GUIDELINE

VERSION 1.0
18 March 2025

European openBIM Forum

openBIM Harmony

PART 1 INTRODUCTION - READ ME FIRST

GENERAL

Contents

1 About openBIM Harmony

openBIM Harmony is a set of guidelines, requirement specifications and templates.
They are developed by European buildingSMART Chapters under European openBIM Forum.
The editorial group represents buildingSMART Chapters: Benelux, Denmark, Norway and Portugal.
openBIM Harmony is a common European reference for European buildingSMART Chapters.
It is intended to be implemented by National Chapters. openBIM Hamony is not meant to be used directly as is. It will require adaptation to National language, regulations, maturity level and standards.
The ambitions of the common framework are:

- Lower the threshold and risk associated with adopting openBIM for SMEs.
- Harmonize how Appointing Parties specifies their information requirements.
- Harmonize how Appointed Parties specifies their approach to deliver on the requirements.

2 BIM

BIM is a comprehensive method for digitizing the AEC/FM industry. More specifically, BIM is the use of a shared digital representation of a built asset to facilitate design, construction and operation processes to form a reliable basis for decisions.
BIM can be used for everything from simple coordination models to complex project management and operating models with automation of processes, e.g. quality assurance and reporting. It is important to specify requirements at the right level. Establishing and maintaining good quality models and using them in project management and operations has a cost. And the more information that must be created, quality assured and maintained, the higher the cost.

3 How to read and use the open Harmony documents

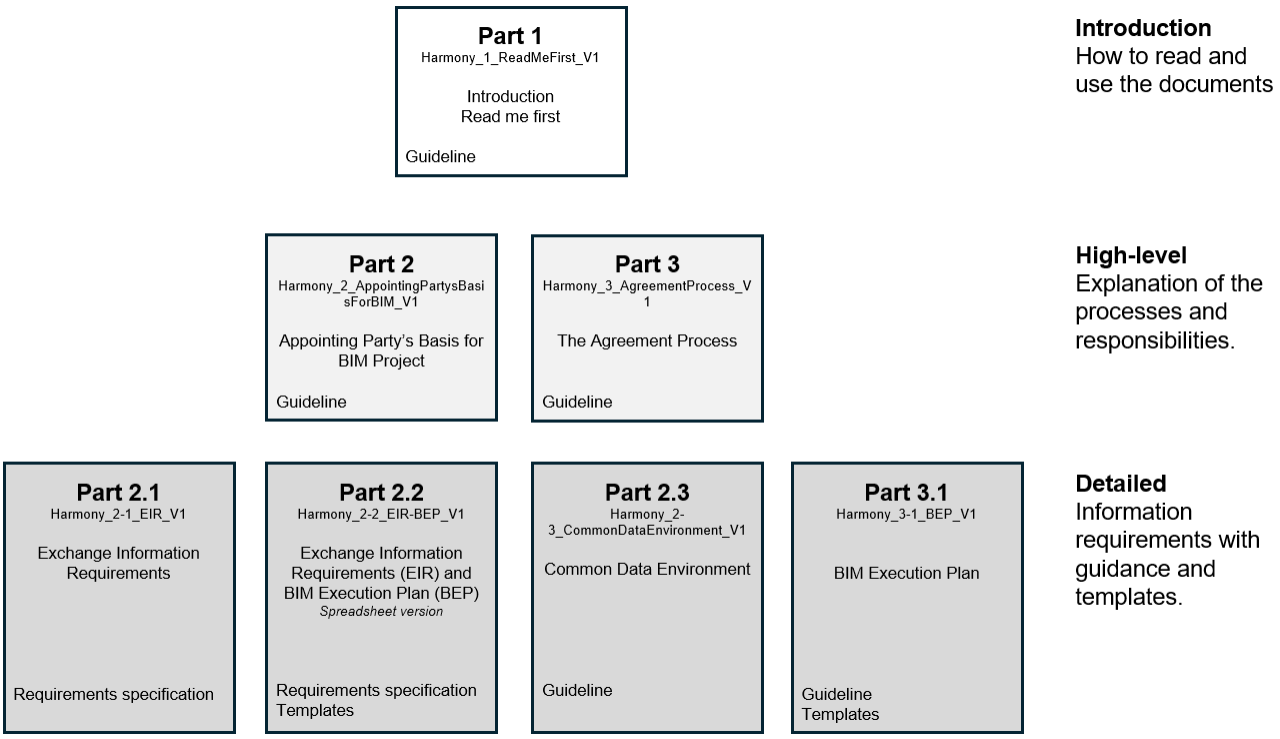


Figure 1 - Document hierarchy and content

The documentation is divided into separate documents. It has a modular structure making it possible to focus on the guidelines you need according to your role and tasks. It is not meant to be read from one end to the other to get the guidelines you need. It is encouraged to read the entire documentation to understand the principles.

3.1 Appointing Party to start a new project

1. READ **Part 2**

2. READ **Part 2-1**
- so you know what you require from the appointed parties in your project.

3. READ AND FILL IN **Part 2-3**
- Make sure to have established solutions and procedures for a Common Data Environment
- Fill in information about the Common Data Environment in Part 2.3 or in the spreadsheet.

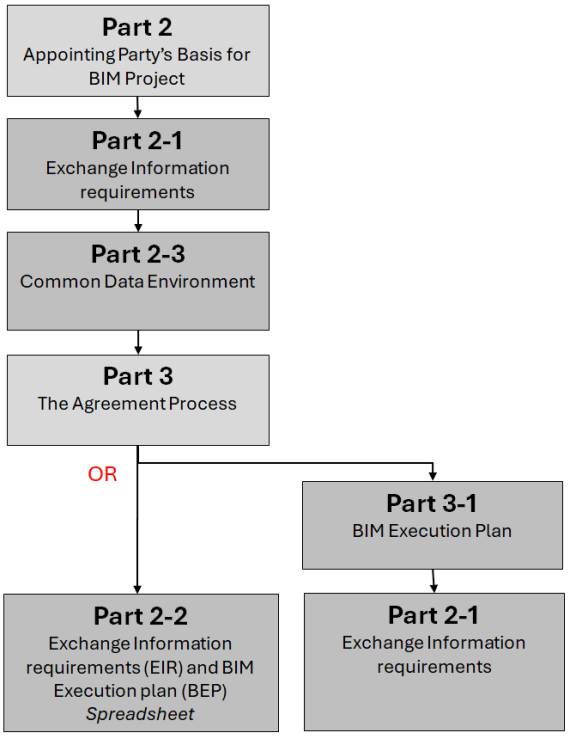
4. READ **Part 3**
- Make sure that there are no conflicts between your organization's procurement procedures and openBIM Harmony's approach

5. CHOOSE
- If you will use "Part 2.1 Exchange Information Requirements" or in "Part 2.2 spreadsheet Exchange Information Requirements and BIM Execution Plan" to express your requirements.

FILL IN AND PROVIDE **Part 2-2**
- Requirement for information as part of the tendering documents

OR

FILL IN AND PROVIDE **Part 3-1** and **2-1**
- Make sure that there are no conflicts between your organization's procurement procedures and openBIM Harmony's approach



3.2 Potential Lead Appointed offering information delivery services in a project

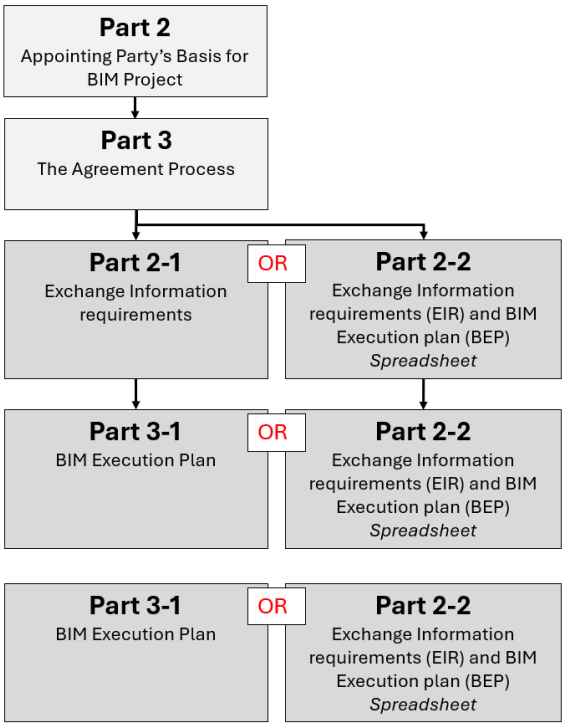
1. READ **Part 2**
- make sure that there are no conflicts between your organization's tendering/offering procedures and openBIM Harmony's approach

2. READ **Part 3**
- make sure that there are no conflicts between your organization's tendering/offering procedures and openBIM Harmony's approach

3. READ **Part 2-1** OR **2-2** (depending on the appointing party tendering)
- make sure to have understood all requirements.
- Involve key resources from the potential delivery team and develop a strategy for information delivery

4. OFFER A RESPONSE
- To the information requirements in 3-1 OR in 2-2

5. CONFIRM
- By chosen Lead Appointed Party
- Confirm EIR and BEP content in 3-1 OR 2-2



4 Normative standards

Information deliverables and management is based on the following standards.

