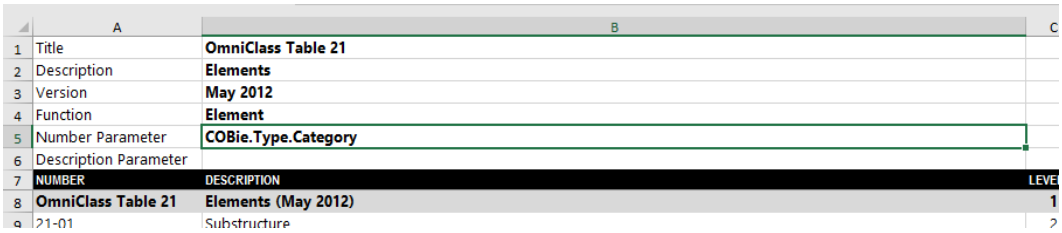
The second method is to leverage Parameter Mapping inside of the COBie Extension. In lieu of using the default COBie parameter, you can reassign it to the Classification Manager. Remember to not overwrite your Classification Manager parameter when you run the batch modify update function in the COBie Extension.



The third technique is to configure your settings in the COBie Extension to pull from the Classification Manager parameters. On the Type and System tab, the Category dropdowns have the default Classification Manager parameters as options that you can choose from. If you select one of these, when the COBie Extension batch update is run, the extension will look for these parameters, and if data is accessible in them, the extension will copy that information to the appropriate COBie parameter.



The fourth and final method is to customize the Classification Manager database to point the parameters used to the default COBie parameters. Then when you assign a classification via the Classification Manager, the tool will fill in the COBie parameter instead of the default Classification Parameter.



	A	B	C
1	Title	**OmniClass Table 21**	
2	Description	**Elements**	
3	Version	**May 2012**	
4	Function	**Element**	
5	Number Parameter	**COBie.Type.Category**	
6	Description Parameter		
7	NUMBER	DESCRIPTION	LEVEL
8	**OmniClass Table 21**	**Elements (May 2012)**	**1**
9	21-01	Substructure	2

Databases

The Classification Manager installs with 3 database files:

- United States (US)
  - OmniClass Tables 21, 22, and 23
  - UniFormat
  - MasterFormat
- United Kingdom (UK)
  - Uniclass 2015
- Custom

Databases as Excel files and are located in the installation folder:

```
C:\Program Files (x86)\Autodesk\Classification Manager\201x
```

Databases include columns for equivalent values in other databases, however there's not always an equivalent. The Classification Manager will let you know if there is more than one option for an equivalent.

Custom Database

The installed custom database can be copied to another location, even a file server, and easily modified to use a custom classification system.

The first tab of the custom database explains the requirements of creating a valid database for the Classification Manager to use. Some highlights and special notes are laid out below:

- The worksheet (tab) name does not matter, except that no special characters can be used.
- The B4 field is the function of the specific worksheet. This will control what tab this data populates in the Classification Manager interface.
- Properly filling in the Title, Version, and Description in field B1, B2, and B3 will automatically populate A8 and B8. These two fields should not be manually updated.
- The data in Row 8 should be the only row set to "Level 1". This is the topmost level of this classification's hierarchy.
- Your custom database can only have a single worksheet of Contact, Facility, and Space function. The database supports up to five (5) worksheets of Element function.

- The Revit Category column of each row can be populated with the Revit Category ID. A list of these IDs can be found on the Instructions worksheet. Note that they start with a "-". You do not have to fill in this field in your rows. It is used to filter down the list in the Classification Manager interface based on what element is selected.
- On the Element worksheets, you can add additional columns starting at Column E. The header for these column in Row 7 should be the name of another Element worksheet in the same database. This allows the population of different parameters with the different classification systems in a single database.
- Do not add any rows about Row 8. Doing so will cause the Classification Manager to not function properly.
- Do not add any columns before Column E. Doing so will cause the Classification Manager to not function properly.

Assembly Code

A properly formatted Classification Manager database can be easily made into an Assembly Code file that Revit can read. Or, you can use the Classification Manager to populate the Assembly Code parameter. The following link has more detailed instructions:

http://www.caddmicrosystems.com/blog/2016/07/classification-manager-assembly-codes-revit/

Parameters

On successful setup, parameters are added to Categories in the Revit model. If you use a custom database, the parameters specified in that database are not managed or created by the Classification Manager. You must assign those parameters to the proper categories before assigning classifications.

