

# ArchiCAD and COBie

*How to Prepare your ArchiCAD 17 Project for COBie2 Documentation*

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**ArchiCAD and COBie**

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## Introduction

COBie is the abbreviation of Construction Operations Building Information Exchange, a specification used in the handover of Facility Management information. It is a spreadsheet data format for the delivery of a subset of building model information, rather than geometric model information.

Although ArchiCAD cannot export COBie spreadsheets directly, ArchiCAD's BIM-quality models and IFC data exchange capabilities produces data output that is easily converted into COBie documentation, with the help of free or commercial conversion programs.

### *What is the relationship between IFC and COBie?*

The COBie spreadsheet is a mapping of the FM Handover View Definition, which is a subset (so-called "Model View Definition" (MVD)) of the current IFC 2x3 scheme. FM Handover View Definition was developed by buildingSMART to exchange facility management information among building models. ArchiCAD 17's IFC 2x3 interface and database support the IFC data and model export requirements of the FM Handover View Definition, so most of the values of the COBie spreadsheet cells are extracted from IFC models exported by ArchiCAD 17 according to the FM Handover MVD settings.

**Hint** To read more information about the relation between IFC 2x3 FM Handover and COBie, visit the buildingSMART website by clicking [here](#).

This paper provides practical information on which data to add to an ArchiCAD project and how to export it as an IFC model, to obtain a format suitable for producing a COBie2 (or current-version COBie) spreadsheet. The final chapter consists of a sample workflow using a free IFC-COBie2 conversion tool recommended by buildingSMART.

**Hint** For detailed documentation about ArchiCAD's IFC capabilities, visit the Graphisoft website by clicking [here](#).

## ArchiCAD Model Preparation for COBie2

The FM Handover View Definition used by COBie2 queries the following IFC data types from an architectural model and/or its elements:

- IFC Attributes
- IFC Properties (standard IFC 2x3 and COBie2-required properties)
- IFC Classification Reference
- IFC Zone
- IFC System
- IFC Type Product
- Base quantities
- Space containment relation
- Space boundary relation

All of these data types can be created in ArchiCAD 17 using one or more of these functions:

- Element Settings dialog boxes
- the IFC Manager tool
- IFC Translator settings used for IFC model export

This chapter summarizes the data (required from a design application) to be provided in ArchiCAD 17 for use by the COBie2 spreadsheet worksheet.

	A	B	C
1	Title	COBie2	
2	Version	2	
3	Release	4	
4	Status	IFC2x3	
5	Region	en-US	
6	Purpose		This spreadsheet supports the exchange of building, system and product information through the life of the project.
7	Outline		Individual worksheets are organized by project phase as shown below
8			
9	All Phases		
10		Sheet	Contents
11		Contact	People and Companies
12			
13	Early Design Worksheets		
14		Sheet	Contents
15		Facility	Project, Site, and Facility
16		Floor	Vertical levels and exterior areas
17		Space	Spaces
18		Zone	Sets of spaces sharing a specific attribute
19		Type	Types of equipment, products, and materials
20			
21	Detailed Design Worksheets		
22		Sheet	Contents
23		Component	Individually named or schedule items
24		System	Sets of components providing a service
25		Assembly	Constituents for Types, Components and others
26		Impact	Economic, Environmental and Social Impacts at various stages in the life cycle
27			

Worksheet tabs at the bottom: Instruction, Contact, Facility, Floor, Space, Zone, Type, Component, System, Assembly, Spare, Resource, Job, Impact, Document, Attribute, Coordinate, Connection, Issue, PickLists

Figure 1 The worksheets of the COBie2 spreadsheet

Key to tables displayed in the following sections of this document:

**data** COBie2 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 our ArchiCAD model.

**data** COBie2 data that are automatically extracted from the IFC model saved from ArchiCAD.

**data** COBie2 data not extracted from the IFC scheme. These data must therefore be manually filled out in the COBie2 spreadsheet later.

## Contact

The COBie2 Contact worksheet summarizes the person and organization data of the project/model designer.

Contact	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
COBie2 spreadsheet data		
<b>Email</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	File > File Special > IFC 2x3 > IFC Options
<b>CreatedBy</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>CreatedOn</b>	Export date of the IFC model	
<b>Category</b>	Person or Organization > "Roles"	File > File Special > IFC 2x3 > IFC Options
<b>Company</b>	Organization > "Name"	File > File Special > IFC 2x3 > IFC Options
<b>Phone</b>	Person or Organization > Addresses > "Telecom" Address type > "TelephoneNumbers"	File > File Special > IFC 2x3 > IFC Options
<b>ExtSystem</b>	"ArchiCAD" text	
<b>ExtObject</b>	"IfcPersonAndOrganization" text	
<b>ExtIdentifier</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>Department</b>	Organization > "Name"	
<b>OrganizationCode</b>	Organization > "Name"	
<b>GivenName</b>	Person > "GivenName"	File > File Special > IFC 2x3 > IFC Options
<b>FamilyName</b>	Person > "FamilyName"	File > File Special > IFC 2x3 > IFC Options
<b>Street</b>	Person or Organization > Addresses > "Postal" Address type > "AddressLines"	File > File Special > IFC 2x3 > IFC Options
<b>PostalBox</b>	Person or Organization > Addresses > "Postal" Address type > "PostalBox"	File > File Special > IFC 2x3 > IFC Options
<b>Town</b>	Person or Organization > Addresses > "Postal" Address type > "Town"	File > File Special > IFC 2x3 > IFC Options
<b>StateRegion</b>	Person or Organization > Addresses > "Postal" Address type > "Region"	File > File Special > IFC 2x3 > IFC Options
<b>PostalCode</b>	Person or Organization > Addresses > "Postal" Address type > "PostalCode"	File > File Special > IFC 2x3 > IFC Options
<b>Country</b>	Person or Organization > Addresses > "Postal" Address type > "Country"	File > File Special > IFC 2x3 > IFC Options

Figure 2 Mapping between ArchiCAD model and the COBie2 **Contact** worksheet data

ArchiCAD project data must be assigned to correspond with the COBie2 items marked in green (the rest of the data are automatically extracted from the IFC model saved from ArchiCAD).

The Person and Organization data can be entered in ArchiCAD's IFC Options dialog box (File > File Special > IFC 2x3). Both „Postal“ and „Telecom“ address types must be defined.

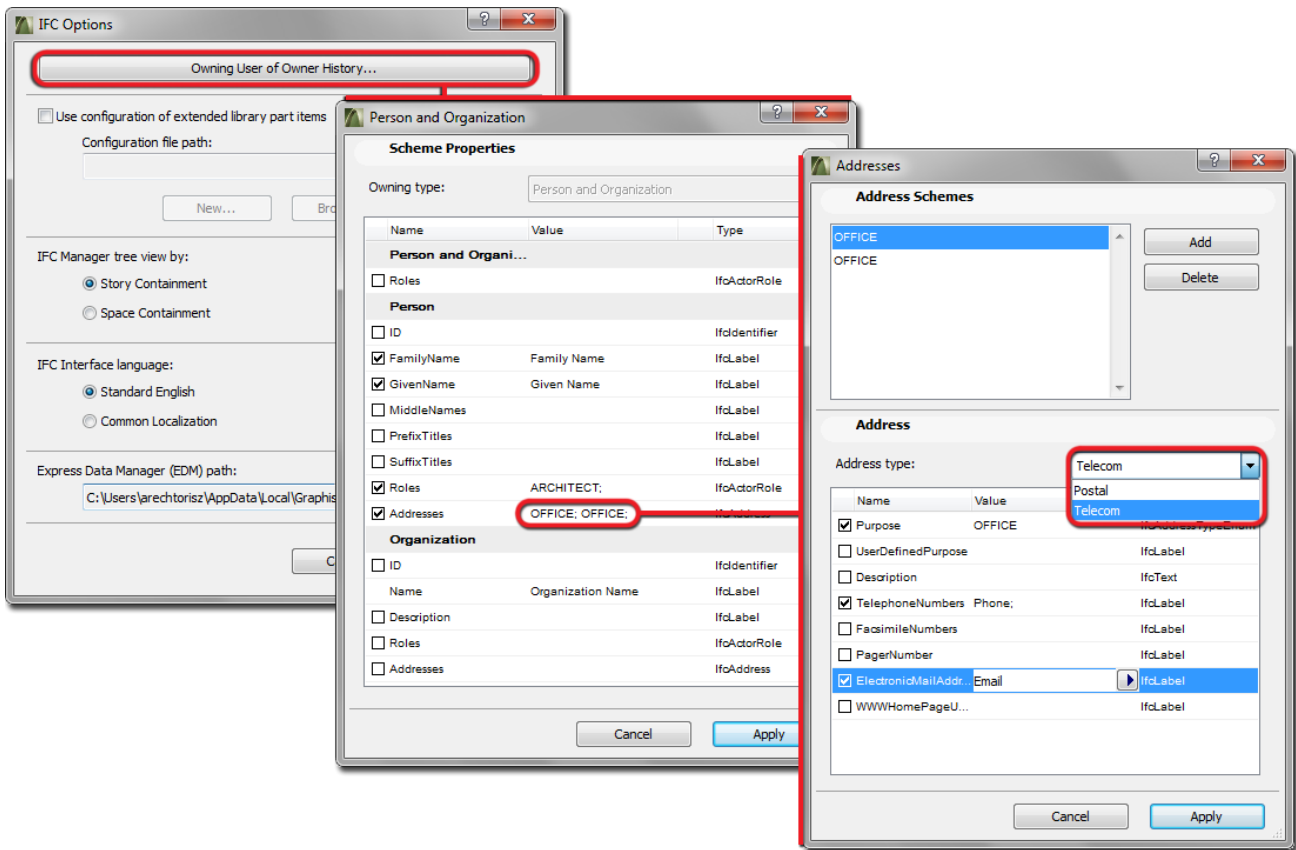


Figure 3 Contact data in ArchiCAD (Person and Organization)

## Facility

The COBie2 Facility worksheet summarizes the Facility (IfcBuilding), Project (IfcProject) and Site (IfcSite) data.