4.1 EN ISO 19650-1

Organization and digitization of information about construction works, including building information modeling (BIM) - Information management with BIM - Part 1: Concepts and principles
In openBIM Harmony the standard regulates terminology, principles, and Common Data Environment.

4.2 EN ISO 19650-2

Organization and digitization of information on construction works, including building information modeling (BIM) - Information management with BIM — Part 2: The project phase (ISO 19650-2:2018)
In openBIM Harmony the standard regulates establishment and follow-up of governing documents EIR and BEP as well as additional documents in the project phase.

4.3 EN ISO 19650-3

Organization and digitization of information about buildings and civil engineering works, including building information modeling (BIM) - Information management using building information modeling — Part 3: Operational phase of the assets (ISO 19650-3:2020)
In openBIM Harmony the standard regulates organization and follow-up of building information in the operational phase.

4.4 ISO 1787-1

Building information modelling - Level of information need, Part 1: Concepts and principles.

In openBIM Harmony the standard regulates specification of concepts and principles to establish a methodology for specifying level of information need and information deliveries in a consistent way when using building information modelling (BIM).

4.5 CEN/TR 17654

Guidelines for the implementation of Exchange Information Requirements (EIR) and BIM Execution Plans (BEP) at European level based on EN ISO 19650-1 and -2
In openBIM Harmony the standard regulates how requirements for EIR and BEP according to NS-EN ISO 19650 are specified and followed up.

4.6 EN ISO 16739-1

Industry Foundation Classes
In openBIM Harmony the standard regulates how requirements to model information are specified. All requirements are specified in accordance with the IFC standard. The appointed party must translate requirements into its own proprietary software.

4.6 EN-ISO 29481-1, Annex C

Building information models - Information delivery manual - Part 1: Methodology and format
In openBIM Harmony the life-cycle stages in Annex C are used as a generic European common life-cycle reference.

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PART 2 APPOINTING PARTY'S BASIS FOR BIM

GENERAL

Contents

1 The basis for BIM

This document prepares the appointing party for an efficient start and execution of the project.
When initiating a new project and before procuring design services, the appointing party has three overall tasks.

- Specify information requirements. See openBIM Harmony part 2.1 Exchange information requirements (EIR).
- Provide the necessary resources, including maps and, if relevant, models of the existing building. Not part of scope of openBIM Harmony version 1.
- Establish a Common Data Environment (CDE). See openBIM Harmony part 2.1 Exchange information requirements (EIR) clause 6 and openBIM Harmony part 3.1 BIM execution plan, clause 3.

2 Establishing the appointing party's exchange information requirements

The process in process map 1 describes an ideal situation where the line organization establishes OIR, AIR and PIR. In such a situation, guidelines are clearly described and can easily be transferred to the project's exchange information requirements (EIR).
To the extent that the systematic approach to EN ISO 19650 has not been implemented in the appointing party’s organization, it is still recommended that the project management themselves translate existing practices and requirements in the line organization into overall guidelines in order to agree these with the line organization, facility manager and project owner. It can, among other things, be done by adopting principles that are relevant to business operations, management and project implementation. Describe these as respectively OIR, AIR and PIR and then convert these into a number of EIRs. This should be done to ensure that all stakeholders have the same expectations for the project's implementation and deliveries.

2.1 Organizational Information Requirements

The appointing party’s main organization requires the project organization to develop the project based on adequate decision-making grounds and with well-established routines that ensure the quality assurance of information. Additionally, the information generated by the project must be usable for the agreed purposes. These requirements influence the project's information requirements.

- The project shall report progress and financial frame to the main organization and stakeholders.
- The asset owner’s main organization may impose overarching requirements for asset management and portfolio governance. These requirements impact the information requirements of the built asset.

The main organization shall maintain an overview of the real estate portfolio, including areas and conditions.

- The identification of and information about components, systems, and spaces shall be standardized across the portfolio. This means that projects must deliver information based on the same standards.

2.2 Asset Information Requirements

The owner organization must have sufficient information to manage, operate, maintain, and develop the built asset. In addition to requirements for FM (Facility Management) documentation, this also includes geometric models.

- Completion and handover include as-built information as well as documentation of the setup of the Project Information Model (PIM) and information control.

- Data to support the management phase.
- The ability to revise geometric information during the management phase.

2.3 Project Information Requirements

Derived from the above requirements from the main organization and the project's own information needs, overarching requirements are specified for the information to be delivered.

- BIM shall be used as the primary method for documentation and decision-making. Design disciplines shall develop and maintain models that represent the project's progress.
- Information shall be cross-discipline quality assured in terms of geometry, functionality, identification, and properties.
- The model shall be used as a basis for preparing and updating the cost estimate, which serves as a decision-making foundation in the project.
- The model shall be used as a basis for preparing and updating planning and production documentation for construction.

2.4 Exchange information requirements

The exchange information requirements are specified in “Part 2.1 Exchange Information Requirements”

3 BIM Execution Plan

The BIM execution plan is a response to the appointing party's exchange information requirements. It is recommended to use a template and require that it be completed as standardized as possible by potential lead appointed parties. This makes evaluation of responses easier. It is recommended to use either “Part 3.1 BIM execution Plan” or “Part 2.2 spreadsheet Exchange Information Requirements and BIM Execution Plan”.

It is recommended that the BIM execution plan is delivered as part of the offer.

4 Shared resources

4.1 Digitization of existing constructions

To the extent that the project concerns the refurbishment, rebuilding or transformation of existing constructions, a digital representation must be made of the existing situation. It can either be provided by one of the appointed parties (architects or engineers) or by a third party.

4.2 Maps

The appointing party shall provide relevant and updated maps for the project.

5 Common Data Environment (CDE)

The appointing party shall provide a shared data environment that supports interaction and information handling in accordance with specified use cases covered by the minimum requirement.

REQUIREMENTS SPECIFICATION

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18 March 2025

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openBIM Harmony

PART 2.1 EXCHANGE INFORMATION REQUIREMENTS

BUILDINGS

Contents

Explanation of color and type

Black text = Part of framework. Can be distributed as is.
Red text = Example. Shall be changed to project information before distribution
Red italic text = Guidance to fill out information. Shall be deleted before distribution

1. Exchange Information Requirements

1.1 General

Exchange Information Requirements are a compilation of information requirements for an agreed information delivery. Exchange Information Requirements are abbreviated to EIR.
The Exchange Information Requirements is an aggregation and detailed specification of overall requirements from three sources of requirements:

- The organizational information requirements (OIR, Organization Information Requirements)
- The Asset Information Requirements (AIR, Asset Information Requirements).
- The Project Information Requirements (PIR, Project Information Requirements).

The EIR specifies information to be exchanged between appointed parties, the Appointing Party and other agreed stakeholders, and ensures that all parties have the necessary data for their tasks. The Appointing Party is responsible for establishing and maintaining the EIR. Source: EN ISO 19650-1

1.2 Required use of information

1.2.1 General

Information requirements specify what information is needed, when it is required, in what format, and who the recipient is. These requirements may originate from the appointing party's organizational level (OIR), asset manager (AIR), or the project (PIR). High-level requirements are translated into specific information deliverables, referred to as EIR requirements. It is recommended to include the original requirements, from which the EIR is derived, in the tender documents shared with potential lead appointed parties. This provides appointed parties with a better understanding of the purpose of the information and enables them to contribute optimally to meeting the needs.
The required use of BIM is defined in clause 1.2.2 to 1.2.8.

