

GRAPHISOFT WORKFLOW GUIDE SERIES

GRAPHISOFT ARCHICAD 22 and COBie 2.4

Creating COBie Documentation from ARCHICAD 22

Workflow guide

Customer Support Services Department

October 2018

Name	CreatedBy	CreatedOn	Category	SheetName	RoomName	Value	Unit	EntityName	EntityObject	EntityInstance	Description	AllowNull
GrossFloorArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Facility	ProjectInfo_BuildingName	223.322	square meters	ARCHICAD-64	BaseQuantities	IQGorWANNKEIC0pDzJdlU	GrossFloorArea	n/a
GrossFloorArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Floor	Ground Floor	74.422	square meters	ARCHICAD-64	BaseQuantities	IQBvUqRtU830XWV6XG5	GrossFloorArea	n/a
GrossFloorArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Floor	Roof Level	0.0	square meters	ARCHICAD-64	BaseQuantities	3BYvT5rHM3An8E3XaEEf3	GrossFloorArea	n/a
GrossFloorArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Floor	Second Floor	73.95	square meters	ARCHICAD-64	BaseQuantities	ZHPqT5GjC4Mz8BFWC3h	GrossFloorArea	n/a
GrossFloorArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Floor	First Floor	73.95	square meters	ARCHICAD-64	BaseQuantities	31hm_Bkvyf45dWUfNpwqz	GrossFloorArea	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 002	6000.0	millimeters	ARCHICAD-64	BaseQuantities	IQgU1U1HnakkKCluKMMI	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 002	1.89	square meters	ARCHICAD-64	BaseQuantities	IQgU1U1HnakkKCluKMMI	Area	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 002	0.055	cubic meters	ARCHICAD-64	BaseQuantities	IQgU1U1HnakkKCluKMMI	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 002	100.0	millimeters	ARCHICAD-64	BaseQuantities	IQgU1U1HnakkKCluKMMI	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 001	7200.0	millimeters	ARCHICAD-64	BaseQuantities	3NjF8ZTMOgM8AbYlVp6	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 001	3.15	square meters	ARCHICAD-64	BaseQuantities	3NjF8ZTMOgM8AbYlVp6	Area	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 001	0.106	cubic meters	ARCHICAD-64	BaseQuantities	3NjF8ZTMOgM8AbYlVp6	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 001	300.0	millimeters	ARCHICAD-64	BaseQuantities	3NjF8ZTMOgM8AbYlVp6	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 203	6000.0	millimeters	ARCHICAD-64	BaseQuantities	ZIaSHMxMyMzZ170o4E4G	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 203	1.89	square meters	ARCHICAD-64	BaseQuantities	ZIaSHMxMyMzZ170o4E4G	Area	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 203	0.055	cubic meters	ARCHICAD-64	BaseQuantities	ZIaSHMxMyMzZ170o4E4G	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 203	100.0	millimeters	ARCHICAD-64	BaseQuantities	ZIaSHMxMyMzZ170o4E4G	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 202	6000.0	millimeters	ARCHICAD-64	BaseQuantities	31N8BvXUL45y78ZK1h	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 202	1.89	square meters	ARCHICAD-64	BaseQuantities	31N8BvXUL45y78ZK1h	Area	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 202	0.055	cubic meters	ARCHICAD-64	BaseQuantities	31N8BvXUL45y78ZK1h	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 202	100.0	millimeters	ARCHICAD-64	BaseQuantities	31N8BvXUL45y78ZK1h	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 003	6000.0	millimeters	ARCHICAD-64	BaseQuantities	3AZT_igAAdA8kH8ZGJUs	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 003	1.89	square meters	ARCHICAD-64	BaseQuantities	3AZT_igAAdA8kH8ZGJUs	Area	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 003	0.055	cubic meters	ARCHICAD-64	BaseQuantities	3AZT_igAAdA8kH8ZGJUs	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 003	100.0	millimeters	ARCHICAD-64	BaseQuantities	3AZT_igAAdA8kH8ZGJUs	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 103	9000.0	millimeters	ARCHICAD-64	BaseQuantities	21x7r9bXK36NPN5NfBr8	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 103	4.5	square meters	ARCHICAD-64	BaseQuantities	21x7r9bXK36NPN5NfBr8	Area	n/a
GrossArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 103	4.5	square meters	ARCHICAD-64	BaseQuantities	21x7r9bXK36NPN5NfBr8	GrossArea	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 103	0.038	cubic meters	ARCHICAD-64	BaseQuantities	21x7r9bXK36NPN5NfBr8	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 103	300.0	millimeters	ARCHICAD-64	BaseQuantities	21x7r9bXK36NPN5NfBr8	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 101	6000.0	millimeters	ARCHICAD-64	BaseQuantities	1G59gF9Cq54nfmfw2b8	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 101	2.25	square meters	ARCHICAD-64	BaseQuantities	1G59gF9Cq54nfmfw2b8	Area	n/a
GrossArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 101	2.25	square meters	ARCHICAD-64	BaseQuantities	1G59gF9Cq54nfmfw2b8	GrossArea	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 101	0.025	cubic meters	ARCHICAD-64	BaseQuantities	1G59gF9Cq54nfmfw2b8	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 101	300.0	millimeters	ARCHICAD-64	BaseQuantities	1G59gF9Cq54nfmfw2b8	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 102	9000.0	millimeters	ARCHICAD-64	BaseQuantities	DTG6z6f_8Q4d18B0Y455H	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 102	4.5	square meters	ARCHICAD-64	BaseQuantities	DTG6z6f_8Q4d18B0Y455H	Area	n/a
GrossArea	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 102	4.5	square meters	ARCHICAD-64	BaseQuantities	DTG6z6f_8Q4d18B0Y455H	GrossArea	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 102	0.038	cubic meters	ARCHICAD-64	BaseQuantities	DTG6z6f_8Q4d18B0Y455H	Volume	n/a
Depth	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	WD - 102	300.0	millimeters	ARCHICAD-64	BaseQuantities	DTG6z6f_8Q4d18B0Y455H	Depth	n/a
Perimeter	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 103	6000.0	millimeters	ARCHICAD-64	BaseQuantities	05V3bFvVQd2HAY4ZPU	Perimeter	n/a
Area	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 103	1.89	square meters	ARCHICAD-64	BaseQuantities	05V3bFvVQd2HAY4ZPU	Area	n/a
Volume	ProjectInfo_ContactEmail	2018-09-19T14:55:53	Requirement	Component	DOO - 103	0.055	cubic meters	ARCHICAD-64	BaseQuantities	05V3bFvVQd2HAY4ZPU	Volume	n/a



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GRAPHISOFT ARCHICAD 22 and COBie 2.4
Creating COBie Documentation from ARCHICAD 22

(International English Version)

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Credits

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1. Introduction

COBie is the abbreviation of Construction-Operations Building information exchange, a specification used in the handover of Facility Management information. The COBie standard was originally developed in the US and BS 1192-4 represents the UK implementation of COBie. However, both the COBie Responsibility Matrix and the NBIMS-US V3 standard documentation provide significant additional useful technical information for implementation. COBie (Construction-Operations Building information exchange) provides a common structure for the exchange of information about new and existing facilities, including both buildings and infrastructure.

It is a spreadsheet data format for the delivery of a subset of building model information, rather than geometric model information.

Although GRAPHISOFT ARCHICAD cannot export COBie spreadsheets directly, ARCHICAD's BIM-quality models and IFC data exchange capabilities produces data output that can be easily converted into COBie documentation, with the help of free or commercial conversion programs. (Figure 1)

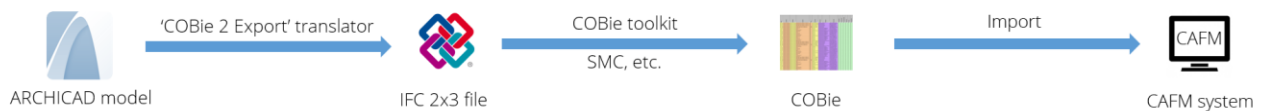


Figure 1 - COBie creation from ARCHICAD

This document aims to provide information that will assist in the provision of COBie from Designers.

Key documents for designers

There are three key documents that designers should aim to read when building an approach to COBie. These are as follows:

1. BS 1192-4:2014 Collaborative production of information. Fulfilling employer's information exchange requirements using COBie. Code of practice – can be downloaded at <http://bim-level2.org/en/standards/>
2. [COBie Responsibility Matrix v17](#)
3. [NBIMS-US V3 4.2 COBie](#) (plus [Annex A](#))

UK-specific

COBie without EIRs/AIRs

Following a BIM Level 2 process, it would be expected that comprehensive information requirements will have been defined prior to a project commencing by the Employer. This is certainly not common place and often Designers are left without any clarity about the information to be provided.

So what should a Designer do? COBie is well documented in BS 1192-4:2014 and there are a number of fields which are mandatory. So, the mandatory requirements must be the starting place for providing information, in line with the requirements of COBie.

Beyond this, Designers may wish to integrate other fields as part of their standard approach. Where a requirement isn't clear, the Designer is best confirming what they propose back to the Employer.

1.1. Different approaches to producing COBie

COBie can be produced in a number of different ways. COBie production currently in practice, typically involves one of the following:

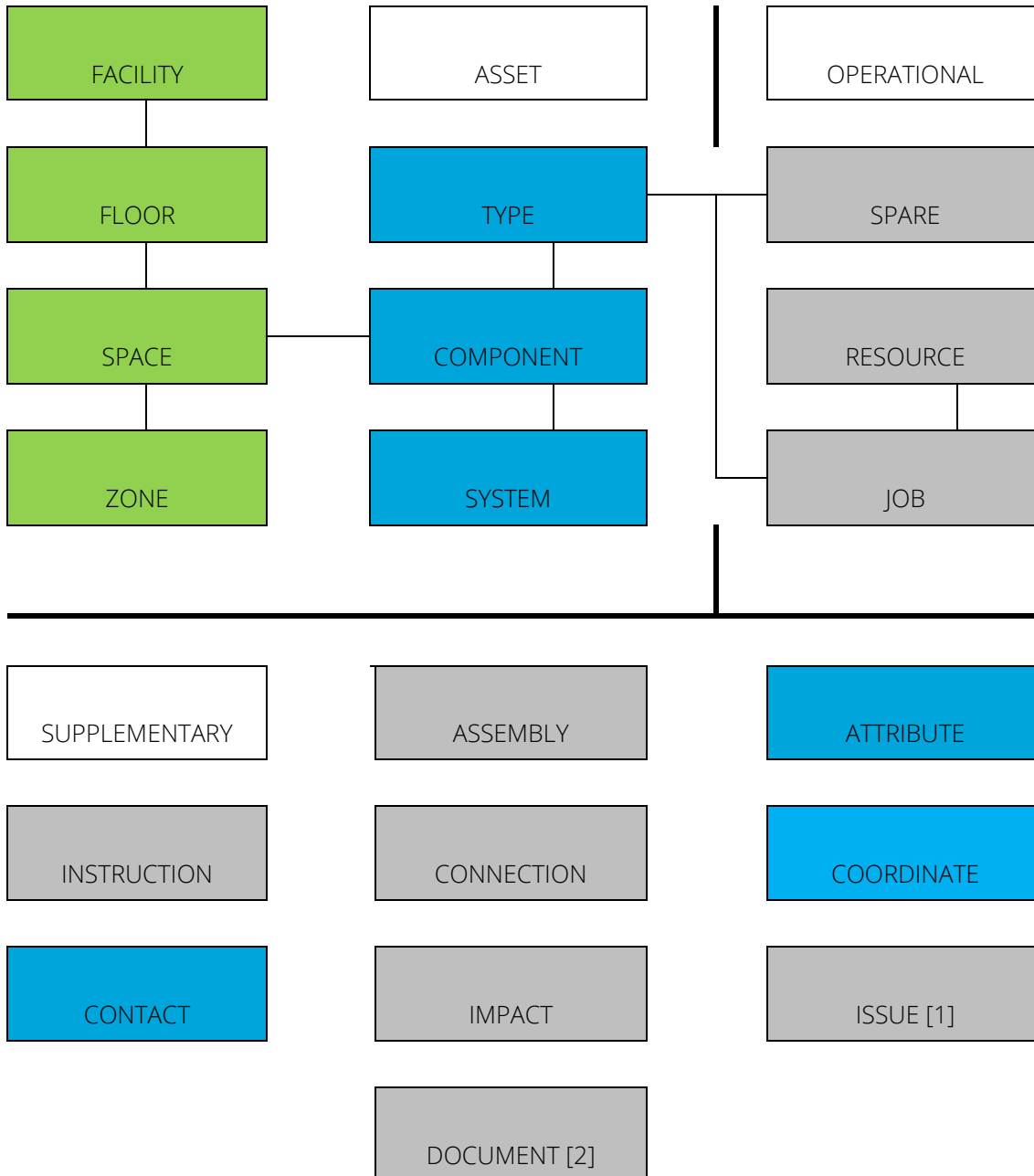
1. Directly from a model authoring tool
2. Exported and generated externally to a model authoring tool

Whichever methodology is utilised, ultimately, a single file is required to be produced, that can be checked.

It should be noted that using a direct export workflow, may not be fully compatible with an exported methodology. Therefore, it is important to understand the proposed methodology for COBie production at the outset of a project. The methodology should be agreed and documented in the post contract-award BIM Execution Plan (BEP).

1.2. Which tabs are relevant to Designers?

The cells in Blue below represent those that need to be completed by all Designers. The Lead Designer / Architect would be expected to complete the Green and Blue information.



[1] **Issues** can be included in authored models – for the UK, see PAS 1192-6:2018 – although this could be achieved in external databases

[2] **Documents** is a list of information associated to assets. This would include Designers information listed in the COBie output. This data is likely to be either manually created in COBie spreadsheet or generated in an external database.

1.3. When should data be produced?

When information is required, should be defined by the Employer in their information requirements.

UK-specific

However, where COBie has been requested, but clarity on when information is required has not been provided, the following would generally be assumed for Designers:

- CIC 2: Concept (i.e. RIBA Stage 2: Concept Design) – Contact, Facility, Floor, Space and Zone
- CIC 3: Design Development (i.e. RIBA Stage 3: Developed Design) – Stage 2 plus Type, Component and System. Space Attributes associated to Room Data Sheets would also be provided at this Stage
- CIC 4: Production Information (i.e. RIBA Stage 4: Technical Design) – Stage 3 plus Attributes associated to Types/Components
- CIC 5: Construction Information (i.e. RIBA Stage 5: Construction) – Stage 4 plus RoomTag (client's final space numbering) field on Space sheet

1.4. Which elements should be included?

BS 1192-4:2014 states that **all elements can be included** in a COBie deliverable. This allows the employer to provide a list of elements which will have **planned preventative maintenance**.

However, where an employer doesn't specify elements, it becomes challenging for designers. Therefore, the default position where there is **no clear defined requirement**, must be to follow the **original US standard**.

The [COBie Responsibility Matrix v17](#) provides a list of both Type Assets and Component Assets that should and shouldn't be included within COBie.

Note: The list is built around IFC4, which is not currently implemented in the UK, so some knowledge of IFC standards is necessary here.

The following Types/Components are defined as **excluded** in the COBie Responsibility Matrix v17: Beams, Building Element Parts [1], Cable Carrier Fittings, Cable Carrier Segments, Cable Fittings (IFC4 only), Cable Segments, Columns, Curtain Walls, Duct Fittings, Duct Segments, Fasteners, Footings, Junction Boxes, Mechanical Fasteners [1], Members, Piles, Pipe Fittings, Pipe Segments, Plates, Railings, Ramps, Ramp Flights, Reinforcing Bars, Reinforcing Meshes, Roofs, Slabs, Stairs, Stair Flights and Walls.





UK-specific

The COBie Responsibility Matrix v17 does not exclude Coverings. This appears in conflict with BS 1192-4:2014 which uses Attributes (i.e. CeilingCovering, FloorCovering and WallCovering are described in Table 12) associated to Spaces to define Covering information. Essentially COBie is capturing Room Data Sheets (RDS) information rather than modelled elements.

If a client does choose to include elements outside of the scope, this should be questioned to ascertain the reason for collecting data about these elements. Often these are included in requirements because the scope of COBie is misunderstood.

1.5. What values need to be completed by Designers?

The requirements for COBie should be set out in the Employer's Information Requirements. COBie has 4 types of fields:

- Required (yellow cells) 
- Referenced (orange cells) 
- Automated (purple cells) 
- Optional (If Specified). (green cells) 

The **Required** and **Referenced** fields **must be provided** as a minimum to satisfy COBie. The information that needs to be provided will vary between designers.

The **Lead Designer / Architect** must provide the following Required data as a minimum to satisfy COBie:

- **Facility** – Name, CreatedBy, CreatedOn, Category, ProjectName, SiteName, LinearUnits, AreaUnits, VolumeUnits, CurrencyUnit and AreaMeasurement
- **Floor** – Name, CreatedBy, CreatedOn and Category
- **Space** – Name, CreatedBy, CreatedOn, Category and Description
- **Zone** – Name, CreatedBy, CreatedOn and Category

All designers must provide the following Required data as a minimum to satisfy COBie:

- **Contact** – Email, CreatedBy, CreatedOn, Category, Company and Phone
- **Type** – Name, CreatedBy, CreatedOn, Category, Description, AssetType, NominalLength, NominalWidth and NominalHeight
- **Component** – Name, CreatedBy, CreatedOn and Description.
- **System** – Name, CreatedBy, CreatedOn and Category.

ARCHICAD will **automatically** fill the following Referenced and Automated data fields:

- **Space** – FloorName, ExtSystem, ExtObject, ExtIdentifier
- **Space** – SpaceNames, ExtSystem, ExtObject, ExtIdentifier
- **Type** – ExtSystem, ExtObject and ExtIdentifier
- **Component** – TypeName, Space and ExtSystem, ExtObject and ExtIdentifier
- **System** – ComponentNames, ExtSystem, ExtObject and ExtIdentifier

1.6. How do you Name items for COBie?

The core principle is that naming should match information on drawings and schedules.

There are two possible approaches to naming:

1. Naming requirements are documented in an Employer's Information Requirements (EIR)
2. Designers set out their proposed approach in a post contract-award BIM Execution Plan (BEP)

Naming requirements should be considered for Floors, Spaces, Zones, Types, Components and Systems.

Setting out naming requirements at the outset of the project means greater consistency across a single asset or multiple assets. Additionally, rules can be setup to ensure they meet the defined naming requirements.

UK-specific

How do you classify items for COBie?

BS 1192-4:2014 currently recommends Uniclass 1.4 in Table 7. However, Uniclass 2015 has been released (April 2016) since this standard was released. The following are now typically implemented in lieu of Table 7:

Sheet	Column	Classification table	Example
Contact	Category	Uniclass 2015 Table PM Project Management	<i>PM_20_20_54: Manufacturer</i>
Facility	Phase	Picklist	<i>CIC 6: Handover</i>
Facility	Category	Uniclass 2015 Table En Entities	<i>En_20_75_10: Detention buildings</i>
Space	Category	Uniclass 2015 Table SL Spaces/locations	<i>SL_20_75_22: Detention cells</i>
Type	Category	Uniclass 2015 Table Pr Products	<i>Pr_40_20_96_70: Recessed wash basins</i>
System	Category	Uniclass 2015 Table Ss System	<i>Ss_40_15_75: Sanitary appliance systems</i>

1.7. Other's data

Designers are required to produce their own information for inclusion in COBie. However, the full data set includes information provided by others.

The following **Required** fields would **not typically be expected from a Designer**:

Type:

Manufacturer, ModelNumber, WarrantyGuarantorParts, WarrantyDurationParts, WarrantyGuarantorLabor, WarrantyDurationLabor, WarrantyDurationUnit and DurationUnit.

The following **Optional** (If Specified) fields would **not typically be expected from a Designer**:

Type

ReplacementCost, ExpectedLife, WarrantyDescription, ModelReference, Shape, Size, Color, Finish, Grade, Material, Constituents, Features, AccessibilityPerformance, CodePerformance and SustainabilityPerformance

Component

SerialNumber, InstallationDate, WarrantyStartDate, TagNumber, BarCode and AssetIdentifier

There are different methodologies for including this data within COBie. This includes the following:

1. Insert data directly into the native authoring tool.
2. Import data into native authoring tool.
3. Add data to an exported IFC file.
4. Add data into an external database to either produce COBie or to create a new enhanced IFC for COBie production.

IMPORTANT

Designers need to carefully consider the impact of including other's data in their native models with the first two workflows. COBie does not require all data to be contained in native models. In some instances employer's may request that data is in the native models and so the timing, process and potential liability for this data needs to be agreed.

1.8. BIM Content

Designers should carefully consider the use of BIM content in projects requiring COBie production. Any content used, should meet the specific requirements of the project (e.g. meet defined naming requirements) and consider liability for other's data if it is included in the content.

Consideration also needs to be given to using manufacturer's content, that may be substituted for different products at a later date. Designers therefore, should carefully consider who is responsible for updating product information. Duplicate attributes and rogue data should also be considered.

1.9. Who generates COBie?

The party required to produce COBie is often not defined. However, it is typically carried out by an Information Manager (IM). The IM is not responsible for the content, this still lies with the originating party (i.e. the Designer), however the IM should check the information to ensure it meets the specific requirements of COBie. Any issues with the COBie file will need to be fed back to the correct designer to resolve either before the stage is complete or during the following stage.

1.10. What is the relationship between IFC and COBie?

The COBie spreadsheet is a mapping of the COBie 2.4 Model View Definition (so-called “Model View Definition”; MVD) formally derived from IFC 2x3 Basic FM Handover MVD, which is a subset of the current IFC 2x3 scheme. The Basic FM Handover MVD was developed by buildingSMART to exchange facility management information among building models. ARCHICAD’s IFC 2x3 interface and database support the IFC data and model export requirements of the Basic FM Handover View Definition, so most of the values of the COBie spreadsheet cells are extracted from IFC models exported by ARCHICAD according to the Basic FM Handover MVD settings.