Facility COBie2 spreadsheet data	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
<b>Name</b>	"Project Name" ArchiCAD data	File > Info > Project Info
<b>CreatedBy</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>CreatedOn</b>	Export date of the IFC model	
<b>Category</b>	Classification Reference data of the IfcBuilding ("ItemReference" and "Name")	File > File Special > IFC 2x3 > IFC Manager
<b>ProjectName</b>	"Name" IFC Attribute of the IfcProject entity	File > File Special > IFC 2x3 > IFC Manager
<b>SiteName</b>	"Name" IFC Attribute of the IfcSite entity	File > File Special > IFC 2x3 > IFC Manager
<b>LinearUnits</b>	Export Options > IFC model units > "Length Unit"	File > File Special > IFC 2x3 > IFC Translation Setup
<b>AreaUnits</b>	Export Options > IFC model units > "Area Unit"	File > File Special > IFC 2x3 > IFC Translation Setup
<b>VolumeUnits</b>	Export Options > IFC model units > "Volume Unit"	File > File Special > IFC 2x3 > IFC Translation Setup
<b>CurrencyUnit</b>	Export Options > IFC model units > "Currency Unit"	File > File Special > IFC 2x3 > IFC Translation Setup
<b>AreaMeasurement</b>	"ArchiCAD BIM Base Quantities" text	
<b>ExternalSystem</b>	"ArchiCAD" text	
<b>ExternalProjectObject</b>	"IfcProject" text	
<b>ExternalProjectIdentifier</b>	"GlobalId" IFC Attribute of the IfcProject entity	
<b>ExternalSiteObject</b>	"IfcSite" text	
<b>ExternalSiteIdentifier</b>	"GlobalId" IFC Attribute of the IfcSite entity	
<b>ExternalFacilityObject</b>	"IfcBuilding" text	
<b>ExternalFacilityIdentifier</b>	"GlobalId" IFC Attribute of the IfcBuilding entity	
<b>Description</b>	"Description" IFC Attribute of the IfcBuilding entity	File > File Special > IFC 2x3 > IFC Manager
<b>ProjectDescription</b>	"Description" IFC Attribute of the IfcProject entity	File > File Special > IFC 2x3 > IFC Manager
<b>SiteDescription</b>	"Description" IFC Attribute of the IfcSite entity	File > File Special > IFC 2x3 > IFC Manager
<b>Phase</b>	"Phase" IFC Attribute of the IfcProject entity	File > File Special > IFC 2x3 > IFC Manager

Figure 4 Mapping between ArchiCAD model and the COBie2 Facility worksheet data

The “Name” data of the Facility worksheet can be set in ArchiCAD at Project Info (File > Info) by defining the “Project Name” data. The main Facility data can be defined as IfcBuilding data in the IFC Manager dialog (File > File Special > IFC 2x3).

To set the Facility Category, define Classification Reference data in the IFC Manager. COBie requires IfcBuilding classification by the OmniClass table 11 ('Construction Entities by Function'), so choose the proper classification value from the built-in “Table 11 – Construction Entities by Function” (OmniClass) list under “Apply Predefined Rule” option. The ArchiCAD classification rule based on Uniclass tables is also available in UK.

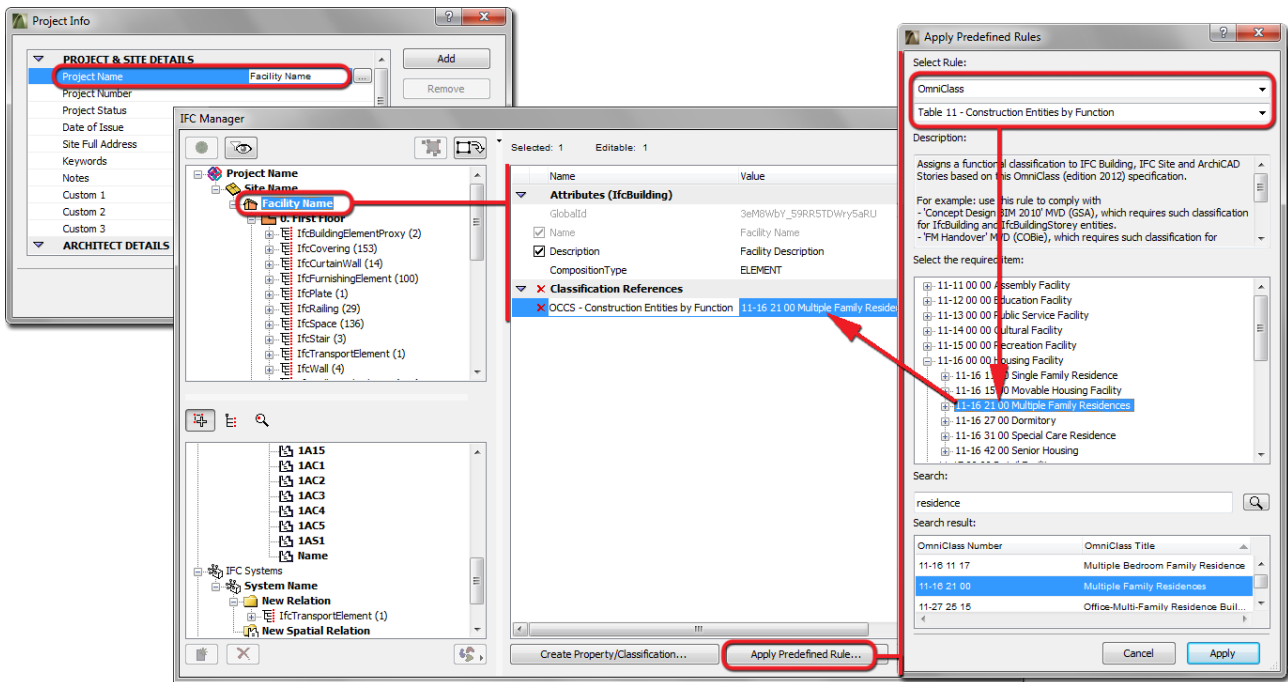


Figure 5 IfcBuilding data set by Project Info and IFC Manager

Other Facility data such as the IFC Attributes of the IfcProject and the IfcSite entities can be set in the IFC Manager dialog.