1.2.2 EIR-01 Project overview

Report on project status about the progression, financial frame, deviations and risks. This includes making the models available to the project’s participants.

1.2.3 EIR-02 Modelling and model-based interaction

BIM shall be used as the primary method for documentation and decision-making. Design disciplines develop and maintain models that represent the project's development.
Models are developed to support the project's decision-making. Models should represent the maturity of the project according to the life-cycle standard adopted.
BIM is used as the primary method for documentation and decision-making. Design disciplines develop and maintain models that represent the project's development.

1.2.4 EIR-03 Interdisciplinary coordinated and controlled information

Appointed parties compile information models, and geometrical and functional deviations are registered. Information models are checked according to geometrical and alphanumerical requirements. Deviations are reported and corrected. Control is documented.

1.2.5 EIR-04 Cost estimation information

Model-based cost estimation as a means to cost-driven design. The project will use models for frequent quantity take-off for cost estimation.

1.2.6 EIR-05 Production information
Appointed parties shall support optimizing the use of models to procure, plan and execute production. This includes coordinating with contractors and subcontractors on information deliverables.

1.2.7 EIR-06 Completion and handover
Appointed parties shall complete and handover as-built information and documentation as part of the facility management information. It also includes PIM set-up and information control documentation.

2 Level of Information Need
2.1 General
This specifies the information to be delivered.

2.2 Prerequisites
All modeling disciplines are required to contribute to the agreed-upon information and support model-based project execution. This applies to the five primary design disciplines: architectural, landscape architectural, structural, plumbing, mechanical, and electrical.
If the responsibility for design is transferred to other parties, such as subcontractors, these parties are also required to deliver information that complies with these requirements.
All information deliveries must undergo quality assurance and be submitted by the agreed milestones. These milestones are strategically set to support decision-making processes and ensure smooth progress into production. By adhering to these milestones, the project maintains a structured workflow, enabling timely evaluations and adjustments as needed.
Information is exchanged at predetermined intervals to facilitate interdisciplinary coordination and control. This structured exchange allows for gradual progress toward full interdisciplinary alignment, minimizing conflicts and enhancing overall project efficiency. Regular coordination ensures that all disciplines are synchronized, leading to a cohesive and integrated project outcome.

2.3 Requirements for geometrical information
Description of geometrical information that can be expressed using the independent aspects: Detail, dimensionality, location, appearance and parametrical behavior.
The geometry shall be representative of the physical product. It shall be possible to see what the object represents. The outer boundaries of the object shall be representative for the purpose of spatial coordination. The geometry of the individual objects shall not be too detailed as it can slow down the aggregated model.
The model use an absolute location reference, either global coordinates or a local point of origin.

2.4 Requirements for alphanumerical information
Description of detail and extent of information that can be expressed using characters, digits and symbols or tokens such as mathematical symbols and punctuation marks. Alphanumerical information can be used to either specify identification or properties of an object.

Table 1 - Information level - Requirements for alphanumerical information

You find this table in the spreadsheet version “Harmony_2-2_EIR-BEP_V1”, “tab EIR_LOIN”

Requirement [1]	ARC[2]	LAN [2]	STR [2]	PLU[2]	MEC[2]	ELE[2]	PS 4[3]	PS 5	PS 6	PS 7	PS 8	PS 9
Object type name	X	X	X	X	X	X	X	X	X	X	X	X
Object type descriptive name	X	X	X						X	X	X	X
Object occurrence name	X	X	X	X	X	X					X	X
Location system				X	X	X			X	X	X	X
System code	X	X	X	X	X	X		X	X	X	X	X
Process Status Code (MMI)	X	X	X	X	X	X	X	X	X	X	X	X
Duplicate object	X	X	X	X	X	X		X	X	X	X	X
External	X	X	X						X	X	X	X
Fire rating	X	X	X						X	X	X	X
Acoustical property	X	X							X	X	X	X
U-value	X	X							X	X	X	X
Load-bearing			X						X	X	X	X

[1] Requirements are explained in the table below, 2.1.1 Explanation of requirements for alphanumerical information.

[2] ARC = Architectural, LAN = Landscape architectural, STR = Structural engineering, PLU = Plumbing Engineering, MEC = Mechanical engineering, ELE = Electrical engineering

[3] PS = Project Stage. The project stages refer to ISO 29481-1 as a common reference. Read more in clause 3.3 Project stages.

[4] Applies only to elements with Pset_XxxCommon. XxxCommon indicates that requirements for the property are found on property sets for specific object classes, e.g. IfcWallCommon. Xxx is used to indicate that it applies to several object classes, e.g. columns, beams, walls, decks, doors, windows etc.

2.5 Explanation of requirements for alphanumerical information

This table explains the requirements for alphanumerical information specified in table 1. The information shall be exchanged in a standardized and consistent manner and shall be quality assured.

2.5.1 Object type name

Identifies the type of the element. Identification of type is important for cost analysis, building specification, linking to product documentation etc.
Name is specified as an attribute of IfcRoot.
Elements are the common term for all object classes that represent physical building objects. e.g. pillar, staircase, pump and lamp.
Ideally the name is allocated on the entity's object type. However, some authoring tools use Name on the object type for other purposes. In that case it may be necessary to allocate the object type name on the object occurrence.
The object type name is specified using IfcRoot.Name on the object's type.

2.5.2 Object type descriptive name

Descriptive names are used e.g. by calculator and description manager to understand what the object is.
For technical disciplines: If the object type code is enough to indicate the object, this is not needed.
The object type name is specified using IfcRoot.Description on the object's type.

2.5.3 Object occurrence name

Identification code for the element's occurrence. This information is necessary for document information specifically for the separate occurrence of the object. This is typically a component class code followed by a serialized number.
The object type name is specified using IfcRoot.Name on the object's instance level.

2.5.5 Location of (technical) system

This is a project specific code communicating the location of the primary system. This usually applies to technical systems, but is can also apply to grouping building components into a functional system e.g. "building envelope". The code is not supported by IFC. It requires a userdefined property set and property. E.g. EUHARM_Reference[1]_RefPriSysLoc

2.5.6 System code

The code of the primary system that the object belongs to. This is important to communicate the objects relation to a system. This usually applies to technical systems, but is can also apply to grouping building components into a functional system e.g. "building envelope". The code is not supported by IFC. It requires a userdefined property set and property. E.g. EUHARM_Reference.RefPriSysOcc

[1] According to recommended rule for user-defined properties. User-defined properties in addition to the IFC standard shall have a user-defined property set. User-defined property sets should have prefix starting with country code followed by a code signifying the author of the property set and property E.g. EU for common European and HARM for openBIM Harmony. The property should be in English and be logically readable without being too long.

2.5.7 Process Status Code (MMI)
A code communicating the model's maturity, on object level, according to the project's decisions and QA processes. The code is not supported by IFC. It requires a userdefined property. E.g. EUHARM_Process.ProcessStatus.

2.5.8 Duplicate object
The code communicates that another discipline is responsible for the object. The object is included in the model to show appearance, location or the like, but technical information about the object is described in the model to the discipline responsible. The value for the property is filled in with the discipline abbreviation of the discipline responsible for the object, for example ARC, STR, PLU, MEC, ELE, LAN, etc. The code is not supported by IFC. It requires a userdefined property. E.g. EUHARM_Process.DuplicateOwnedBy

2.5.9 External
Specifies if an element is part of the building envelope/outside a construction or if it is internal. The property is specified using the Common property set available for the object class Pset_XxxCommon.IsExternal (the Xxx is a placeholder for the object class e.g. Pset_WallCommon or Pset_DoorCommon).