HINT

For more information about the relationship between IFC 2x3 Basic FM Handover MVD and COBie, visit the buildingSMART website by clicking [here](#).

For detailed documentation about ARCHICAD’s IFC capabilities, read the ARCHICAD Help documentation or read the [IFC2x3 Reference Guide](#).

This guide provides practical information on which data should be added to an ARCHICAD project and how to export it as an IFC model to obtain a format, suitable for producing a COBie 2 spreadsheet. (The current version of COBie is 2.4.) The final chapter consists of a sample workflow using a free IFC → COBie conversion tool recommended by buildingSMART.

Although COBie uses the Basic FM Handover MVD, in the IFC translator setup we created the **COBie 2.4 MVD** for COBie related IFC exports.

NOTE

This documentation was written based on the [currently available](#) COBie – IFC mapping rule called “Responsibility Matrix version 17” (published 30th April 2013).

Although IFC 4 has already been released, **COBie 2.4 only uses the IFC 2x3 scheme**.

The Basic FM Handover View Definition and COBie 2.4 Model View Definition used by COBie 2 queries includes the following IFC data types from an architectural model and/or its elements:

- Owner History data
- IFC Attributes
- IFC Properties (standard IFC 2x3 and custom COBie 2-required properties)
- IFC Classification Reference data
- IFC Type Product entities
- IFC Zone assignments
- IFC System assignments
- Base quantities
- Space containment relation
- Space boundary relation

All these data types are **available** in ARCHICAD **as native ARCHICAD data**. The relevant properties are automatically mapped to the right IFC properties therefore further action is not needed if the provided COBie translator, properties and classification are loaded and the IFC translator is set as an *Active Preview*.

For Contact/Facility level properties, fill up the relevant fields in *File > Project Info*. You can change the property values in *IFC Project Manager* too in the Project/Site/Facility hierarchy level.

For defining Floor level properties, *Story Settings* and *IFC Project Manager* can be used

For Space, Type and Component level, properties can be added by using native ARCHICAD properties and the mapping to IFC properties are automatically handled by ARCHICAD

For Zone and System level properties, only the *IFC Project Manager* can be used.

COBie is possible without following the required mapping but adds additional work for those producing and checking the COBie output, particularly where multiple designers all take a different approach.

UK-specific

Much of the UK documentation has been developed around the IFC4 schema. However current implementation of COBie using IFC is built around the IFC2x3 version of the schema. COBie utilising IFC2x3 requires that Electric Distribution Points are included. This presents an issue as Electric Distribution Points, Tendons and Tendon Anchors do not have a Type in IFC2x3. This means workarounds are required when using IFC2x3 (i.e. one solution involves adding required Type data at Component level).

The same would be true if Footings, Piles, Ramps, Reinforcing Bars, Reinforcing Meshes, Roofs, Stairs were required to be included in COBie with an IFC2x3 workflow.

1.11. Testing COBie creation

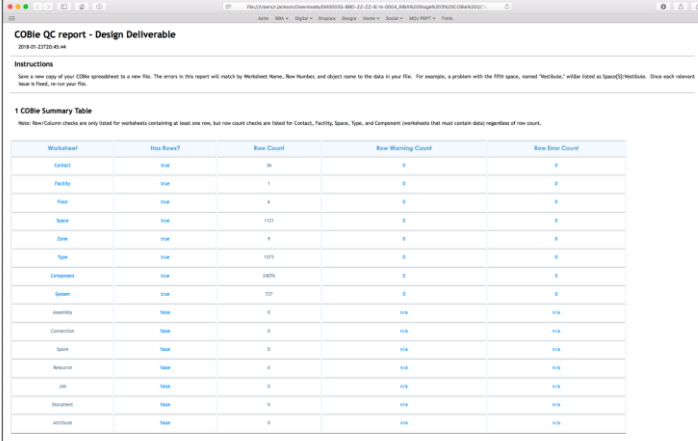
A COBie spreadsheet has strict requirements in order to make sure it is valid.

A COBie spreadsheet can be formally tested for free using the COBie QC (Quality Control) Reporter. This is available here:

<https://github.com/OhmSweetOhm/CobieQcReporter/releases>

The QC Report should aim to produce a report with '0' or 'n/a' in both the 'Row Warning Count' and 'Row Error Count' columns.

The report will demonstrate compliance with the COBie schema, but this does not necessarily mean that the data is correct! Other checks should take place outside of the COBie QC Reporter to ensure the data is reliable.



Worksheet	Row Count	Row Warning Count	Row Error Count
Contact	36	0	0
Facility	1	0	0
Floor	6	0	0
Space	1101	0	0
Zone	9	0	0
Type	193	0	0
Component	24676	0	0
System	227	0	0
Assembly	0	n/a	n/a
Connection	0	n/a	n/a
Space	0	n/a	n/a
Resource	0	n/a	n/a
Job	0	n/a	n/a
Document	0	n/a	n/a
Attribute	0	n/a	n/a

Figure 2 - COBie Quality Control HTML report from COBie toolkit

1.12. Possible implementation methods of COBie into your project

Incorporating COBie data into the BIM model can be done by several methods. Basically, two possible ways are available for the implementation. The way it will be implemented in the practice should be decided by the company BIM Manager. Both methods have their benefits and company-by-company or project-by-project different ways should be chosen.

The main difference between the methods is how they drive the COBie required properties and how the property mapping is done in the background. Both methods are identical in properties and function but the way how to put the COBie related properties into the model is completely different.

The two methods:

1. **National classification system** (Uniclass 2015 / Omniclass / Other) driven property mapping
2. **ARCHICAD classification** (IFC) driven property mapping

National classification system driven property mapping

In the National classification system driven property mapping the users must classify all the relevant model elements in that particular system to be able to add the COBie related properties.

This means if an element is not classified in Uniclass 2015/Omniclass, the relevant COBie properties are not showing up. As the IFC export is almost always driven by the ARCHICAD -22 Classification, every element should be classified two times; one in ARCHICAD 22 Classification and one in in Uniclass 2015 / Omniclass classification system.

Pro

If an element is not classified in Uniclass2015/Omniclass, related COBie properties are not showing up to be filled. This helps the users to classify every necessary element before adding the property values. Also it ensures, that every element which has a COBie property are classified in the national classification system too.

Con

Properties are driven by Uniclass2015/Omniclass classification system, therefore every change in the classification system needs manual update in the Property Manager/Classification manager.

Recommendation

This method is recommended for those companies who are not familiar with IFC Type and Property mapping. **This method is described in detail in this guide.**

ARCHICAD 22 classification driven property mapping

In the ARCHICAD 22 classification driven property mapping the 3D model elements are assigned to a ARCHICAD 22 classification by default, therefore COBie properties are showing up automatically, when a COBie required element is created. Uniclass2015/Omniclass classification is still necessary but properties are not driven by the existence of this classification for an element.

Pro

The ARCHICAD classification is a given and the COBie related properties are showing up automatically for the relevant elements because all of the tools are assigned to a ARCHICAD 22 classification by default.

The IFC classification is not changing therefore if there is no change in the ARCHICAD 22 classification, no further action is needed for being up to date.

Con

If the ARCHICAD 22 Classification is modified or new items are added into, manual update of the Classification/Property connection should be managed.

Uniclass 2015/Omniclass classification is still a must but this method allows for a model element to have COBie properties without a Uniclass2015/Omniclass classification which can end up in a wrong COBie spreadsheet easily.

Recommendation

This method is recommended for those companies who are familiar with IFC Type and Property mapping.

2. Workflow – Project preparation, importing provided template material

2.1. Importing COBie properties and IFC translator

To display the COBie 2-required and relevant IFC data in IFC data management dialogs, the following steps should be followed.

1. Open *Options > Classification Manager* and import the required classification system by using one of the provided PLN files. Each file contains the **Classification System** (Omniclass or Uniclass 2015), the relevant **COBie properties** and **IFC translator**. If the Omniclass or Uniclass 2015 Classification is already in use in your project, only import the properties from the *Property Manager* and IFC translator.
2. If you import the Classification System and you check the “*Include Properties from Files*” checkbox, the properties will automatically be imported. (*Figure 3*)
3. After the Classification System and Properties are imported, the IFC translator shall be imported into the Export IFC translators. (*Figure 4*)

IMPORTANT

To be able to use the predefined setting in your project, always follow the 1. Classification System > 2. Properties > 3. IFC Translator order. In case of importing the translator first than the properties and classification system, the mapping between ARCHICAD properties and IFC properties will be missed!

Follow the import order below:

1. Classification System
2. Properties
3. IFC Translator

STEP 1-2: Importing the Classification System and Properties

Open *Options > Classification Manager / Property Manager* to start the process and follow the steps on Figure 3.

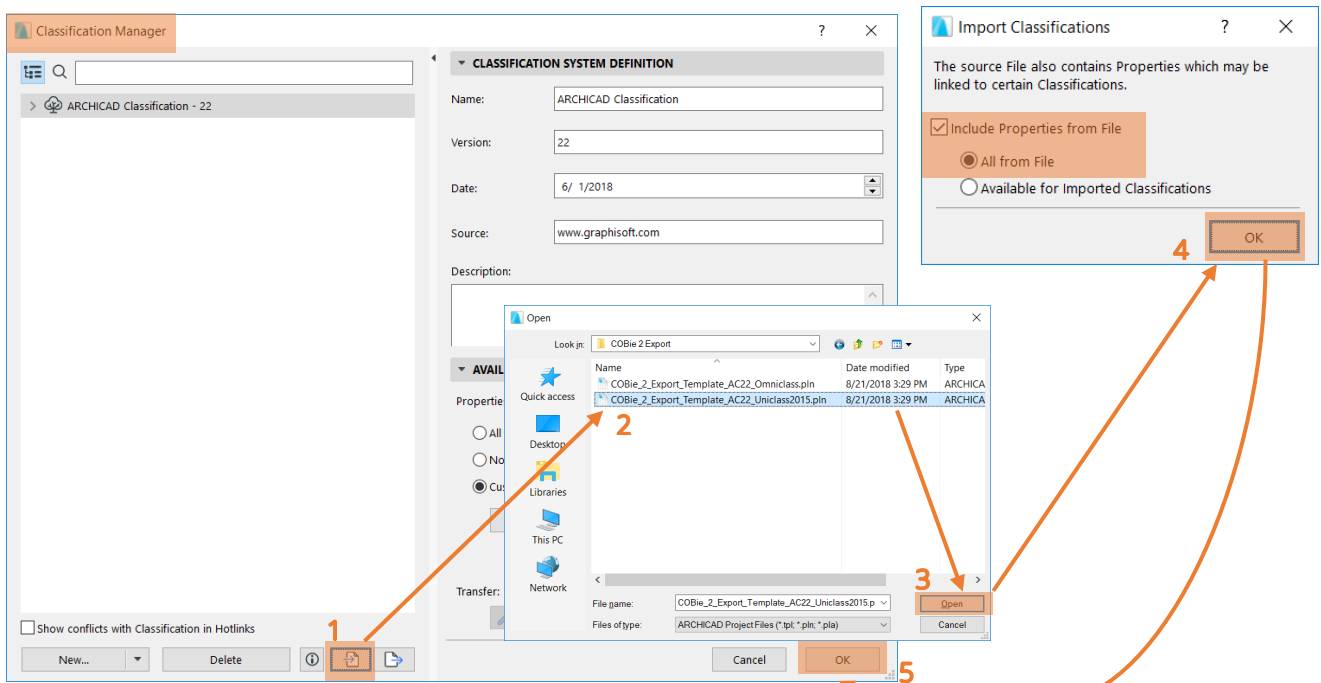


Figure 3 - STEP 1-2: Importing Classification Systems and Properties

HINT

The reason there are multiple COBie 2 scheme files is that the Category definitions required by COBie use different classification standards in different countries. For example, the U.S. uses the OmniClass standard to categorize Facility, Space and Type, while the UK uses Uniclass 2015. Obviously, you should fill out only one Classification Reference data (since COBie requires one data) – the one which best expresses the Category definition required by COBie for the specific element.

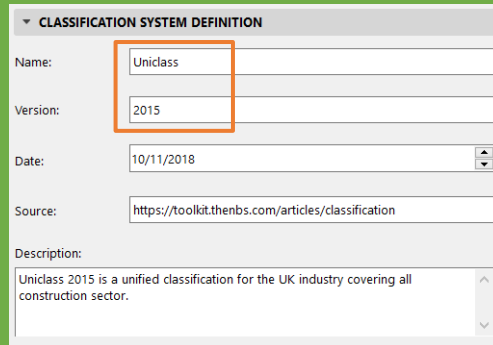
IMPORTANT

In the classification system examples only OmniClass and Uniclass 2015 are mentioned. These are the two most common systems to be used, but **other classification systems** like Unifomat, Masterformat, CAWS, NBS and many more **can be used** for COBie creation after some adjustments in the property mapping.

UK-specific

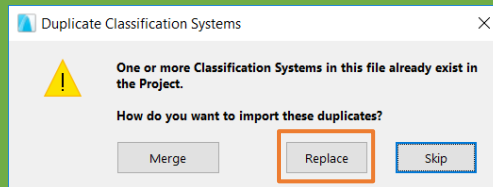
The ARCHICAD 22 UKI template contains the 'ARCHICAD Classification – 22' and 'Uniclass 2015 – January 2018' classification systems by default.

To be able to use the COBie template, **rename** the 'Uniclass 2015 – January 2018' classification system **to 'Uniclass - 2015'** in the *Options > Classification Manager* as the naming of the classification system was changed by GRAPHISOFT.



If the name is retyped accordingly, the importing process of the properties and classifications can be started. If the naming is not changed, a third classification system is going to be created.

Browse for the 'COBie_2_Export_Template_AC22_Uniclass2015_with_BS1192.pln' file with the *Classification Manager's* Import button and follow the steps described on page 18. Choose the **Replace button** when the warning message appears.



The replacing keeps the existing property-classification associations and adds the new COBie related ones as well.

Note, if you have used IFC property mapping according to the 'Uniclass 2015 – January 2018' classification, you need to readjust it in the Property Mapping part of the IFC translator according to the new naming.

STEP 3: Importing the IFC translator

Open *File > Interoperability > IFC > IFC Translators* and follow the steps on Figure 4.

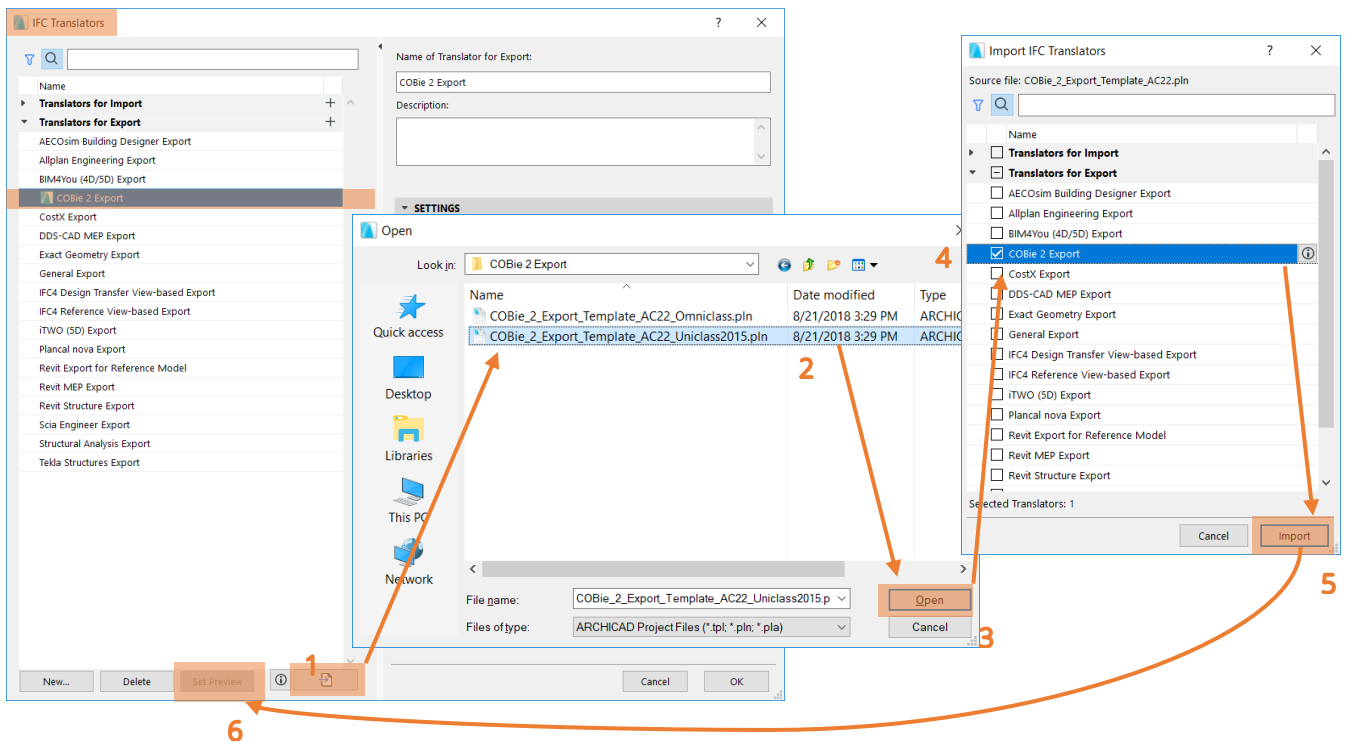


Figure 4 – STEP 3 - Importing 'COBie 2 Export' IFC translator into current project

It is recommended using the 'COBie 2 Export' ARCHICAD translator as an **active preview** (Figure 5): this filters the IFC standard scheme to show only the required COBie data fields throughout the user interface. To set an IFC translator as an Active translator, select the export translator and hit the 'Set Preview' button. A small ARCHICAD icon indicates the active translator.

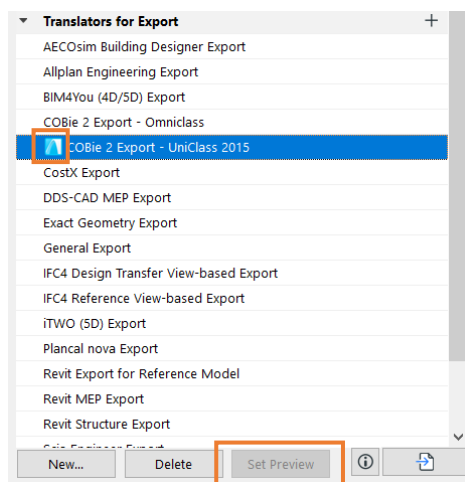


Figure 5 - Set IFC translator as active preview

IMPORTANT

After importing the translator, please select the proper *Model Filter* and *Type Mapping* conversion preset for your project. The recommended preset for:

Model Filter is 'All 3D elements' and for
Type Mapping is 'ARCHICAD Classification - 22'

but custom ones can be used if necessary. (Figure 6)

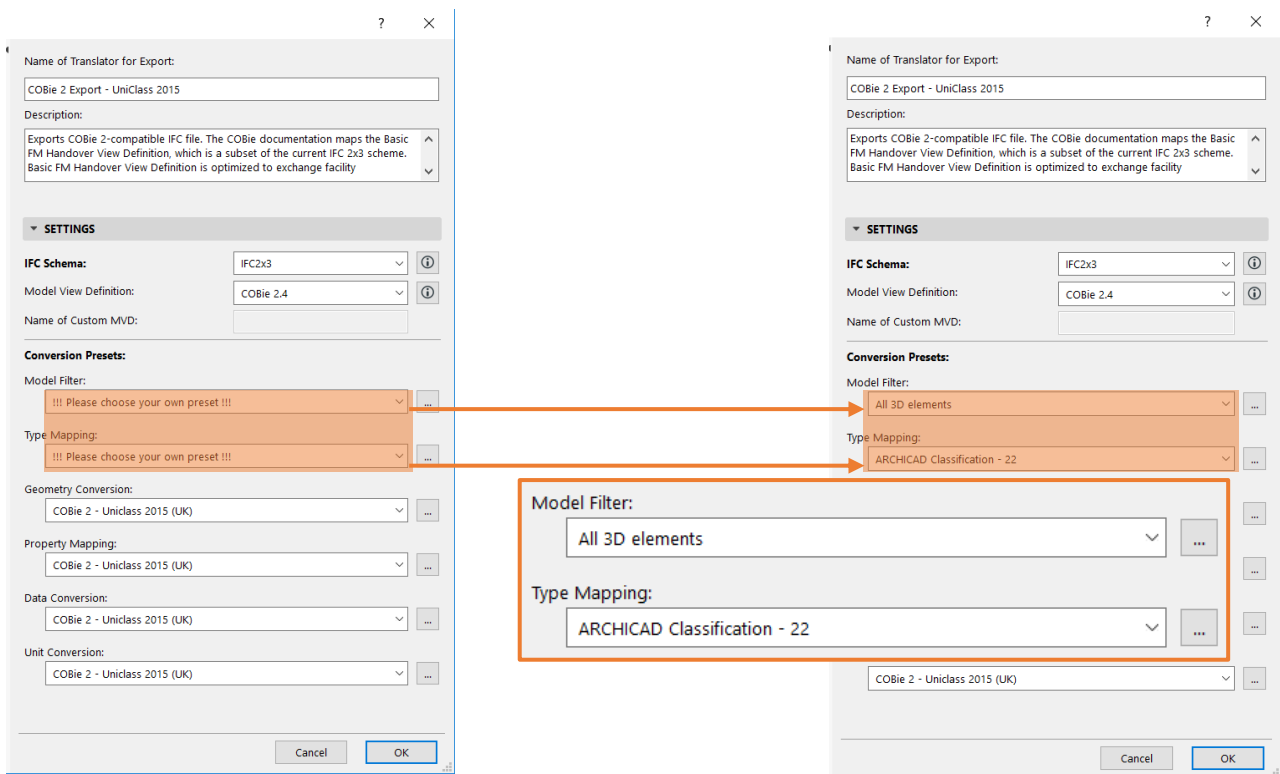


Figure 6 - Selecting Model Filter and Type Mapping presets

2.2. How does the template file work?

As the Classification, Properties and IFC Translator is loaded in the project, everything is prepared for adding the COBie-related data into the model. In the IFC translator, certain *Conversion Presets* are provided by GRAPHISOFT with a “COBie 2” prefix in the names.

