



openDBL

Improving Buildings is Improving EU

D1.1

Project goals, KPIs, application requirements, sustainability concept and standards analysis Report

Disclaimer and acknowledgements



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Glossary of terms and acronyms used

Table 1: Glossary of terms and acronyms used

Acronym/Term	Description
AECO	Architects, Engineering, Construction and Operation
Asset	Building and/or Civil Infrastructure
Applications Requirements	Synonym of Functional Requirements. Defines a function of a system or its component and may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what an ICT solution/ platform/software/application is supposed to accomplish
BAU	Business as Usual
BIM	Building Information Modeling
CFP	Carbon Footprint
DOA - DOW	Description of Action – Description of Work – Official Proposal to the EU
FSD	Functional specifications documents. Are used to determine functional specifications of a platform such as openDBL
LCA	Lifecycle Assessment

Executive summary

Subject of the deliverable: Identification of major standards, sustainability requirements, KPIs and Application (functional) requirements.

Purpose of the deliverable: This report describes and details the activities that the consortium partners have undertaken in the first month of activities and define the activities to be undertaken until September 2023 (M9). As by product, this deliverable has been instrumental to (re)align the partners to the work to be done and kick start the creation of openDBL.

Summary of the work carried out. The Parties have carried out two tasks:

- Task 1.1 refers to Goals, KPIs and Applications requirements, which we have analysed and identified and that later will be instrumental to define metrics with baseline values for buildings. We foresee to conduct several interviews with subject matters experts, other stakeholders and potential users of openDBL, to stay aligned with the information needs of our target clients while ensuring open access, inclusivity and improved user experience. Also, formal existing standards in the area of the project were analysed and identified (Attachment 1, which contains all the identified existing standards, to be evaluated and validated for their fit with openDBL).
- Task 1.2 refers to Sustainability requirements, which we have analysed and identified for various environments, taking into account the following issues: 1) Clean and climate neutral industrial value chains, 2) Raw material management based on a circular system, 3) Identification and management of waste in terms of its further recovery and reuse, 4) Decarbonization of buildings in terms of energy efficiency and optimal use of available energy carriers, 5) Promotion of sustainable solutions appearing in dynamically changing conditions related to the available raw materials and energy carriers.

Main Conclusions:

We have:

- designed an approach to define and keep updated this report and its conclusions for the whole project duration.
- identified the major goals, KPIs, sustainability and functional requirements.
- analysed and identified already a long list of standards.
- started to prioritize them and will do so within the planned schedule of work.

Introduction

openDBL project summary

openDBL intends to integrate multidisciplinary know-how to cover the requirements of the Call and solve the issues of the current situation. The challenge of the project is to allow, through the development of openAPI, the disposal of openDBL in a unique standardized platform and create useful content, to simplify the workload of the AECO industry.

The project pursues 3 objectives: 1) create a DBL with useful content and functionalities, 2) ensure openDBL is usable and simple to use, reducing the time spent to upload, search and process the information and data to facilitate usage and gain wide adoption, 3) ensure attractive economics, through value propositions and convenient pricing. We'll provide any user with an integrated platform for their digitization needs; ensure that information and data conform to the latest trends and needs of our target clients and support the EU's circular economy and green policies; develop automatic classification systems and data standards; facilitate the operation and maintenance activities of the buildings. This will be achieved creating an Information Delivery Manual and a Data Model and further developing our existing platform used to create a DBL for an important Italian Public Contracting Authority. openDBL will support data matching with external databases and will integrate state of-the art technologies (AI, Blockchain, IoT and VR). Our ambition is to make openDBL the platform of reference for the monitoring of building consumption, transparencies of transactions and official documents, and the positive impact on maintenance and environment.

To reach its goals openDBL is divided into 6 WPs with different goals, tasks and deliverables.

The main objective of WP1 is to define the requirements of openDBL, starting with its goals, KPIs and applications requirements. This will be achieved with five tasks, and at the end all prerequisites for WP2 (openDBL development) will be met.

Deliverable 1.1 comprehends Task 1.1 (Goals, KPI and Application requirements) and Task 1.2 (Sustainability requirements). Together, they are the inputs for Task 1.3 (creation of the Information Delivery Manual according to ISO 29481-19 and of the openDBL Data Model).

Both Task 1.1 and 1.2 ensure that:

- openDBL will focus on environment, society and economy, as well as their degree of circularity.
- the IDM fully complies with the Commission Environmental Agenda, the Circular Economy needs and international databases such as GaBi or Ecoinvent, to simplify environmental impacts assessment.

We have not encountered any limitation at this stage and each partner is fully committed to achieve what has been described above.

Mapping openDBL outputs

Table 2 openDBL work description

openDBL GA Component Title	openDBL GA Component Outline	Respective Document Chapter(s)	Justification
DELIVERABLE			
<i>D[1.1] [Project goals, KPIs, application requirements, sustainability concept and standards analysis report]</i>	The main objective of WP1 (led by e-Metodi) is to define the requirements of openDBL. D1.1. is the basis of the work to be carried out by each partners around the core building elements of openDBL: goals, standards, sustainability requirements, KPIs and applications requirements. This is the basis of the other tasks, and will be continuously updated until the requirements of openDBL have been defined and detailed (M9).	1.1 WP Objectives and limitations 1.2 Description of work undertaken 1.2.1 Approach Schedule of Work	Deliverable 1.1 will be used by each Partner to: 1. contribute to the development of the approach for the Roadmap for standardization (D5.4) 2. recommend improving analysed existing standards and new standardization documents development (EO-06) At the same time by conducting at least 50 interviews with key players to qualify their Information Requirements we will match O.1 – KPI 1.1 of the GA.
TASKS			
<i>T[1.1] [Goals, KPI and Application requirements.]</i>	Goal is to analyse and define key indicators and metrics with baseline values for buildings and then “transpose” them into functional requirements to ensure open access and inclusivity to improve user experience. The technical functional quality requirements will be analyzed according to the ISO/IEC 9126 standards with respect to the users (e.g. usability, reliability, efficiency,	1.3 Results 1.3.1 Project goals, 1.3.2 Standards 1.3.4 KPIs, 1.3.5 Application requirements	Ultimate goal of openDBL is to address the use cases of our clients, all of which relate to the need of obtaining and maintaining updated key information related to their assets. The tasks accomplished have determined the definition and validation of each partners of the major project goals, standards, KPIs and applications requirements of openDBL

	etc.) and to the platform (security, functionality, maintainability, scalability, interoperability, etc.). Then we will detail tasks for the development of the components of openDBL (divided into substantial milestones and related KPI for the development and the production environments). Finally operation test will be generated and test reports will be developed to allow the monitoring and control of the future outcomes. The existing formal standards in the project area will also be identified and analysed, especially those within the CEN / TC 442 (WG 6 and WG 7 in particular) CEN/TC 350 subcommittee 1 – Circular economy area and ISO/TC 59/SC 13 - Organization and digitization of information about buildings and civil engineering works, including building information modelling. The conclusions of the analysis (gaps of existing standards) will be used to develop a Roadmap for standardization in the area the project, for proposing improvements to existing standards and for proposing new standardization topics. Lead in2it,		
T[1.2] [Sustainability requirements.]	Goal is the assessment of the impact that is measurable and optimal for various environments, taking into account the following issues: 1) Clean and climate neutral industrial value chains, 2) Raw material management based on a circular system, 3) Identification and management of waste in terms of its further recovery and reuse, 4) Decarbonization of	1.3.3 Sustainability	The tasks accomplished have determined the definition and validation of each partners of the key sustainability requirements of openDBL

	buildings in terms of energy efficiency and optimal use of available energy carriers, 5)Promotion of sustainable solutions appearing in dynamically changing conditions related to the available raw materials and energy carriers. Lead AMTP		
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Deliverable Overview and Report Structure

In our openDBL proposal we wrote: “The availability of **consistent and reliable data** can contribute to better design, construction and management of buildings, improved market information and transparency, creation of innovative services and business models, as well as more effective policymaking.”

