SLOVENSKI STANDARD
SIST-TP CEN/TR 17654:2021

01-oktober-2021

Smernica za izvajanje načrtov za izvedbo BIM-pristopa (BEP) in informacijskih zahtev naročnika (EIR) na evropski ravni na podlagi EN ISO 19650-1 in EN ISO 19650-2

Guideline for the implementation of BIM Execution Plans (BEP) and Exchange Information Requirements (EIR) on European level based on EN ISO 19650-1 and -2

Leitfaden für die Implementierung von BIM-Ausführungsplänen (BEP, en: BIM Execution Plan) und Austausch-Informationsanforderungen (EIR, en: Exchange Information Requirement) auf europäischer Ebene auf EN ISO 19650-1 und -2 basierend

Ta slovenski standard je istoveten z: **CEN/TR 17654:2021**

ICS:

35.240.67	Uporabniške rešitve IT v gradbeništvu	IT applications in building and construction industry
91.010.01	Gradbeništvo na splošno	Construction industry in general

SIST-TP CEN/TR 17654:2021 en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 17654

July 2021

ICS 35.240.67; 91.010.01

English Version

Guideline for the implementation of Exchange Information Requirements (EIR) and BIM Execution Plans (BEP) on European level based on EN ISO 19650-1 and -2

Guide pour la mise en œuvre des exigences en matière d'échange d'informations (EIR) et de plans d'exécution BIM (BEP) au niveau européen sur la base des normes EN ISO 19650-1 et 2

Leitfaden für die Implementierung von BIM-Ausführungsplänen (BEP, en: BIM Execution Plan) und Austausch-Informationsanforderungen (EIR, en: Exchange Information Requirement) auf europäischer Ebene auf EN ISO 19650-1 und -2 basierend

This Technical Report was approved by CEN on 30 May 2021. It has been drawn up by the Technical Committee CEN/TC 442.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

iTeh STANDARD PREVIEW

(standards.iteh.ai)

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. CEN/TR 17654:2021 E

Contents

Page

European foreword

This document (CEN/TR 17654:2021) has been prepared by Technical Committee CEN/TC 442 "Building Information Modelling", the secretariat of which is held by SN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

CEN/TR 17654:2021 (E)

Introduction

Reference to EN ISO 19650-1, EN ISO 19650-2 and CEN/TR 17439.

This document aims at applicability across Europe, and provides, especially with regard to the attached template in Annex A, a lowest common denominator to help responsible parties to capture and deliver the most relevant information.

Qualified technical decisions are only possible based on quality-ensured information. The conversion of the project specific needs for information into technical-formal information requirements is a complex task that requires special skills and needs experience and a standardized procedure. The tendering of data can be carried out, as described in this guideline, in the form of exchange information requirements (EIR).

Another central aspect of BIM according to EN ISO 19650-1 and EN ISO 19650-2 is collaborative work. Early and regular sharing of work, sharing and using information as opposed to files or "electronic paper" are core elements of BIM and enable the often experienced and described benefits of better communication, coordination, efficiency, transparency and control. The conventions, processes, rules and technical support required for this are referenced in the BIM execution plan (BEP) and form the backbone of information creation.

All exemplary templates in Annex A and examples of use in Annex B can be adapted, either due to specific requirements of an organization or region. National bodies can develop complementary national annexes and guidance to EN ISO 19650-2 based on this document.

1 Scope

This document deals with the processes involved in the procurement and delivery of information to planning and construction projects, specifically with exchange information requirement (EIR) and BIM execution plan (BEP), considering the administrative processes. This document takes into account international standards and specifications as well as recommended practice.

This document is relevant for all parties involved in the tendering of information deliverables. Including both those that require and those that deliver the information. The required information can be relevant for all processes in the life cycle such as design, construction, operation and maintenance and end-of-life processes. It applies above all to e.g. client, asset owners/operators, architects, engineer, contractors, subcontractors etc.

This document provides methodology to appointing parties on how to require and agree the right amount, quality and level of information needs.

It is also important for appointed parties to be able to assess the quality of existing EIRs and identify possible over-specification or gaps. Based on this, it is possible to estimate and calculate the necessary effort for data creation.