Below is a table outlining the default parameters that the Classification Manager uses.

PARAMETER NAME	DEFAULT CLASSIFICATION	INSTANCE OR TYPE	CATEGORY		
Classification.Facility.Description Classificaiton.Facility.Number	US/UK	Instance	Project Information		
Classification.MasterFormat.Description Classification.MasterFormat.Number Classification.OmniClass.21.Description Classification.OmniClass.21.Number Classification.OmniClass.22.Description Classification.OmniClass.22.Number Classification.OmniClass.23.Description Classification.OmniClass.23.Number Classification.UniFormat.II.Description Classification.UniFormat.II.Number Classification.uniclass.Pr.Description Classification.uniclass.Pr.Number Classification.uniclass.Ss.Description Classification.uniclass.Ss.Number	US UK	Type	Air Terminals Cable Tray Fittings Cable Tray Runs Casework Ceilings Columns Communication Devices Conduit Fittings Conduit Runs Conduits Curtain Panels Curtain Wall Mullions Data Devices Doors Duct Accessories Duct Fittings Duct Insulations Duct Linings Duct Systems Ducts Electrical Equip Electrical Fixtures Fire Alarm Devices	Flex Ducts Flex Pipes Floors Furniture Furniture Systems Generic Models Lighting Devices Lighting Fixtures Mechanical Equipment Nurse Call Devices Pip Accessories Pipe Fittings Pipe Insulations Pipes Piping Systems Planting Plumbing Fixtures Railings Ramps Roofs Security Devices Site Specialty Equipment	Sprinklers Stairs Structural Area Reinforcements Structural Beam Systems Structural Columns Structural Connections Structural Fabric Reinforcement Structural Foundations Structural Framing Structural Path Reinforcement Structural Rebar Structural Stiffeners Structural Trusses Telephone Devices Topography Walls Windows
Classification.Space.Description Classificaiton.Space.Number	US/UK	Instance	Rooms Spaces		

How to Get These Tools

Acquiring the Tools

This web site always has the latest build as well as all the resources (sample files, videos, help pages, etc.).

www.biminteroperabilitytools.com

All of these add-ins are in a collection of the “BIM Interoperability Tools” and are free to download and use. In addition to the COBie Extension and the Classification Manager, the Autodesk Model Checker for Revit and Model Checker Configurator are both available on the site for free and can be used to help check data integrity and BIM standards in Revit models.

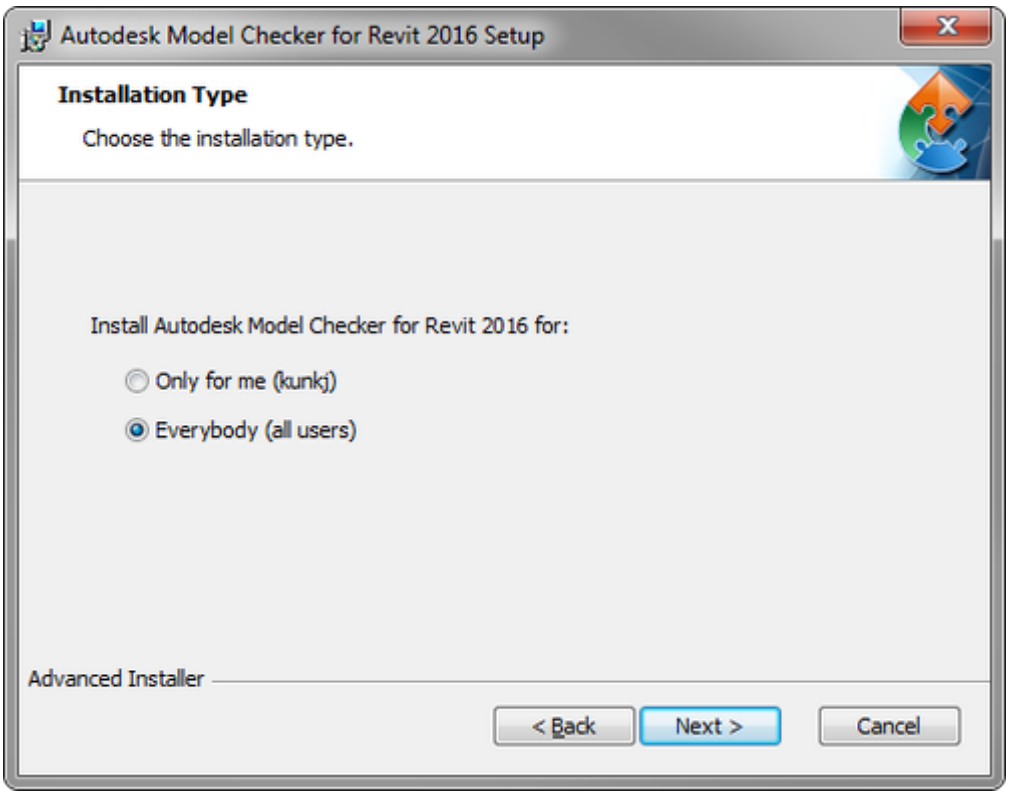
The website has the installers, help files, and other resources to help use the tools effectively.