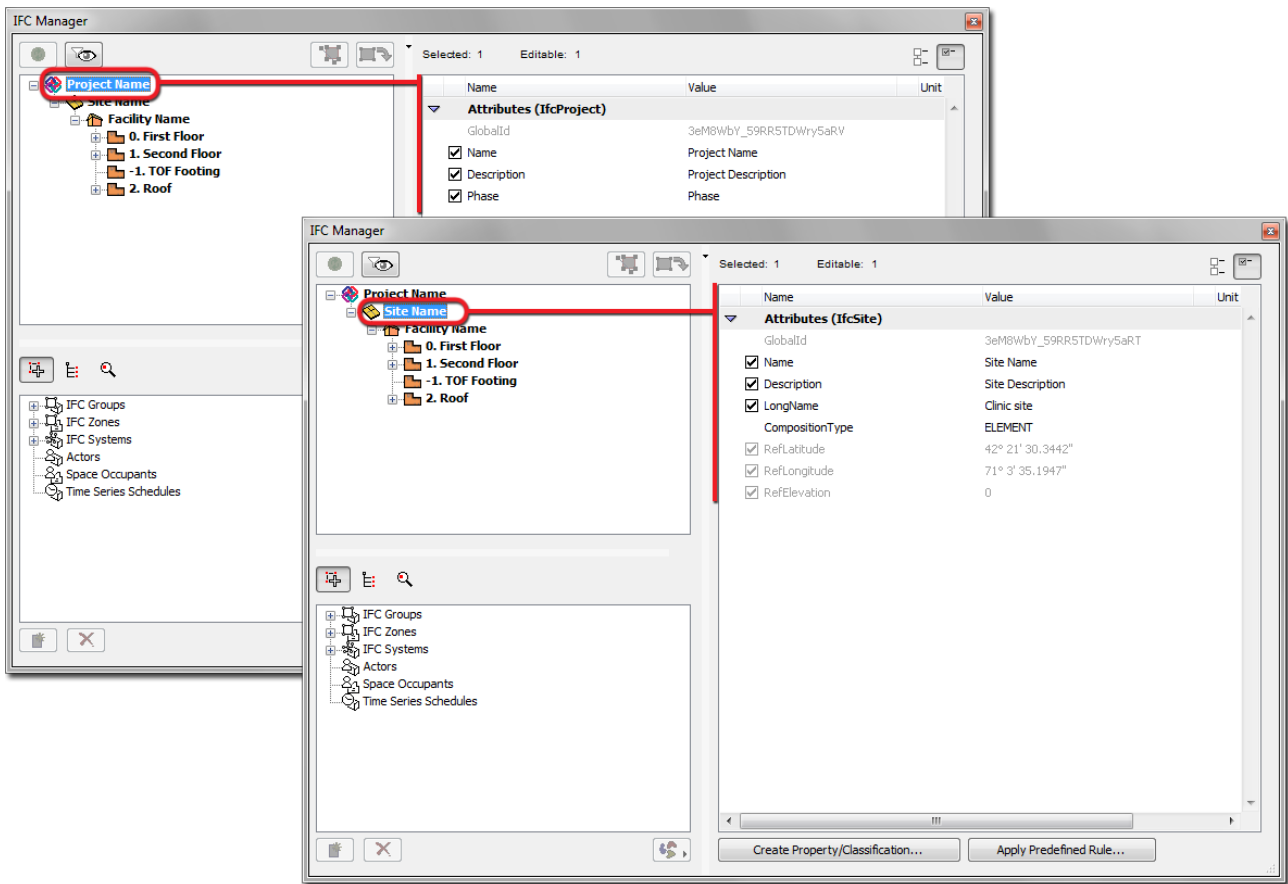


Figure 6 IfcProject and IfcSite data set by IFC Manager

The unit system of the Facility can be set in the IFC Translator's Export Options which are fine-tuned for IFC model export required for COBie2 ("FM Handover.COBie"; see chapter [COBie2-enabled IFC Model Export](#)).

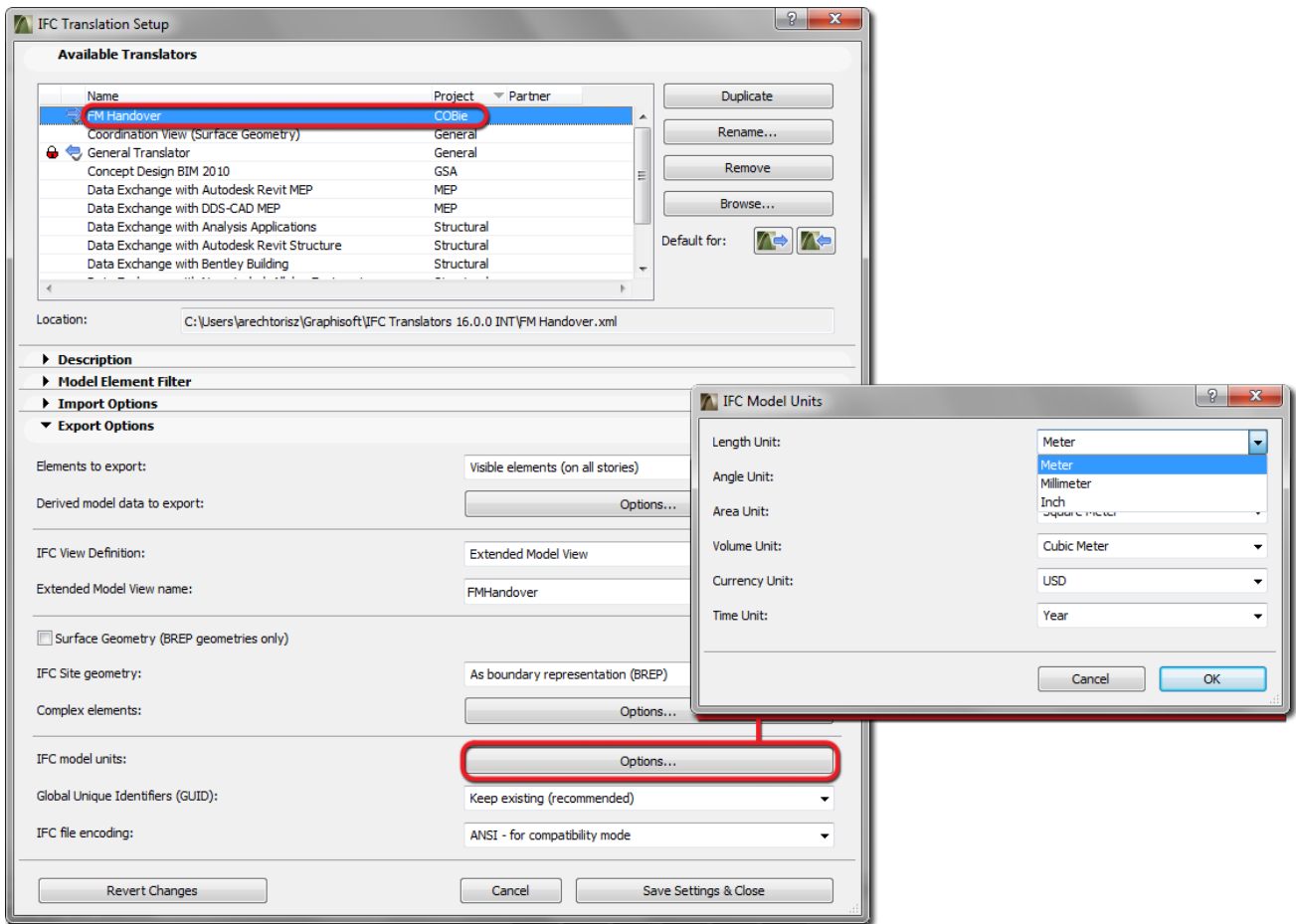


Figure 7 Unit settings of the IFC Translator

## Floor

The COBie2 Floor worksheet summarizes data of the Stories (IfcBuildingStorey) of the project.

Floor COBie2 spreadsheet data	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
<b>Name</b>	"Name" of an ArchiCAD Story	Story Settings
<b>CreatedBy</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>CreatedOn</b>	Export date of the IFC model	
<b>Category</b>	Classification Reference data of an ArchiCAD Story ("Name")	File > File Special > IFC 2x3 > IFC Manager
<b>ExtSystem</b>	"ArchiCAD" text	
<b>ExtObject</b>	"IfcBuildingStorey" text	
<b>ExtIdentifier</b>	"GlobalId" IFC Attribute of an ArchiCAD Story	
<b>Description</b>	"Description" IFC Attribute of an ArchiCAD Story	File > File Special > IFC 2x3 > IFC Manager
<b>Elevation</b>	Base quantities	
<b>Height</b>	Base quantities	

Figure 8 Mapping between ArchiCAD model and the COBie2 Floor worksheet data

The "Floors" are interpreted as Stories in the ArchiCAD project. Thus, the Floor Names are derived from the ArchiCAD Story names.

To set the Floor Category, define a "FloorType"-named Classification Reference data item in the IFC Manager. COBie requires one of the following values for the "Name" Attribute of the Classification Reference: Floor, Roof or Site.

The "Description" IFC Attribute of an ArchiCAD Story (IfcBuildingStorey) can also be set via the IFC Manager.