In the *Geometry Conversion* preset, the “Use BREP geometry in current color for all elements” and “Explode Composite and Complex Profile elements into parts” are checked for proper geometry conversion.

In the *Property Mapping* preset, certain mapping rules can be changed according to company standards or needs. (Figure 7)

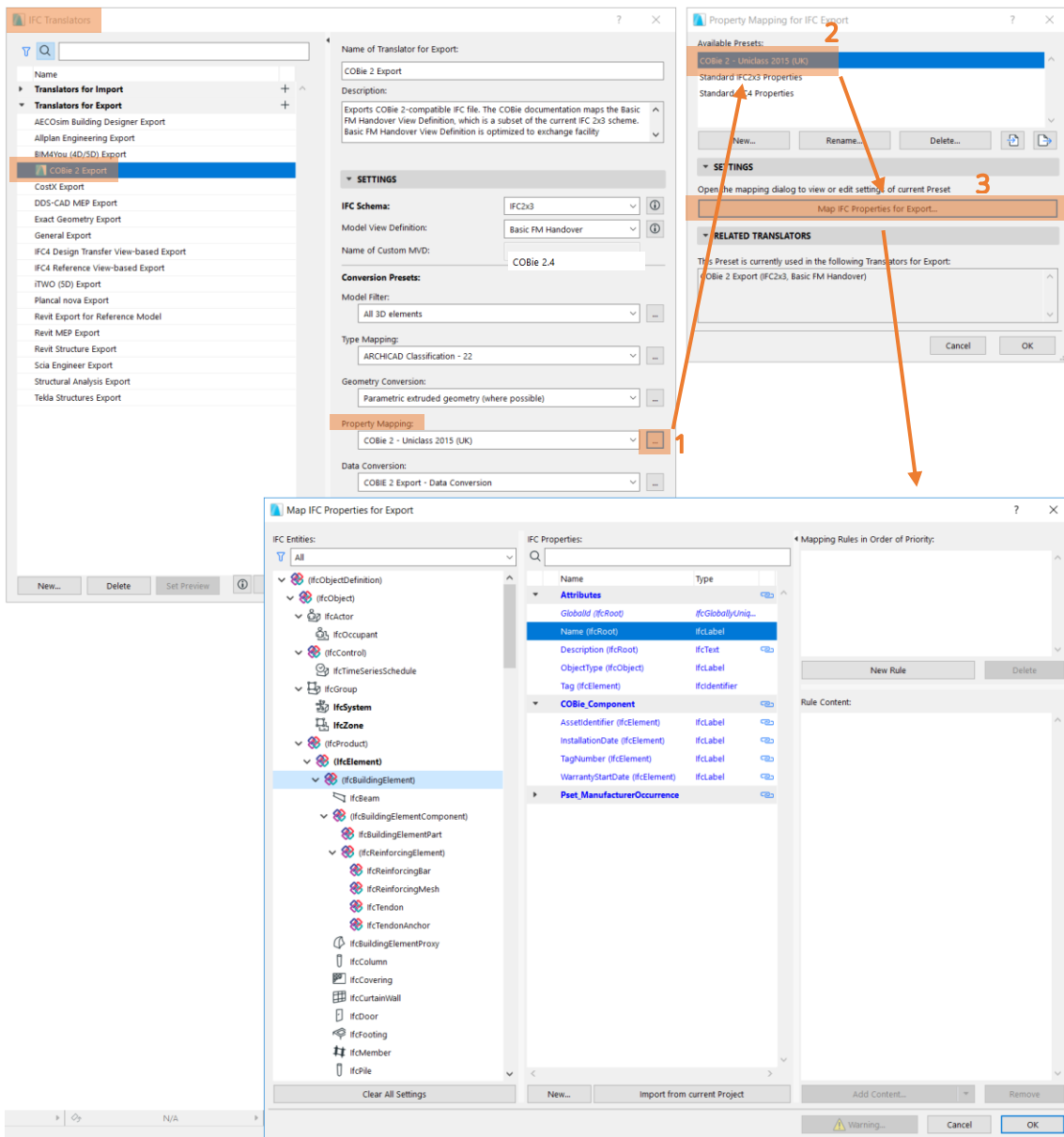


Figure 7 - Mapping rule setup of COBie required properties (Scheme Setup)

In the *Data Conversion* preset, “Only properties set in Property Mapping for the selected Translator” is set for exporting only the COBie relevant properties. Also, *IFC Base Quantities*, *IFC Space Containment* and *IFC Space Boundaries* are necessary. (Figure 8)

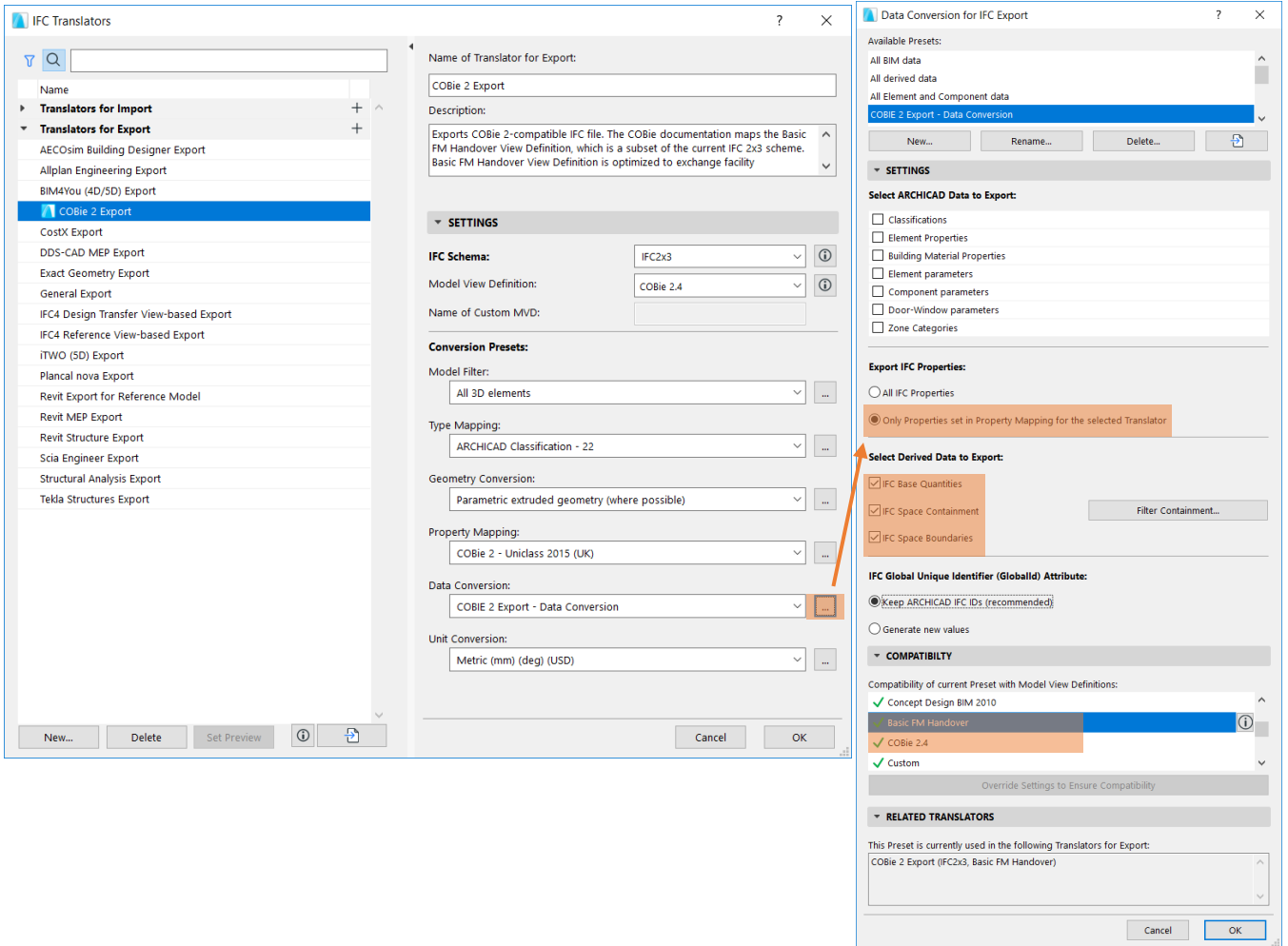


Figure 8 - Data Conversion preset

In the *Unit Conversion* preset, general units are set. Please select the required *Currency Unit* if the predefined one is inadequate. (Figure 9)

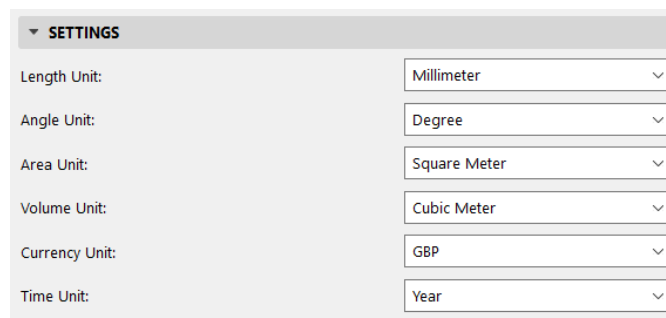
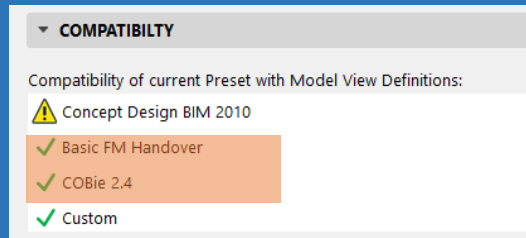



Figure 9 - Unit Conversion preset

IMPORTANT

All Conversion presets must be compliant with the *Basic FM* and *COBie 2.4* Model View Definitions.



In the IFC data management dialog boxes, click the *Show only scheme items* icon  to filter the full IFC database to show only the loaded COBie scheme data (if the 'COBie 2 Export' translator is the active preview). If this icon is activated, all data fields that are not part of the scheme definition are hidden on the interface: this helps you check the final data which is only relevant for COBie. (Figure 10)

For example, data fields inherited from ARCHICAD that are not part of the COBie scheme (such as "Structural Function", "Position", "Renovation Status", etc.) will be hidden. The same is true of application-specific, custom IFC data fields which were added earlier to the project, as a result of model exchanges with other applications (e.g. structural or MEP), but which are irrelevant to COBie. The following chapters summarize the data (required from a design application) to be provided in ARCHICAD by the COBie 2 spreadsheet.

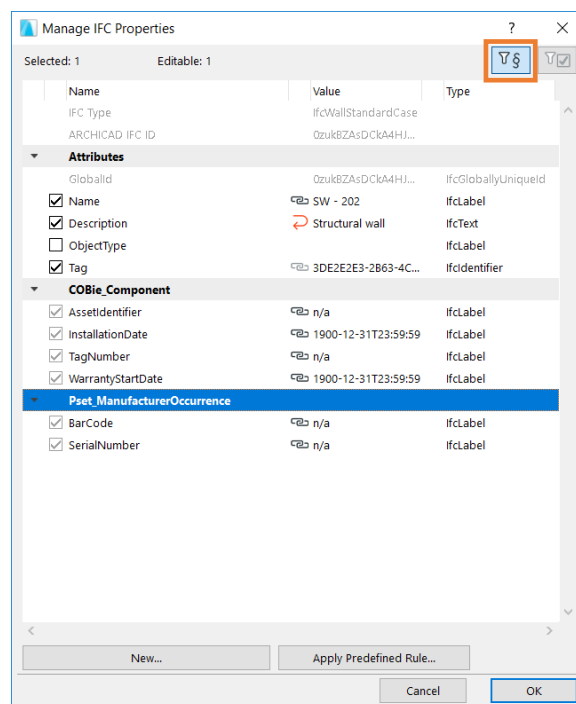


Figure 10 - Show only scheme items filter

3. Key to tables of this guide

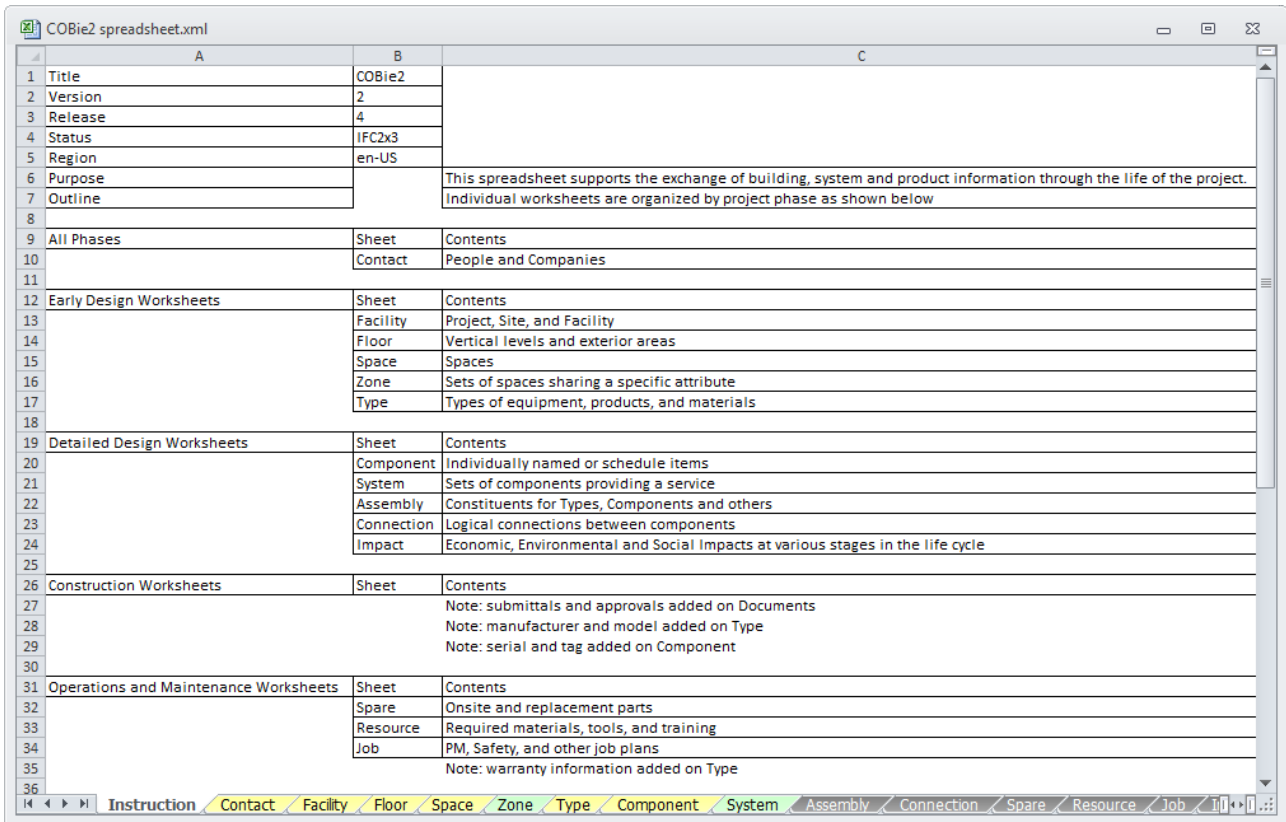


Figure 11 - The worksheets of the COBie 2 spreadsheet

Key to tables displayed in the following sections of this document (Figure 12):

COBie2 data

COBie 2 data taken directly from **data** that was **input** in ARCHICAD. In other words, the ARCHICAD and IFC data types corresponding to these COBie data **must be set or created in the ARCHICAD model**.

COBie2 data

COBie 2 data that are **automatically extracted from the ARCHICAD model**, project settings and their IFC export. In other words, these COBie data are set automatically in ARCHICAD; no extra data definition is required from the ARCHICAD user.

EXAMPLE COBie2 worksheet data	ARCHICAD data mapped to COBie data	ARCHICAD command
EXAMPLE 1 / manually entered value	Location of the data in ARCHICAD which is mapped to COBie	Where to set the parameter in ARCHICAD
EXAMPLE 2 / automatic value generation/derivation	Location of the data in ARCHICAD which is mapped to COBie	

Figure 12 - Key to tables of this document

3.1. Contact

The COBie 2 **Contact** worksheet summarizes the person and organization data of the project / model designer.

Contact COBie 2 worksheet data	ARCHICAD data mapped to COBie data	ARCHICAD command
Email	Contact Details > Contact E-mail	File > Info > Project Info
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	Contact Details > Contact Role	File > Info > Project Info
Company	Contact Details > Contact Company	File > Info > Project Info
Phone	Contact Details > Contact Phone Number	File > Info > Project Info
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IfcPersonAndOrganization'	
ExtIdentifier	Contact Details > Contact E-mail	File > Info > Project Info
Department	Contact Details > Contact Department	File > Info > Project Info
OrganizationCode	Contact Details > Contact Company Code	File > Info > Project Info
GivenName	Contact Details > Contact Full Name > Given Name	File > Info > Project Info
FamilyName	Contact Details > Contact Full Name > Family Name	File > Info > Project Info
Street	Contact Details > Contact Full Address > Address	File > Info > Project Info
PostalBox	Contact Details > Contact Full Address > Postal Box	File > Info > Project Info
Town	Contact Details > Contact Full Address > City	File > Info > Project Info
StateRegion	Contact Details > Contact Full Address > State/Province	File > Info > Project Info
PostalCode	Contact Details > Contact Full Address > Postcode/ZIP	File > Info > Project Info
Country	Contact Details > Contact Full Address > Country	File > Info > Project Info

Figure 13 - Mapping between ARCHICAD model data and the COBie 2 Contact worksheet data

ARCHICAD project data must be assigned to correspond with the COBie 2 items marked in green. All “Contact” data can be entered in ARCHICAD’s *Project Info* (File > Info > Project Info) dialog box. (Figure 14)

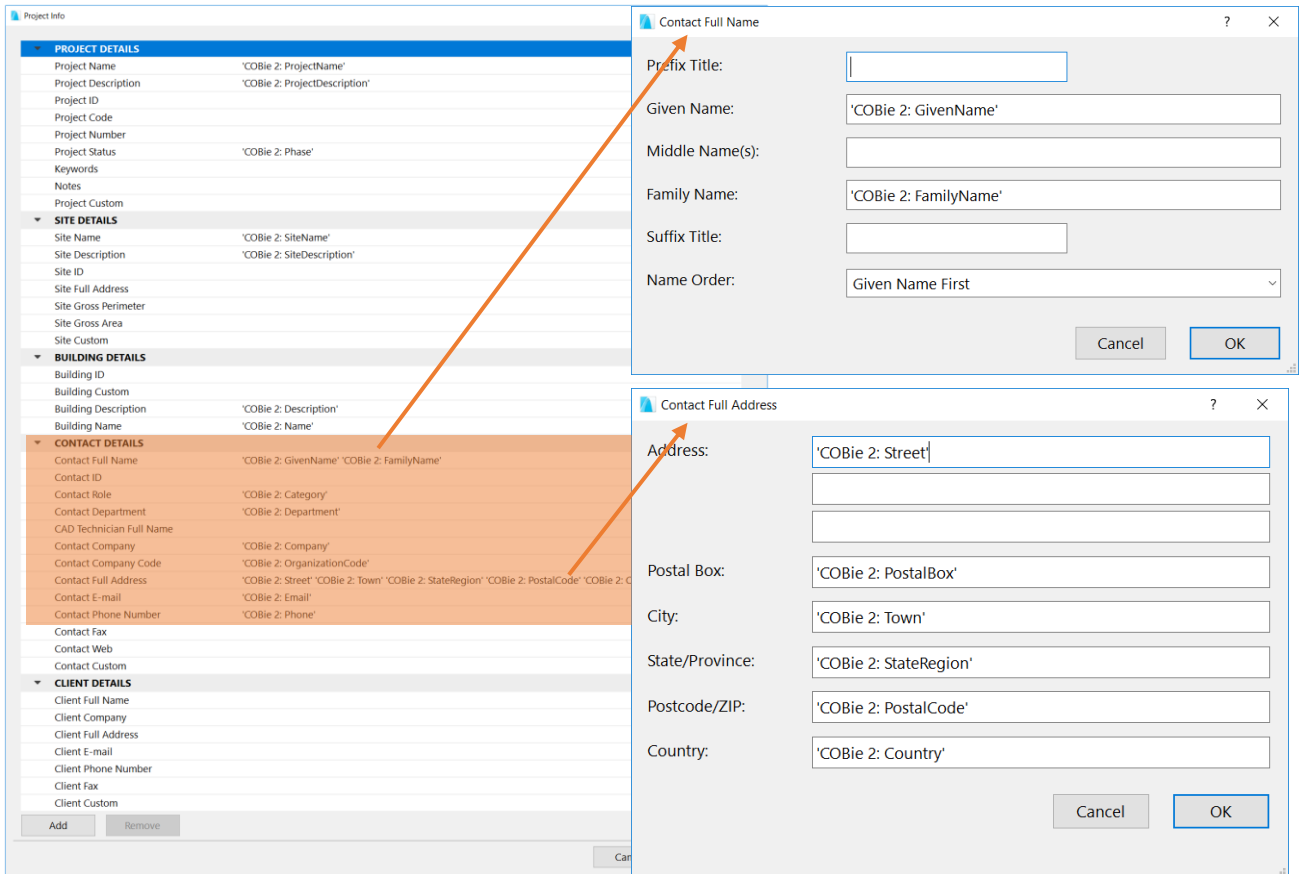


Figure 14 - Contact data in ARCHICAD (Project Info)

3.2. Facility

The COBie 2 **Facility** worksheet summarizes the Facility (IfcBuilding), the Project (IfcProject) and the Site (IfcSite) data.

