



ECE CAD & IT Guideline

Section 4: BIM-Models

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Änderungsnachweis

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General Introduction

The ECE CAD & IT Guideline has been developed to improve the quality of Computer-Aided Design (CAD) standardization efforts within ECE. The purpose of this manual is to set a basic CAD standard to ensure consistent electronic deliverables to and within ECE.

All externally produced documents delivered to ECE must be submitted in accordance with these standards.

The ECE CAD & IT Guideline is broken down into separate sections as follow:

- Section 0 defines the general CAD organizational structure.
- Section 1 addresses the general DWG Specifications for drawings.
- Section 2 addresses the Layer standard that will be used at ECE and that should be used when creating CAD files for ECE.
- Section 3 addresses the plan- and file naming convention and shows some examples (according to the requirement and rules for usage of a project room).
- Section 4 defines basic topics around BIM models

Each section was created to stand alone. Sections 0, 1 & 2 represent the complete ECE CAD Standard. It is expected that external architectural design firms use sections 0, 1 & 2 for general CAD rules and Section 3 for file naming and file organisation in general, especially if a project room is used for a project. Section 4 is to be considered in the case of project execution according to the BIM method.

This regulation does not specify any detailed definitions for projects conducted with the BIM method. For projects in which the BIM method is used, the project specific documents Client-Information Requirement (German: AIA, Auftraggeber Informationsanforderung) and BIM-Plan of Procedure (German: BAP, BIM-Ablaufplan) are created and provided to all project participants.

Acronyms

ACA	AutoCAD Architecture
ACA 2018	AutoCAD Architecture, Version 2018
AEC	Architecture, Engineering and Construction (or Civil)
AIA	American Institute of Architects related to CAD/Layer-Context or
AIA	German: Auftraggeber Informationsanforderung in BIM-Context (English: Client-Information Requirement)
BAP	German: BIM-Ablaufplan (English: BIM-Plan of Procedure)
BIM	Building Information Modeling (Method)
CAD	Computer aided Drafting / Design
DWG	Drawing (AutoCAD file format)
ECE	ECE Projektmanagement G.m.b.H. & Co. KG
FM	Facility Management
IAI	International Alliance for Interoperability
IFC	Industry Foundation Classes
ISO	International Organization for Standardization
LEED	Leadership in Energy and Environmental Design
NCS, USNCS	United States National CAD Standard
NIBS	National Institute of Building Sciences
UDS	Uniform Drawing System

Project management according to BIM method

For the handling of projects according to the BIM method, there is a multitude of approaches and keywords. The most important distinction from our point of view is "Closed BIM" and "Open BIM".

Closed BIM

"Closed BIM" defines a project execution in which all project participants involved are working with

- identical software
- in identical software version
- with identical file type

In view of the large number of project participants and the most diverse project types and peculiarities, a "Closed BIM" process is most unlikely from our point of view. In any case, however, it should be checked whether closed BIM processing is possible because in such a case a loss of data or information through data exports to IFC or pure 2D CAD formats would be ruled out.

Open BIM

With "Open BIM", all project participants should work according to BIM methodology. However, the software products used are not mandatory. However, a common ground must always be agreed upon: Data exchange between the parties shall be organised in a specific IFC file format to be agreed.

IFC

The Industry Foundation Classes (IFC) are an open standard in the construction industry for the digital description of building information modeling. The IFC are defined by buildingSMART International (bSI), formerly known as the Industrial Alliance for Interoperability (IAI). The IFC are registered under ISO 16739.

The logical building structures (e.g. window opening, wall, storey buildings), associated properties (attributes) and optional geometry are shown. Complex 3D planning data with the components and descriptive attributes can be transferred between building software systems.

IFC is supported by numerous software for the exchange of building data. Areas of application include 2D/3D CAD, static and energy calculations, quantity and cost determination and facility management. The exchange takes place using IFC files with the extension *.ifc. IFC files in the XML standard (*.ifcXML) and zipped IFC files (*.ifcZIP) are also used.

However, IFC is not the same as IFC. There are many different variants, each with a different focus on specific aspects of the information to be transferred.

The minimum requirement for settlement using the "Open BIM" method is as of September 2018: "IFC(2x3)". If necessary, a different format can be agreed at the start of the planning process. The 3D building models are also submitted in the native format of the creation software. The transfer takes place by providing the planning service in the designated project room or the agreed cloud storage area. 2D plan derivations (drawings in DWG and PDF file format) must continue to be created and handed over as binding throughout all work phases. In the case of drawings in DWG format, the provisions of sections 0, 1 and 2 of the ECE CAD & IT Guideline shall be complied with as far as technically possible.

Areas and rooms in 3D building models

The mapping of areas or spaces in 3D building models is very different depending on the software used. At the same time, areas and rooms are very important to ECE. Therefore, when editing BIM models together or exchanging data via IFC, a project-specific, very precise coordination is required for the creation or editing of polygons/areas. In particular with "Open BIM" with regard to the effort and feasibility of the different modelling software.

Project-specific specifications and their documentation

Detailed specifications for the handling of projects in accordance with the BIM method must always and without exception be included in the following documents

- Client-Information Requirement
(German: AIA, Auftraggeber Informationsanforderung) and
- BIM-Plan of Procedure
(German: BAP, BIM-Ablaufplan)

These documents are project-specific and are made available to all project participants. Among other things, the specifications about the specific BIM method ("Open BIM" or "Closed BIM") and the data exchange formats to be used are documented here (e.g. "Native Revit 2019" or "IFC(2x3)").