As a result of this, we stated that openDBL will pursue “three priority actions: (O.1) create useful openDBL content, to simplify the workload of the AECO supply chain; (O.2) ensure its usability, to facilitate usage and gain wide adoption; (O.3) be economically viable, and be offered at convenient pricing”.

With reference to O.1 we stated that openDBL will:

1. Provide any user with an integrated solution for their digitization needs: workflows, guidelines, BIM and data model, automatic data validation;
2. **Ensure that information and data conform to the latest needs of our target clients;**
3. **Ensure that information and data support EU's circular economy & green policies;**
4. **Align information and data to the relevant existing ontologies like bot, saref, ifcowl;**
5. **Automatically match classification systems and data standardisation to constructive elements and be compliant with the GDPR - General Data Protection Regulation - (users will have the guarantee of privacy, protection and portability of data);**
6. **Ensure that information, data and documents comply with European and individual member country regulations, conducting periodic research and analysis from the established information providers;**
7. **Identify the existing standards and the tools for architects and engineers to make buildings safe, and compliant with legislative and technical standards and representative of certain requirements of environmental comfort both physical internal and with respect to the environment (environmental footprint). Provide, in a later stage of implementation of the project, recommendation for improving existing standards or recommendation for developing new European standards;**
8. Facilitate the operation and maintenance activities of the building (users will adapt templates and use “smart” contracts, specifications, certificates,

regulations and remotely work with plans, checklists, requests for information, service orders, repairs and interventions, accounting and payment tasks, reports)

We have highlighted in **bold** the main outcomes which are discussed and covered in this report, which constitute our first deliverable.

1. DESCRIPTION OF THE RESULTS

1.1. WP1 objectives and limitations

The main objective of WP1 is to define the requirements of openDBL, starting with its goals, KPIs and applications requirements. This will be achieved with five tasks, and at the end all prerequisites for WP2 (openDBL development) will be met.

Deliverable 1.1 comprehends Task 1.1 (Goals, KPI and Application requirements) and Task 1.2 (Sustainability requirements). Together, they are the inputs for Task 1.3 (creation of the Information Delivery Manual according to ISO 29481-19 and of the openDBL Data Model).

Both Task 1.1 and 1.2 ensure that:

1. openDBL will focus on environment, society and economy, as well as their degree of circularity.
2. the IDM fully complies with the Commission Environmental Agenda, the Circular Economy needs and international databases such as GaBi or Ecoinvent, to simplify environmental impacts assessment.

We have not encountered any limitation at this stage and each partner is fully committed to achieve what has been described above.

1.2. Description of work undertaken

1.2.1 Approach

Figure 1 describes the work undertaken and the activities which will follow to produce the information requirements (and the first report for the future standardization roadmap, as foreseen in D5.2).

The workflow has been created using the swimlane method and shows:

1. the activities to be undertaken
2. their inputs and outputs
3. the partners involved
4. the interactions among the partners

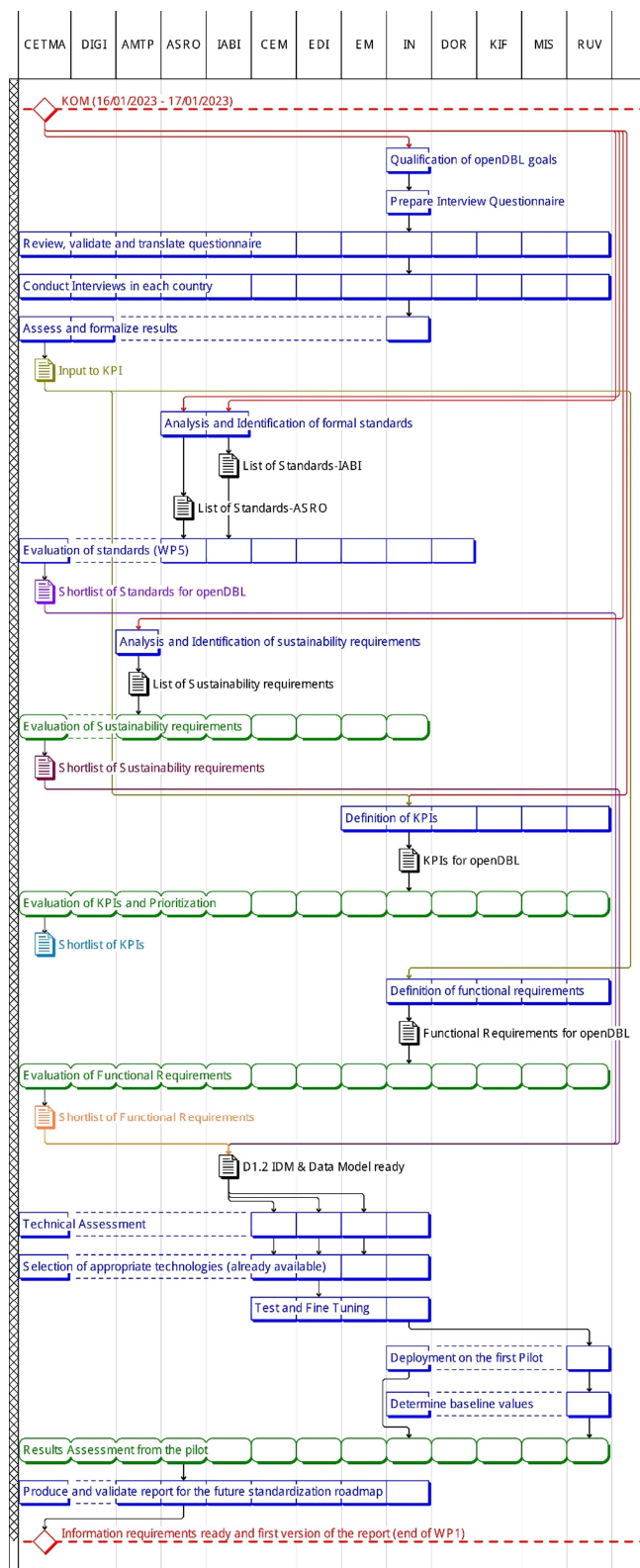


Figure 1 Workflow of activities

Each partner has started the work and performed the initial activities of WP1:

1. ASRO and IABI have analysed and identified a “long” list of existing standards in the area of the projects.
2. AMTP has done the same for the sustainability requirements
3. in2it has coordinated the work of the three Municipalities through a questionnaire and one-to-one interviews to define the initial KPIs and Functional Requirements.