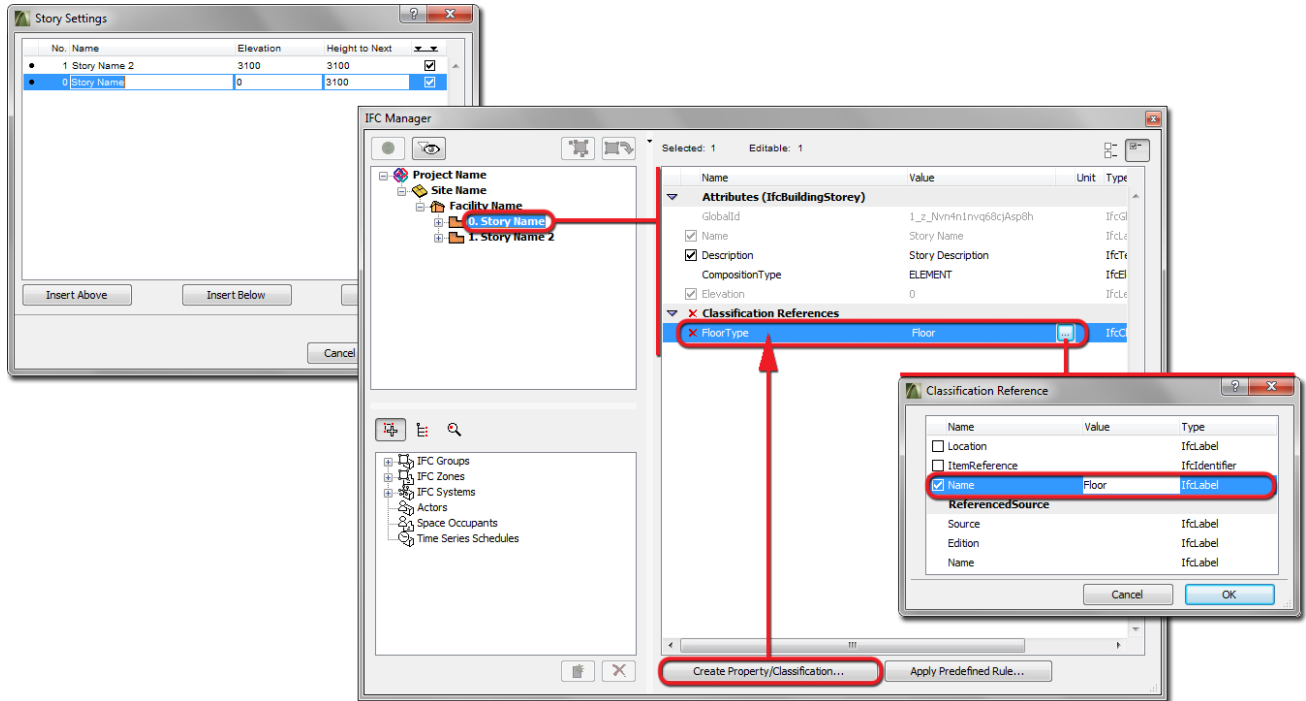


Figure 9 Floor data in ArchiCAD

## Space

The COBie2 Space worksheet summarizes data of the Spaces (IfcSpace) of the project.

Space COBie2 spreadsheet data	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
<b>Name</b>	"No." Attribute of an ArchiCAD Zone	Settings Dialog (AC Zone)
<b>CreatedBy</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>CreatedOn</b>	Export date of the IFC model	
<b>Category</b>	Classification Reference data of an IfcSpace ("ItemReference" and "Name")	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog (AC Zone) > Manage IFC
<b>FloorName</b>	"Name" of the ArchiCAD Zone's Home Story	
<b>Description</b>	"Zone Name" Attribute of an ArchiCAD Zone	Settings Dialog (AC Zone)
<b>ExtSystem</b>	"ArchiCAD" text	
<b>ExtObject</b>	"IfcSpace" text	
<b>ExtIdentifier</b>	"GlobalId" IFC Attribute of an ArchiCAD Zone (IfcSpace)	
<b>RoomTag</b>	"COBie_Pset_Space" IFC Property Set > "RoomTag" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog (AC Zone) > Manage IFC
<b>UsableHeight</b>	Base quantities	
<b>GrossArea</b>	Base quantities	
<b>NetArea</b>	Base quantities	

Figure 10 Mapping between ArchiCAD model and the COBie2 Space worksheet data

The “Spaces” are interpreted as Zones (IfcSpaces) in the ArchiCAD project. Thus, the COBie2-required data can be set in ArchiCAD Zone Settings. IFC data can be set using the “Manage IFC Properties” option (Tags and Categories tab).

To set the Space Category, define Classification Reference data in the IFC Manager or in the Zone Settings Dialog. COBie requires IfcSpace classification by the OmniClass table 13 (“Space by Function”), so choose the proper classification value from the built-in “Table 13 – Space by Function” (OmniClass) list under “Apply Predefined Rule” option. ArchiCAD classification rule based on Uniclass tables is also available in UK.

“Name” and “Description” COBie2 items are derived from the “No.” and the “Zone Name” Attributes of the ArchiCAD Zone, which can be set in Zone Settings.

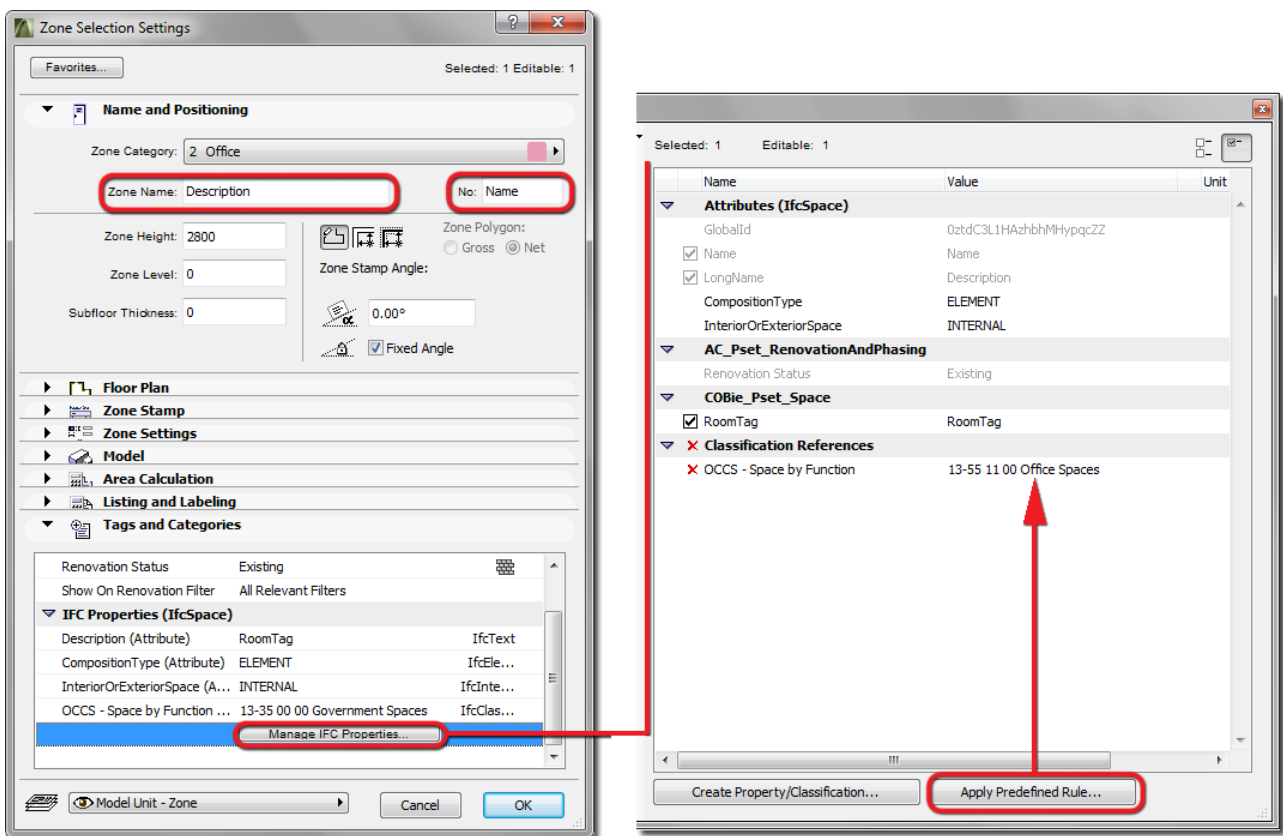


Figure 11 Space data in ArchiCAD

To make the COBie2-required “RoomTag” IFC Property available for the Spaces in the IFC Manager and the Setting Dialogs (Tags and Categories > Manage IFC Properties), import the “COBie2-PropertySet.xml” scheme into the ArchiCAD project (see chapter [Component](#)). The XML-type scheme can be added to the project with the IFC Scheme Setup command (File > File Special > IFC 2x3).

## Zone

The COBie2 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 Spaces (IfcSpaces).

Zone	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
COBie2 spreadsheet data		
Name	"Name" IFC Attribute of an IfcZone entity	File > File Special > IFC 2x3 > IFC Manager
CreatedBy	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
CreatedOn	Export date of the IFC model	
Category	Classification Reference data of an IfcZone entity ("Name")	File > File Special > IFC 2x3 > IFC Manager
SpaceNames	"No." Attribute of the assigned ArchiCAD Zones	
ExtSystem	"ArchiCAD" text	
ExtObject	"IfcZone" text	
ExtIdentifier	"GlobalId" IFC Attribute of an IfcZone entity	
Description	"Description" IFC Attribute of an IfcZone entity	File > File Special > IFC 2x3 > IFC Manager

Figure 12 Mapping between ArchiCAD model and the COBie2 Zone worksheet data

The “Zones” are interpreted as IfcZone Assignment in the ArchiCAD project. IfcZones (group of IfcSpaces (ArchiCAD Zones)) and their COBie2-requested data can be defined in the IFC Manager only.