2.5.10 Fire rating
Fire rating refers to how well a material, component or building part resists fire or limits the spread of flames and smoke. Applies typically to enclosing element classes such as wall, slabs, windows, doors etc. Fire rating is indicated in accordance with the national fire safety classification. The property is specified using the Common property set available for the object class Pset_XxxCommon.FireRating

2.5.11 Acoustical property
The property indicates the sound transmission resistance of this object using an index value (rather than providing full sound absorption values). It is specified in accordance with national building regulations. The property is specified using the Common property set available for the object class Pset_XxxCommon.AcousticRating

2.5.12 U-value
Heat transfer coefficient, often called U-value, is a measure of how well a building part, such as a wall, a window or a roof, insulates against heat loss. The U-value is measured in W/m²K (watts per square meter per degree Kelvin). Applies typically to element classes that are part of the building envelopes. The property is specified using the Common property set available for the object class Pset_XxxCommon.ThermalTransmittance

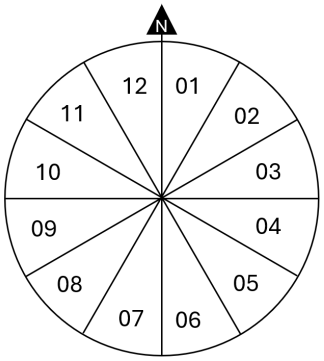
2.5.13 Load-bearing
Indicates whether the object is intended to carry loads (TRUE) or not (FALSE). Applies to element classes such as beams, columns, walls etc. The property is specified using the Common property set available for the object class Pset_XxxCommon.LoadBearing

3 Method for project information model (PIM)
The following applies unless otherwise explicitly agreed and approved by the Appointing Party.

Table 2 – Method for project information model

You find this table in the spreadsheet version “Harmony_2-2_EIR-BEP”, tab “EIR_IPMP” (Project’s Information Production Methods and Procedures)

No.	Requirement	Description
1	IFC standard	Requirements apply to IFC4 and later versions. Models must be exported to the agreed version of IFC and object classes, attributes and properties must follow the IFC standard. The project must use the agreed version of the IFC standard for object classes, attributes and properties. Custom attributes and properties should only be established if the agreed version of the IFC standard does not meet needs.
2	Georeferencing	EPSG and no rotation of model relative to map. Common local project point of origin
3	Local point of origin	A common local point of origin must be used for all discipline models. The model should be in the first quadrant relative to the zero point to avoid negative numbers, which some modeling software can have problems with. The model should be placed at a distance from the zero point, so that all the model's parts are in the first quadrant. For object representing local point of origin se No. 10 in this table.
4	Gross area	A space object specifying the building story gross area(s).
5	SI units	SI units must be used.
6	Simplified model objects	Where model objects/discipline models are particularly detailed, beyond what is necessary for interdisciplinary planning and this weighs down the performance of assembled models, the appointing party can demand the delivery of a simplified model that is used for assembly purposes. This is perceived as part of the delivery offered. Simplified models for special analysis purposes, e.g. energy analysis, must be agreed at the conclusion of the agreement or is to be understood as an additional delivery.
7	Horizontal division of room areas	Rooms that extend over several floors must have a separate room object for each floor.
8	System affinity	Apply to technical disciplines. Objects belonging to the same system must be grouped in the same system. Either in IfcSystem or a relevant subcategory of IfcSystem.
9	Predefined subtypes	Use the IFC standard's subdivision of object classes where applicable to specify class and subclass. E.g. IfcCovering:FLOORING where Flooring is a predefined subtype of coverings specifying that the object represents a flooring.
10	Local point of origin and control objects	Local point of origin objects must be established, which lies in the local point of origin coordinate, so that it is possible to visually check that all models are correctly positioned. Two control points object must also be established to ensure that models are not rotated. Coordinates of local point of origin and control objects are documented in Part 3.1 BIM Execution Plan, clause Both zero point objects and control point objects must be represented by a "pie slice". The size of the “pie slice” should be such that it is clearly visible when looking at the entire model including the zero point and control objects on the screen. The bottom of the pie is at Z=0.

		Each discipline gets a “pie slice” of 30 degrees. Starting in the 1st quadrant: 01 ARK 0-30 degrees 02 LAN 30-60 degrees 03 STR 60-90 degrees 04 PLU 90-120 degrees 05 MEC 120-150 degrees 06 ELE 150-180 degrees 07 NN 180-210 degrees 08 NN 210-240 degrees 09 NN 240-270 degrees 10 NN 270-300 degrees 11 NN 300-330 degrees 12 NN 330-360 degrees  NN = Discipline not specified. If more than 12 disciplines are needed, 12 additional pie slices can be established below these. The top of the pie slice is at height Z=0. Both zero point objects and control point objects must be represented by a "pie slice" from each designing discipline. The size of the pie slice should be such that it is clearly visible when looking at the entire model including the zero point and control objects on the screen. Local point of origin and control objects is recommended as IFC entities IfcAnnotationTypeEnum:SURVEY

4 The project's information standard

4.1 General

Information shall be produced in line with the project’s information standard to ensure successful exchange with other technologies, using open data formats where possible.

4.2 Spatial Breakdown Structure

Information is delivered according to the model breakdown that follows EN ISO 16739 IFC. Storey (IfcBuildingStorey) will not normally be used in infrastructure projects. In construction, the model must relate to the project's common floor specification.
All disciplines shall use the same information for each attribute. Information about values is provided by the client.

Table 3 – Spatial Breakdown Structure
You find this table in the spreadsheet version “Harmony_2-2_EIR-BEP”, tab “EIR_IS” (Information Standard)

Entity	Entity IFC	Identification	Identification attribute	Description
Project	IfcProject	Project number	Name	Identified with appointing party's project number
		Project name	LongName	Identified with appointing party's project name.
Site	IfcSite	Cadastral number	LandTitleNumber	Identified with cadastral number
		Site numer	Name	Identified with appointing party's site number
		Site name	LongName	Identified with appointing party's site name
Building	IfcBuilding	Building number	Name	Identified with appointing party's building number
		Building name	LongName	Identified with appointing party's building name
Building storey	IfcBuildingStorey	Building storey number	Name	Identified with appointing party's building story number
		Building storey name	LongName	Identified with appointing party's building story name
Space	IfcSpace	Space number	LongName	Identified with space number during building operation
		Space name	Description	Identified with appointing party's/user organization's space name
		Space function number	Name	Identified with appointing party's/user organization's space function number

4.3 Naming conventions

4.3.1 Naming of model files and metadata

Model files must be named and specified with relevant metadata. See “Part 2.3 Common Data Environment”.

4.3.2 Naming of building storeys

The Lead Appointed Party must establish a system for naming floors in collaboration with the Appointing Party and other stakeholders, including the user representative and the authorities.

5 The project’s information production methods and procedures

5.1 General

The project's information production methods and procedures describe the details of how information is to be produced, processed and transferred throughout the project, to ensure effective communication and coordination between all parties involved.

5.3 Routines

5.3.1 Interdisciplinary coordination and model control

The Lead Appointed Party must establish and maintain routines for interdisciplinary quality assurance of models so that the quality of models complies with Exchange Information Requirements and that deviations are found and corrected.
Interdisciplinary quality assurance must be carried out on an ongoing basis as part of the exchange and coordination of models. Quality assurance must cover all models in the project, including design subcontractors.
Interdisciplinary quality assurance must also include final control in connection with the completion and handover of the project phase. This must include written documentation of the control carried out with a report from the model check and a complete checklist from the responsible disciplines.
Routines for interdisciplinary coordination and model control are made available for the project and are referred to from the BIM Execution Plan.

5.3.2 Process Status Coding

The appointed party must code objects to communicate maturity and suitability for use. The Lead Appointed Party must establish a system for this, make it available in the project and integrate it in interdisciplinary coordination and model control.
The Lead Appointed Party clarifies which codes are to be used and shares this with all relevant actors in the project.

5.3.3 Revision and version control

The Lead Appointed Party must establish a procedure for handling changes, revision, approval and distribution of information to ensure that information is in accordance with the project's requirements before distribution and that there is no doubt about the current revision. P procedure must include:

- Complementary and agreed description of steps in the procedure.
- Documentation of change history.
- Specification of approval roles and responsibilities.
- Methods for revision and distribution of updated files and models.

5.3.4 Training and skills development

The Lead Appointed Party must establish a plan for training project personnel what is to be delivered (EIR), how it is to be delivered (BEP). Everyone who must deliver on these requirements must be trained. This applies both at the start of the project and when bringing in new resources during the project implementation.
The plan must also include systematic evaluation of procedures and regular updating of knowledge about current procedures and tools.