Facility COBie 2 worksheet data	ARCHICAD data mapped to COBie data	ARCHICAD command
Name	Building Details > Building Name	File > Info > Project Info
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	IfcBuilding > Classification References > 'Classification System' Can be overridden manually in case of missing entities in the <i>Predefine Rules</i>	File > Interoperability > IFC > IFC Project Manager
ProjectName	Project Details > Project Name	File > Info > Project Info
SiteName	Site Details > Site Name	File > Info > Project Info
LinearUnits	Translators for Export > 'COBie 2 Export' > Unit Conversion > Length Unit	File > Interoperability > IFC > IFC Translators
AreaUnits	Translators for Export > 'COBie 2 Export' > Unit Conversion > Area Unit	File > Interoperability > IFC > IFC Translators
VolumeUnits	Translators for Export > 'COBie 2 Export' > Unit Conversion > Volume Unit	File > Interoperability > IFC > IFC Translators
CurrencyUnit	Translators for Export > 'COBie 2 Export' > Unit Conversion > Currency Unit	File > Interoperability > IFC > IFC Translators
AreaMeasurement	Text 'ARCHICAD BIM Base Quantities'	
ExternalSystem	Text 'ARCHICAD-64'	
ExternalProjectObject	Text 'IfcProject'	
ExternalProjectIdentifier	IfcProject > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
ExternalSiteObject	Text 'IfcSite'	
ExternalSiteIdentifier	IfcSite > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
ExternalFacilityObject	Text 'IfcBuilding'	
ExternalFacilityIdentifier	IfcBuilding > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
Description	Building Details > Building Description	File > Info > Project Info
ProjectDescription	Project Details > Project Description	File > Info > Project Info
SiteDescription	Site Details > Site Description	File > Info > Project Info
Phase	Project Details > Project Status	File > Info > Project Info

Figure 15 - Mapping between ARCHICAD model and the COBie 2 Facility worksheet data

All major Facility data can be defined in the Project Info dialog (*File > Info*). These data can also be managed in the *IFC Project Manager* as the main Attributes of the IfcProject, IfcSite and IfcBuilding entities. (Figure 16)

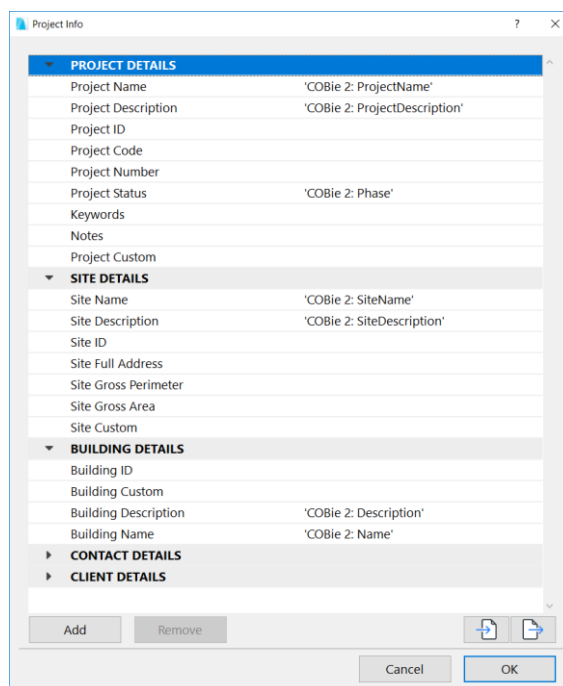


Figure 16 - Facility data in ARCHICAD (Project Info)

To set the **Facility “Category”**, provide the proper Classification Reference value in the *IFC Project Manager*. COBie requires IfcBuilding classification by OmniClass table 11, entitled “Construction Entities by Function” (in US) or by the Uniclass 2015 system (in UK). Both systems are available as built-in classification rules in ARCHICAD under the *Apply Predefined Rule* option in the *File > Interoperability > IFC > IFC Project Manager*. (Figure 17)

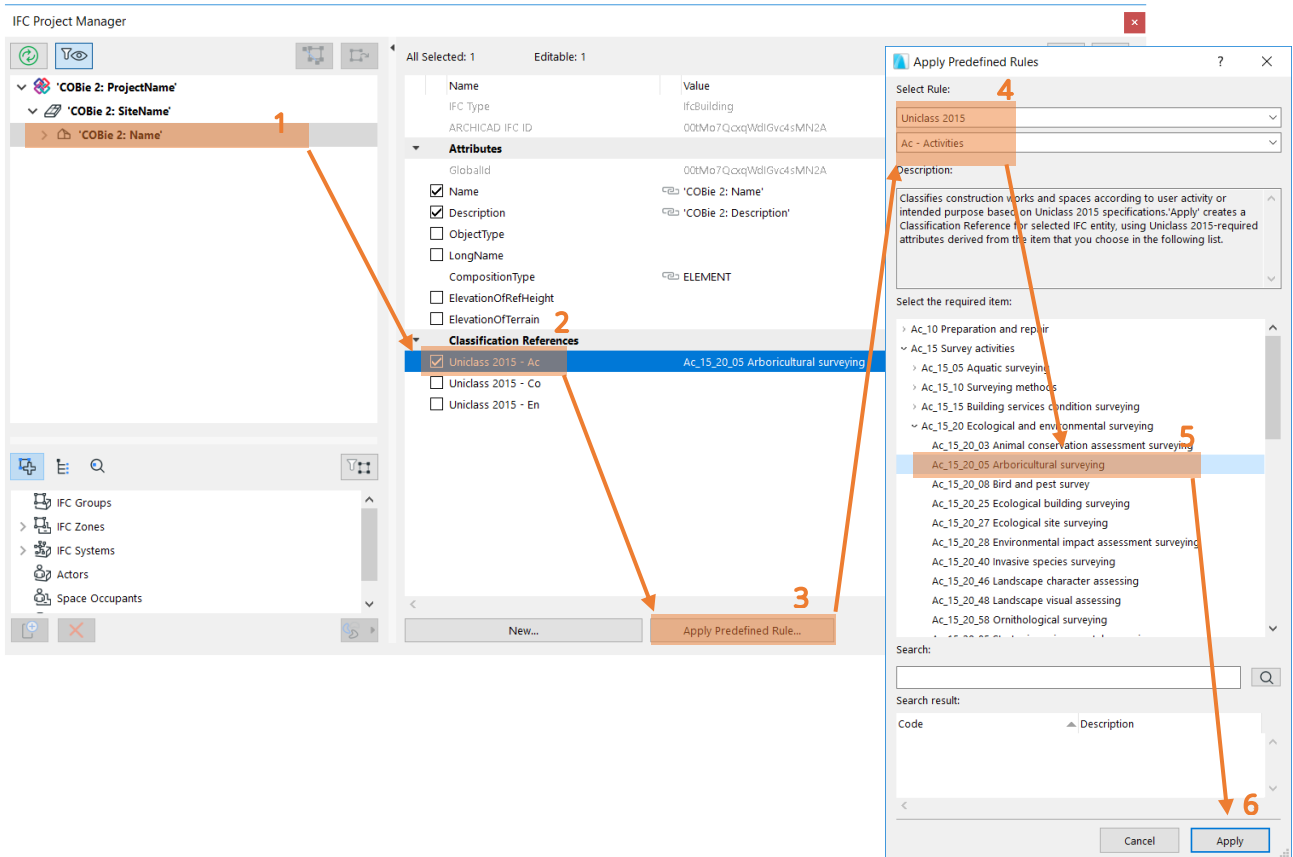


Figure 17 - COBie Facility Category set by the proper OmniClass or Uniclass 2015 classification system (IFC Project Manager)

As the content of classification systems may be updated frequently, absence of certain entities can occur in ARCHICAD's *Apply Predefine Rule*. Please **always check the relevant source** to be able to use the most updated version of the classification entities. For example in case of Uniclass 2015, please check the [source page](#) regularly. If a necessary classification code and entity is missing, please **fill** the Classification Reference field **manually** by following the steps below (Figure 18).

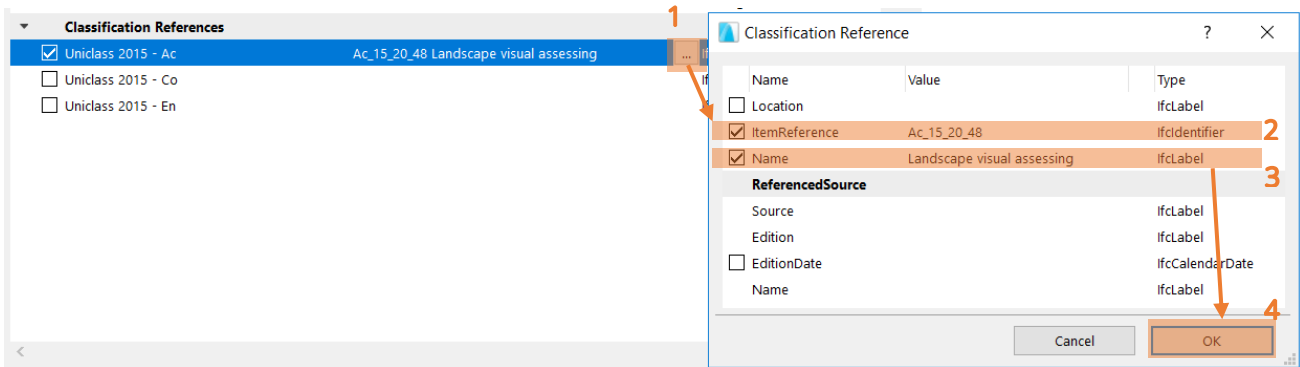


Figure 18 - COBie Facility Category set manually (IFC Project Manager)

The COBie-required unit systems of the Facility can be set at 'COBie 2 Export' IFC translator > Unit Conversion. There is a predefined settings package (so-called "IFC Translation Setup" in ARCHICAD) which contains export options optimized for the COBie-required IFC export.

Multi Building Definition

By default, ARCHICAD assigns identical "GlobalId" Attributes to IfcProject (Project), IfcSite (Site), IfcBuilding (Facility), and IfcBuildingStorey (Floor). More precisely: the "GlobalIds" will be identical, provided that the respective ID fields, defined at ARCHICAD's *Project Info* dialog box (*File > Info*) contain identical keywords (or no value at all). However, you can alter these keywords in the *Project Info* dialog box to control whether the spatial entities have identical or different "GlobalIds".

Suppose you have two separate buildings (stored in two different ARCHICAD projects). You want both projects and both sites to share the same "GlobalId"; yet you want the various buildings on each site to have different "GlobalIds".

To achieve this, enter the same keyword in the "Project ID" and "Site ID" fields of both projects. Enter different keywords for the "Building ID" fields.

IfcBuildingStorey (Floor) entities have no corresponding ID field in the *Project Info* dialog box. The "GlobalIds" of IfcBuildingStorey entities are derived from their "Building ID". If two buildings in two different ARCHICAD projects have the same "Building ID", then all stories of those buildings which have the same Story number ("No.") will have the same "GlobalId". (Figure 19)

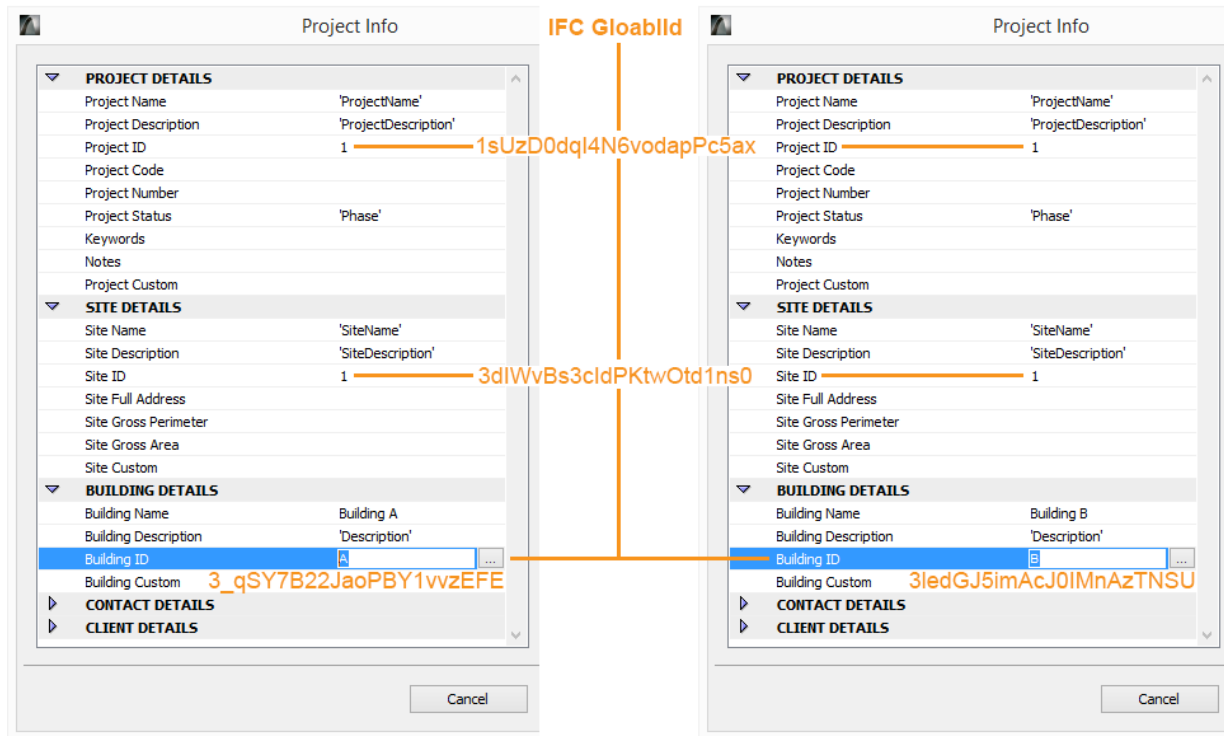
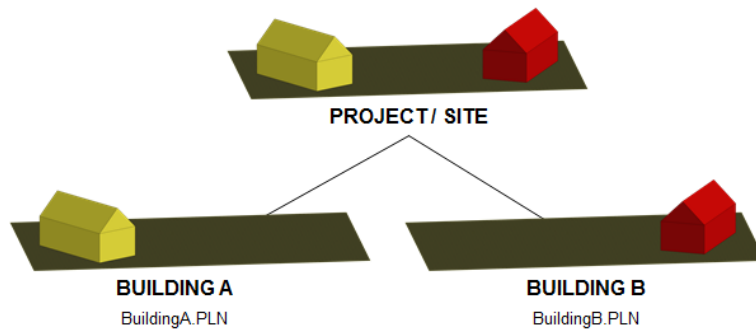


Figure 19 - Multi-building definition in ARCHICAD (Project Info)

3.3. Floor

The COBie 2 Floor worksheet summarizes data of the building stories (IfcBuildingStorey).

Floor	ARCHICAD data mapped to COBie data	ARCHICAD command
COBie2 worksheet data		
Name	Name	Design > Story Settings
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	'Name' (IfcBuildingStorey) > Classification References > Category (= 'Site', 'Floor' or 'Roof')	File > Interoperability > IFC > IFC Project Manager
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IfcBuildingStorey'	
ExtIdentifier	'Name' (IfcBuildingStorey) > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
Description	'Name' (IfcBuildingStorey) > Attributes > Description	File > Interoperability > IFC > IFC Project Manager
Elevation	Elevation	Design > Story Settings
Height	Height to Next	Design > Story Settings

Figure 20 - Mapping between ARCHICAD model and the COBie 2 Floor worksheet data

The “Floors” are interpreted as Stories in the ARCHICAD project. The story names (COBie “Name”), the elevation (COBie “Elevation”) and the height (COBie “Height”) can be defined in the *Story Settings* dialog (*Design > Story Settings*). (Figure 21)

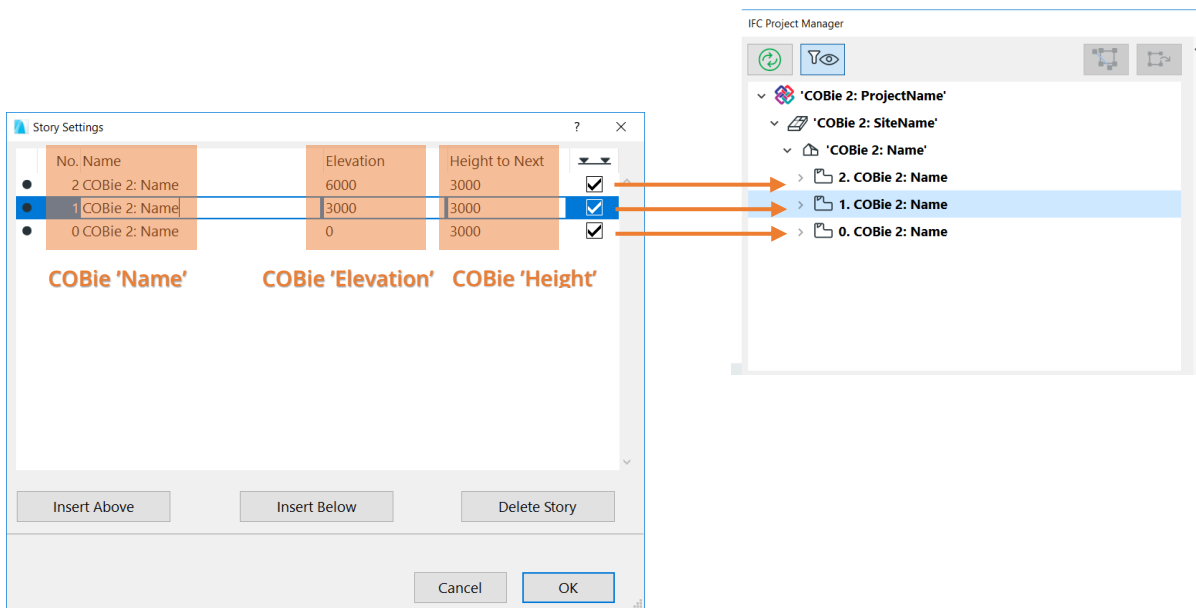


Figure 21 - Story settings define the major COBie Floor data in ARCHICAD

To set the **Floor “Category”**, choose the proper “Floor Type” Classification Reference data in the *IFC Project Manager*. Just choose the “COBie Floor and Zone Categories” (*Floor Types*) predefined rule with the *Apply Predefined Rule* tool. The “Description” attribute of an ARCHICAD Story (IfcBuildingStorey) can also be set via the *IFC Project Manager*. (Figure 22)

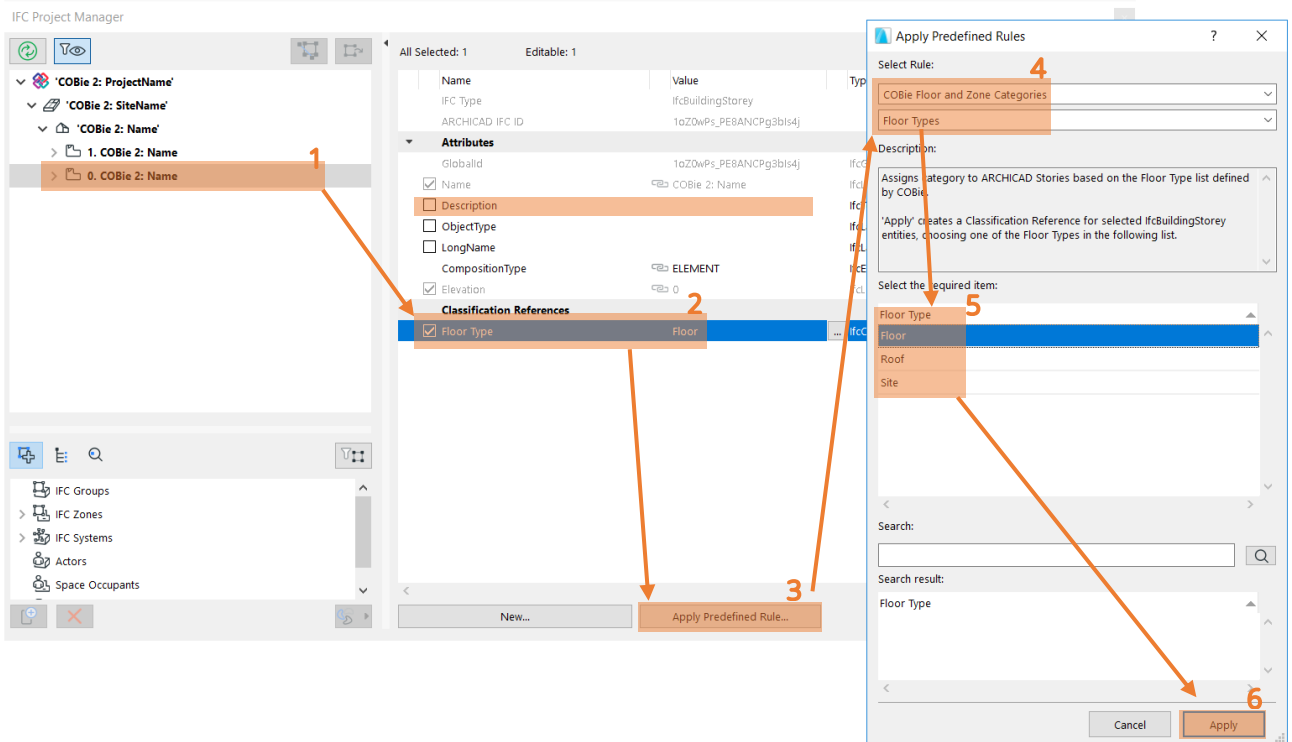


Figure 22 - Floor Type definition in the IFC Project Manager

3.4. Space

The COBie 2 **Space** worksheet summarizes data of the Spaces (IfcSpace) of the project.