Every partner will continue to carry on its activities according to the described workflow and the Gantt (end of WP1 is planned for 09/2023).

As shown in the workflow, each activity (qualification of openDBL goals through interviews, analysis and Identification of formal standards, analysis and Identification of sustainability requirements, definition of KPI and functional requirements) will be evaluated by the partners, according to their role in the project.

Then technology assessment will be carried out by EM, CEM, EDI and IN before testing and deploying them at the first pilot (RUV).

The scheduling of this PILOT IS A PROPOSED CHANGE TO OUR DOW.

WE THINK THAT ANTICIPATING ONE OF THE THREE PILOT AT THIS STAGE OF THE PROJECT WILL DELIVER USEFUL HINSIGHTS TO THE WHOLE PROJECT WORK; SPEEDING UP THE LEARNING CURVE OF ALL PARTNERS INVOLVED.

1.2.2 Schedule of Work

Based on the approach, figure 2 shows the schedule of the work already undertaken and the way forward as will be described in chapter 2.3.

This schedule has been validated by each partner, with proposed start and finish dates for WP1. The schedule will be periodically monitored and updated by IN and EM to ensure achievement of results as well management of eventual obstacles and risks.

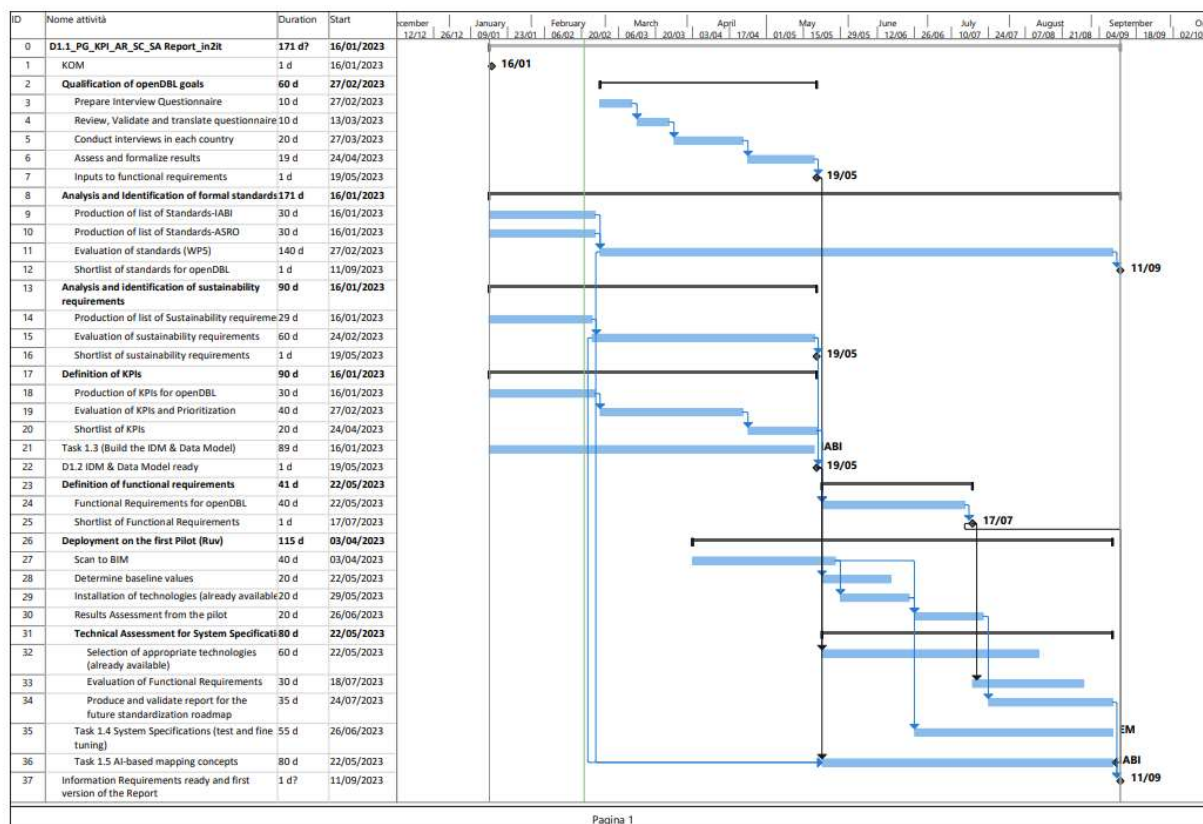


Figure 2: Schedule of Work (with refinements) related to WP1

1.3. Results and Way forward

1.3.1 Goals

Ultimate goal of openDBL is to address the use cases of our clients, all of which relate to the need of obtaining and maintaining updated key information related to their assets.

The requirements catalogue defined in the IDM for the openDBL data model consider a large number of different data sources and data types that come from various categories:

Table 3: openDBL Goals (Use cases)

#	Goal categories	Uses
1	Scan to BIM	1.1.Building Program & Project Meta Data 1.2.Physical Properties of BIM Objects & Elements 1.3.GeoSpatial and Spatial Location of Objects & Elements 1.4.Renovation planning and potential improvements in terms of security, accessibility, health, energy efficiency, wellbeing, comfort.
2	Product comparison and choice	2.1.manufacturer information 2.2.sustainability specific Information 2.3.selection and use of appropriate materials
3	Construction and BIM to Field	3.1.Specifications Estimating 3.2.Construction Logistics 3.3.Time Sequencing 3.4.Total Cost of Ownership 3.5.Value Engineering (cost analysis of elements allowing for making financial decisions - financial comparison with the possibility of using alternative scenario) 3.6.Technical and technological analysis 3.7.Building Commissioning
4	Energy Management	4.1.Consumption Analysis and Monitoring 4.2.Sustainable Material (ie. LEED, etc) 4.3.Environmental & Site Conditions 4.4.Energy efficiency certification 4.5.Recommendations for energy efficiency operation
5	Compliance	5.1.Program, Space 5.2.Validation and Code
6	Health & Safety	6.1.Users Safety 6.2.Users Comfort
7	Structural Monitoring	7.1.Obsolete structures – components for replacement 7.2.Monitoring of structures and buildings in real time 7.3.Preventive conservation of heritage buildings 7.4.Non-destructive testing of structural damage
8	Facilities/Asset Operation & Management	8.1.Building & facilities features & conservation status 8.2.Instructions and registration on building use & maintenance (conservation measures, etc) 8.3.Maintenance Plan 8.4.Extraordinary Maintenance 8.5.Inspections and Incidence registration and management (ticketing) 8.6.Repairs 8.7.Reduction of operating costs 8.8.Reporting 8.9.Smart contracts
9	Energy audits & building renovation	
10	Deconstruction and Circular Economy	

These goals will be linked to the Lifecycle of typical assets and the way of linking them will be decided upon by the partners before the functional requirements have been defined.