Additional Information

Installation

“Only for me” versus “Everybody”

During installation, the user can choose which method to use. Some government agencies require installation to only be valid for the current user, but most commercial firms want the installation to apply to all users.



File locations

Most Revit add-ins are installed the same way, and these tools are no exception. The required files include:

One .ADDIN file installed in one of the two standard Revit "Addins" folders. This .ADDIN file is a text file pointing to the .DLL and support files folder location and can be manually edited, if needed. The .ADDIN file is located in one of two folders:

For all users:

```
C:\ProgramData\Autodesk\Revit\Addins\201x
```

For each user:

```
C:\Users\!!USERNAME!!\AppData\Roaming\Autodesk\Revit\Addins
\201x
```

One or more .DLL files that include the compiled application and, optionally, support files. For these tools, the folder that includes these files is located:

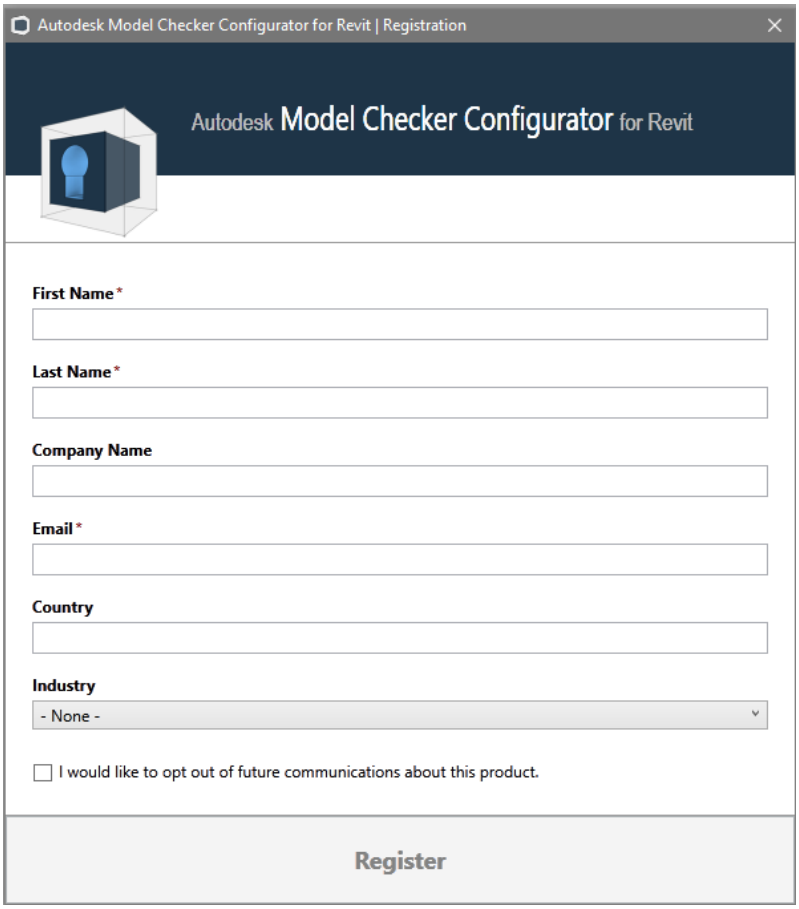
```
C:\Program Files (x86)\Autodesk\Model Checker\201x
C:\Program Files (x86)\Autodesk\Model Checker\Configurator
C:\Program Files (x86)\Autodesk\Classification Manager\201x
C:\Program Files (x86)\Autodesk\COBie Extension\201x
```

These .DLL files are all signed by Autodesk for the 2017 requirements if having new add-ins digitally signed. Users should not get any warning about running them.