Space	ARCHICAD data mapped to COBie data	ARCHICAD command
COBie2 worksheet data		
Name	Settings Dialog > Name and Positioning > No (= Zone Number)	Design > Design Tools > Zone
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	Settings Dialog > Classification and Properties > Classifications > ' Classification System '	Design > Design Tools > Zone
FloorName	Settings Dialog > Name of the Zone's Home Story	Design > Design Tools > Zone
Description	Settings Dialog > Name and Positioning > Name	Design > Design Tools > Zone
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IfcSpace'	
ExtIdentifier	IfcSpace > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
RoomTag	Settings Dialog > Classification and Properties > COBie 2: Space > Room Tag	Design > Design Tools > Zone
UsableHeight	Settings Dialog > Name and Positioning > Zone Height	Design > Design Tools > Zone
GrossArea	Zone's Measured Area (= GrossFloorArea of IfcSpace)	Document > Schedules (for Zones)
NetArea	Zone's Calculated Area (= NetFloorArea of IfcSpace)	Document > Schedules (for Zones)

Figure 23 - Mapping between ARCHICAD model and the COBie 2 Space worksheet data

The “Spaces” are interpreted as Zones (IfcSpaces) in the ARCHICAD project. Thus, the COBie 2-required data can be set in ARCHICAD Zone Settings. By selecting the correct classification of the Zones in the *Classification and Properties* tab and filling in the *Room Tag* property, our task is complete.

Each COBie Space (ARCHICAD Zone) must have a **unique COBie “Name”**, that is a **unique ARCHICAD Zone number (“No”)**. (Figure 24)

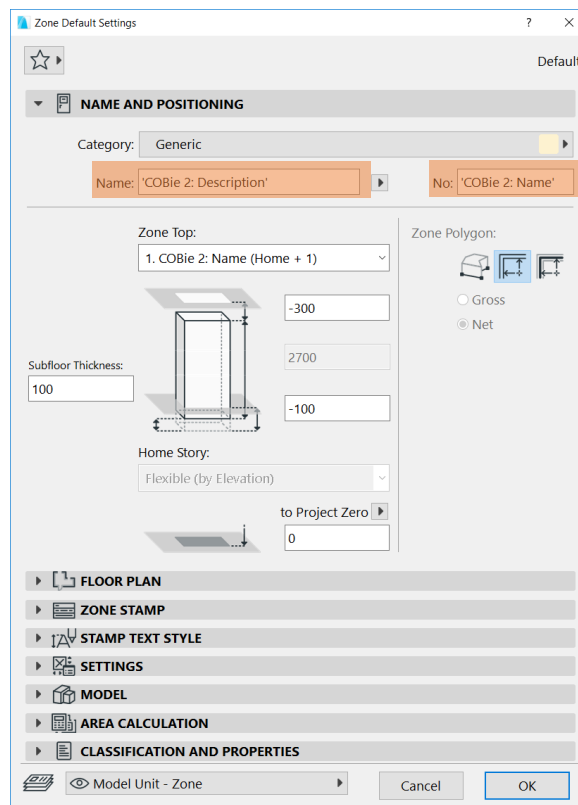


Figure 24 - IfcSpace name and Description settings in ARCHICAD's Zone tool

To set the **Space "Category"**, select the proper Uniclass 2015 or Omniclass classification entity in the *Zone Settings > Classification and Properties > Classifications* dialog. COBie requires IfcSpace classification by the OmniClass table 13 called "Space by Function" (in the U.S.) or by the Uniclass 2015 system (in UK). (Figure 25)

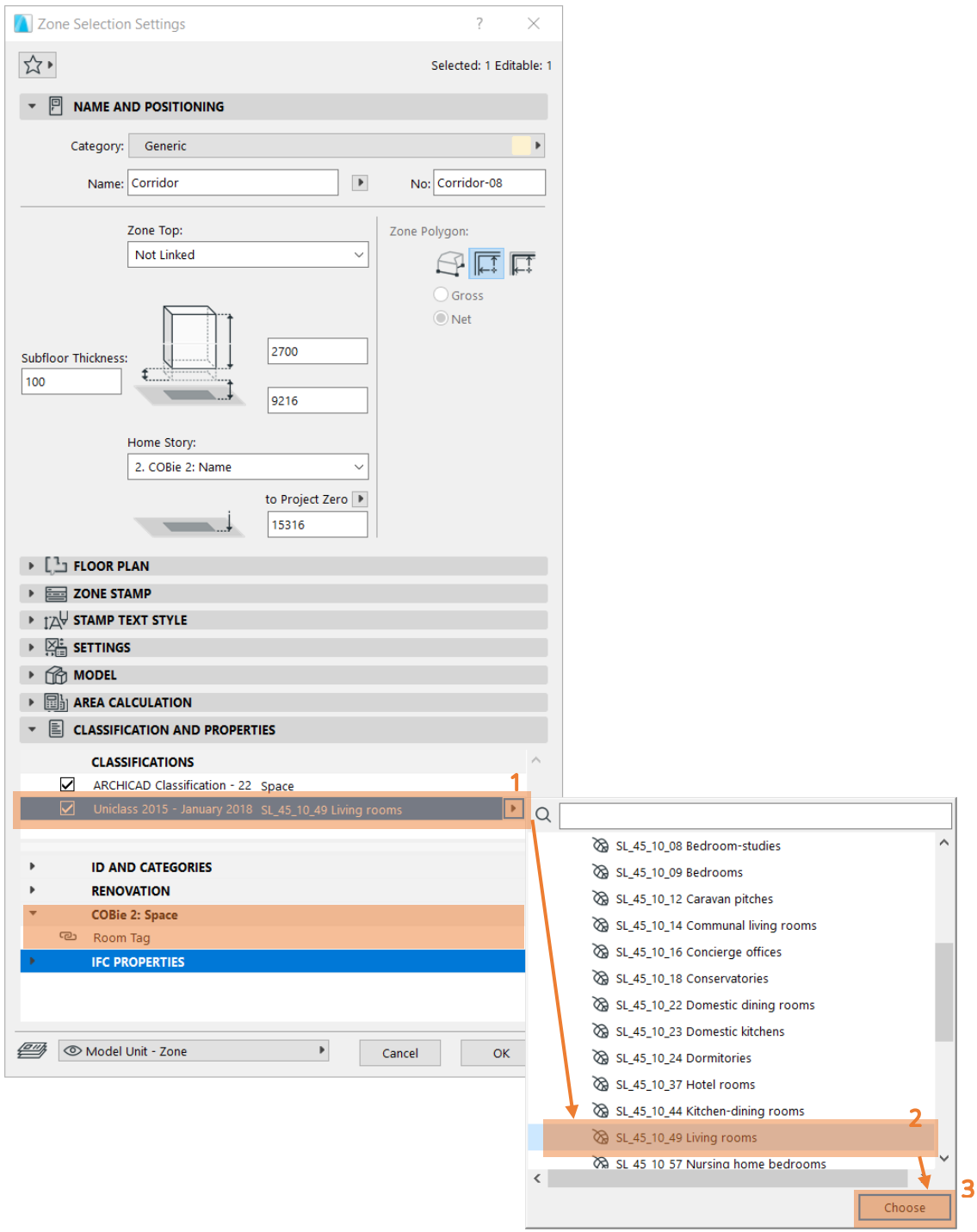


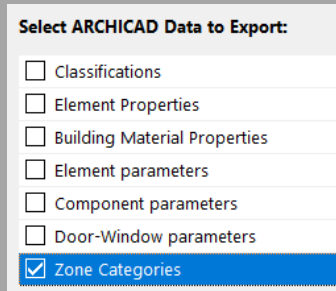
Figure 25 - Space Category definition and Room Tag property

For filling out the *Room Tag* property, please use the ARCHICAD property from 'COBie 2: Space' property set.

HINT

Those, who use the **ARCHICAD UKI template** can also use ARCHICAD Zone Categories for setting the Space Category. In this case an additional checkbox has to be selected in the **IFC translator's Data Conversion preset** to export the relevant data.

Note that by using ARCHICAD Zone category one IfcSpace entity can only be part of one Zone.



Select ARCHICAD Data to Export:	
<input type="checkbox"/>	Classifications
<input type="checkbox"/>	Element Properties
<input type="checkbox"/>	Building Material Properties
<input type="checkbox"/>	Element parameters
<input type="checkbox"/>	Component parameters
<input type="checkbox"/>	Door-Window parameters
<input checked="" type="checkbox"/>	Zone Categories

IMPORTANT

For the different classification systems, different templates are available because of the different mapping rules. Please select the correct template accordingly with the classification system you use.

3.5. Zone

The COBie 2 **Zone** worksheet summarizes the sets of spaces sharing a specific attribute in the project. In other words, it summarizes the data of the groups (IfcZones) of [COBie Spaces](#) (IfcSpaces).

Zone COBie2 worksheet data	ARCHICAD data mapped to COBie data	ARCHICAD command
Name	Assignments > IFC Zones > 'Zone name' > Attributes > Name	File > Interoperability > IFC > IFC Project Manager
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	Assignments > IFC Zones > 'Zone name' > Classification References > Category (='Circulation Zone', 'Lighting Zone', 'Fire Alarm Zone', 'Historical Preservation Zone', 'Occupancy Zone' or 'Ventilation Zone')	File > Interoperability > IFC > IFC Project Manager
SpaceNames	Settings Dialog > Name and Positioning > No (= Zone Number) of the ARCHICAD Zones assigned to the IFC Zone	Design > Design Tools > Zone
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IfcZone'	
ExtIdentifier	Assignments > IFC Zones > 'Zone name' > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
Description	Assignments > IFC Zones > 'Zone name' > Attributes > Description	File > Interoperability > IFC > IFC Project Manager

Figure 26 - Mapping between ARCHICAD model and the COBie 2 Zone worksheet data

COBie “Zones” are interpreted as IFC Zone Assignment (IfcZone) entities in the ARCHICAD project. An IfcZone entity is a group of ARCHICAD Zone (IfcSpace) entities. IFC Zone entities with their COBie 2-required data can be defined and managed **only in the IFC Project Manager**.

A COBie “Zone” (IfcZone) can be defined with the *New* command by applying it to the “IFC Zones” member of the “Assignments” tree. Set the COBie “Name” and the “Description” data at the attributes of the same name. To set the Zone “Category”, choose the proper “Zone Type” Classification Reference data in the *IFC Project Manager*. Just choose the “COBie Floor and Zone Categories” (Zone Types) predefined rule with the *Apply Predefined Rule* tool. (Figure 27)

HINT

The main difference between the ARCHICAD Zone Category and IFC Zone is that a room (ARCHICAD Zone / IfcSpace) can only be part of only one ARCHICAD Zone Category while the very same room can be part of several IFC Zones simultaneously.

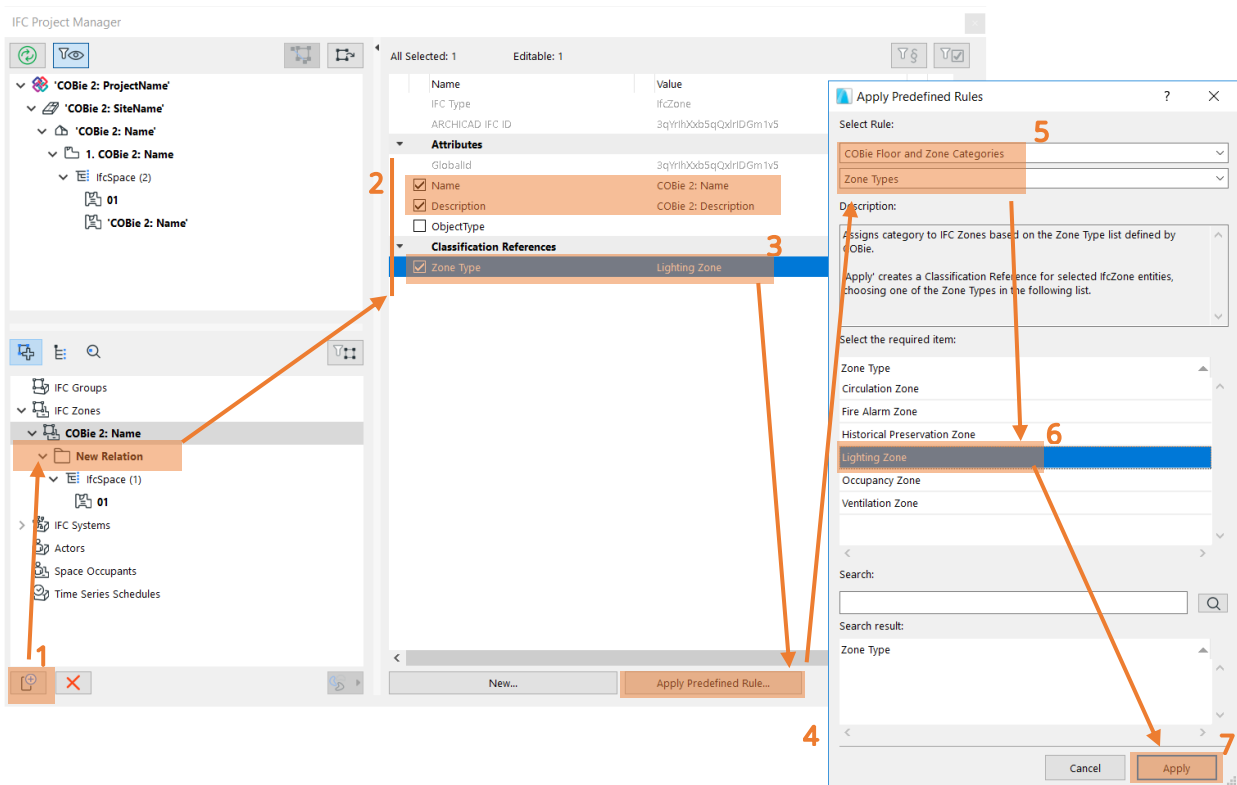


Figure 27 - COBie 2 Zone (IFC Zone) definition in the IFC Project Manager

To assign several ARCHICAD Zones (IfcSpaces) having the same function (on Fig 21 IfcZone 'COBie 2: Name') to a newly created IFC Zone entity, just drag and drop them to the "New Relation" folder of the IFC Zone entity. (Figure 28)

HINT

Use schedules to check all ARCHICAD Zones (IfcSpace) have been assigned to a IfcZone. **Every Space should be assigned to at least one Zone** and every Zone should have at least one Space. Spaces however can be assigned to multiple Zones as required.

IMPORTANT

Hotlinked ARCHICAD Zone entities cannot be grouped in IFC Zones. To assign an IFC Zone entity to these Zones, you must first **break their Hotlink** module connection.

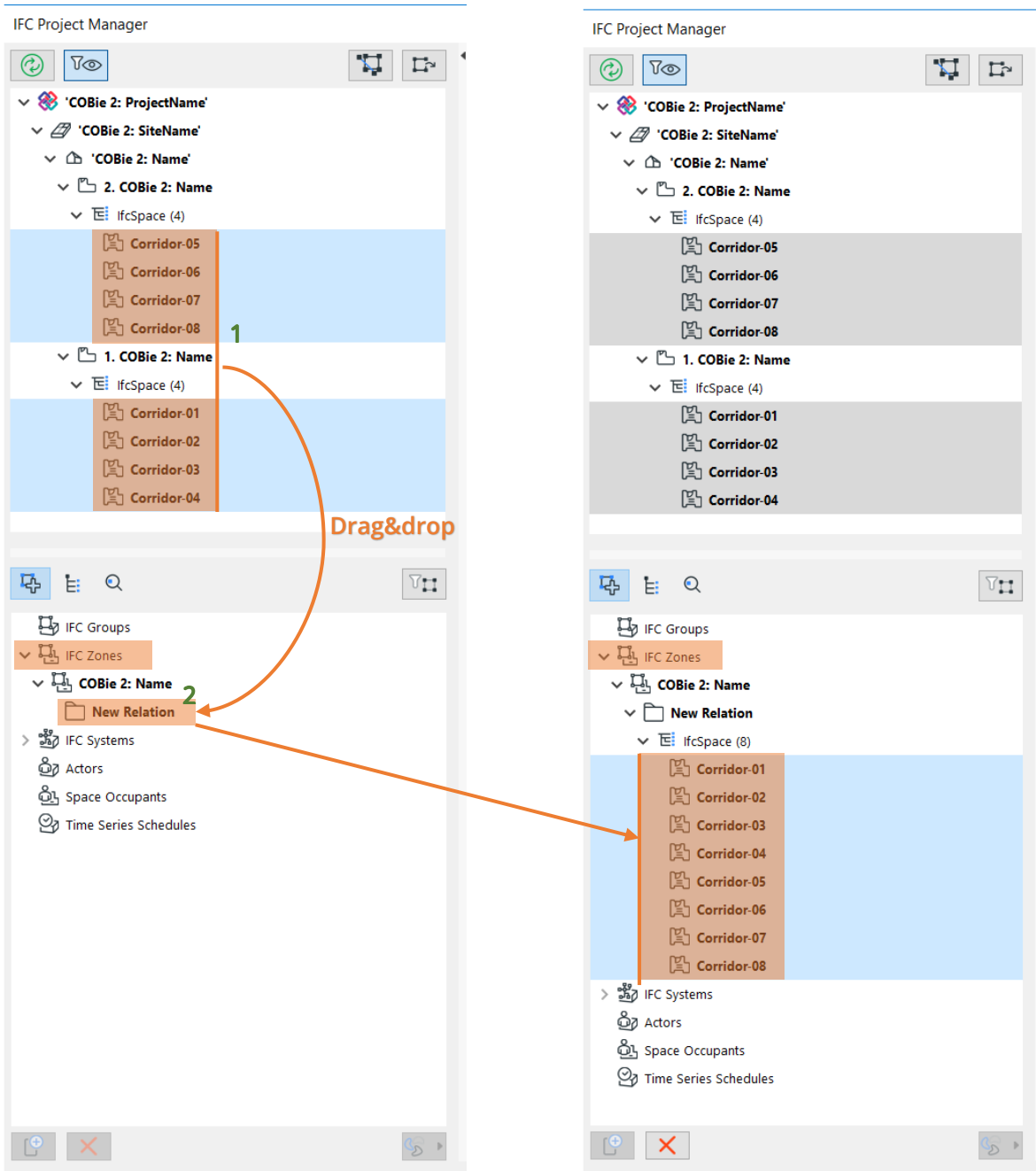


Figure 28 - Grouping ARCHICAD Zones in an IFC Zone (IFC Project Manager)

3.6. Type

COBie 2 Type worksheet summarizes the types of equipment and products.