This document operationalizes the tendering and appointment process of information deliverables as specified in EN ISO 19650-2:2018. This document does not cover all clauses of EN ISO 19650-2:2018. Its main goal is to provide template examples and guidance for all activities conditioning specification of requirements and deliverables in the production of exchange information requirements and BIM execution plan. Specifically, it covers the "shall" and "shall consider" requirements in EN ISO 19650-2:2018, 5.2.1 (EIR), 5.3.2 (pre-appointment BEP) and 5.4.1 (confirmed BEP). For specification of Scope and out of scope see Table 1 (see Annex A for which part of EN ISO 19650-2:2018 is supported by templates).

CEN/TR 17654:2021 (E)

Table 1 — Scope of documentation covered in this document according to EN ISO 19650-2:2018 clause reference

	Invitation to tender EIR	Tender response pre-appointment BEP	Appointment BEP
In scope	5.2.1 Appointing party's exchange information requirements a) information requirement b) level of information need c) acceptance criteria d) supporting information e) information delivery dates	5.3.2 Delivery team's (pre-appointment) BIM execution plan a) information management functions b) information delivery strategy c) federation strategy d) high-level responsibility matrix e) project's information production methods and procedures f) project's information standard g) schedule of software	5.4.1 Confirm the delivery team's BIM execution plan 5.4.3 lead appointed party's exchange information requirements
Out of scope	5.2.4 Invitation to tender information – the relevant reference information and shared resources (within the project's common data environment) – the tender response requirements and evaluation criteria (if applicable) – the project's information standard and (within the project's common data environment) – the project's information production methods and procedure (within the project's common data environment) – the project's information protocol	5.3.7 The delivery team's tender response – capability and capacity assessment summary – mobilization plan – information delivery risk assessment	5.4.6 Lead appointed party's appointment documents 5.4.7 Appointed party's appointment documents

iTeh STANDARD PREVIEW
(standards.iteh.ai)

	Invitation to tender EIR	Tender response pre-appointment BEP	Appointment BEP
Out of scope although included in Annexes	5.1.4 Project's information standard examples in Annex D in this document		5.4.2 Delivery team's detailed responsibility matrix 5.4.4 Task information delivery plan(s) 5.4.5 Master information delivery plan

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 17412-1:2020, *Building Information Modelling - Level of Information Need - Part 1: Concepts and principles*

EN ISO 19650-1:2018, *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 1: Concepts and principles (ISO 19650-1:2018)*

EN ISO 19650-2:2018, *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 2: Delivery phase of the assets (ISO 19650-2:2018)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply: the terms and definitions given in EN ISO 19650-1:2018, EN ISO 19650-2:2018.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 General

4.1 The tendering process of information delivery

The workflow for appointing information deliverables as described in EN ISO 19650-2:2018 is as follows (see Figure 1):

1) Invitation to tender.

2) Tender response.

3) Appointment.

CEN/TR 17654:2021 (E)

4.2 Invitation to tender

The appointing party establishes exchange information requirements (EIR) for each lead appointed party appointment, considering, where appropriate, the organizational information requirements (OIR), asset information requirements (AIR) and project's information requirements (PIR) (see EN ISO 19650-1:2018, 5.1, Figure 2 and explanations in EN ISO 19650-1:2018, 5.2 to 5.7). The requirements for the EIR are specified in EN ISO 19650-2:2018, 5.2.1. An EIR is made available for all prospective lead appointed parties being invited to tender for an appointment.

4.3 Tender response

The prospective lead appointed parties respond to the EIR with a BIM execution plan (pre-appointment). The minimal requirements to the pre-appointment BIM execution plan are specified in EN ISO 19650-2:2018, 5.3.2.

4.4 Appointment

When the lead appointed party is selected, the lead appointed party confirms the BIM execution plan and provides a defined set of information about the execution of the deliverables within the scope of their appointment. The minimal requirements to the appointment BIM execution plan are specified in EN ISO 19650-2:2018, 5.4. The detailing of the (pre-appointment) BIM execution plan depends on the project specific tendering process. If more than one lead appointed party is appointed, the collaborative aspects of the BIM execution plan cannot always be specified prior to appointment. It should be amended in the master information delivery plan (MIDP) and the task information delivery plan (TIDP) as part of the process establishing the appointment.