1.3.2 Standards

openDBL list of standards resulted from a series of analysis done on documents, activities, and technical committees. They are based on:

1. Socio-political framework and current development and trends in the DBL area
2. Ethics and responsibilities in specific areas

ASRO has already analysed and identified the major formal standards and delivered several lists with:

1. standardization bodies and related TCs
2. standards and standardization documents
3. standards and standardization documents proposed for the analysis, first list of existing standards (Attachment 1)
4. Propose content and authors of the Standardization Roadmap

ISO 23386¹ is the standard that may have major impacts on users of assets and on the openDBL Platform (CEN/TC 442). Moreover, CEN/TC 59/SC13 EN 13369, EN 15037, EN 12794, and EN 13670, have a major impact on building users and software platforms.

Table 2 presents what IABI has already produced and delivered that shall be considered and that can add value to openDBL.

Table 4: List of standards

#	Standards	Details and Source	Scope
1	BPMN 2.0	Business Process Model and Notation from OMG	Process standard category
2	IFC	Industry Foundation Classes from ISO 16739-	Data sharing in the construction and facility management industries
3	BCF	BIM Collaboration Format from buildingSMART international	Allows different BIM applications to communicate model-based issues with each other by leveraging IFC models that have been previously
4	IDM	Information Delivery Manual from ISO 29481-1:2010	Methodology to capture and specify processes and information flow during the lifecycle of a facility.
5	bsDD	Data model, API from ISO 12006-3:2022	Organizes information about construction works, framework for object-
6	PDT	Product Data Template from ISO 23387:2020	Data templates for construction objects used in the life cycle of built assets, concepts principles.
7	PEA	Property Exchange API from buildingSMART international	API to exchange properties within a Common Data Environment.
8	MVD	Model View Definition from buildingSMART	It is a specific implementation level of IFC to describe and facilitate a
9	ISO 23386:2020		Process, Property definition, Quality & Trust.
10	CEN/TC 442 EN ISO 19650		Aims to improve the efficiency, quality, and safety of the construction process and ensure the accuracy and reliability of data and information used throughout the entire lifecycle of buildings.

Only selected standards for the analyses, will be uploaded to the MS Team, after all partners will be sent to ASRO a signed NDA and will be periodically updated.

¹ Building information modelling and other digital processes used in construction — Methodology to describe, author and maintain properties in interconnected data dictionaries.

1.3.3 Sustainability

Table 3 presents the list of sustainability requirements produced and delivered by AMTP. They refer to Circular Economy and that have been part of the work done by CEN/TC 350 (subcommittee 1).

Table 5: List of Sustainability Requirements

#	Sustainability	Details and Source	Scope
1	BS 8001:2017	Launched in May 2017 by the British Standards Institution - BSI	Framework to implement the principles of the Circular Economy in organizations
2	XP X30 901 - Circular economy	System Requirements and guidelines launched in October 2018 by the French Standard Institute (AFNOR).	Economic system of exchange and production which, at all stages of the product (good and services) life cycle, aims to use resources more efficiently and reduce the environmental impact while fostering individual wellbeing, and in which the value of the products, materials, and resources is maintained in the economy for as long as possible and waste production is minimized.
3	XP X30 901 - Management systems and sustainable development	Applicable to organizations of all sizes, types, and natures (can be adapted to any type of project such as the development of a strategy, the supply of new services, the modification of a procurement, design or distribution process of a service or product) - It is a first CE standard which allows organizations to apply for certification that will attest to the project's circularity credentials.	3.1 environmental guidelines to reduce the environmental impact 3.2 economic guidelines to increase resource use efficiency, 3.3 societal guidelines to improve the wellbeing of internal and external interested parties
4	ISO 14067:2018 - Carbon Footprint	Principles, requirements and guidelines for quantification, applicable to CFP studies, the results of which provide the basis for different applications.	4.1 Quantification and reporting of the carbon footprint of a product, in a manner consistent with International Standards on life cycle assessment (LCA) (ISO 14040 and ISO 14044) for a single impact category: climate change.
5	ISO 14040:2006 - LCA	Principles and Framework for life cycle assessment (LCA)	Environment management — Life cycle assessment — Principles and framework 5.1 Definition of the goal and scope of the LCA, 5.2 Life cycle inventory analysis (LCI) phase, 5.3 Life cycle impact assessment (LCIA) phase, 5.4 Life cycle interpretation phase,
6	EN 15978, and EN 17219		EN 15978 and EN 17219 aim to ensure that building products are evaluated based on their environmental impacts and sustainability
7	while EN 16309		It promotes sustainable resource management throughout the life cycle of buildings and infrastructure

The ISO 14067:2018 has some limitations, since addresses only a single impact category: climate change, whereas carbon offsetting and communication of CFP or partial CFP information are outside its scope. Moreover it does not assess any social or economic aspects or impacts, or any other environmental aspects and related impacts potentially arising from the life cycle of a product.

The ISO 14040:2006² describes the life cycle interpretation phase, including its limitations. It does not describe the LCA technique in detail, and does not specify methodologies for the individual phases of the LCA.

All documents listed above have been uploaded into our MS Teams platform and will be periodically updated.

² The intended application of LCA or LCI results is considered during definition of the goal and scope, but the application itself is outside the scope of this International Standard.

Our openDBL DOA pointed to two impacts (and project results) clearly directed to sustainability:

- **Impact #5** aims to increase productivity, innovation capacity, resilience, sustainability and global competitiveness of European energy intensive industries. This includes developing sustainable ways for circular utilisation of waste and CO₂/CO streams; and electrifying industry to enable and foster a switch to a renewable energy system.
- **Impact #6** aims to contribute to a substantial reduction of waste and CO₂ emissions, turning them into alternative feedstocks to replace fossil-based raw materials and decrease reliance on imports.

To ensure the achievement of the project results related to those impacts, AMTP expects to perform a large part of the work using SimaPro³.

1.3.4 KPIs

KPIs are instrumental to assess the benefits and the business value of openDBL across the AECO value chain.

Table 4 presents a list of KPIs that we have identified and that we are going to quantify, monitor, evaluate and periodically update on our pilot buildings (to compare with the related baseline values).

³ SimaPro is based on the robust science of LCA, the leading method to measure product sustainability. It was built on 30 years of thought leadership on sustainability metrics and contributions to major research and policy developments and is ideal for creating ISO-compliant LCAs (e.g. ISO 14067 and 14040), EPDs and reports.