Type	ARCHICAD data mapped to COBie data	ARCHICAD command
COBie2 worksheet data		
Name	Translators for Export > 'COBie 2 Export' > Property Mapping > 'IfcTypeProduct' > Attributes > Name Can be overridden manually: Type Products > 'IfcTypeProduct' > Attributes > Name	File > Interoperability > IFC > IFC Translators File > Interoperability > IFC > IFC Project Manager
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	Settings Dialog > Classification and Properties > Classifications > ' Classification System '	Design > Design Tools > 'ARCHICAD Tool'
Description	Settings Dialog > Classification and Properties > COBie 2: Type > Type Description	Design > Design Tools > 'ARCHICAD Tool'
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IFC Type Product' (e.g. 'IfcFurnishingElementType')	File > Interoperability > IFC > IFC Project Manager
ExtIdentifier	Type Products > 'IfcTypeProduct' > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
AssetType	Settings Dialog > Classification and Properties > COBie 2: Type > Asset Type	Design > Design Tools > 'ARCHICAD Tool'
ReplacementCost	Settings Dialog > Classification and Properties > COBie 2: Type > Replacement Cost	Design > Design Tools > 'ARCHICAD Tool'
ExpectedLife	Settings Dialog > Classification and Properties > COBie 2: Type > Expected Life	Design > Design Tools > 'ARCHICAD Tool'
AccessibilityPerformance	Settings Dialog > Classification and Properties > COBie 2: Type > Accessibility Performance	Design > Design Tools > 'ARCHICAD Tool'
CodePerformance	Settings Dialog > Classification and Properties > COBie 2: Type > Code Performance	Design > Design Tools > 'ARCHICAD Tool'
Color	Settings Dialog > Classification and Properties > COBie 2: Type > Color	Design > Design Tools > 'ARCHICAD Tool'
Constituents	Settings Dialog > Classification and Properties > COBie 2: Type > Constituents	Design > Design Tools > 'ARCHICAD Tool'
Features	Settings Dialog > Classification and Properties > COBie 2: Type > Features	Design > Design Tools > 'ARCHICAD Tool'
Finish	Settings Dialog > Classification and Properties > COBie 2: Type > Finish	Design > Design Tools > 'ARCHICAD Tool'
Grade	Settings Dialog > Classification and Properties > COBie 2: Type > Grade	Design > Design Tools > 'ARCHICAD Tool'
Material	Settings Dialog > Geometry and Positioning > Building Material/Composite	Design > Design Tools > 'ARCHICAD Tool'
NominalHeight	ARCHICAD object's Height	Design > Design Tools > 'ARCHICAD Tool'
NominalLength	ARCHICAD object's Length	Design > Design Tools > 'ARCHICAD Tool'
NominalWidth	ARCHICAD object's Width	Design > Design Tools > 'ARCHICAD Tool'
Shape	Settings Dialog > Classification and Properties > COBie 2: Type > Shape	Design > Design Tools > 'ARCHICAD Tool'
Size	Translators for Export > 'COBie 2 Export' > Property Mapping > 'IfcTypeProduct' > COBie_Specification > Size (=HeightXLengthXWidth) Can be overridden manually: Settings Dialog > Classification and Properties > COBie 2: Type > Size	File > Interoperability > IFC > IFC Translators Design > Design Tools > 'ARCHICAD Tool'
SustainabilityPerformance	Settings Dialog > Classification and Properties > COBie 2: Type > Sustainability Performance	Design > Design Tools > 'ARCHICAD Tool'
WarrantyDescription	Settings Dialog > Classification and Properties > COBie 2: Type > Warranty Description	Design > Design Tools > 'ARCHICAD Tool'
WarrantyDurationLabor	Settings Dialog > Classification and Properties > COBie 2: Type > Warranty Duration Labor	Design > Design Tools > 'ARCHICAD Tool'
WarrantyDurationParts	Settings Dialog > Classification and Properties > COBie 2: Type > Warranty Duration Parts	Design > Design Tools > 'ARCHICAD Tool'
WarrantyGuarantorLabor	Settings Dialog > Classification and Properties > COBie 2: Type > Warranty Guarantor Labor	Design > Design Tools > 'ARCHICAD Tool'
WarrantyGuarantorParts	Settings Dialog > Classification and Properties > COBie 2: Type > Warranty Guarantor Parts	Design > Design Tools > 'ARCHICAD Tool'
Manufacturer	Settings Dialog > Classification and Properties > COBie 2: Type > Manufacturer	Design > Design Tools > 'ARCHICAD Tool'
ModelNumber	Settings Dialog > Classification and Properties > COBie 2: Type > Model Number	Design > Design Tools > 'ARCHICAD Tool'
ModelReference	Settings Dialog > Classification and Properties > COBie 2: Type > Model Reference	Design > Design Tools > 'ARCHICAD Tool'
DurationUnit	Translators for Export > 'COBie 2 Export' > Unit Conversion > Time Unit	File > Interoperability > IFC > IFC Translators
WarrantyDurationUnit	Translators for Export > 'COBie 2 Export' > Unit Conversion > Time Unit	File > Interoperability > IFC > IFC Translators

Figure 29 - Mapping between ARCHICAD model and the COBie 2 Type worksheet data

COBie "Types" are interpreted as IFC Type Product entities in the ARCHICAD project. ARCHICAD automatically generates IFC Type Product entities for all ARCHICAD element types. The following table shows naming examples of the automatically generated IFC Type Products. IFC Type Products and their COBie 2-requested data primarily can be defined on the element level by using ARCHICAD Properties from the 'COBie 2: Type' property set or in the IFC Project Manager > Type Products tab by types. (Figure 30)

ArchiCAD element (IFC Entity)	IFC Element Type	"Name" IFC Attribute of IFC Element Type derives from
Column (IfcColumn)	IfcColumnType	Profile name and size
Beam (IfcBeam)	IfcBeamType	Profile name and size
Wall (IfcWall)	IfcWallType	Name of Cut Fill / Composite and thickness
Door (IfcDoor)	IfcDoorStyle	Name of the Library Part without .gsm extension
Window (IfcWindow)	IfcWindowStyle	Name of the Library Part without .gsm extension
GDL-based Objects	e.g. IfcFurnitureType	Name of the Library Part without .gsm extension

Figure 30 - Naming rule examples of IFC Type Product entities

In the *IFC Scheme Setup* (*File > Interoperability > IFC > IFC translators > 'COBie 2 Export' translator > Property Mapping > Map IFC properties for export*) command dialog, you can override the Type naming with mapping rules. The default 'COBie 2 Export' ARCHICAD template gives a complex naming rule for *IfcWindowStyle* (Window Type) and *IfcDoorStyle* (Door Type) naming that contains a custom text 'DoorStyle_' or 'WindowStyle_' and the "Library Part Name", the "Width" and "Height" parameters with the "Orientation" and some static texts among the data values. **These rules can be changed or modified according the requirements** for each *IfcTypeProduct*. For an *IfcTypeProduct* more than one rule can be created by using sequences. The first rule which is applicable on the Type will be used (priority of rules is considered) and the rest of the rules will be ignored. (Figure 32)

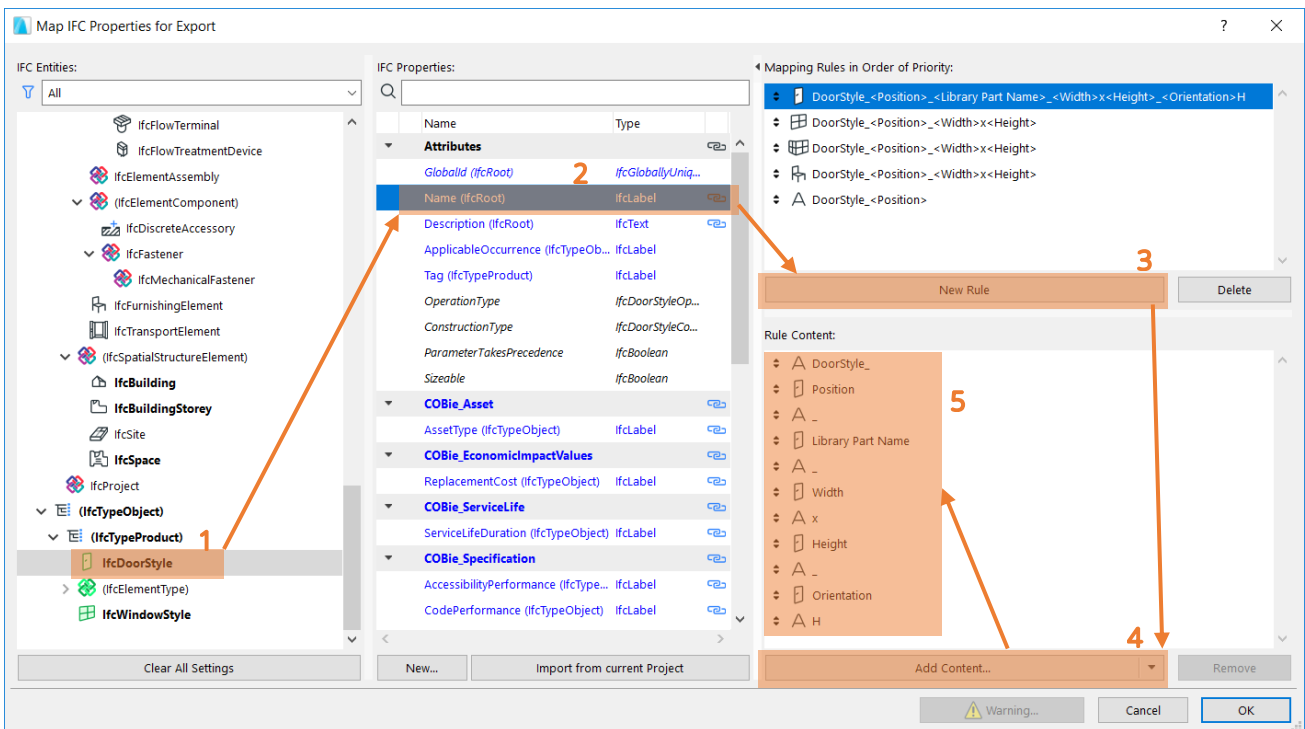


Figure 31 - Name mapping by the IFC Scheme Setup command

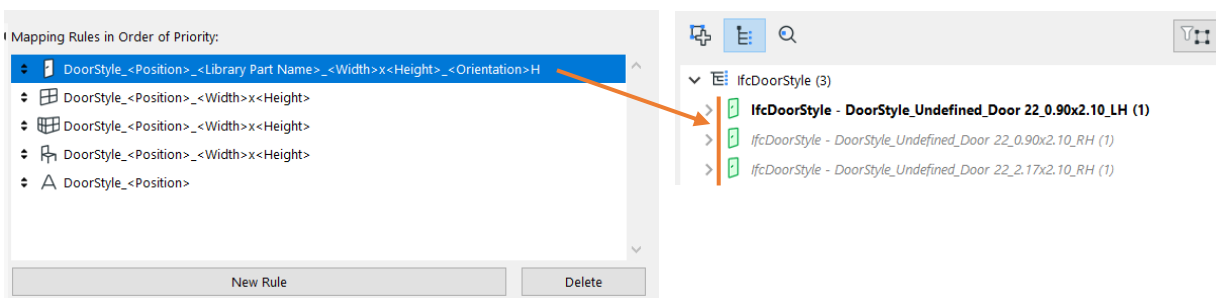


Figure 32 - The effect of the scheme-driven DoorStyle mapping (IFC Project Manager)

All Type names must be unique. Consistent naming of Types is necessary and can be changed according your company standards by changing the mapping rules.

Type names **also can be modified manually**. To modify the predefined name of a Type and/or to manage the COBie-required attributes, properties and classification reference (COBie Category) of a Type, first you have to set **IFC Type Product entity to be editable**. Apply the *Edit/New Type* command on the selected Type Product item and manage its properties in its property table (right hand side). (Figure 33)

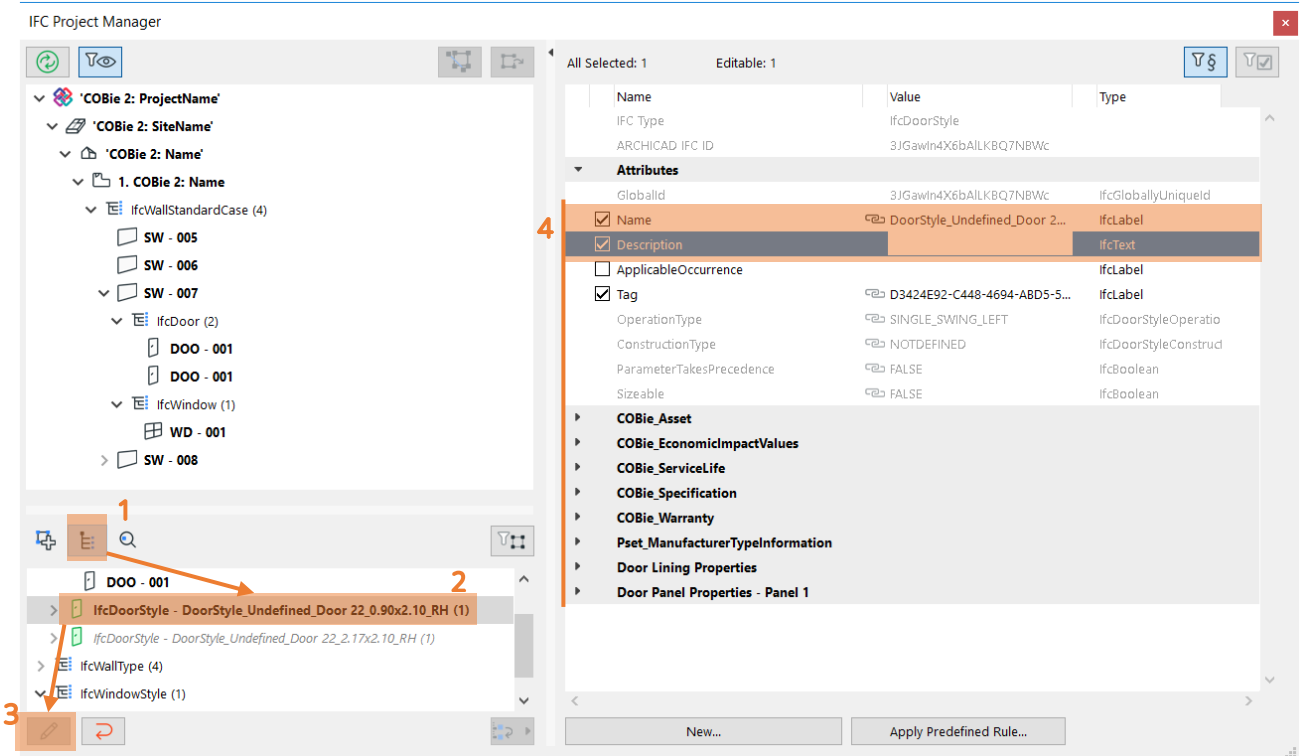


Figure 33 - How to make a Type Product entity editable (IFC Project Manager)

If an IFC Type Product is editable, the following functions become available:

- renaming (modification of the "Name" attribute),
- setting COBie attributes and properties,
- setting Type Category, and
- modifying its member content by moving the members into another type.

To set the **Type "Category"**, select the proper Omniclass or Uniclass 2015 Classification of the element in the ARCHICAD tool's settings dialog. COBie requires IFC Type Product classification by the OmniClass table 23 called "Products" (in the U.S.) or by the Uniclass 2015 system (in UK). (Figure 34)

If you have to use more than one classifications simultaneously (or multiple tables from one classification system), you need to split that classification system into parts or use the built-in classification rules in ARCHICAD under the *Apply Predefined Rule* option.

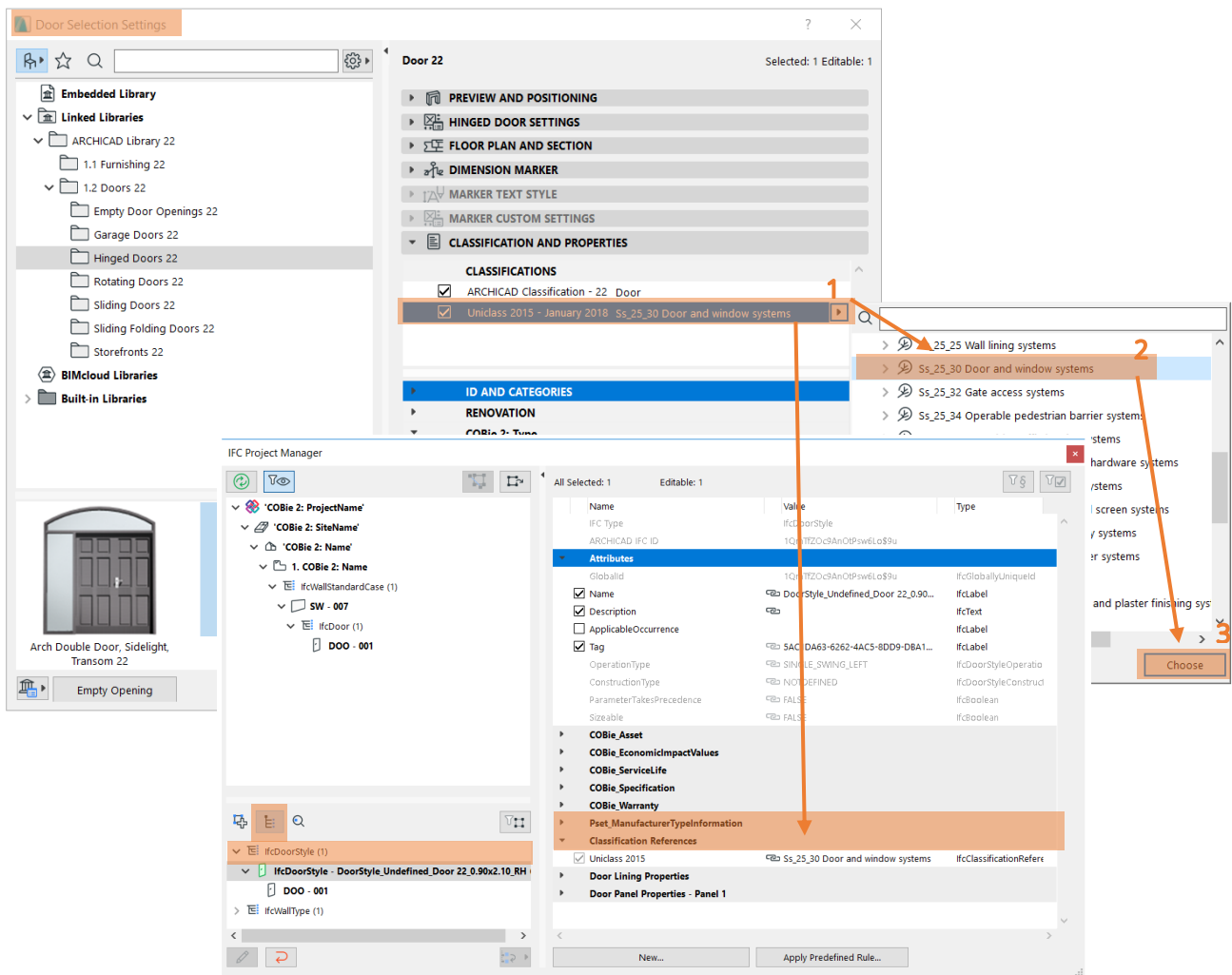


Figure 34 - Automatic mapping of COBie Category definition for Door Type (IfcDoorStyle) entity (IFC Project Manager)

IMPORTANT

As the content of classification systems may be updated frequently, absence of certain entities can occur in ARCHICAD's *Apply Predefine Rule*. Please always check the relevant source to be able to use the correct classification entity. For example in case of Uniclass 2015, please check the [source page](#). If the necessary classification code and entity is missing, please fill the Classification Reference field **manually** by following the steps below. (Figure 35)

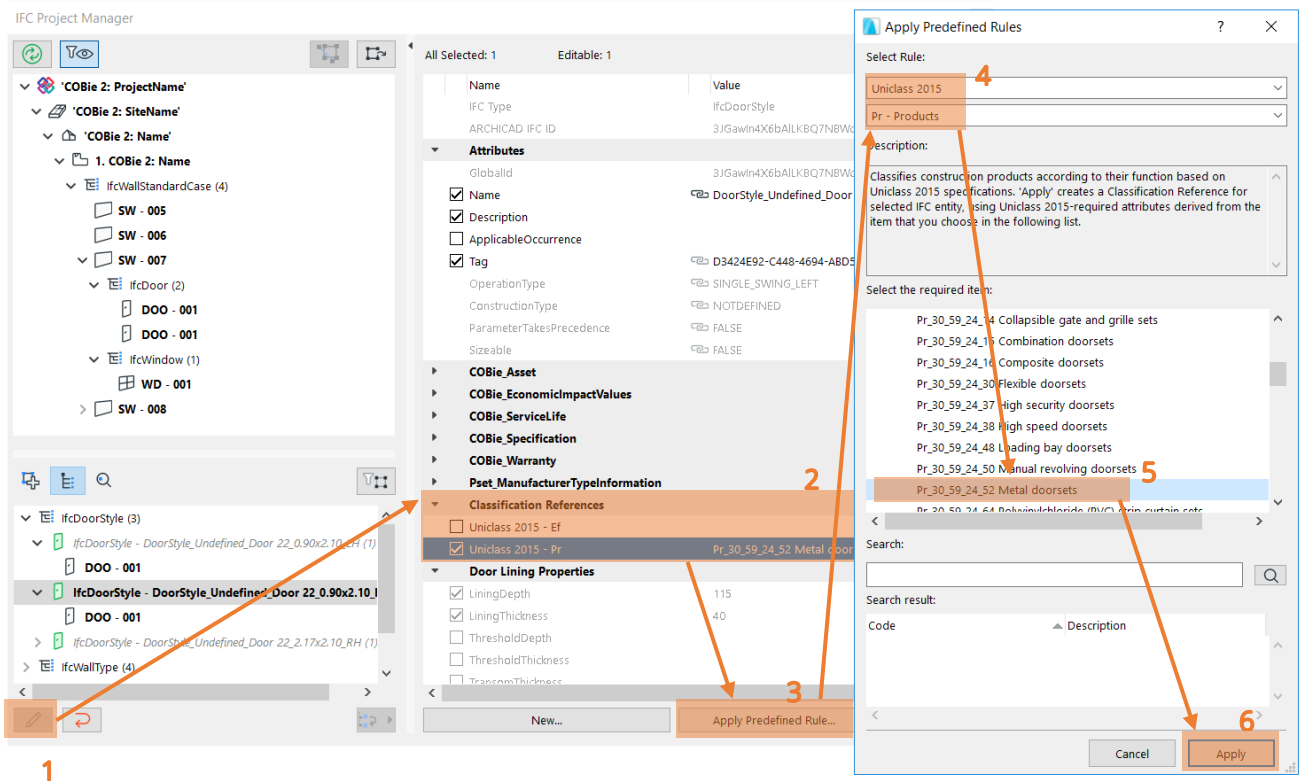


Figure 35 - Manual setup of COBie Category definition for Door Type (IfcDoorStyle) entity (IFC Project Manager)

The COBie-required duration unit can be set in *Export Options*. There is a predefined settings package (so-called “IFC Translation Setup” in ARCHICAD) which contains export options optimized for the COBie-required IFC export. It is called “COBie 2 Export” IFC Translator.

If you create a new Component in your model after Type definition, you can easily drag and drop the new Component onto an edited Type in the “Type Products” dialog of the *IFC Project Manager*.

If you have same type Components in two different Hotlinked modules, you can unify them in one common Type (within one COBie Type “ExtIdentifier” (IFC “GlobalId”)) only after you break their Hotlink module connection.

3.7. Component

The COBie 2 **Component** worksheet summarizes the individually named items of the project.