NOTE 1   The project team can include one or more lead appointed parties.

NOTE 2   The lead appointed party represents one or more appointed parties. When the appointed only represents one appointed party they are usually the same company with two different functions.
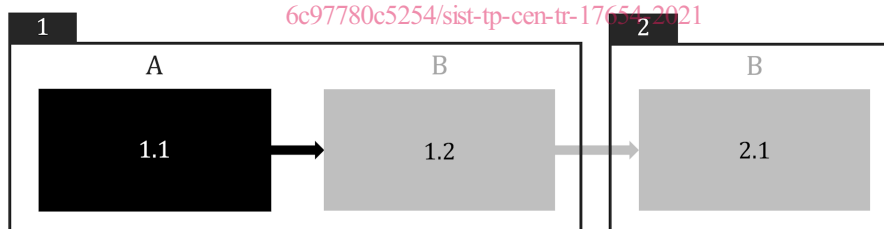
Key

1   tendering process – pre-appointment

1.1   invitation to tender, EIR, guidance in Clause 5

1.2   tender response, pre-appointment BEP, guidance in Clause 6

2   appointment

2.1   appointment, BEP, guidance in Clause 7

A   appointing party

B   lead appointed party

Figure 1 — The two responsible parties in the pre-appointment process

The shades (black and grey) of the parties in Figure 1 are also used in Annex B, example 2 template heading to signal whether the information should be provided by the appointing party or the lead appointed party. This is only as an example on graphical layout.

This document provides examples of templates supporting each set of information to be established by both the appointing party, lead appointed party and appointed parties. For examples on how to use this document, refer to Annex B.

5 Exchange information requirements (EIR)

5.1 General

This Clause provides guidance on how to provide required information, according to EN ISO 19650-2:2018, 5.2.1. See Table 2 for where to find information in EN ISO 19650-1, EN ISO 19650-2 in this document and in Annex A.

Table 2 — Mapping table for requirements in EN ISO 19650-2:2018, 5.2.1 and template examples in this document's Annex A

EN ISO 19650-1:2018, clauses	EN ISO 19650-2:2018, Clause 5.2.1	Clause in this document	Template number in Annex A
5.5 Exchange information requirements (EIR)	Information requirements	5.2	Table A.1 and Table A2
11.2 Level of information need	Level of information need	5.3	Table A.1
	Acceptance criteria	5.4	Table A.1
	Supporting information	5.5	Table A.1
	Information delivery dates	5.6	Table A.1

NOTE 1   The project team can include one or more lead appointed parties.

The appointing party establishes the exchange information requirements by listing all applicable information requirements for the specific appointment. The exchange information requirements are provided to the potential lead appointed parties.

5.2 Information requirements

The information requirements can state what, when, how produced, and for whom the information is needed. The information requirements are organizational (OIR), asset (AIR) or project (PIR) and exchange (EIR) information requirements. It is recommended that the OIR, AIR or PIR, that the EIR is derived from, are also included in the invitation to tender sent to each prospective lead appointed party, but this is not mandatory.

Informing each lead appointed party why the information is needed will allow them to innovate in the method of information production and delivery for the appointing party's business needs. Stating what is needed helps each appointed party to focus on the deliverables that the appointing party knows they need.

Information requirements should be a description of the purpose for organizational objectives, operation of an asset or delivery of an asset. The information requirement should be referenced between the EIR and the OIR, AIR and PIR so they can be tracked in other project documentations e.g. BEP.

CEN/TR 17654:2021 (E)

For example, template on how information can be provided see Table A.1 and A.2. For project examples see Table B.1 and Table B.2, Figure B.2 and Figure B.3.

The "When" can be referenced to a trigger event or date based on the information delivery milestones (EN ISO 19650-2:2018, 5.1.3).

The "How" can be referenced to the project's information standard (EN ISO 19650-2:2018, 5.1.4) or the project's information production methods and procedures (EN ISO 19650-2:2018, 5.1.5).