Table 6: KPIs categories and main indicators

#	KPI categories	Indicators	Description
1	Sustainability - environmental impact	Analysis of the building materials and installed facilities to determine: 1.1 Global warming potential GWP (kg EQ Co2) 1.2 Total use of renewable primary energy resources (MJ, net calorific value) 1.3 LEED and Green/Energy Program Ratings of performance 1.4 Decarbonization of energy supplies to buildings	Any asset is made of components whose production has specific environmental impacts. Each component has its specific levels of recyclability. These data can be aggregated from available databases (LCA, CO2 emission etc.)
2	Energy consumption and resource efficiency indicators	2.1 Annual Heating and cooling demand 2.2 Energy needs for cooling/heating, ventilation, and domestic hot water. 2.3 Annual Electric energy consumption 2.4 Renewable energy installed capacity 2.5 Annual electric power production from renewable energy systems 2.6 In case of blackout of electricity supply, (natural disasters or other...) monitoring the time of remaining energy	Analysis of the energy consumed by the facility during its life cycle. Each facility needs energy for heating, connecting devices, electricity, etc. All this can be expressed in kWh. Different energy mixes for different countries, different Energy demand depends on weather conditions, so different periods of construction of the facility should be included. Moreover, suggested strategies and eco-innovations solutions can be applied to adjust and adapt vulnerable heat components of buildings (Green roofs, shade structures and components).
3	Evaluation of renovation, reconstruction, modernization	3.1 Accessibility (Access for people with specific needs, access to the building) 3.2 Adaptability (Capacity to be adapted to a given user's requirements) 3.3 Health and comfort (Quality of indoor air and thermal comfort natural ventilation building), such as index of CO2 3.4 Security (security against intruders)	These indicators aim to determine their comparative levels on the improvements . This is the most sensitive element, because openDBL's needs to be updated with the calculation values coming from the analysis and the interventions and this is difficult to demonstrate without an actual intervention on the pilot's buildings. Anyway, for example, specific types of waste are generated during a renovation: some of them are recycled and some elements of social judgment must be included (ie. a specific building object can have a huge impact on the local community). Therefore, also a specific KPI should be adopted, to quantify social, cultural and historical issues.
4	Performance (Facility management)	4.1 Facility Condition Index (FCI) 4.2 Age of the facility 4.3 Replacement Value of the facility 4.4 Business priority of the facility	These indicators define the performance of an asset , when relating to the current status, and/or to build and renovation projects. Moreover, the current and replacement value of all components in the building could be quantified and evaluated according to specific official listings such as the London metal stock exchange.
5	Costs of exploitation	5.1 Total energy use by month or by year 5.2 Benchmarks on energy use metrics (ie. reduction) with other similar buildings 5.3 Life-cycle building energy use 5.4 Carbon footprint per year, based on expected duration of exploitation 5.5 Minimization of the embodied GHG in building materials components and construction processes. 5.6 Use of fresh water	Exploitation happens to provide additional value to assets and/or to improve the comfort of users. Public assets (such as those chosen for our pilots) may be subject to a change of use decided by the City Council, to meet other requirements (ie. public interest) and for which there is no risk of serious damage. During normal operation of an asset, any damage must be repaired and must be paid by the user (ie. example additional costs of lighting, heating and water).
6	Maintenance Costs	6.1 Inspections 6.2 Incidents 6.3 Repairs 6.4 Other	According to the ISO 15686 there are three types of maintenance (preventive, scheduled, corrective) and these pursue some standard goals to ensure that the assets and their services are in a safe condition and fit for use. Preventive maintenance consist of works and repairs that are repeated at approximately the same time intervals, depending on the service life of the facility or its structural elements. These activities are conducted to keep the facility in a desired state of repair.

Analysis to determine the KPI categories under 1 and 2 can generate an overall assessment of the asset, e.g. from A, A-, B+, B, B- to e.g. F, where "A" means sustainable, eco-friendly, energy-saving and " F" can mean completely replaceable. Levels from A to F can be designated for specific areas of the facility - e.g. windows are "A" but wall insulation is "F".

The indicators under 3 allow the comparison from BAU scenario with CE scenario. Social indicators will be assessed through clients' interviews and/or through personalised checklists.

The KPI categories under 4,5 and 6 will be used for all major equipment and systems of an asset: for example for HVAC system cost will sum up: inspecting connections, motor operations, thermostat functionality, monitoring refrigerant pressure, testing safety controls, lubricating moving parts, replacing air filter, etc.

After having assessed the KPI's and verified the quantification of their baseline values at pilot sites, openDBL enable the consolidation of data and results to provide real-time overall rating of each asset, such as the **Smart Readiness Indicator**, which covers and weights energy efficiency, comfort & wellbeing, convenience, health &

safety, information to occupants, energy flexibility & storage, operation & maintenance costs.

1.3.5 Functional requirements

To be successful, openDBL must satisfy the functional requirements of its users. These requirements depend on Goals, Sustainability requirements and KPIs but are also strongly influenced by standards and available technologies. Once the functional requirements have been specified and the exact technologies have been included, then the partners will define the technical requirements.

Functional requirements will be formalized through functional specifications documents (FSDs) and -as indicated in our Approach- this will undergo a validation and approval process.

openDBL users will continuously verify that openDBL addresses their needs and concerns, and the technical partners of our Consortium will verify that the required solutions (applications) can be implemented. This will include test, quality assessment from selected end users and other feedback methods.

openDBL functionalities will be therefore developed and implemented to enable users to accomplish their tasks in the easiest possible manner. So, it's important to understand users' and stakeholders' expectations through the interview process and test them during the pilot phases.

Many aspects around us are being digitized and automated at rapid pace. Strong care will be therefore taken to ensure that openDBL will grant access to external databases or applications, through the use of openAPI. Moreover, it will ensure easy data entry and data input from existing buildings, it will be easy to use even by non-trained users and guarantee transparent clear data ownership and responsibilities.

The FSD to build openDBL will provide details to the following topics:

1. Who openDBL is intended for (use cases)
2. Who is authorized to use the product (user profiles configuration, admin functionality)
3. Inputs into the system (IDM, data model), data requirements, etc.)
4. What each screen should do (user interface)
5. Which technologies will be used (platform, mobile, sensors,
6. System workflows (system specifications, system integration, API to external databases, etc)
7. Outputs (algorithms, data and information, reporting, etc)
8. Regulatory requirements (government oversights, standards, etc)
9. Formal and informal standards

- 10.Support and maintenance (manuals, help desk, error handling)
- 11.Security
- 12.Remote access and control
- 13.Automation, customization
- 14.Reliability, availability, maintainability

1.3.6 Enabling technologies

openDBL will integrate several technologies to manage and achieve goals and KPIs defined in this document. In our DOW (to be implemented in WP3) we have listed:

ARTIFICIAL INTELLIGENCE: will be used to enrich the elements of the building model with attributes coming from different classification systems, ideally for both foreseen ones and not. Based on the openDBL data model and its underlying ontologies, a dynamic mapping of these cross-system data will be enabled. The possibility of the AI being used also as a Localization tool is also being explored.

SMART QUALITY CONTROL & DATA VERIFICATION TOOL: a mobile tool will be used in the design (BIM Modelling) Surveying and digitalization (SCAN to BIM), construction (BIM to Field) and operation (FM) phases of the assets to ease the traceability of the problem and shorten the time to ascertain the causes and identify the solution.

BLOCKCHAIN: will be used to provide transparency of specific key data.

CLOUD: will ensure high reliability of openDBL, its scalability to the flow of requests and guaranteed privacy and safety of data.

OBJECT LIBRARIES: will contain relevant information on the assets' operation (ensuring digital preservation, access, interface design, interoperability, training and development, etc.). openDBL will adopt a standardized format for objects to create a reusable and sustainable library, with Facility Management related content while ensuring circular exploitation.