First, create an IfcZone by clicking the “New” command from the “IFC Zones” item in the “Assignments” tree, then drop the IfcSpaces (ArchiCAD Zones) to the “New Relation” folder of the new IfcZone entity from the Project tree of the IFC Manager.

To set the Zone Category, define a “ZoneType”-named Classification Reference data in the IFC Manager. COBie requires one of the following values for the “Name” Attribute of the Classification Reference:

- Circulation Zone,
- Lighting Zone,
- Fire Alarm Zone,
- Historical Preservation Zone,
- Occupancy Zone, or
- Ventilation Zone.

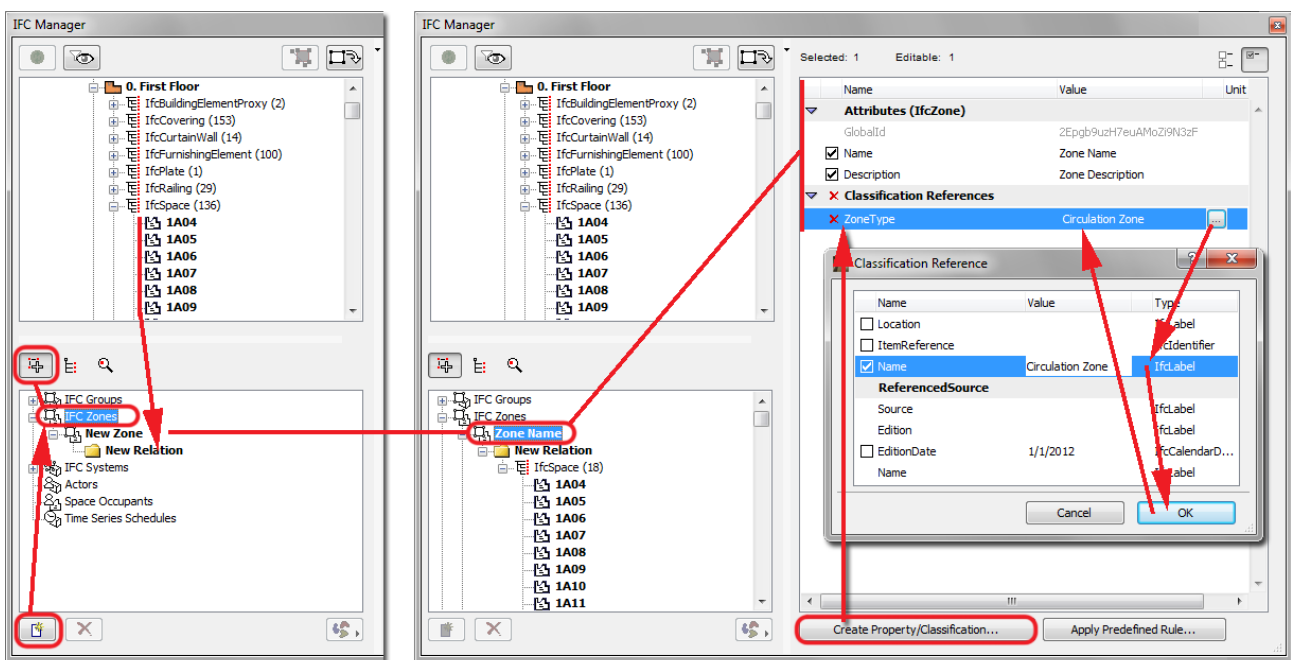


Figure 13 Zone definition

# Type

COBie2 Type worksheet summarizes the types of equipment and products.

Type	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
COBie2 spreadsheet data		
Name	"Name" IFC Attribute of an IFC Type Product entity	Generated automatically, but can be edited in IFC Manager
CreatedBy	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
CreatedOn	Export date of the IFC model	
Category	Classification Reference data of an IfcSpace ("ItemReference" and "Name")	File > File Special > IFC 2x3 > IFC Manager
Description	"Description" IFC Attribute of an IFC Type Product entity	File > File Special > IFC 2x3 > IFC Manager
AssetType	"COBie_Pset_Asset" IFC Property Set > "AssetAccountingType" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Manufacturer	"COBie_Pset_ManufacturersTypeInformation" IFC Property Set > "Manufacturer" IFC Property	File > File Special > IFC 2x3 > IFC Manager
ModelNumber	"COBie_Pset_ManufacturersTypeInformation" IFC Property Set > "ModelLabel" IFC Property	File > File Special > IFC 2x3 > IFC Manager
WarrantyGuarantorParts	"COBie_Pset_Warranty" IFC Property Set > "WarrantyGuarantorParts" IFC Property	File > File Special > IFC 2x3 > IFC Manager
WarrantyDurationParts	"COBie_Pset_Warranty" IFC Property Set > "WarrantyDurationParts" IFC Property	File > File Special > IFC 2x3 > IFC Manager
WarrantyGuarantorLabor	"COBie_Pset_Warranty" IFC Property Set > "WarrantyGuarantorLabor" IFC Property	File > File Special > IFC 2x3 > IFC Manager
WarrantyDurationLabor	"COBie_Pset_Warranty" IFC Property Set > "WarrantyDurationLabor" IFC Property	File > File Special > IFC 2x3 > IFC Manager
WarrantyDurationUnit	Export Options > IFC model units > "Time Unit"	File > File Special > IFC 2x3 > IFC Translation Setup
ExtSystem	"ArchiCAD" text	
ExtObject	The type of the IFC Type Product entity (for example IfcWallType, IfcWindowStyle etc.)	
ExtIdentifier	"GlobalId" IFC Attribute of an IFC Type Product entity	
ReplacementCost	"COBie_Pset_EconomicImpactValues" IFC Property Set > "WarrantyDurationLabor" IFC Property	File > File Special > IFC 2x3 > IFC Manager
ExpectedLife	"COBie_Pset_ServiceLife" IFC Property Set > "ServiceLifeDuration" IFC Property	File > File Special > IFC 2x3 > IFC Manager
DurationUnit	Export Options > IFC model units > "Time Unit"	File > File Special > IFC 2x3 > IFC Translation Setup
WarrantyDescription	"COBie_Pset_Warranty" IFC Property Set > "WarrantyDescription" IFC Property	File > File Special > IFC 2x3 > IFC Manager
NominalLength	"COBie_Pset_Specification" IFC Property Set > "NominalLength" IFC Property	File > File Special > IFC 2x3 > IFC Manager
NominalWidth	"COBie_Pset_Specification" IFC Property Set > "NominalWidth" IFC Property	File > File Special > IFC 2x3 > IFC Manager
NominalHeight	"COBie_Pset_Specification" IFC Property Set > "NominalHeight" IFC Property	File > File Special > IFC 2x3 > IFC Manager
ModelReference	"COBie_Pset_Specification" IFC Property Set > "ModelReference" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Shape	"COBie_Pset_Specification" IFC Property Set > "Shape" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Size	"COBie_Pset_Specification" IFC Property Set > "Size" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Color	"COBie_Pset_Specification" IFC Property Set > "Color" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Finish	"COBie_Pset_Specification" IFC Property Set > "Finish" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Grade	"COBie_Pset_Specification" IFC Property Set > "Grade" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Material	"COBie_Pset_Specification" IFC Property Set > "Material" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Constituents	"COBie_Pset_Specification" IFC Property Set > "Constituents" IFC Property	File > File Special > IFC 2x3 > IFC Manager
Features	"COBie_Pset_Specification" IFC Property Set > "Features" IFC Property	File > File Special > IFC 2x3 > IFC Manager
AccessibilityPerformance	"COBie_Pset_Specification" IFC Property Set > "AccessibilityPerformance" IFC Property	File > File Special > IFC 2x3 > IFC Manager
CodePerformance	"COBie_Pset_Specification" IFC Property Set > "CodePerformance" IFC Property	File > File Special > IFC 2x3 > IFC Manager
SustainabilityPerformance	"COBie_Pset_Specification" IFC Property Set > "SustainabilityPerformance" IFC Property	File > File Special > IFC 2x3 > IFC Manager

Figure 14 Mapping between ArchiCAD model and the COBie2 Type worksheet data

The “Types” are interpreted as IFC Type Product entities in the ArchiCAD project. IFC Type Products and their COBie2-requested data can be defined in the IFC Manager only. ArchiCAD automatically generates IFC Type Product entities for all ArchiCAD element types. The following table shows some naming examples of the automatically generated IFC types. Of course, the default values of the names can be modified manually with the IFC Manager.