Component	ARCHICAD data mapped to COBie data	ARCHICAD command
COBie2 worksheet data		
Name	Settings Dialog > Classification and Properties > ID and Categories > ID	Design > Design Tools > 'ARCHICAD Tool'
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
TypeName	Type Products > 'IfcTypeProduct' > Attributes > Name of the Type Product auto-assigned to the item	File > Interoperability > IFC > IFC Project Manager
Space	Settings Dialog > Name and Positioning > No (= Zone Number) of the ARCHICAD Zone contains the item	File > Interoperability > IFC > IFC Project Manager: Space Containment hierarchy
Description	Settings Dialog > Classification and Properties > COBie 2: Component > Component Description	Design > Design Tools > 'ARCHICAD Tool'
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IFC Type' (e.g. 'IfcFurnishingElement')	File > Interoperability > IFC > IFC Project Manager
ExtIdentifier	'IfcType' > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
AssetIdentifier	Settings Dialog > Classification and Properties > COBie 2: Component > Asset Identifier	Design > Design Tools > 'ARCHICAD Tool'
InstallationDate	Settings Dialog > Classification and Properties > COBie 2: Component > Installation Date	Design > Design Tools > 'ARCHICAD Tool'
TagNumber	Settings Dialog > Classification and Properties > COBie 2: Component > Tag Number	Design > Design Tools > 'ARCHICAD Tool'
WarrantyStartDate	Settings Dialog > Classification and Properties > COBie 2: Component > Warranty Start Date	Design > Design Tools > 'ARCHICAD Tool'
BarCode	Settings Dialog > Classification and Properties > COBie 2: Component > Bar Code	Design > Design Tools > 'ARCHICAD Tool'
SerialNumber	Settings Dialog > Classification and Properties > COBie 2: Component > Serial Number	Design > Design Tools > 'ARCHICAD Tool'

Figure 36 - Mapping between ARCHICAD model and the COBie 2 Component worksheet data

The “Name” data are derived from the ARCHICAD “ID” of the element, so you can set them in the element Settings dialogs. All IFC data can be set by using the **ARCHICAD Properties** from the *COBie 2: Component* property set if a Uniclass 2015 or Omniclass classification is assigned to the element. (Figure 37)

Each Component has to have a **unique COBie “Name”** (ARCHICAD “ID”). If you did not assign unique (different) ID’s to your ARCHICAD elements, you can do so at any time, for example using the *Element ID Manager* function (*Document > Listing Extras > Schedules and Lists*). Also, make sure to know the behaviour of this tool when re-IDing elements is coming to picture.

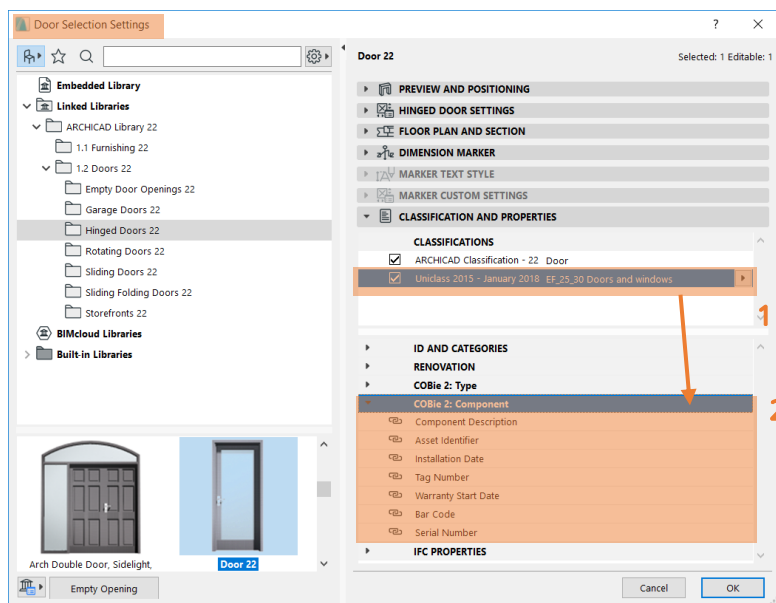


Figure 37 - COBie-required Component property data set in the Window Settings dialog

3.8. System

The COBie 2 **System** worksheet summarizes the sets of [Components](#) providing a service. In other words, it summarizes the data of the systems (IfcSystem) of the project elements.

System	ARCHICAD data mapped to COBie data	ARCHICAD command
COBie2 worksheet data		
Name	Assignments > IFC Systems > 'System name' > Attributes > Name	File > Interoperability > IFC > IFC Project Manager
CreatedBy	Contact Details > Contact E-mail	File > Info > Project Info
CreatedOn	The creation date of the IFC file	
Category	Assignments > IFC Systems > 'System name' > Classification References > Category	File > Interoperability > IFC > IFC Project Manager
ComponentNames	Settings Dialog > Classification and Properties > ID and Categories > ID of the item assigned to the IFC System	Design > Design Tools > 'ARCHICAD Tool'
ExtSystem	Text 'ARCHICAD-64'	
ExtObject	Text 'IfcSystem'	
ExtIdentifier	Assignments > IFC Systems > 'System name' > Attributes > GlobalId	File > Interoperability > IFC > IFC Project Manager
Description	Assignments > IFC Systems > 'System name' > Attributes > Description	File > Interoperability > IFC > IFC Project Manager

Figure 38 - Mapping between ARCHICAD model and the COBie 2 System worksheet data

COBie “Systems” are interpreted as IFC System Assignment (IfcSystem) entities in the ARCHICAD project. An IfcSystem entity is a group of ARCHICAD elements. IFC System entities with their COBie 2-required data can be defined and managed only in the *IFC Project Manager*.

A COBie “System” (IfcSystem) can be defined with the *New* command by applying it to the “IFC Systems” member of the “Assignments” tree. Set the COBie “Name” and the “Description” using the attribute fields of the same name. (Figure 39)

To set the System “Category”, select proper Classification Reference data in the *IFC Project Manager*. COBie requires IFC System classification by the OmniClass table 21 called “Elements” (in the U.S.) or by the Uniclass 2015 system (in UK). Both systems are available as built-in classification rules in ARCHICAD under the *Apply Predefined Rule* option.

Systems are often created by the MEP engineers therefore the architects/designers can leave this work for the discipline. In this situation, the MEP engineer is responsible for the “System” related information. Later on that COBIE output has to be merged together with the architectural COBie data.

However, if the MEP modeler add-on is installed in ARCHICAD, MEP systems can be recognized automatically and System related information can be exported along with the architectural model. If the Systems and related elements are not native ARCHICAD elements, always test the exported output.

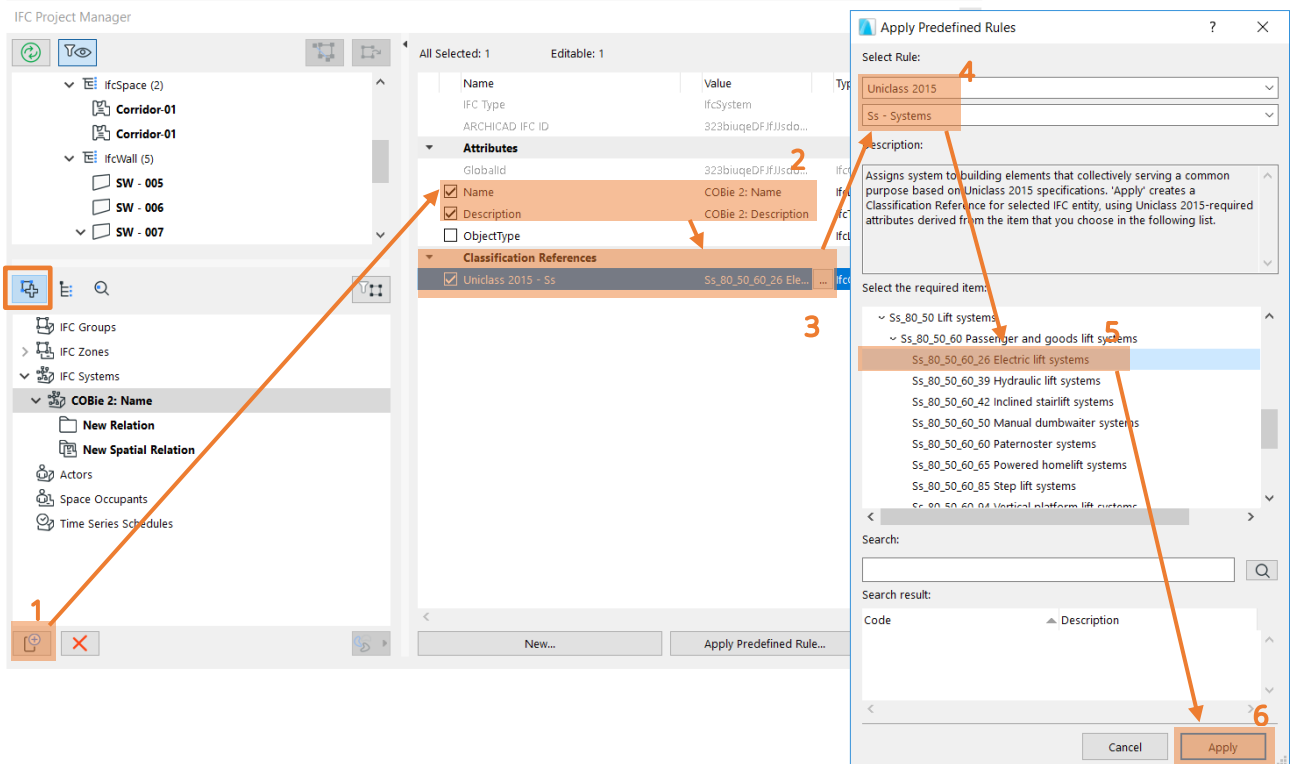


Figure 39 - COBie 2 System (IFC System) definition in the IFC Project Manager

As the content of classification systems may be updated frequently, absence of certain entities can occur in ARCHICAD's *Apply Predefine Rule*. Please always check the relevant source to be able to use the correct classification entity. For example in case of Uniclass 2015, please check the [source page](#). If the necessary classification code and entity is missing, please fill the Classification Reference field manually by following the steps below.

To assign ARCHICAD elements having the same function (for example elevators) to a newly created IFC System entity, just drag and drop them to the "New Relation" folder of the IFC System entity. (Figure 40)

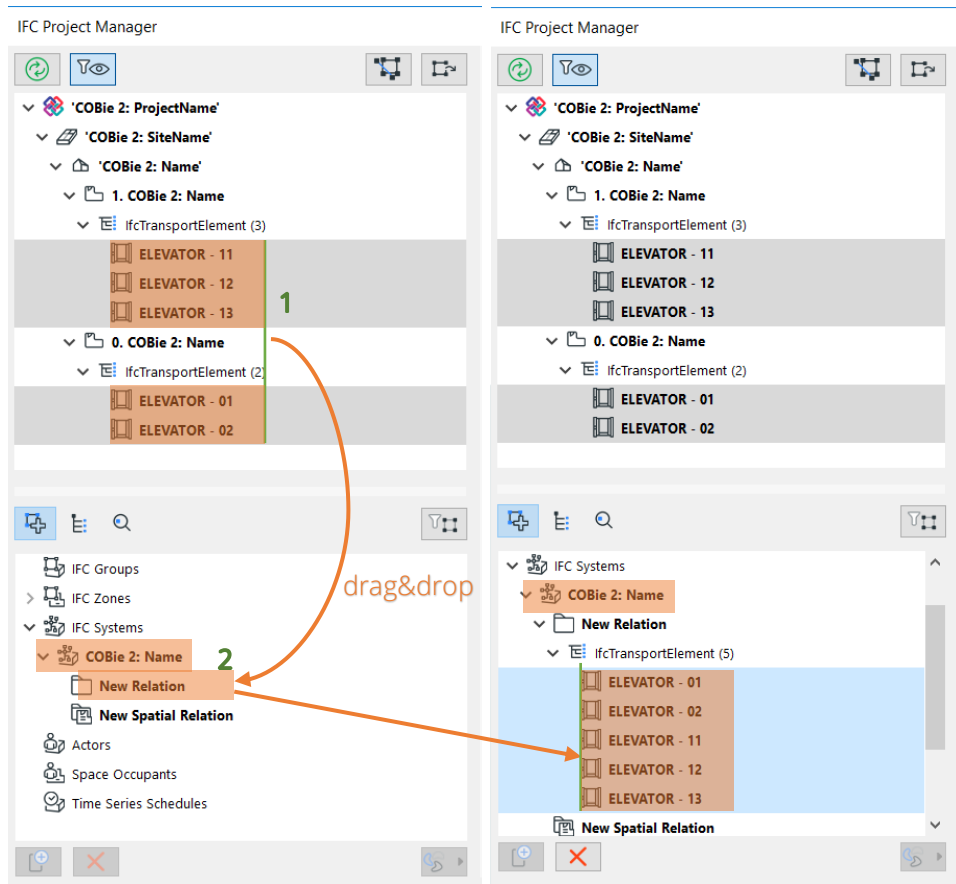


Figure 40 - Grouping ARCHICAD elements in an IFC System (IFC Project Manager)

Hotlinked Components (ARCHICAD elements) cannot be grouped in IFC Systems. To assign an IFC System entity to these elements, you must break their Hotlink module connection.

MEP Systems defined with the [GRAPHISOFT MEP Modeler](#) Add-On can be also handled as IfcSystem inside an ARCHICAD project. Just create a new IfcSystem (as mentioned above) and choose the predefined MEP System name from the available list . ()
 If an IFC model exported by an MEP application is merged to an ARCHICAD project, you can also manage its MEP systems and their properties in the *IFC Project Manager*.

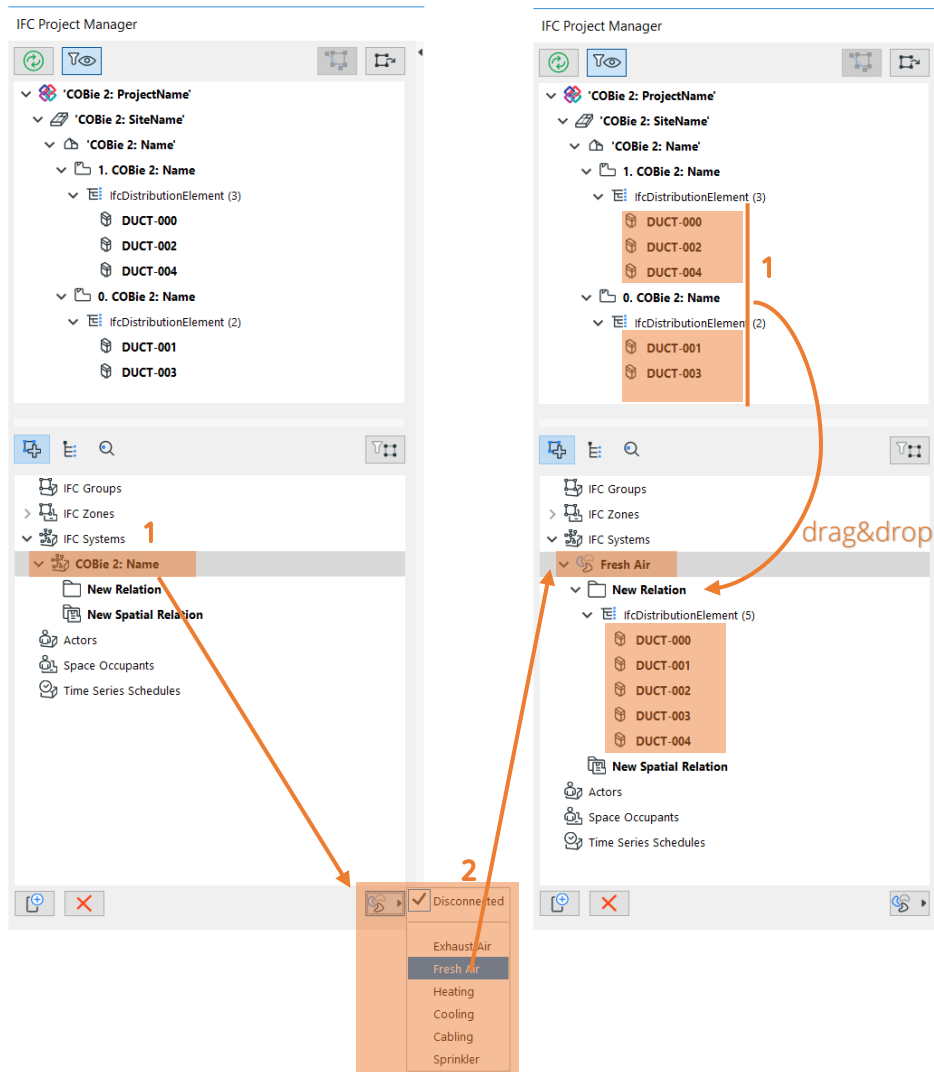


Figure 41 - Conversion of a MEP Modeler System to an IFC System (IFC Project Manager)

UK-specific

BS 1192-4 defines Systems as a required sheet for COBie. This presents some challenges for some software where using an IFC to COBie workflow as not all software support the concept of Systems for all disciplines. This means workarounds are currently necessary to include System data in an IFC file.

3.9. Attribute

Ideally, required Attributes should be specified by the employer as this allows for optimum exchange.

Alternatively, it is recommended that Designers confirm the Attributes they will provide to the Information Manager (IM) for inclusion in COBie. This will allow the IM, to only include Attributes that have been completed and more importantly checked.

3.10. Coordinates

The coordinate data is automated from software. Whilst coordinates are automated, there is an argument to say that this data is largely redundant to those maintaining buildings, who primarily want to know about the relationship of a Component to its Space. For this reason, there have been suggestions that coordinates will be removed from future versions of COBie.

3.11. Document / PickLists

Data are extracted automatically from the IFC model exported by ARCHICAD.

3.12. Assembly / Connection / Spare / Resource / Job / Impact / Issue

At present model authoring tools have not been certified or tested for exchange of Assembly and Connection data. These sheets would typically need to be completed externally to model authoring tools, if they are required.

These data types are not requested from a design application by the COBie 2 rules, and they are not available in ARCHICAD projects either. The table contents should be manually filled out in the spreadsheet, if they are required.

UK-specific

It should be noted that the example for Assembly in BS 1192-4:2014 shows an example of a floor build-up but this would not be included if the exclusion list is followed in the COBie Responsibility Matrix v17.

4. Workflow – Data export

The COBie-required IFC model/file can be exported easily by using the export set (i.e. IFC Translator) optimized for the COBie 2 requirements. Just use the *Save as* command (*File* menu) together with the translator called “COBie 2 Export” a 3D window (preferably) or floor plan view.

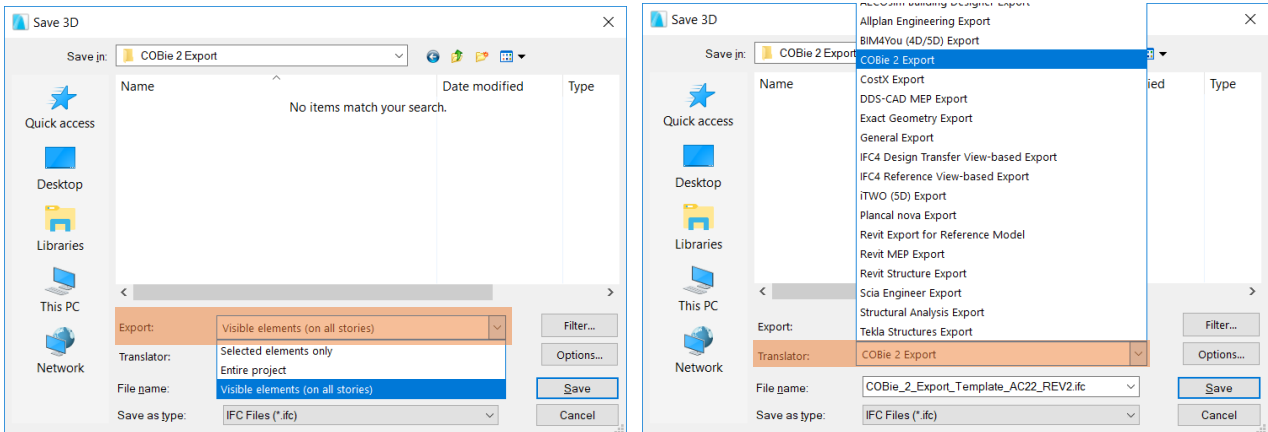


Figure 42 - IFC model export optimized for COBie 2 requirements (Save as)

4.1. The steps of IFC model export to COBie 2

1. Filter elements for the export (use the following options):

- *Selected elements only* (available only if elements have been selected):
elements selected in the current view (the view that was open when you issued the *Save as* command) will be exported.
- *Entire project*:
entire model (regardless of any selection, and regardless of the shown/hidden status of the elements' layers) will be exported.
- *Visible elements*:

the visible elements in the current view will be exported, regardless of any selection. “Visible” means all elements that are set to be displayed (due to *Layer Settings*, *Model View Options*, *Partial Structure Display*, etc.).

IMPORTANT

If you issue the export command from Floor Plan view (“Visible elements (on all stories)”), this choice includes all elements currently displayed on every story of the project.

If you choose “Visible elements”, make sure that ARCHICAD Zones are set to be displayed in the current view. For example, if you are saving from the 3D window, make sure that Zones are “on” in the Filter and Cut Elements in 3D dialog box (View > Elements in 3D View).

2. Choose the “COBie 2 Export” Translator, in which export settings are fine-tuned for the COBie 2 requirements. The meaning of the major export options (*Derived model data to export* options) of the “COBie 2 Export” Translator is the following (check *Data Settings*):

- **Space containment:**
It exports the relationship between ARCHICAD Zones (IfcSpaces) and their contained Object (Furnishing, MEP Equipment, etc.) and Morph elements. “Contained” means that the midpoint of an Object or Morph is within an ARCHICAD Zone in the 3D space. This option is required for exporting COBie “Space” data of the [Component](#) worksheet.
- *IFC base quantities (size, area and volume):*
It exports elements’ base quantities required by COBie 2.
- *IFC Space boundaries:*
It exports the logical connection between ARCHICAD Zones (IfcSpace) and the building elements that enclose them. This option is also required for exporting COBie “Space” data of the [Component](#) worksheet.