RFID: will automatically identify and locate materials, machines, objects, etc. Data is transmitted contactless and without visual contact between a data carrier attached to the object to be identified and a recording unit. openDBL will use optimized RFIDs for large-scale efficient use in spectrum intensive environments, dedicated anti-collision protocols, turn-off features, etc.

SENSORS (and measuring technologies): will capture the analogue environment as precisely as possible and store the relevant information in the cloud without

significant human interaction where it will be presented to the end-user clearly in the openDBL user interface. openDBL will enable the balance between energy efficiency/operational lifetime, accuracy, maintenance (time) and cost, adapting low-cost, low-power and long-distance communication IoT devices, which are capable to provide accurate real-time data.

VIRTUAL REALITY: will enable navigation and interaction of the BIM models via web using simple controls. Any 3D object in the virtual scene will be interrogable and it will preserve technical, scientific, and semantic data as per our Data Model, even if not immediately visible in the VR environment.

1.3.7 Smart equipment

This category contains many systems and equipment, which are the core facilities to be monitored and controlled by openDBL, which will process information about their energy consumptions and KPI about the effectiveness, (e.g., cost/carbon footprint vs QoL, with provisional savings or expenditures from change of settings or the monthly costs to increase the temperature by a single degree in this room, etc.).

OpenDBL will integrate data from:

1. smart doors (dormakaba) to enable users to operate more efficiently through the processing of following data:
 - 1.1. Automatic locking/release, lifting/lowering and movement
 - 1.2. Manual emergency operation in the event of a power failure
 - 1.3. Centralized control and management of door) how often was a door opened/closed, elevators scheduling)
 - 1.4. Real-time monitoring & control system (error messages/alarm triggers)
 - 1.5. Automatic ventilation via a motor-operated window for a healthy indoor climate.
 - 1.6. Internal and external temperature,
 - 1.7. Identification of users (remote control of access)
 - 1.8. Occupancy level (number of people going through at a single opening and use this data to optimize energy efficiency vs the waiting time of the users)
 - 1.9. Inputs to fire safety alarms

2. Sensors (EDI) to provide data machine2machine without human interactions on:
 - 2.1. Temperature and humidity (measure water and air temperatures, measurement of internal and external levels, sun radiance in order to prevent the overheating indoor when the sun heat before it reaches the glass, remote control, etc.).
 - 2.2. Pressure (measure the pressure levels within certain zones and alerts the system if maintenance or replacement is required).
 - 2.3. Co2 (measures the air composition in the ventilation system, monitoring of indoor air levels and air quality, etc);
 - 2.4. Occupancy- to be linked to smart doors (information about the presence of occupants within the building or specified area.).
 - 2.5. Variable Speed of Fans (send information on the HVAC system in order to keep the room temperature at consistent levels).
 - 2.6. Lighting
 - 2.7. Operating hours, setpoints, etc
3. HVAC and other equipment
 - 3.1. automation based on schedule or occupancy
 - 3.2. analysis of data for planned or preventive maintenance
 - 3.3. As example: in a fan coil openDBL would collect: name, type, brand & model, location, generator that provides water, cooling and heating capacity, fan power, air flow, supply temperature, return temperature, free cooling, heat recover, operation schedule, regulation & control, year, status, start of warranties, warranty periods, expected life, disposal details, reutilization details, etc.

1.4. Comments

The results achieved so far and the described way forward require periodic assessment from the interim results achieved and eventual integrations with new insights and innovation.

The partners have already identified relevant stakeholders to interview in their countries, and will adopt the approach and follow the schedule described in paragraph 2.2.

The interviewees come from the following categories:

1. Designers and Engineers
2. Construction Companies
3. Project Managers
4. Building and facility managers
5. Service and sales teams from manufacturers
6. Users of the assets

Contact details of the interviewees have been consolidated in the excel sheet uploaded into our MS Teams platform at this link: [Contact Lists for interviews](#) and will be periodically updated.

2. Conclusions

We have designed an approach to define and keep updated this document for the whole project duration.

We have identified the major goals, KPIs, sustainability and functional requirements for openDBL. Moreover, we have analysed and identified already a long list of standards.

We have started to prioritize them and will do so withing the planned schedule of work.

However, we need to stay flexible with the contents described in this report and therefore maintain the necessary flexibility to update, complete and improve it during the development and deployment of openDBL.

3. References

NA

Disclaimer

The sole responsibility of this publication lies within the author. The European Union is not responsible for any use that may be made of the information contained therein.

Attachment I: List of Standards

No crt	Standards developing organization (SDO)	Standard reference	Standard Title	Standard Status (published/draft /withdrawn)	Standard Category (basic standard, process standard, product standard)	Responsible Body Technical Committee (TC)	Drafting Body Working group (WG)	Date of publication (Year)	Level (international , european, national)	Status Updated by the end of the project	Domain (BIM, Facility Management, Sustainability etc)	Abstract
1	CEN	EN ISO 29481-2:2016	Building information models - Information delivery manual - Part 2: Interaction framework (ISO 29481-2:2012)	Published	Main	CEN/TC 442		2016	European		BIM	ISO 29481-2:2012 specifies a methodology and format for describing 'coordination acts' between actors in a building construction project during all life cycle stages. It therefore specifies a methodology that describes an interaction framework, an appropriate way to map responsibilities and interactions that provides a process context for information flow, a format in which the interaction framework should be specified. ISO 29481-2:2012 is intended to facilitate interoperability between software applications used in the construction process, to promote digital collaboration between actors in the building construction process, and to provide a basis for accurate, reliable, repeatable, and high-quality information exchange.
2	CEN	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)	Published	Main	CEN/TC 442	CEN/TC 442/WG 3	2018	European		BIM	This document outlines the concepts and principles for information management at a stage of maturity described as "building information modelling (BIM) according to the ISO 19650 series". This document provides recommendations for a framework to manage information including exchanging, recording, versioning and organizing for all actors. This document is applicable to the whole life cycle of any built asset, including strategic planning, initial design, engineering, development, documentation and construction, day-to-day operation, maintenance, refurbishment, repair and end-of-life. This document can be adapted to assets or projects of any scale and complexity, so as not to hamper the flexibility and versatility that characterize the large range of potential procurement strategies and so as to address the cost of implementing this document.
3	CEN	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)	Published	Main	CEN/TC 442	CEN/TC 442/WG 3	2018	European		BIM	This document specifies requirements for information management, in the form of a management process, within the context of the delivery phase of assets and the exchanges of information within it, using building information modelling. This document can be applied to all types of assets and by all types and sizes of organizations, regardless of the chosen procurement strategy.
4	CEN	EN ISO 29481-1:2017	Building information models - Information delivery manual - Part 1: Methodology and format (ISO 29481-1:2016)	Published	Main	CEN/TC 442		2017	European		BIM	ISO 29481-1:2016 specifies - a methodology that links the business processes undertaken during the construction of built facilities with the specification of information that is required by these processes, and - a way to map and describe the information processes across the life cycle of construction works. ISO 29481-1:2016 is intended to facilitate interoperability between software applications used during all stages of the life cycle of construction works, including briefing, design, documentation, construction, operation and maintenance, and demolition. It promotes digital collaboration between actors in the construction process and provides a basis for accurate, reliable, repeatable and high-quality information exchange.
5	CEN	EN ISO 23386:2020	Building information modelling and other digital processes used in construction - Methodology to describe, author and maintain properties in interconnected data dictionaries (ISO 23386:2020)	Published	Main	CEN/TC 442	CEN/TC 442/WG 4	2020	European		BIM	This document establishes the rules for defining properties used in construction and a methodology for authoring and maintaining them, for a confident and seamless digital share among stakeholders following a BIM process. Regarding the definition of properties and groups of properties, this document provides: — definitions of properties and groups of properties as a list of attributes; — definitions of all the provided attributes. Regarding the authoring and maintaining process, this document provides: — definitions and roles of applicants; — definitions and roles of experts and the commission of experts; — definitions of request's attributes; — definitions of expert's attributes; — requirements to establish the management rules to interconnect data dictionaries through the mapping process for properties and groups of properties. To apply the methodology of this document, it is presupposed that the following are in place: — an established governance model for a data dictionary; — a framework for a network of data dictionaries. It is not in the scope of this document to provide the content of the interconnected data dictionaries.
6	CEN	EN 17412-1:2020	Building Information Modelling - Level of Information Need - Part 1: Concepts and principles	Published	Main	CEN/TC 442	CEN/TC 442/WG 2	2020	European		BIM	This document specifies 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). This document specifies the characteristics of different levels used for defining the detail and extent of information required to be exchanged and delivered throughout the life cycle of built assets. It gives guidelines for principles required to specify information needs. The concepts and principles in this document can be applied for a general information exchange and whilst in progress, for a generally agreed way of information exchange between parties in a collaborative work process, as well as for an appointment with specified information delivery. The level of information need provides methods for describing information to be exchanged according to exchange information requirements. The exchange information requirements specify the wanted information exchange. The result of this process is an information delivery. This document is applicable to the whole life cycle of any built asset, including strategic planning, initial design, engineering, development, documentation and construction, day-to-day operation, maintenance, refurbishment, repair and end-of-life.