ArchiCAD element (IFC Entity)	IFC Type Product	Derivation of "Name" Attribute of IFC Type Product
Column (IfcColumn)	IfcColumnType	Profile name and size
Beam (IfcBeam)	IfcBeamType	Profile name and size
Wall (IfcWall)	IfcWallType	Name of Cut Fill / Composite and thickness
Slab (IfcSlab)	IfcSlabType	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
Curtain Wall (IfcCurtainWall)	IfcCurtainWallType	"Curtain Wall Type" text
Curtain Wall > Panel element (IfcPlate)	IfcPlateType	Type and size of the CW panel element
Curtain Wall > Frame element (IfcMember)	IfcMemberType	Type and profile size of the CW frame element
GDL-based Objects	IfcFurnitureType, IfcRailingType, IfcRampFlightType, etc.	Name of the Library Part without .gsm extension

Figure 15 The default naming rule examples of IFC Type Product entities

To make all COBie2-required IFC Properties available for the Type elements in the IFC Manager, import the “COBie2-PropertySet.xml” scheme into the ArchiCAD project (see chapter [Component](#)). The XML-type scheme can be added to the project with the IFC Scheme Setup command (File > File Special > IFC 2x3). To manage the IFC Attributes, the Properties and the Classification reference items of an IFC Product Type (for example the properties of an IfcWindowStyle assigned to an IfcWindow), first set the type object editable with the “Edit / New Type” tool, and then define the values of its properties.

To set the Type Category, define Classification Reference data in the IFC Manager. COBie requires IfcSystem classification by the OmniClass table 21 (‘Building Elements’), so choose the proper classification value from the built-in “Table 21 – Elements” (OmniClass) list under the “Apply Predefined Rule” option. ArchiCAD classification rule based on Uniclass tables is also available in UK.

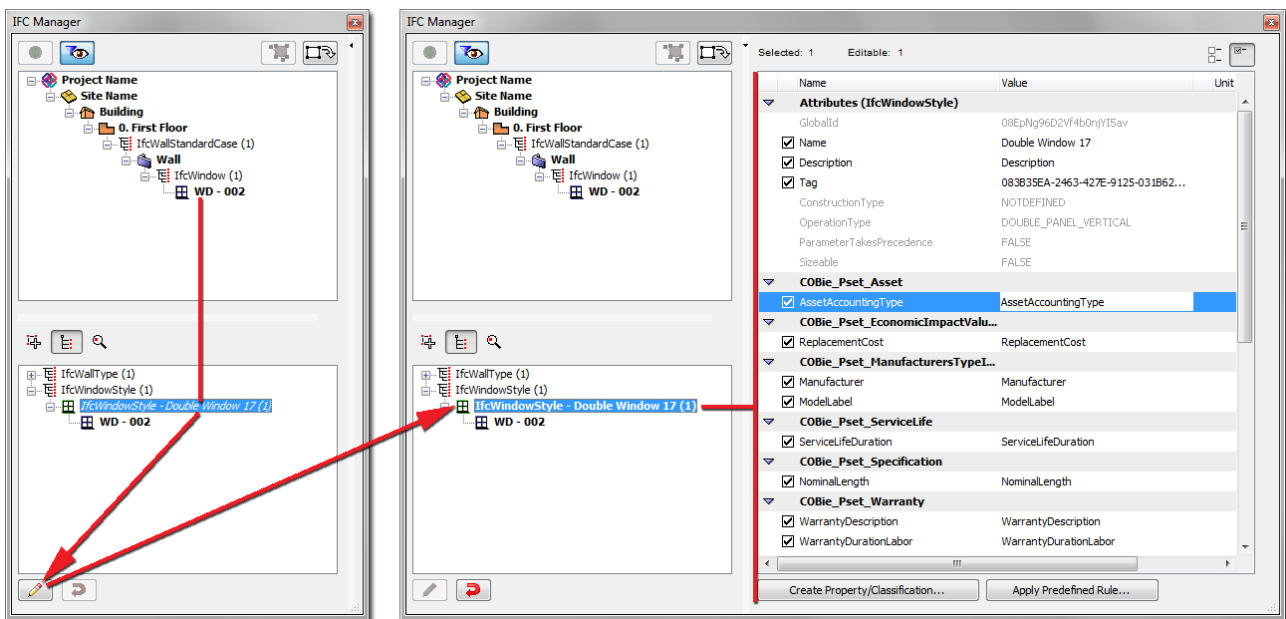


Figure 16 IFC Properties defined for an IFC Type Product entity (COBie Type item)

## Component

The COBie2 Component worksheet summarizes the individually named or schedule items of the project.

Component COBie2 spreadsheet data	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
<b>Name</b>	"ID" Attribute of an ArchiCAD element	Settings Dialog (AC element)
<b>CreatedBy</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>CreatedOn</b>	Export date of the IFC model	
<b>TypeName</b>	"Name" IFC Attribute of the assigned IFC Element Type (if available)	
<b>Space</b>	"No." Attribute of the ArchiCAD Zone assigned to the ArchiCAD element (Space containment and Space boundaries data)	File > File Special > IFC 2x3 > IFC Translation Setup > Export Options > Derived model data to export
<b>Description</b>	"Description" IFC Attribute of an ArchiCAD element	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties
<b>ExtSystem</b>	"ArchiCAD" text	
<b>ExtObject</b>	"IFC Entity type" of an ArchiCAD element (for example "IfcWall", "IfcSlab", etc.) as text	
<b>ExtIdentifier</b>	"GlobalId" IFC Attribute of an ArchiCAD element	
<b>SerialNumber</b>	"COBie_Pset_Component" IFC Property Set > "SerialNumber" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties
<b>InstallationDate</b>	"COBie_Pset_Component" IFC Property Set > "InstallationDate" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties
<b>WarrantyStartDate</b>	"COBie_Pset_Component" IFC Property Set > "WarrantyStartDate" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties
<b>TagNumber</b>	"COBie_Pset_Component" IFC Property Set > "TagNumber" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties
<b>BarCode</b>	"COBie_Pset_Component" IFC Property Set > "BarCode" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties
<b>AssetIdentifier</b>	"COBie_Pset_Component" IFC Property Set > "AssetIdentifier" IFC Property	File > File Special > IFC 2x3 > IFC Manager, or Settings Dialog > Manage IFC Properties

Figure 17 Mapping between ArchiCAD model and the COBie2 **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.

The "Space" data describe the assigned ArchiCAD Zone (IfcSpace) to a component. This data is automatically calculated, if the IFC export uses the Space containment and Space boundaries functions (see chapter [COBie2-enabled IFC Model Export](#)).

To make all COBie2-required IFC Properties available for the Component elements in the IFC Manager and the Setting Dialogs (Tags and Categories > Manage IFC Properties), import the "COBie2-PropertySet.xml" scheme into the ArchiCAD project. The XML-type scheme can be added to the project with the IFC Scheme Setup command (File > File Special > IFC 2x3).