The Model Checker Configurator is the only standalone application, so there is no .ADDIN file installed. Also, the COBie Extension installation routine includes bindings to Microsoft Excel, so it cannot be manually installed like the other add-ins by simply placing the files in the correct locations.

Registration

When the user first launches any one of the tools, they will be prompted to register the tools.



Once filled out, a file will be saved per tool to the local computer in the following location so that this registration dialog does not show again.

```
C:\Users\!!USERNAME!!\AppData\Roaming\Autodesk\ExtensionReg
```

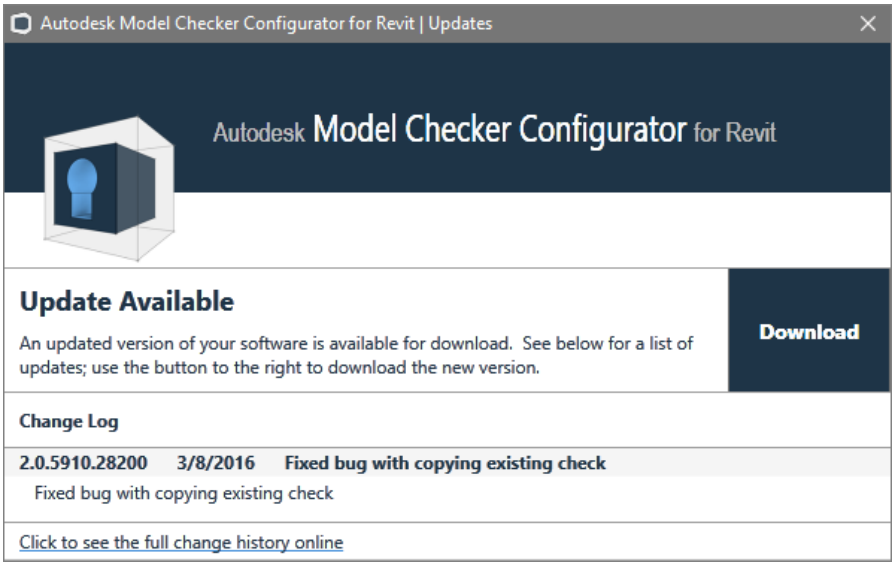
This file can be manually deleted to force the dialog to show again the first time the add-in is used. Data from this dialog, if the “Opt Out” is not checked, is sent to the BIM Interoperability Tools web site and downloaded monthly by Autodesk.

If necessary for a larger organization, this file can also be copied from a PC with a successful registration and copied to other PCs to avoid the registration window. The installer does not have built in functionality to support this. The mechanism used to copy this file around must be provided and supported by the company in question.

If the user does not have an Internet connection, the software will still function.

Version Checking

Each time any of the add-ins is launched, the software checks a list maintained on the BIM Interoperability Tools web site of the latest builds of each tool. If the build of the installed tool is equal to the latest build, then nothing happens. If it is older, the following dialog box lets the user know and gives them a button to directly download the latest build.



The bottom line of each of these dialogs provides a link to a version history list on the BIM Interoperability Tools web site.

Silent Installs for Managed Installations

All the tools can be installed silently, avoiding the dialog boxes and their prompts, by using a DOS command line. This is ideal for managed installations via Microsoft SCCM (System Center Configuration Manager) or equivalent.

Using the "/passive" switch will only show only a progress bar to the end user, and install the application using the "Everyone" option.

```
C:\>RevitModelCheckerShell_Revit2016_Setup.msi /passive
C:\>RevitModelCheckerShell_Revit2016_Setup.msi /passive ADDINFOLDER=%appdata%
```

To install silently for the current user only, use "/passive ADDINFOLDER=%appdata%".

Support

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Hours

Monday through Friday (excluding US holidays)

8:30am - 4:30pm EST / 12:30pm - 8:30pm GMT