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7	CEN	EN ISO 23387:2020	Building information modelling (BIM) - Data templates for construction objects used in the life cycle of built assets - Concepts and principles (ISO 23387:2020)	Published	Main	CEN/TC 442	CEN/TC 442/WG 4	2020	European		BIM	This document sets out the principles and structure for data templates for construction objects. It is developed to support digital processes using machine-readable formats using a standard data structure to exchange information about any type of construction object, e.g. product, system, assembly, space, building etc., used in the inception, brief, design, production, operation and demolition of facilities. This document provides the specification of a taxonomy model that defines concepts from ISO 12006-3:2007, i.e. objects, collections and relationships between them, to support the information need for the specific purpose of the data template. This document provides an EXPRESS specification with extensions of the EXPRESS-G notation and specification from ISO 12006-3:2007. These extensions have been provided to support market needs developed since the publication of ISO 12006-3 in 2007. This document provides the rules for linking between data templates and IFC classes within a data dictionary based on ISO 12006-3:2007. This document provides the rules for linking between data templates and classification systems within a data dictionary based on ISO 12006-3:2007. The target audience of this document is software developers and not construction industry domain experts appointed to create data templates based on sources describing information needs. It is not in the scope of this document to provide the content of any data templates. The data structure provided is intended to be used for developing specific data templates based on standards developed in ISO/IEC, CEN/CENELEC, national standardization organizations, or other sources describing information needs.
8	CEN	EN ISO 16757-1:2019	Data structures for electronic product catalogues for building services - Part 1: Concepts, architecture and model (ISO 16757-1:2015)	Published	Main	CEN/TC 442		2019	European		BIM	The primary purpose of ISO 16757 is the provision of data structures for electronic product catalogues to transmit building services product data automatically into models of building services software applications. This includes a meta model for the specification of product classes and their properties and a meta model for the product data which is exchanged in product catalogues. Product data has to follow the specifications for their product groups. ISO 16757-1:2015 specifies the underlying concepts, a generic model specifying the available modelling elements and their relationships, and a framework for the specification of the Content Parts by describing the elements which are to be provided by these Parts.
9	CEN	EN ISO 16757-2:2019	Data structures for electronic product catalogues for building services - Part 2: Geometry (ISO 16757-2:2016)	Published	Main	CEN/TC 442		2019	European		BIM	ISO 16757-2:2016 describes the modelling of building services product geometry. The description is optimized for the interchange of product catalogue data and includes - shapes for representing the product itself, - symbolic shapes for the visualization of the product's function in schematic diagrams, - spaces for functional requirements, - surfaces for visualization, and - ports to represent connectivity between different objects. The shape and space geometry is expressed as Constructive Solid Geometry (CSG) based on geometric primitives concatenated to boundary representations by Boolean operations. ISO 16757-2:2016 uses the applicable primitives from ISO 10303-42 and from ISO 16739 and adds primitives which are required for the special geometry of building services products. For symbolic shapes, line elements are also used. ISO 16757-2:2016 neither describes the inner structure and internal functionality of the product nor the manufacturing information because this is typically not published within a product catalogue. Building services products can have millions of variant dimensions. To avoid the exchange of millions of geometries, a parametric model is introduced which allows the derivation of variant-specific geometries from the generic model. This is necessary to reduce the data to be exchanged in a catalogue to a manageable size. The parametric model will result in smaller data files, which can be easier transmitted during data exchanges. The geometry model used does not contain any drawing information such as views, line styles or hatching.
10	CEN	EN ISO 21597-1:2020	Information container for linked document delivery - Exchange specification - Part 1: Container (ISO 21597-1:2020)	Published	Main	CEN/TC 442		2020	European		BIM	This document defines an open and stable container format to exchange files of a heterogeneous nature to deliver, store and archive documents that describe an asset throughout its entire lifecycle. It is suitable for all parties dealing with information concerning the built environment, where there is a need to exchange multiple documents and their interrelationships, either as part of the process or as contracted deliverables. The format is intended to use resources either included in the container (such as documents) or referenced remotely (such as web resources). A key feature is that the container can include information about the relationships between the documents. Relevant use-cases reflect the need for information exchange during the entire life cycle of any built asset and can include, but are not limited to, the handover of - a published bidding package, - required project deliverables at a specific project stage (e.g. when proposing different design scenarios), - shared information as background or for further development, - published approval packages, or - information about versions between partners to provide a means to reference particular states of the information and track changes.
11	CEN	EN ISO 21597-2:2020	Information container for linked document delivery - Exchange specification - Part 2: Link types (ISO 21597-2:2020)	Published	Main	CEN/TC 442		2020	European		BIM	This document provides the opportunity to add information about the contents of a container by further specializing the generic types of links specified in ISO 21597-1. The defined link types have been chosen to enhance the use of the container by allowing the addition of semantic relationships that are human interpretable to provide greater clarity about those links.