5.3.5 Security Procedures

The Lead Appointed Party must establish a description of security procedures to ensure that the information is handled in a secure manner throughout the project's life cycle. Proactive measures must be taken to prevent unauthorized access to information.

6 Project's information protocol

Legal aspects related to information are regulated in contract standards for consulting and construction. However, the parties should ensure that the following topics are adequately addressed:

- Rights to use information
- Responsibility for information being correct
- Responsibility for information automatically generated by authoring tools
- Liability for use beyond the model's purpose
- Responsibility for storage during and after the project
- Ranking of contract documents (models, drawings, specifications) and relations between them.
- Common Data Environment (CDE).
- Change, revision and version management

7 Generic project stages

This framework uses the project stages from ISO 29481-1, Annex C as a common reference. For adaptation to a national context, use national project stage standard. Such an adaptation may include collapsing or splitting of stages in the reference table. Please note that any such changes may affect requirements in clause 2.4 Requirements for alphanumerical information.

Table 4 – Generic project stages ISO 29481-1 Annex C

Principal stage name	Stage No.	Stage name	Description
Inception	0	Portfolio requirements	Establish the need for a project to satisfy the client's business requirement
Brief	1	Conception of need	Identify potential solutions to the need and plan for feasibility
	2	Outline feasibility	Examine the feasibility of options presented in phase 1 and decide which of these should be considered for substantive feasibility
	3	Substantive feasibility	Gain financial approval
Design	4	Outline conceptual design	Identify major design elements based on the options presented
	5	Full conceptual design	Conceptual design and all deliverables ready for detailed planning approval
	6	Coordinated design (and procurement)	Fix all major design elements to allow the project to proceed. Gain full financial approval for the project
Production	7	Production Information	Finalize all major deliverables and proceed to construction.
	8	Construction	Produce a product that satisfies all client requirements. Handover the building as planned.
Maintenance	9	Operation and maintenance	Operate and maintain the product effectively and efficiently.

Demolition	10	Disposal	Decommission, dismantle and dispose of the components of the project and the project itself according to environmental and health/safety rules

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PART 2.3 COMMON DATA ENVIRONMENT

BUILDINGS

Contents

1 Common Data Environment

This guideline is primarily aimed at appointing parties and owners and those who will support the appointing party in getting the common data environment to work.
A common data environment is a system of one or more solutions that make it possible to exchange information, process issue management and handle information according to agreed use cases. A common data environment is essential for effective information exchange and collaboration.
The client should establish a common data environment from the start of the project so that all actors can work together on the same platform throughout the entire project period. Clients should acquire a common system for a common data environment so that all projects can be serviced and followed up as equally as possible.
The Common data environment is not limited to project implementation. The Common data environment also includes the management of information during the building's lifetime.
Requirements for the functionality of a common data environment in project implementation and management are different and often consist of different solutions. However, the most seamless transfer of information from project to administration should be ensured.
This guideline focuses on a common data environment for the project phase up to and including handover to administration.
This guideline relates to the requirements of EN ISO 19650-1.

2 Functionality

A common data environment is a broad term that can encompass everything from simple exchange of files to a complex system of solutions with many different functionalities that support project start-up, project implementation, transfer to operation and management of information models. This guideline recommends a minimum level of functionality that supports the recommended purposes of BIM as described in Part 2 Appointing Party's basis for BIM. The minimum recommended functionality for handling models and model information is:

- Exchange of information - It must be possible to exchange information either in the form of files or a model database. Information includes both model information and other information in the information model, including any room and equipment databases, document management, maps and more. Simultaneity in exchange of models
- Manage metadata – It should be possible to get information about information containers. See clause 4 - Recommended Metadata for Information containers in a common data environment
- Version History – Access the latest revision as well as older versions.
- Machine-interpretable requirements format - Read machine-interpretable format for BIM requirements IDS (possibly mvdXML)
- Deviations in models - Finding deviations in models according to requirements for machine-interpretable format.
- Deviation reporting - Report deviations in open BCF format integrated with modeling software for seamless communication with designers. Concurrency in exchange of BCF (API)
- Project dashboard - Report information from models to the project dashboard for management data.

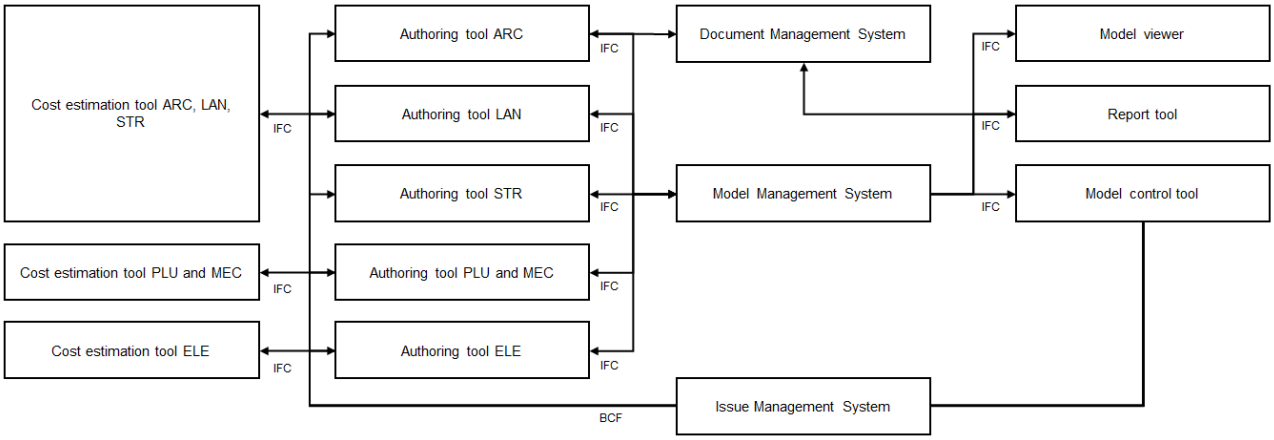

Figure 1 - Schematic concept of a common data environment

This list does not describe the applications of individual subjects or the need for integration into a common data environment, e.g. with plugins or APIs.
Future information exchange will change in the direction to be based to a greater extent on shared databases and exchange with API.

3 Rules for changing the status of information containers

3.1 General

EN ISO 19650 uses the term information containers to describe all types of digital information exchange. It can be files, it can be changes in model server, it can be API search etc. Regardless of how the project exchanges model information, it is relevant to indicate the condition or status of the information.
The ISO standard calls the different levels of information condition. In everyday speech, it is often called status. This should not be mixed with status setting at object level. The different conditions are:

- Work in progress – Typically when a solution is sketched or designed that is not sufficiently mature or quality assured to be shared with the other design disciplines.
- Shared – Typically when a model is shared with other engineering disciplines to be coordinated with their models.
- Published – It can e.g. be that models are interdisciplinary coordinated and quality assured and shared with contractors or subcontractors. Completed does not necessarily mean that the project is finished, but that the subject has come as far as they can.
- Archived – The information has been handed over to information management and satisfies the requirements for these.