EXAMPLE   At the start of operations, the end-user wants to know how to manage the new asset on a day by day basis. For more information on defining information requirements refer to EN 17412-1 and EN ISO 29481-1 format.

5.3 Level of information need

The level of information need is a framework which defines the extent and granularity of information. They should be defined by different concepts: geometrical information, alphanumerical information, and documentation.

Stating the level of information need helps the appointed party to produce only what is needed and saves time from over or underproduction of information.

Level of information need describes the quality, quantity, and granularity of the information delivery exchange during each appointment. This is to be done by describing first the purpose of the required information, when the information is required, by whom and to which object within the breakdown structure it is associated.

The project's information standard includes the method to assign the level of information need for the appointment (EN ISO 19650-2:2018, 5.1.4 c)).

The method of assignment the level of information need should follow the concepts and principles of EN 17412-1.

EXAMPLE   Geometrical information: For facility management purposes: Detail: a boiler can be simplified and reduced to a box including the volume of the operational space, Dimensionality: 3D, Location: Absolute, against a reference, Appearance: Cubic volume expressing the boilers outer dimensions and required access for connections and service access, Parametrical behaviour: None; Alphanumerical information: Identification: Type name, classification, codification, index, Information content: Type, power, capacity, connections etc.; Documentation: To get approval of proposed design solutions, e.g. with technical requirements.

A specification of level of information need according to EN 17412-1 will usually not fit into a template as the examples in Annex A. The level of information need can be specified in a separate documentation with reference in a table.

For more information on defining level of information need refer to EN ISO 19650-1:2018, 11.2, EN 17412-1 and CEN/TR 17439:2020, 6.7.

5.4 Acceptance criteria

5.4.1 General

The acceptance criteria are the conditions used to check that the information is delivered in the correct way, not that the contents of the information are correct. Failing to meet the predetermined conditions will lead to the information delivery being rejected.

Acceptance criteria can refer to but be more specific than the project's information standard, the project's information production methods and procedures and reference information or shared resources.

The acceptance criteria are used to ensure that deliverables are compliant with the information requirements.

5.4.2 Project's information standard

The project's information standard describes project-specific criteria to support the consistency and exchange of information required for the project. When establishing the project's information standard, the following should be considered: Requirements to level of information need, the use of open BIM standards, the means of structuring and classifying information, information formats needed for further use of information in later project phases and for asset operation etc.

These considerations ensure that meaningful, reliable and consistent data are provided by the project. This information is the basis for informed decision-making.

They should prescribe what is required for information exchanges, how information is structured and classified, how to assess if the information is to the correct level of information need, and how the information will be used in operation, including who will be using the information if this is known. The project's information standard should not specify the methodology for the production of project's information. All information should conform to the project's information standard before changing status in the CDE.

EXAMPLE   Acceptance criteria can be stated in the EIR or reference by URL to the documentation that defined the criteria. *LinearUnits: Millimetres, AreaUnits: Squaremetres, VolumeUnits: Cubicmetres, CurrencyUnit: Euros; URL link [Project Standard Units]*

For more information, refer to EN ISO 19650-1:2018, 11.3. Information quality and for a recommended practice for model, object naming and user-defined properties as part of appointing party's project's information standard see Annex D.

5.4.3 Project's information production methods and procedures

Project's information production methods and procedures define the approaches and techniques the appointed party uses to create, manage and approve information. This may include requirements to information exchange processes, data security management, quality assurance procedures and other use cases involving information exchanges etc. This may also include the security or distribution of information.

They should define the most effective and efficient way to complete tasks. Information production by these methods and procedures should automatically be to the required standard for the project and ensure consistency of information.

Project's information production methods and procedures should as much as possible be developed in a collaborative manner. The appointed parties are required to describe their intended methods and procedures for the project. They should be repeatable and scalable.

EXAMPLE   *A protocol for security classification of information deliverables.* As information production methods and procedures are most likely organizational proprietary documentation a URL could be the most suitable method of specifying this information. *URL link [Check, Review, and Approval process map]*

5.4.4 Project's reference information and shared resources

Project's reference information and shared resources are existing information that should be used or referred to by the appointed parties when producing the information deliverables. The appointing party should make available all existing or predefined information as detailed by the appointment.