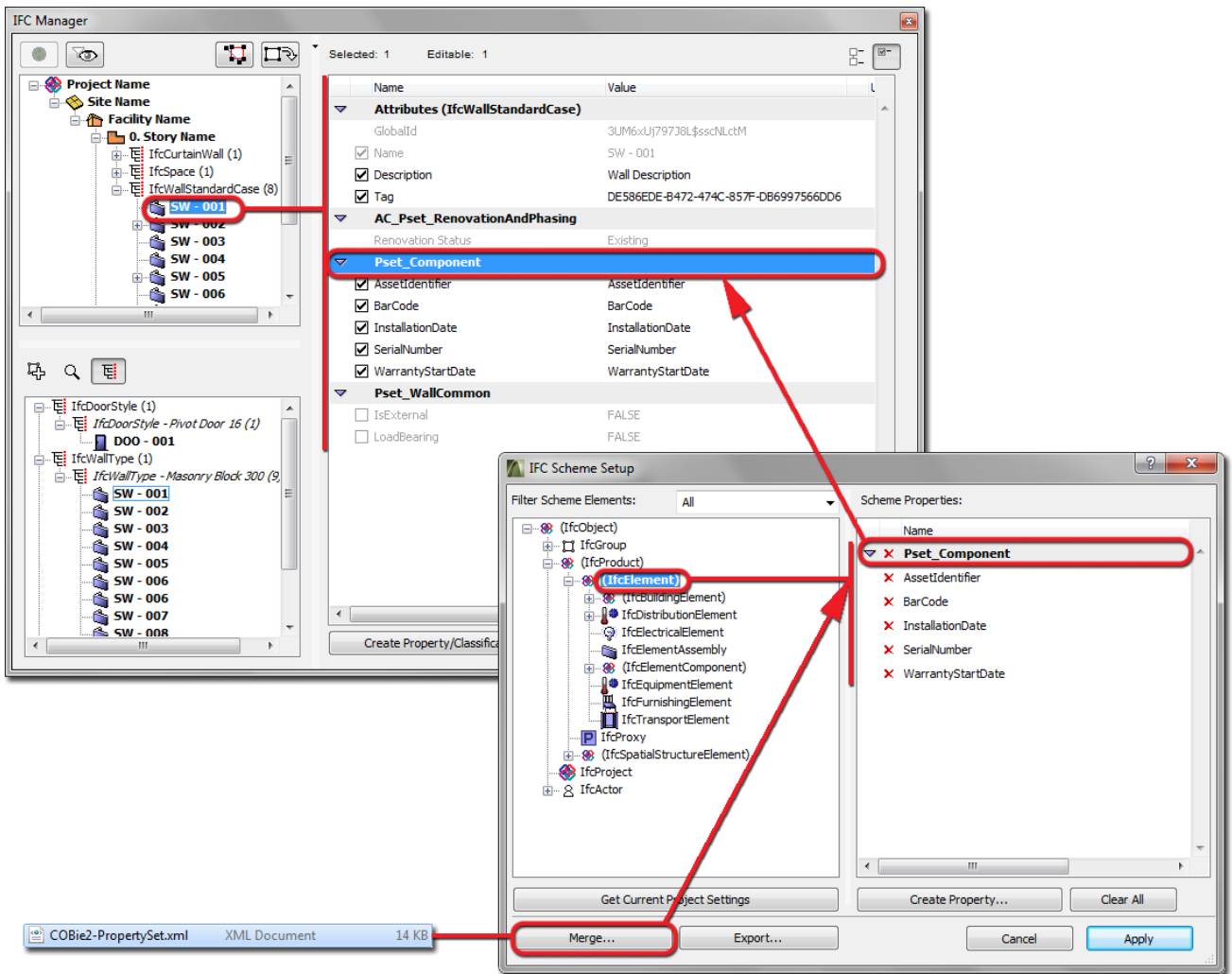


Figure 18 IFC Properties defined in the “COBie2” predefined scheme

## System

The COBie2 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	Mapped item from the ArchiCAD and IFC model	ArchiCAD command
COBie2 spreadsheet data		
<b>Name</b>	"Name" IFC Attribute of an IfcSystem entity	File > File Special > IFC 2x3 > IFC Manager
<b>CreatedBy</b>	Person or Organization > Addresses > "Telecom" Address type > "ElectronicMailAddress"	
<b>CreatedOn</b>	Export date of the IFC model	
<b>Category</b>	Classification Reference data of an IfcSystem entity ("ItemReference" and "Name")	File > File Special > IFC 2x3 > IFC Manager
<b>ComponentNames</b>	"ID" Attribute of the assigned ArchiCAD elements	
<b>ExtSystem</b>	"ArchiCAD" text	
<b>ExtObject</b>	"IfcSystem" text	
<b>ExtIdentifier</b>	"GlobalId" IFC Attribute of an IfcSystem entity	
<b>Description</b>	"Description" IFC Attribute of an IfcSystem entity	File > File Special > IFC 2x3 > IFC Manager

Figure 19 Mapping between ArchiCAD model and the COBie2 System worksheet data

The "Systems" are interpreted as IfcSystem assignment entities in the ArchiCAD project. IfcSystem and their COBie2-requested data can be defined in the IFC Manager only.

First, create an IfcSystem by clicking the "New" command from the "IFC Systems" item in the "Assignments" tree, then drop the IFC elements to the "New Relation" folder of the new IfcSystem entity from the Project tree of the IFC Manager.

To set the System Category, define Classification Reference data in the IFC Manager. COBie requires IfcSystem classification by the OmniClass table 21 ('Building Elements'), so choose the proper classification value from the built-in "Table 21 – Elements" (OmniClass) list under the "Apply Predefined Rule" option. ArchiCAD classification rule based on Uniclass tables is also available in UK.

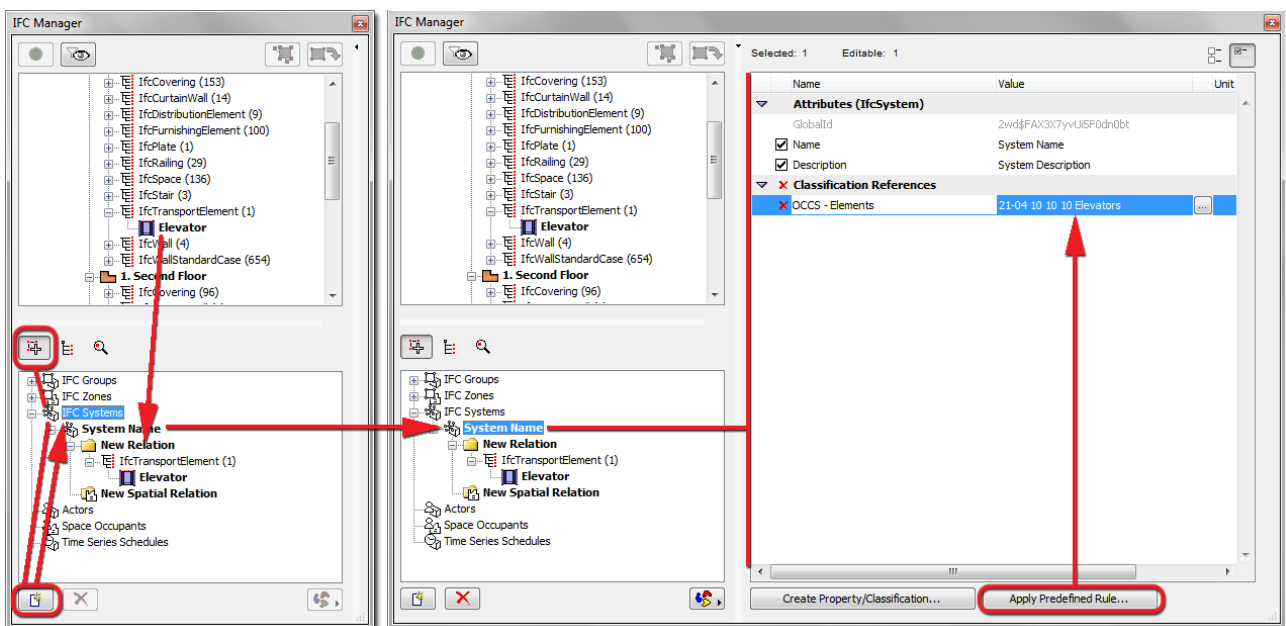


Figure 20 IfcSystem definition in ArchiCAD

MEP Systems can be also handled as IfcSystem inside an ArchiCAD project:

- If a MEP System is defined by the GRAPHISOFT MEP Modeler, it and its members can be easily assigned to an IFC System. Just create a new IfcSystem (mentioned before) and set its Name to the required MEP System name (see the next figure).
- If an IFC model (for example exported by an MEP application) merged to the current ArchiCAD project contains IfcSystems, you can also manage them and their properties in the IFC Manager.

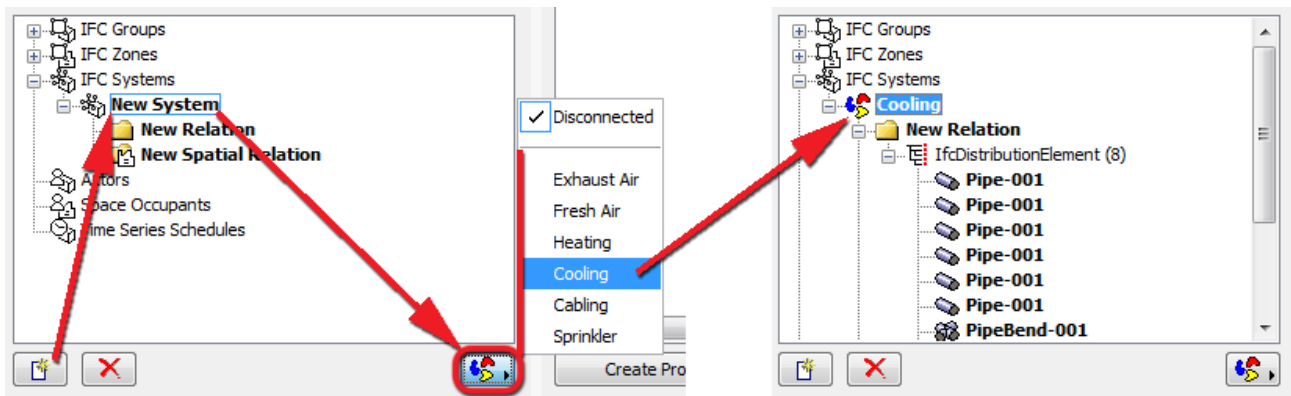


Figure 21 Conversion of a MEP Modeler System to an IfcSystem

## Document / Attribute / Coordinate / PickLists

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

## Assembly / Connection / Spare / Resource / Job / Impact / Issue

These data types are not requested from a design application by the COBie2 rules, and they are not available in ArchiCAD projects too. The table contents should be manually filled out in the spreadsheet, if they are required.