3. Set the model units (“IFC model units”).

4. Define file name.

5. Set the file format to .IFC or .IFCXML depending on the file support of the COBie 2 spreadsheet converter program.

6. Click Save.

Filtering model elements required for COBie within ARCHICAD is not necessary, as during the COBie spreadsheet generation, the responsible converter tools are filtering for the necessary elements automatically.

5. Workflow – COBie Spreadsheet creation

An external application is needed to convert an ARCHICAD IFC file to an XML-type COBie 2 spreadsheet format.

The IFC and COBie 2 spreadsheet formats for the IFC 2x3 Basic FM Handover MVD, capture the same information content and can be transformed forth and back, across the different formats. COBie from IFC transformations are implemented according to the so-called “COBie Responsibility Matrix” document. This document, defines the mapping rules between the IFC file and the COBie spreadsheet and which IFC entity types are allowed to be converted to COBie Component and Type entities (“Type Assets” and “Component Assets” tables).

A number of dedicated tools can be used to execute the transformations, such as the free **COBie Toolkit** application, developed by Engineer Research and Development Center (ERDC) or **Solibri Model Checker (SMC)** with the COBie extension.

GRAPHISOFT takes no responsibility for creating COBie spreadsheet by using third party applications.

5.1. COBie Toolkit

The COBie Toolkit is a free application and can be downloaded from the buildingSMART homepage.

ERDC COBie Toolkit, developed for the COBie FM Handover project, includes the transformer tool and the configurations to map IFC data to COBie 2. The conversion can be done in two easy steps.

In order to be able to generate the COBie spreadsheets from an IFC file, JAVA is required.

On WIN platform, the latest JAVA version must be installed.

On MAC platform, the latest JAVA and Java SE Development Kit 8 must be installed

1. Open the COBie toolkit (the file with .JAR extension)

Press the Start button to run the application. (Figure 43)

In case of very large IFC models, modify the memory options (by increasing the “Max Heap Size”, “Max Perm Size” and “Stack Size”) in the COBie Toolkit Starter dialog.

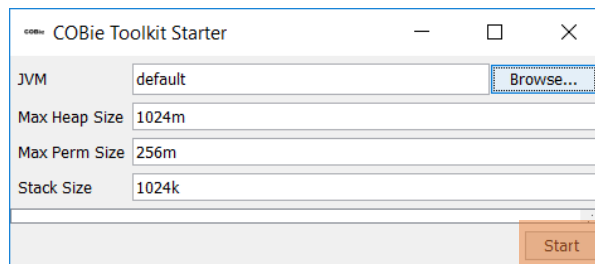


Figure 43 - COBie toolkit starter

2. Open the COBie toolkit (the file with .JAR extension)

Click on the *Import* button to browse for IFC files to be loaded.

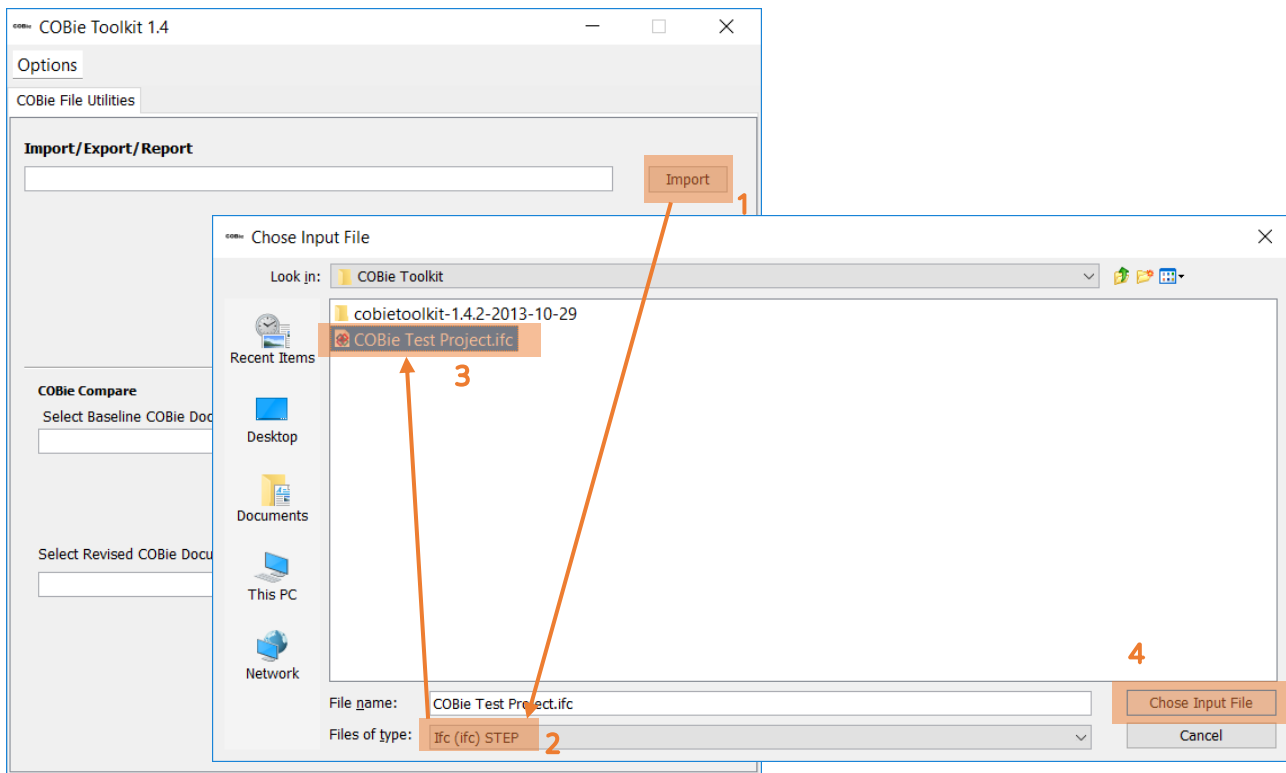


Figure 44 - Opening IFC files into COBie toolkit

3. Export COBie spreadsheet

Click on the *Export/Report* button and choose the **COBie Spreadsheet XML (2003) (xml)**

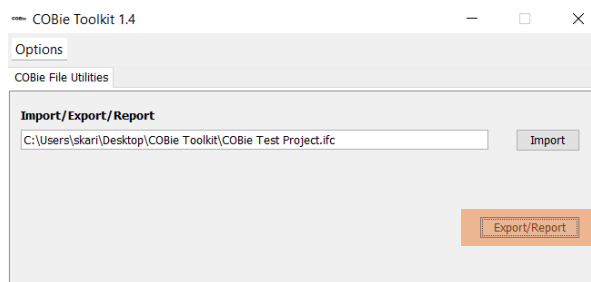


Figure 45 - Exporting COBie spreadsheet

If you choose the “COBie QC Report - Design Deliverable” export format, the application checks for any missing items in your IFC model. This quality check presents a summary of various checks performed on the COBie data: e.g. at least one Component for each Type, unique names for Types, at least one Floor, etc.

4. Open the COBie file in a spreadsheet application

Open the file and check if all relevant tabs have information included.

Title	COBie2	
Version		2
Release		4
Status	IFC2x3	
Region	en-US	
Purpose		This spreadsheet supports the exchange of building, system and product information through the life of the project.
Outline		Individual worksheets are organized by project phase as shown below
All Phases	Sheet	Contents
	Contact	People and Companies
Early Design Worksheets	Sheet	Contents
	Facility	Project, Site, and Facility
	Floor	Vertical levels and exterior areas
	Space	Spaces
	Zone	Sets of spaces sharing a specific attribute
	Type	Types of equipment, products, and materials
Detailed Design Worksheets	Sheet	Contents
	Component	Individually named or schedule items
	System	Sets of components providing a service
	Assembly	Constituents for Types, Components and others
	Connection	Logical connections between components
	Impact	Economic, Environmental and Social Impacts at various stages in the life cycle
Construction Worksheets	Sheet	Contents
		Note: submittals and approvals added on Documents
		Note: manufacturer and model added on Type
		Note: serial and tag added on Component
Operations and Maintenance Worksheets	Sheet	Contents
	Spare	Onsite and replacement parts
	Resource	Required materials, tools, and training
	Job	PM, Safety, and other job plans
		Note: warranty information added on Type
All Phases	Sheet	Contents
	Document	All applicable document references
	Attribute	Properties of referenced item
	Coordinate	Spatial locations in box, line, or point format
	Issue	Other issues remaining at handover.
Legend		
	text	required
	text	reference to other sheet or pick list
	text	external reference
	text	if specified as required
	text	secondary information when preparing product data
	NOTES:	
		Note: Regional, owner, or product specific data may be added as new columns to the right of standard template columns.
		Note: Regional classification codes may be substituted for the specifiable picklists used in the United States.
Copyright	USACE ERDC	(c) 2006-2011

Figure 46 - COBie spreadsheet

Additional Info

Based on the COBie Responsibility Matrix (“Type Assets” and “Component Assets” tables), the COBie Toolkit ignores some IFC entity types (e.g. IfcWallType, IfcWall, IfcWallStandardCase) by default. If you would like to allow all IFC entity type conversion to COBie Types and Components, change the “COBieIDMPlugin” mode to “None” at “Options”.

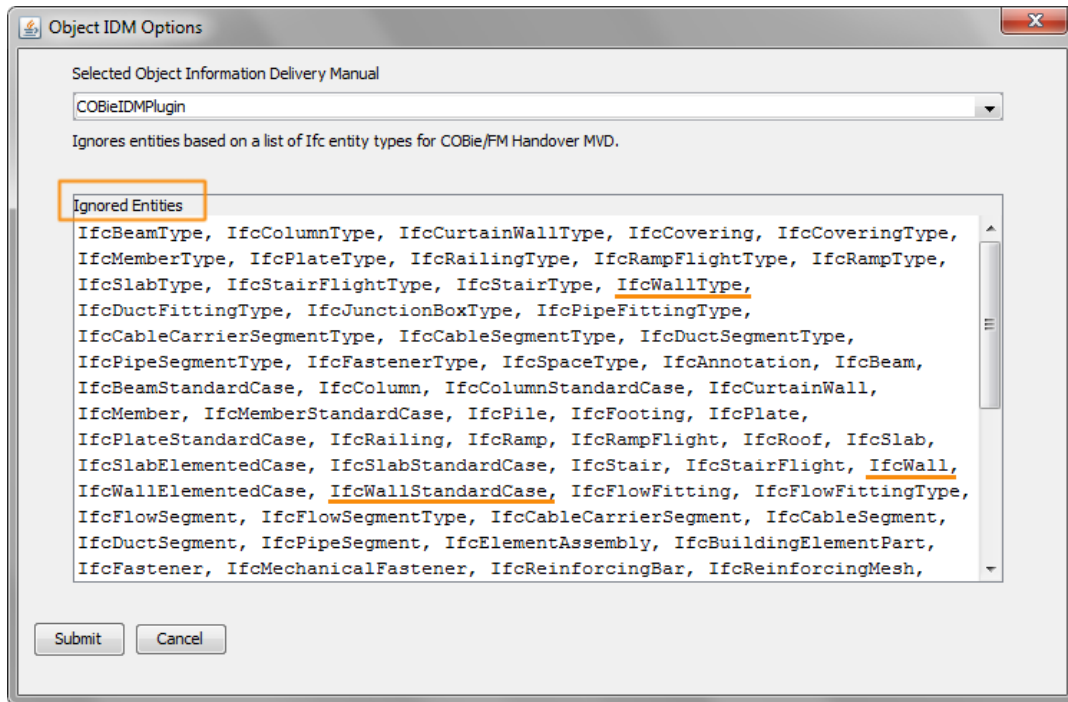


Figure 47 - IFC Entity and Type Products ignored in the IFC to COBie conversion by default

5.2. SOLIBRI MODEL CHECKER

Please follow the official Solibri guidelines to be able to create the COBie spreadsheet with the use of SMC. By default, SMC will not create automatically the COBie documentation from an IFC file prepared by following this guide.

SMC requires further Information Take-off setup to locate and extract the proper data for COBie spreadsheet creation automatically.

Appendix 1 - BS 1192-4 specific properties

BS 1192-4 specific properties are added to the Uniclass 2015 template file.

The following properties are included in the Uniclass 2015 template

Facility

Facility related properties can only be entered manually in the *IFC Project Manager*.

Location in ARCHICAD	Name of Property Set	Name of Property	Data creation
IfcSite	Pset_SiteCommon	LandTitleNumber	Manual entry
IfcBuilding	Pset_BuildingCommon	IsLandmarked	Manual entry
IfcBuilding	Pset_BuildingCommon	BuildingID	Manual entry
IfcBuilding	Pset_BuildingCommon	IsPermanentID	Manual entry
IfcBuilding	Pset_BuildingCommon	OccupancyType	Manual entry
IfcBuilding	Pset_BuildingCommon_UK	RefEasting	Manual entry
IfcBuilding	Pset_BuildingCommon_UK	RefNorthing	Manual entry
IfcBuilding	Pset_BuildingCommon_UK	UPRN	Manual entry
IfcBuilding	Pset_BuildingCommon_UK	TOID	Manual entry

Space

Space related properties are *Automatically Mapped* (AM) from different sources. Mapping rules can be seen and changed in the *IFC Translator > Property Mapping*.

Location in ARCHICAD	Name of Property Set	Name of Property	Data creation in ARCHICAD
IfcSpace	Pset_SpaceCommon	Capacity	AM from AC Properties
IfcSpace	Pset_SpaceCommon	Category	AM from Zone Category
IfcSpace	Pset_SpaceCommon	CeilingCovering	Mapping rule
IfcSpace	Pset_SpaceCommon	Concealed	AM from AC Properties
IfcSpace	Pset_SpaceCommon	FinishCeilingHeight	Mapping rule
IfcSpace	Pset_SpaceCommon	FloorCovering	Mapping rule
IfcSpace	Pset_SpaceCommon	InteriorOrExteriorSpace	AM from AC Properties
IfcSpace	Pset_SpaceCommon	OccupancyNumber	AM from AC Properties
IfcSpace	Pset_SpaceCommon	Utilization	AM from AC Properties

Component

Component related properties are *Automatically Mapped* (AM) from ARCHICAD properties.

Location in ARCHICAD	Name of Property Set	Name of Property	Data creation in ARCHICAD
IfcElement	Pset_Criticality	Criticality	AM from AC Properties
IfcElement	Pset_Condition	AssessmentDate	AM from AC Properties
IfcElement	Pset_Condition	AssessmentDescription	AM from AC Properties
IfcElement	Pset_Condition	AssessmentCondition	AM from AC Properties
IfcElement	Pset_ComponentCommon_UK	AssetStatus	AM from AC Properties

Additional properties can be added in the *Property Manager* but make sure to create the proper mapping rules in the IFC Translator to have those properties exported.

Appendix 2 – List of necessary and unnecessary IFC entities for COBie

It is recommended **not to** filter any of the elements **from the IFC Translator**. Associative elements, like windows, doors, skylights, etc. may end up not being exported if their host is filtered out (IfcWall, IfcSlab, etc.). During the COBie spreadsheet creation, these entities can be filtered out, but not for the IFC export.

Included COBie Components	
Building Element Proxy	IfcBuildingElementProxy
Chimney	IfcChimney
Ceiling	IfcCovering with a predefined type: CEILING
Covering	IfcCovering
Discrete Accessory	IfcDiscreteAccessory
Distribution Chamber Element	IfcDistributionChamberElement
Distribution Control Element	IfcDistributionControlElement
Distribution Element	IfcDistributionElement
Distribution Flow Element	IfcDistributionFlowElement
Door	IfcDoor and IfcDoorStandardCase
Duct Flow Terminal	IfcFlowTerminal
Energy Conversion Device	IfcEnergyConversionDevice
Flow Controller	IfcFlowController
Flow Moving Device	IfcFlowMovingDevice
Flow Storage Device	IfcFlowStorageDevice
Flow Treatment Device	IfcFlowTreatmentDevice
Furniture	IfcFurnitureElement, IfcFurniture and IfcSystemFurnitureElement
Lamp	IfcFlowTerminal) IfcFlowTerminals
Light Fixture	IfcFlowTerminal
Pipe Flow Terminal	IfcFlowTerminal
Shading Device	IfcShadingDevice
Tendon	IfcTendon
Tendon Anchor	IfcTendonAnchor
Transport Element	IfcTransportElement
Window	IfcWindow and IfcWindowStandardCase
Excluded COBie Components	
Beam	IfcBeam and IfcBeamStandardCase
BuildingElementPart	---
Cable Carrier Fitting	IfcCableCarrierFittingType
Cable Carrier Segment	IfcCableCarrierSegmentType
Column	IfcColumn and IfcColumnStandardCase
CurtainWall	IfcCurtainWall
Duct Fitting	IfcFlowFitting

Duct Segment	IfcFlowSegment
Fastener	IfcFastener
Footing	IfcFooting
Mechanical Fastener	IfcMechanicalFastener
Member	IfcMember and IfcMemberStandardCase
Pile	IfcPile
Pipe Fitting	IfcFlowFitting
Pipe Segment	IfcFlowSegment
Plate	IfcPlate and IfcPlateStandardCase
Railing	IfcRailing
Ramp	IfcRamp
Ramp Flight	IfcRampFlight
Reinforcing Bar	IfcReinforcingBar
Reinforcing Mesh	IfcReinforcingMesh
Roof	IfcRoof
Site Geometry	---
Slab	IfcSlab, IfcSlabElementedCase, IfcSlabStandardCase
Stair	IfcStair
Stair Flight	IfcStairFlight
Wall	IfcWall, IfcWallElementedCase, IfcWallStandardCase

Included COBie Types
*Only available in IFC4
IfcActuatorType
IfcAirTerminalType
IfcAirTerminalBoxType
IfcAirToAirHeatRecoveryType
IfcAlarmType
IfcAudioVisualApplianceType*
IfcBoilerType
IfcBuildingElementPartType*
IfcBuildingElementProxyType
IfcBurnerType*
IfcChillerType
IfcChimneyType*
IfcCoilType
IfcCommunicationsApplianceType*
IfcCompressorType
IfcCooledBeamType
IfcCoolingTowerType
IfcCondenserType
IfcControllerType

IfcCoveringType
IfcDamperType
IfcDiscreteAccessoryType
IfcDistributionChamberElementType
IfcDistributionControlElementType
IfcDistributionElementType
IfcDistributionFlowElementType
IfcDoorStyle
IfcDoorType*
IfcDuctSilencerType
IfcElectricApplianceType
IfcElectricDistributionBoardType*
IfcElectricFlowStorageDeviceType
IfcElectricGeneratorType
IfcElectricMotorType
IfcElectricTimeControlType
IfcElementAssemblyType*
IfcElementComponentType
IfcEngineType*
IfcEnergyConversionDeviceType
IfcEvaporativeCoolerType
IfcEvaporatorType
IfcFanType
IfcFilterType
IfcFireSuppressionTerminalType
IfcFlowControllerType
IfcFlowInstrumentType
IfcFlowMeterType
IfcFlowMovingDeviceType
IfcFlowStorageDeviceType
IfcFlowTerminalType
IfcFlowTreatmentDeviceType
IfcFootingType*
IfcFurnitureType
IfcFurnishingElementType
IfcGeographicElementType*
IfcHeatExchangerType
IfcHumidifierType
IfcInterceptorType*
IfcLampType
IfcLightFixtureType
IfcMechanicalFastenerType
IfcMedicalDeviceType*
IfcMotorConnectionType

IfcOutletType
IfcPileType*
IfcProtectiveDeviceType
IfcProtectiveDeviceTrippingUnitType*
IfcPumpType
IfcReinforcingBarType*
IfcReinforcingElementType*
IfcReinforcingMeshType*
IfcRoofType*
IfcSanitaryTerminalType
IfcSensorType
IfcShadingDeviceType*
IfcSolarDeviceType*
IfcSpaceHeaterType
IfcStackTerminalType
IfcSwitchingDeviceType
IfcSystemFurnitureElementType
IfcTankType
IfcTendonType*
IfcTendonAnchorType*
IfcTransformerType
IfcTransportElementType
IfcTubeBundleType
IfcUnitaryEquipmentType
IfcUnitaryControlElementType*
IfcValveType
IfcVibrationIsolatorType
IfcWasteTerminalType
IfcWindowStyle
IfcWindowType*
Excluded COBie Types
*Only available in IFC4
IfcBeamType
IfcCableCarrierFittingType
IfcCableCarrierSegmentType
IfcCableFittingType
IfcCableSegmentType
IfcColumnType
IfcCurtainWallType
IfcDuctFittingType
IfcDuctSegmentType

IfcElementType
IfcFastenerType
IfcFlowFittingType
IfcFlowSegmentType
IfcJunctionBoxType
IfcMemberType
IfcPipeFittingType
IfcPipeSegmentType
IfcPlateType
IfcRailingType
IfcRampType*
IfcRampFlightType
IfcSlabType
IfcSpaceType
IfcStairType*
IfcStairFlightType
IfcWallType

Appendix 3 - References

Help Center links

- [1] IFC Project Manager <https://helpcenter.graphisoft.com/user-guide/65786/>
- [2] Navigating in IFC Project Manager: Attributes and Properties
<https://helpcenter.graphisoft.com/user-guide/77305/>
- [3] Using Property Mapping <https://helpcenter.graphisoft.com/user-guide/77330/>
- [4] IFC Translators: Overview <https://helpcenter.graphisoft.com/user-guide/65791>
- [5] Model View Definitions <https://helpcenter.graphisoft.com/user-guide/77337/>
- [6] Bond Bryan Blog <https://bimblog.bondbryan.co.uk/cobie/>

Keywords

COBie, IFC, COBie toolkit, ARCHICAD