By sharing its reference information and shared resources the appointing party will remove redundant work recreating existing information, templates or libraries and ensure the new information is created to the correct standard. This can be referenced to existing asset information e.g. utilities underground layouts.

11

CEN/TR 17654:2021 (E)

EXAMPLE   *A pre-existing asset floorplan.* As reference information and shared resources most likely is additional documentation a URL could be the most suitable method of specifying this information. *URL link [pre-existing asset floorplans].*

5.5 Supporting information

Supporting information is existing information that could be used or referred to by the appointed party when producing the information deliverables or preparing the tender response. The appointing party should make available all existing or predefined information as detailed by the appointment.

Supporting information can help the lead appointed party to better understand or evaluate the information required or its acceptance criteria.

This can be referenced to existing asset information or samples of exemplary information deliverables.

EXAMPLE   *Surveys specifically for this appointment, other documents, guidance's, other standards (international, national, or industry).* As supporting information most likely is additional documentation, a URL could be the most suitable method of specifying this information. *URL link [topographical survey].*

5.6 Project's information delivery milestones

Project's information delivery milestones specify when the information is needed by the appointing party. This should accommodate how much time is required to accept the information. This can be a date, frequency or relative to an event.

Milestones allow the appointing party and the appointed parties to plan and resource the project. They should be respected by both parties to ensure the delivery schedule is achieved.

Information exchanges can be required to accommodate internal coordination by the appointed party to quality ensure or other internal processes before the project milestones.

EXAMPLE   *Milestone delivery date 06.10.2018; Internal information exchanges every first Monday in the month; Information delivery to be quality ensured starting at latest 15 working days prior to milestone delivery.*

For more information refer to the information delivery milestones see EN ISO 19650-2:2018, 5.1.3 and timing of information delivery EN ISO 19650-1:2018, 10.2.

6   (Pre-appointment) BIM execution plan

6.1 General

This Clause provides guidance on how to respond to the tender, according to EN ISO 19650-2:2018, 5.3.2. See Table 3 for where to find information from EN ISO 19650-1 and EN ISO 19650-2 in the present document.

Table 3 — Mapping table for requirements in EN ISO 19650-1 and EN ISO 19650-2:2018, 5.3.2 and template examples in this document Annex A

EN ISO 19650-1 reference	EN ISO 19650-2 reference (Clause 5.3.2)	Clause in this document	Template number Annex A
7 Project and asset information management functions	Information management functions	6.2	A.3
	Information delivery strategy	6.3	A.4
10.4 Federation strategy	Federation strategy	6.4	A.5
10.3 Responsibility matrix	High-level responsibility matrix	6.5	A.6
	Proposed additions or amendments to the project's information production methods and procedures	6.6	A.7
	Proposed additions or amendments to the project's information standard	6.7	A.8
	Proposed schedule of software, hardware and IT infrastructure	6.8	A.9

NOTE 1   The templates in Annex A provides an example on how requirements can be expressed. Requirements can be expressed in other ways as demonstrated in Annex B example 2.

6.2 Information management function

The prospective lead appointed party response informs the appointing party who (named individuals) will be responsible for information management during the project through extension to existing project roles and/or inclusion of new roles such as information manager. Where the delivery team is using information managers, the description of information management function should include the lead appointed party and known task team's information managers at pre-appointment. At appointment all task team's information manager should be included.

The response should demonstrate that the proposed individuals are competent to perform the function. This also gives the delivery team clarity about the allocation of responsibilities for the information management from the very start of the project.

This information can be presented on a schedule or organizational chart. The minimum amount of information to be provided as a list of names and resumes of individuals detailing their previous experience performing a similar function, including brief descriptions of their information management responsibility.

For example, template on how information can be provided see Table A.3. For project examples see Table B.3, Figure B.1 and Figure B.7.

Information to be included in the information management function response:

1) the names of individuals;

2) the organizations they represent;

3) information management responsibilities;

4) links to personal resumes that may be uploaded to a secure area the CDE; (General Data Protection Regulation (GDPR) should be considered regarding personal details).