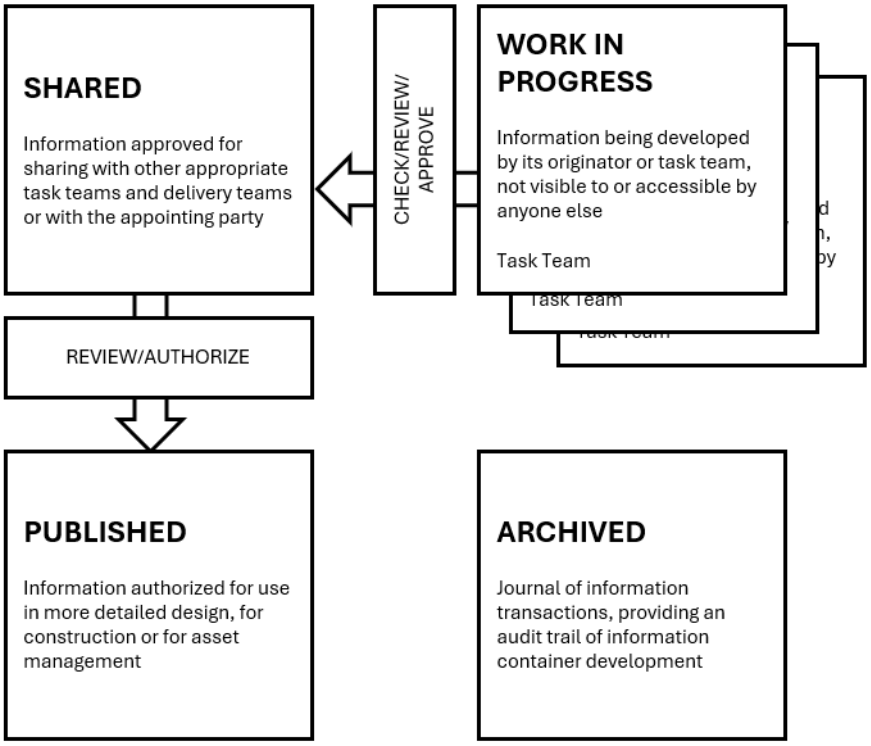

Figure 2 - Different levels of information containers

The following requirements and quality assurance processes ensure that information containers in a common data environment change status in a controlled and documented manner, and meet the necessary standards and quality requirements.
To ensure that information containers (e.g. files, models, documents) in a common data environment change state from "Working" to "Shared", "Published" and "Archived", clear criteria and requirements for quality assurance should be established. Here are the recommended minimum requirements for each state change:

3.2 From "Work in progress" to "Shared"

Quality control

- Discipline approval must be carried out with self-check and peer check to ensure that the information is accurate and consistent.
- Requirements for quality control:
  - The model must represent agreed progress and a basis for decision-making.
  - The model must comply with the requirements for the model at the given time in the project.
  - The file format and structure conform to the defined standards (e.g. IFC, GML, XML)
  - Models must be correctly geolocated and set in the correct coordinate system.
  - Models must be made available in common areas to exchange shared information.

3.3 From "Shared" to "Published"

External verification

- Discipline and cross-disciplinary approval must be carried out with self-check, peer review and interdisciplinary check to ensure that the information is accurate and consistent. Some subjects also require third-party verification.
- Requirements for quality control. In addition to requirements for quality control for "In progress" to "Shared", it applies that:
    - All deviations and corrections of changes from shared phases have been addressed and implemented.
    - Projected material must comply with the Planning and Building Act, local regulations and the project's building programme.
    - Final approval from the project manager or other superior authority.
    - Documentation of the final approval process with necessary signatures or digital confirmations.
    - Save the reports as attachments to the information container.
    - Models must be made available in common areas for senders and receivers of completed information.

3.4 To "Archived"

Completeness check

- Discipline approval must be carried out with a self-check and a peer check that confirms that the information container is complete and that all necessary data and documents, including the current version of the EIR and BEP, are included.
- Requirements for quality control:
    - Check that there have been no changes to the information since the last approval.
    - Models must be cleaned for:
        - Drafts, copies and alternative solutions
        - External references
    - Proprietary models must be able to be opened in the same version as without the use of special third-party software, plug-ins and add-ons.
- Ensure that any associated documents or references are correct and accessible.
- Ensure that all required metadata is provided and correct.
- Add relevant archive metadata for future reference.
- Implement the information management archiving process that includes transferring the information container to a secure, long-term storage medium.
- Adjust access rights to limit changes and access to authorized people only. Ensure that archived data is protected against unauthorized access and changes.

4 Checklist requirements for a common data environment

This checklist will ensure that the common data environment implemented in the project is in line with best practice and standards and ensures efficient data handling, communication and security throughout the project's life cycle.

4.1 Availability and user access

- Ability to manage users, assign and revoke access rights.
- Control over who has access to specific data, files and information.
- Defined roles and responsibilities with customized access levels.
- Secure methods of authentication (eg two-factor authentication).

4.2 Data security

- The data must be securely stored and be able to be restored in the event of loss.
- Data must be encrypted both during transmission and during storage.
- Regular backups and a clear data recovery plan.
- Logging of all activities (who has done what and when).

4.3 Compliance with the project's information standard and requirements for a common data environment

- Support for standardized metadata, file naming conventions, and classification systems.
- Built-in processes for reviewing, approving and sharing documents according to the four states (work in progress, shared, published, archived).
- Checking that information delivered to the project complies with the requirements specifications.

4.4 Document management and version control

- The system must support version control to keep track of changes to files and documents.
- Ability to track revisions and changes over time as well as access previous versions of information containers.
- Users should be notified of changes to documents or project information.
- Easy to share documents with the right recipients in the project.

4.5 Cooperation and communication

- The system must support real-time editing or shared documents for seamless collaboration.
- Built-in tools for commenting, tagging and giving feedback on files.
- Messaging system that enables project groups to communicate directly in a common data environment.

4.6 Integration and compatibility

- The system must be able to be integrated with other BIM tools and support open formats such as IFC.
- Possibility of integration with external systems and software via APIs.
- Cross-platform compatibility. Information management must work on different devices (PC, tablet, mobile) and browsers.

4.7 User training and support

- User manual, tutorials and FAQs available.
- The system should have customer support available for questions and technical problems.

- User training with an offer of training resources or courses for effective use of a common data environment.

4.8 Performance and scalability

- The system must be able to handle large amounts of data efficiently without significant delays.
- The common data environment must be scalable to adapt to both small and large projects.

4.9 Compliance with laws and regulations

- The common data environment must comply with the requirements for privacy and data security according to GDPR and other relevant laws.
- The system must support national standards, e.g. NS 8360 in Norway.

4.10 Updates and maintenance

- The system should be updated with security and functional improvements regularly.
- The common data environment must be stable and have minimal downtime, with planned maintenance well announced.

5 Naming of information containers

5.1 Generally

It is recommended to use a standardized naming convention to contribute to better organization, easier retrieval of files and reduced risk of confusion and errors in construction projects. The following proposal is primarily meant for countries/projects without an established standard for file naming.

5.2 Syntax

Many appointing parties have their own information container name requirements. This framework recommends the following syntax for clients/projects that does not have such established naming conventions:

Bold text = Mandatory
Italic text = Voluntarily

5.2.1 Project stage

In the project phase, it is not desirable to have the project number in the file name. Project name is only provided as metadata. The project name does not provide much value in the file name since all documents start with the same name. In some user interfaces, such as mobile applications it can be a problem that you only see the project name on all files.

Syntax project stage:
[**Building/Construction code**]_[**Construction subdivision code**]_[**Discipline code**]_[**Building element classification**]_[**Document type**]_*[Building Storey]_[Zone]_[Serial number]*

Example: **12345_A_ARC_230_110**_*03_XX_XXX (X means no value in the field)*

5.2.2 Facility Management stage

Facility Managers who have more than one building to manage should add the property number to the file name to be able to distinguish between different properties.

Syntax Facility Management stage:
[**Property code**]_[**Building/Construction code**]_[**Construction subdivision code**]_[[**Discipline code**]_[**Building element classification**]_[**Document type**]_*[Building Storey]_[Zone]_[Serial number]*

123456_12345_A_ARC_230_110_*03_XX_XXX (X means no value in the field)*

5.3 Revision and date as metadata

Information about e.g. version/revision and date shall only be handled as metadata. This is done because, in a common data environment, files are often linked to each other and/or various processes have been automated based on information container names. If models change names for each new revision, this must be set up again for each change.

5.4 The filename components

5.4.1 Project name and property name

Project number is only provided as metadata. Project number is provided by the appointing party. When using property name in the facility management. The property code is provided by the building owner.

5.4.2 Building/Construction code
A short code that identifies which building or area the model belongs to.
Example: B1 [=Building 1], A2 [Area 2].

5.4.3 Discipline code
A short code for the discipline to which the model belongs. It is recommended to use subject codes standardized at national level for a common understanding of these.

5.4.4 Building element
Indication of building element according to National classification.

5.4.5 Document type
Enter code for document type according to National classification.

5.4.6 Building story
If relevant for the building/construction. Use the code for the building storey according to National classification.

5.4.7 Zone
Enter code for zone. Codes are established by project.

5.4.8 Serial number
If there are several models in the project from the same subject and with the same type of content or subdivision, it may be appropriate to use serial numbers. This component is only used if there is a need to distinguish between several information containers from the same subject with the same content/subdivision.