## COBie2-enabled IFC Model Export

The IFC model export using FM Handover View can be easily carried out using the File > Save as command. The "Save as IFC" command is available from either the Floor Plan or 3D window.

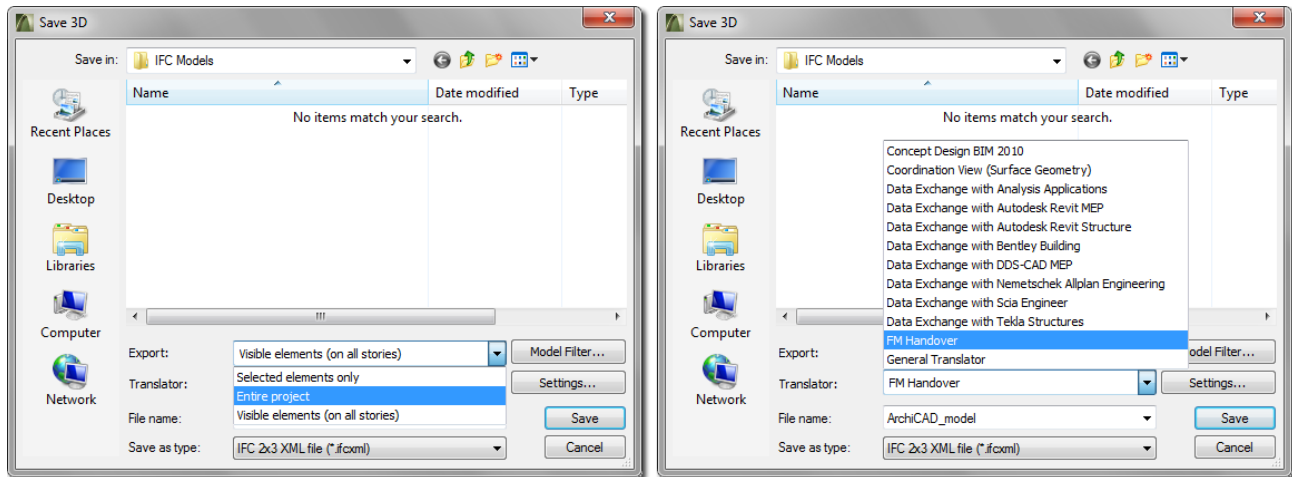


Figure 22 IFC model export based on FM Handover View

The steps of IFC model export:

1. Element filtering possibilities for the export:

- **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 export command) will be exported.
- **Entire project:**  
entire model (regardless of any selection, and regardless of the elements' show/hide status) will be exported.
- **Visible elements (on all stories):**  
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.).  
**Note** 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.
- **All elements on current story** (available only if Floor Plan is open):  
all elements (regardless of any selection, and regardless of the elements' show/hide status) on the current story of the Floor Plan will be exported.
- **Visible elements on current story** (available only if Floor Plan is open):  
all elements (regardless of any selection) that are visible on the current story of the Floor Plan will be exported.

**Note** 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 Elements in 3D” dialog box (View > Elements in 3D View > Filter Elements in 3D).

2. Choose the “FM Handover” Translator, in which export settings are fine-tuned for the FM Handover requirements.

**Note** If the “FM Handover” Translator is not available in ArchiCAD, you must create such a Translator, by clicking the “Settings” button in the “IFC Translation Setup” dialog.

1. Duplicate the built-in “General Translator” and rename it to “FM Handover”.
2. Set “Extended Model View” for “IFC View Definition” (Export Options).
3. Type “FMHandover” text in the “Extended Model View name” field (Export Options). This text defines the identification of the FM Handover View Definition in the header of the exported IFC file.
4. Activate the following options at Export Options (Derived model data to export):
  - “Space containment”: it exports the relationship between ArchiCAD Zones (IfcSpaces) and Furnishing, Mechanical (HVAC) and other contained elements within the space. The option is required for exporting “Space” data of the Component tab in the COBie2 Spreadsheet.
  - “Base quantities (length, area and volume)”: it exports base quantities including data required by COBie2.
  - “IFC Space boundaries with tolerance between Zones [mm]”: it exports the logical connection between ArchiCAD Zones (IfcSpace) and the building elements that enclose them. The “tolerance between Zones” means the maximum distance between neighboring ArchiCAD Zones (for example, the thickest wall/slab) in mm. The option is required for exporting “Space” data of the Component tab in the COBie2 Spreadsheet.
5. Set the unit system for the exported model (Export Options > IFC model units).
6. Click “Save Settings & Close”.

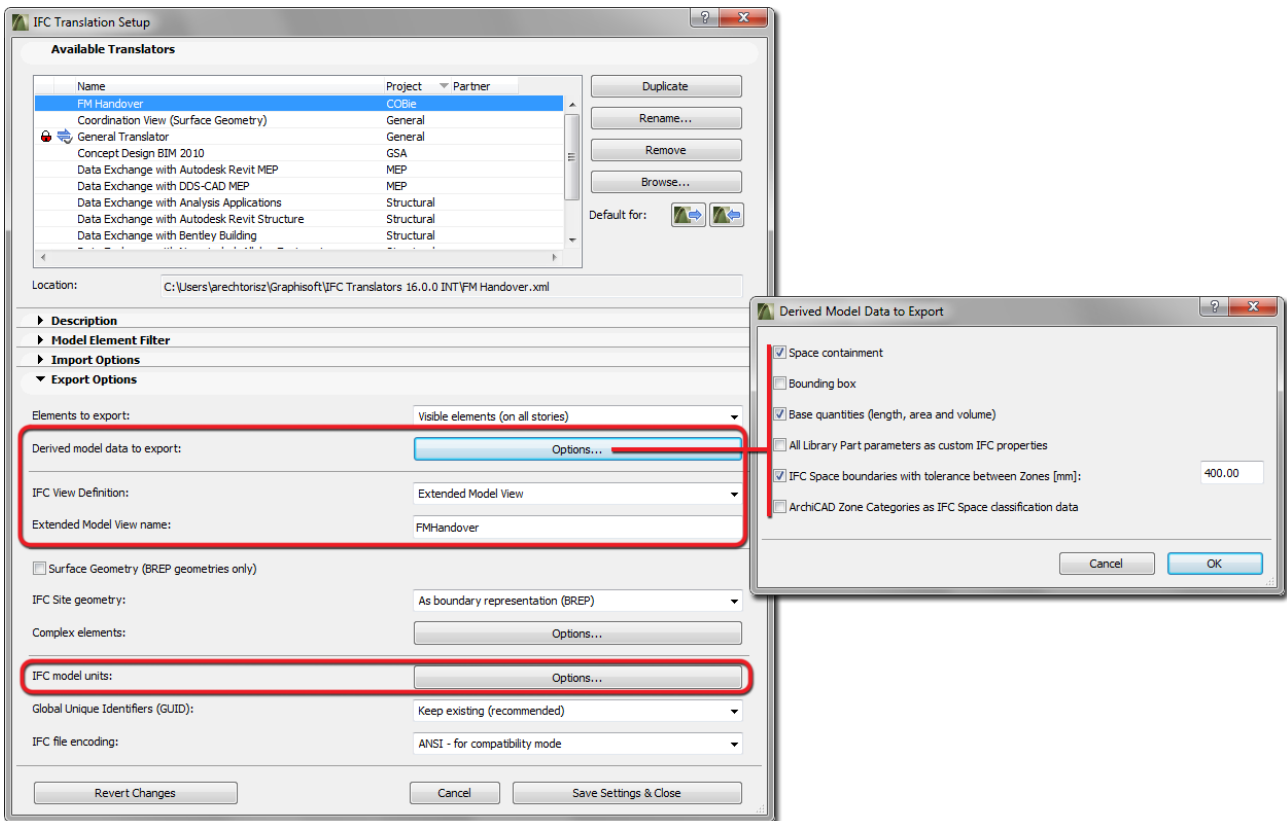


Figure 23 Major export options of the IFC translator set for the FM Handover requirements

3. Define file name.
4. Choose the file format of the IFC export. Choose .IFC or .IFCXML depending on the file support of the COBie2 spreadsheet converter programs (see the [How to Create a COBie2 Spreadsheet](#) chapter).
5. Click Save.

## How to Create a COBie2 Spreadsheet

An external application is needed for the conversion of an ArchiCAD IFC file to an XLS/XML-type COBie2 spreadsheet format.

The IFC, IFCXML and COBie2 spreadsheet formats for the IFC 2x3 FM Handover MVD do capture the same information content and can be transformed forth and back across the different formats. There are some dedicated tools can be used to execute the transformations, such as the no-cost application, developed by Engineer Research and Development Center (ERDC), called COBie Toolkit.

ERDC COBie Toolkit, developed for the COBie FM Handover project, includes the transformer tool and the configurations to map IFC data to COBie2.

**Hint** COBie Toolkit is a free tool and can be downloaded from [here](#) (not available yet).