5.5 Implementation and maintenance
- Specify guidelines that describe the naming convention in detail and distribute this to all project participants.
- Ensure training of all relevant resources so that they understand and follow the naming convention.
- Establish a system to check and approve file names before they are uploaded to the common data environment.
- Consider using software or scripts to automate the naming process where possible.

6 Recommended metadata for information containers in a common data environment

6.1 General

Metadata is essential to ensure that information containers are managed efficiently in a common data environment. They provide the necessary context, tracking and control over the information containers, enabling all parties involved to access the right information at the right time. This is crucial for achieving optimal interaction and project management.

6.2 General metadata

- Filename - Unique name of the information container.
- File Type - Format of the information container (e.g. IFC, RVT, DNG, DWG).
- File Size - The size of the file in megabytes (MB).
- Version - Version number or code to track changes.
- Creation Date - Date and time when the file was created.
- Last modification - Date and time of last modification.

6.3 Project-specific metadata

- Project name - Name of the project the file belongs to.
- Project number - Unique number that identifies the project.
- Client - Name of client.
- Appointed party - Name of the appointed party who is responsible for delivering the model.
- Project phase – Phase or main milestone to which the delivery applies.

6.4 BIM-specific metadata

- Model Name - Name of the specific model.
- Subject area - Subject discipline to which the model belongs (e.g. ARC, LAN, STR, PLU, MEC, ELE).
- Author - Name of the person or team who created or edited the model.
- Approved by - Name of the person who has approved the model.
- Status - Status of the model (Work in progress, Shared, Published and Archived).

6.5 Geographic metadata

- Coordination Reference System – Coordination reference system used in the model (e.g. EPSG:4326).
- Geolocation - GPS coordinates for the model's location.

6.6 Document handling metadata

- Document type - Type of document (e.g. drawing, report, model).
- Reference number - Unique number that identifies the document.
- Revision - Revision number or code for the document.
- Distribution list - List of people or entities that have received the document.

6.7 Security and Access metadata

- Access Level - What level of access is required to view or edit the file.
- Ownership - Name of the person or team that owns the file.
- Confidentiality Level - Level of confidentiality (e.g. public, internal, confidential).

6.8 Technical metadata

- Software - Software used to create or edit the file (e.g. Revit, ArchiCAD, Tekla).
- Software version - Version of the software used.
- File structure - Information about the file's internal structure, if relevant.

6.9 Metadata integration

- Links - Any links to other relevant documents or models.
- Relationships - Relationships to other information containers or project data.

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PART 3 – THE AGREEMENT PROCESS

GENERAL

Contents

Agreement on deliveries for and use of the model

1. The agreement process

1.1. General

This part provides guidance on how to agree what is to be delivered and how the models are to be used between the appointing party and the lead appointed party.

1.2. The overall process

The agreement process has three overall steps:

- The invitation to tender where the information delivery is specified in the exchange information requirements (EIR)
- The tender response by the potential lead appointed parties. Their response to the exchange information requirements ideally by describing approach and goals for the information delivery in the pre-appointment BIM execution plan (BEP) clauses 2 and 3.
- After the lead appointed party is chosen, they confirm their BIM execution plan.

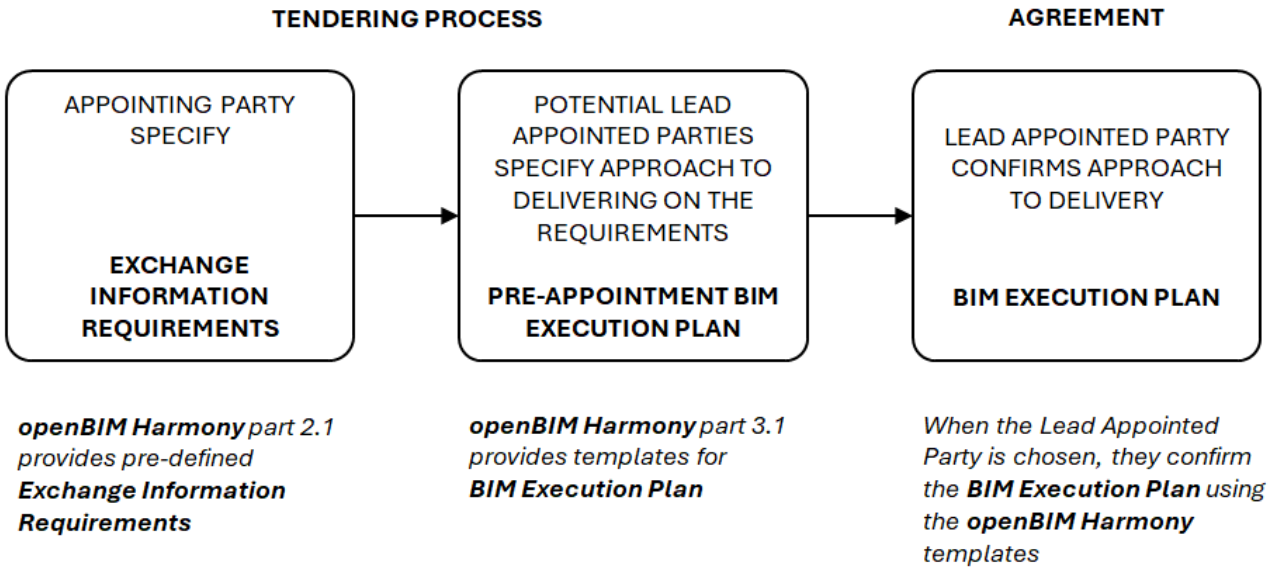

Figure 1 – The three overall steps of the agreement process

2. Weighting of response to Exchange Information Requirements (EIR)

The potential lead appointed parties' approach to delivering on the requirements can be weighed differently as part of the evaluation. If the appointing party has subcontracted a consultant to develop the EIR, the consultant should be involved in the evaluation of the pre-appointment BIM Execution Plan. Some responses may suggest different deliverables. Unless otherwise agreed the requirements in the appointing party's exchange information requirements applies regardless of the tender response. When evaluating the tender responses there are different ways to weigh the responses.

2.1. Qualification requirements

The requirement is absolute and if the tender response does not satisfy the requirements the potential lead appointing party disqualified. This approach can be chosen if the requirement is perceived as a condition for the project's successful execution.

2.2. Evaluation criteria

The response to the EIR is given points as part of a total score also considering e.g. cost. understanding of the delivery, resources offered etc. This approach can be chosen if the lead appointed party's ability to deliver on the requirement is an important part of the project.

2.3. Task understanding

The response is not given separate points. The response is assessed as a part of the potential lead appointed party’s overall understanding of the delivery. This approach is appropriate if the lead appointed party’s ability to deliver according to the EIR is important, but the appointing party has little experience in requiring BIM.

PLAN TEMPLATE

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PART 3.1 BIM EXECUTION PLAN

BUILDINGS

Contents

Explanation of color and type
Black text = Part of framework. Can be distributed as is.
Red text = Example. Shall be changed to project information before distribution
Red italic text = Guidance to fill out information. Shall be deleted before distribution

1. General

A BIM execution plan is a plan that describes how information is to be managed and exchanged in the project. BEP ensures that all parties agree on how the delivery team must deliver on the appointing party's Exchange Information Requirements and how BIM processes must be carried out, which promotes cooperation and efficiency. The lead appointed party's project manager is responsible for the BEP being drawn up. It is often created by the lead appointed party's BIM manager. Source: EN ISO 19650-2.

NB! Tables in clause 2 and 3 should be filled in as part of the offer.

2. BIM Execution Plan

2.1. General

The lead appointed party must respond to the request for information as described in Part 02-1 Exchange Information Requirements. The answer must be given in this BIM Execution Plan. If additional documentation is added to the response beyond this document, these must be referred to from here.

2.2. The delivery teams approach to meeting information requirements

Describe methods and solutions that meet requirements in an appropriate way. If the method and solution are described in a separate document, a brief description of this is written in the table below and a separate document is attached and referred to with a link here.

Table 1 - BIM Execution Plan - The delivery team's approach to meeting information requirements

You will find this table in the spreadsheet version in Harmony_02-2_EIR-BEP, tab EIR_LOIN

EIR Ref.	The delivery team's approach to meeting information requirements
EIR-01 Project overview	
EIR-02 Modelling and model-based interaction	
EIR-03 Interdisciplinary coordinated and controlled information	
EIR-04 Cost Estimation Information	
EIR-05 Production Information	
EIR-06 Completion and handover of Facility Management Information	

2.3. The delivery team goals for information delivery

Describe how to measure and document that requirements for information delivery have been met. The purpose of this is that the appointing party and the lead appointed party agree on the level and scope of the delivery. A description of what is perceived as complete delivery can clarify task understanding and provide an opportunity to clarify any misunderstandings before the project starts.

Table 2 - BIM Execution Plan - The delivery team's goals for information delivery

You will find this table in the spreadsheet version in Harmony_02-2_EIR-BEP, tab EIR_LOIN

EIR Ref.	**The delivery team's goals for information delivery**
EIR-01 Project overview	
EIR-02 Modelling and model-based interaction	
EIR-03 Interdisciplinary coordinated and controlled information	
EIR-04 Cost Estimation Information	
EIR-05 Production Information	
EIR-06 Completion and handover of Facility Management Information	

3. Common Data Environment (CDE)

Table 3 - Common Data Environment (CDE)

You will find this table in the spreadsheet version in Harmony_02-2_EIR-BEP, tab EIR-BEP_CDE

Purpose of solution	**Party responsible for solution**	**Software**		**Used on hardware** If relevant for performance or data security	**Responsible for cost**
More solutions are added as needed		**Software name**	**Versions**	**Specification**	**Role/function**
Provided by the Appointing Party					
Model Management System	Appointing party				
Document Management System	Appointing party				
Issue Management System	Appointing party				
Model viewer	Appointing party				
Document viewers	Appointing party				
Project dashboard	Appointing party				
Room program	Appointing party				
Model requirements (generates machine-interpretable description of model requirements, IDS format)	Appointing party				
Filled in by Lead Appointed Party					
Model development architecture	ARC				
Model development landscape architecture	LAN				
Model development of load-bearing constructions	STR				
Model development plumbing	PLU				
Model development mechanical	MEC				
Model development Electro	ELE				
Model check	Appointing party/ Delivery Team/ main contractor				
Communication of model deviations found in model check.	General contractor/ All named parties.				

Cost estimate Construction	ARC/STR/LAN				
Cost calculation plumbing	PLU				
Cost calculation mechanical	MEC				
Cost calculation electrical	ELE				
Cost estimate contractor construction	Main contractor				
Cost calculation contractor plumbing	Main contractor				
Cost calculation contractor mechanical	Main contractor				
Cost estimate contractor electrical	Main contractor				

NB! Tables in clauses 4 and 5 are completed in connection with the start of the project and are maintained on an ongoing basis when information is developed.

4. Responsibilities and routines

4.1. General

The Lead appointed party shall establish and implement routines to ensure adequate information management.

4.2. Interdisciplinary coordination and model control

Describe the routine for interdisciplinary coordination and model control

4.3. Process status coding

Establish and implement a routine for process status coding. Clarify which codes are to be used and share this with all relevant actors in the project.

4.4. Change, revision and version control

Describe the routine for handling changes, revision and version. This includes quality assurance, approval and distribution of information to ensure that information is in accordance with the project's requirements before distribution and that there is no doubt about the current revision. The routine includes:

- Complementary and agreed description of steps in the routine.
- Documentation of change history.
- Specification of approval roles and responsibilities.
- Methods for revision and distribution of updated files and models.

See this framework's part 2.2 Common Data Environment, clause 3.

4.5. Training and skills development

Describe the plan for training project personnel, what is to be delivered (EIR), how it is to be delivered (BEP). Everyone who must meet these requirements must be trained. This applies both at the start of the project and when bringing in new resources during the project implementation.
The plan must also include systematic evaluation of routines and regular updating of knowledge about current routines and tools.

4.6. Security routines

The lead appointed party must establish a description of security routines to ensure that the information is handled in a secure manner throughout the project's life cycle. Proactive measures must be taken to prevent unauthorized access to information.

5. Project Information Model setup

5.1. Project information

The appointing party provides the project information. This will be used as part of the spatial breakdown structure. In case the project includes more than one site and/or more than one building, expand the table with additional rows to specify all sites and buildings.
You will find the following tables in the spreadsheet version in “Harmony_2-2_EIR-BEP”, tab “BEP_Setup-PIM” (Setup Project Information Model)

Table 4 – Project information

Information type	Information *Information provided by the Appointing Party*
Project name	
Project number	
Site name	
Site number	
Building name	
Building number	

5.2. Map and elevation datum

The appointing party specifies which map and elevation datum to be utilized by the projects. All participants shall unless otherwise agreed use the same datum.

Table 5 – Map and elevation datum

Type	Requirement	Description/example
Map date	*Information provided by the Appointing Party*	*Enter map datum with EPSG code. Also state the appointed party of the map and date of map issue.*
Altitude datum	*Information provided by the Appointing Party*	*Enter the current altitude datum. E.g. NN2000 (Norwegian example)*
If more maps are used, more rows are added to the table.		

5.3. Specification of EPSG code in model

Specify the code that communicates map and height datum in the model.

Table 6 – Specification of EPSG Code in model

Entity	Attribute	Value	String
IfcProjectedCRS	Name	EPSG:xxxx	IfcProjectedCRS.Name:EPSG:XXXX
Example: EPSG:5950 (specifies ETRS89 / NTM zone 10 + NN2000 height).			

5.4. Specification of map's North in model

Correct angel in map is specified with the entity IfcMapConversion and the properties XAxisAbscissa and XaxisOrdinate.

Table 7 – Specification of map's North in model

IFC Entity	IFC Property	String	Value[1]
IfcMapConversion	XAxisAbscissa	IfcMapConversion.XAxis Abscissa:1	1
IfcMapConversion	XAxisOrdinate	IfcMapConversion.XAxis Ordinate:0	0
[1] Fixed values. If values deviate, the model is rotated which is not allowed.			

5.5. Specification of project's point of origin

Project's point of origin shall be specified in East, North and height. This is specified using the entity IfcMapConversion and the properties for the three dimensions.

Table 8 – Specification of project's point of origin

IFC Entity	IFC Property	String
IfcMapConversion	Eastings	IfcMapConversion.Eastings
IfcMapConversion	Northings	IfcMapConversion.Northings
IfcMapConversion	OrthogonalHeight	IfcMapConversion.OrthogonalHeight

5.6. Coordinates of local point of origin and control objects

All disciplines shall use the same common point of origin.

Table 9 – Coordinates of local point of origin and control objects

Map base	Description		
Local point of origin in map	X (E):	Y (N):	Z (H):
Rotation relative to north	Model rotation is not permitted. Rotation should only be done in model view.		
Angle and direction of rotation of model view.			
Control object 1	X (E):	Y (N):	Z (H):
Control object 2	X (E):	Y (N):	Z (H):

5.7. Building storeys

All disciplines shall use the same level settings. Specify the project's common building storeys here.

Table 10 – Building Storeys

Floor name	Level height	Reference point	Unit
Rooftop			Centimeters
Floor 9			Centimeters
Floor 8			Centimeters
Floor 7			Centimeters
Floor 6			Centimeters
Floor 5			Centimeters
Floor 4			Centimeters
Floor 3			Centimeters
Floor 2			Centimeters
Entrance floor 1			Centimeters
Lower floor -1			Centimeters
Lower floor -2			Centimeters

5.8. Active proprietary models

Fill in information about active proprietary models. This is important to communicate the totality of the information. Active models are models describing (a part of) the construction.

Table 11 - Active proprietary models

Discipline *E.g. ARC LAN, STR, PLU, MEC, ELE etc.*	**Model** *Briefly describe what the model includes. E.g. building, building part etc.*	**Name proprietary model** *The name of the file including extension e.g. rvt, dgn, etc.*	**Date** *DD.MM.YYYY*

5.9. Active IFC models

Fill in information about active proprietary models. This is important to communicate the totality of the information. Active models are models describing (a part of) the construction.

Table 12 - Active IFC models

Discipline *E.g. ARC LAN, STR, PLU, MEC, ELE etc.*	**Model** *Briefly describe what the model includes. E.g. building, building part etc.*	**Name IFC** *The name of the file including format ifc*	**Date** *DD.MM.YYYY*