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12	CEN	EN ISO 19650-5:2020	Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 5: Security-minded approach to information management (ISO 19650-5:2020)	Published	Main	CEN/TC 442		2020	European		BIM	This document specifies the principles and requirements for security-minded information management at a stage of maturity described as "building information modelling (BIM) according to the ISO 19650 series", and as defined in ISO 19650-1, as well as the security-minded management of sensitive information that is obtained, created, processed and stored as part of, or in relation to, any other initiative, project, asset, product or service. It addresses the steps required to create and cultivate an appropriate and proportionate security mindset and culture across organizations with access to sensitive information, including the need to monitor and audit compliance. The approach outlined is applicable throughout the lifecycle of an initiative, project, asset, product or service, whether planned or existing, where sensitive information is obtained, created, processed and/or stored. This document is intended for use by any organization involved in the use of information management and technologies in the creation, design, construction, manufacture, operation, management, modification, improvement, demolition and/or recycling of assets or products, as well as the provision of services, within the built environment. It will also be of interest and relevance to those organizations wishing to protect their commercial information, personal information and intellectual property.
13	CEN	EN ISO 12006-3:2022	Building construction - Organization of information about construction works - Part 3: Framework for object-oriented information (ISO 12006-3:2022)	Published	Main	CEN/TC 442		2022	European		BIM	This document specifies a language-independent information model which can be used for the development of dictionaries used to store or provide information about construction works. The model is extended by instantiating content, such as further objects and their relationships, allowing the content to serve as an ontology, taxonomy, meronymy, lexicon and thesaurus. NOTE 1 Lexicons are resources for comprising lexical entries for a given language NOTE 2 Meronymies are type of hierarchies which deals with part-whole relationships NOTE 3 Ontologies are formal, explicit specification of a shared conceptualization it enables classification systems, information models, object models, data templates and process models to be cross-referenced from within a common framework. This document provides the description of an API allowing the interconnection of data dictionaries as described in ISO 23386.
14	CEN	EN ISO 19650-3:2020	Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 3: Operational phase of the assets (ISO 19650-3:2020)	Published	Main	CEN/TC 442		2020	European		BIM	This document specifies requirements for information management, in the form of a management process, within the context of the operational phase of assets and the exchanges of information within it, using building information modelling. This document can be applied to all types of assets and by organizations of all types and sizes involved in the operational phase of assets. The requirements in this document can be achieved through direct actions carried out by the organization in question or can be delegated to another party.
15	CEN	EN 17632-1:2022	Building information modelling (BIM) - Semantic modelling and linking (SML) - Part 1: Generic modelling patterns	Published	Main	CEN/TC 442	CEN/TC 442/WG 4	2022	European		BIM	This document addresses syntactic and semantic interoperability for information describing assets going through their life cycle in the built environment. It assumes the underlying technical interoperability provided already by the Internet/World Wide Web (WWW) technology-stack. The syntactic aspects relate to the Linked Data (LD)/Semantic Web (SW) formats and the SPARQL direct access method provided. The semantic aspects relate to the LD/SW-based information models in the form of thesauri and ontologies giving meaning to the information. The following information architecture (Figure 1) applies. This document specifies: - a conceptual "L1: Information language" with four RDF-based language bindings being SKOS, RDFS, OWL and SHACL, including: - a choice of 'linked data'/RDF-based formats (to be used for all modelling and language levels); and - a generic Top Level Information Model of a total "M1: Information model", here "an upper ontology", including: - a set of generic information modelling patterns for identification, annotation, enumeration datatypes, complex quality/quantity modelling, decomposition and grouping. This modelling approach for information models and information sets is relevant within the built environment from multiple perspectives such as: - Building information modelling (BIM); - Geographical information systems (GIS); - Systems engineering (SE); - Monitoring & control (M&C); and - Electronic document management (EDM). Annex E discusses in an informative way how the information models and sets relevant for these different worlds can be linked together using LD/SW technology. This document does not specify a full meta-'information model', sometimes referred to as a 'Knowledge Model (KM)'. EN ISO 12006-3 provides such an often used model for the built environment. In Annex D, Subclause D.3 it is shown how this existing model can be made compliant to this document. The only direct support for this meta level comes in the form of the possibility to define 'types' (enumeration types or concept types) and 'objectifications' as metaconcepts.

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16	CEN	CEN/TR 17439:2020	Guidance on how to implement EN ISO 19650-1 and -2 in Europe	Published	Main	CEN/TC 442	CEN/TC 442/WG 3	2020	European		BIM	The scope of this guidance is deliberately restricted only to refer to EN ISO 19650-1 and -2, highlighting and describing the manner in which to use it -and not extending or contradicting the scope and content of the standard. The document aims simply to provide minimum supporting text to achieve a basic understanding and ability to implement EN ISO 19650-1 and -2. In each country, each client, each team can use this guidance to provide the best response to information management in each project. This document explains the terms and definitions, explains the concepts and principles and how to use them, and gives typical examples with clear explanations. It should be noted that in this guidance, Information Management is considered as a part of the Project Management. This guidance is intended to demonstrate how the standard works at European level, which is neutral, agnostic, and applicable to any of the following circumstances: - the nature of contracts: e. g. public; private, alliances, global, partnership, - the actors' functions: e. g. through the programming, design, construction phases, from small agencies, SMEs to large firms, large companies, - the types of works: e. g. simple, complex, new, rehabilitated, housing, infrastructure.
17	CEN	CEN/TR 17741:2021	Guidance for understanding and utilize EN/ISO 29481-1 Building information models - Information delivery manual - Part 1: Methodology and format	Published	Main	CEN/TC 442	CEN/TC 442/WG 3	2021	European		BIM	This document provides guidance on how to develop an information delivery manual (IDM) in compliance with EN ISO 29481-1 hereafter referred to as the "IDM standard". This document explains the core components and development process of the IDM methodology in non-technical terms. This document aims to help users and software vendors understand and utilize the IDM standard in defining information requirements and deliverables. The technical implementation of IDM in a data model, model view definition (MVD), is excluded from this document's scope. IDM standard introduces the MVD concept but does not specify it in detail. This document also utilizes some transaction framework concepts introduced in EN ISO 29481-2. The technical XML- and XSD-schema definitions supporting the software solutions are excluded from this document.
18	CEN	CEN/TR 17654:2021	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	Published	Main	CEN/TC 442	CEN/TC 442/WG 3	2021	European		BIM	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).
19	CEN	EN ISO 16739-1:2020	Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries - Part 1: Data schema (ISO 16739-1:2018)	Published	Main	CEN/TC 442		2020	European		BIM	The Industry Foundation Classes, IFC, are an open international standard for Building Information Model (BIM) data that are exchanged and shared among software applications used by the various participants in the construction or facility management industry sector. The standard includes definitions that cover data required for buildings over their life cycle. This release, and upcoming releases, extend the scope to include data definitions for infrastructure assets over their life cycle as well. The Industry Foundation Classes specify a data schema and an exchange file format structure. The data schema is defined in - EXPRESS data specification language, defined in ISO 10303-11, - XML Schema definition language (XSD), defined in XML Schema W3C Recommendation, whereas the EXPRESS schema definition is the source and the XML schema definition is generated from the EXPRESS schema according to the mapping rules defined in ISO 10303-28. The exchange file formats for exchanging and sharing data according to the conceptual schema are - Clear text encoding of the exchange structure, defined in ISO 10303-21, - Extensible Markup Language (XML), defined in XML W3C Recommendation. Alternative exchange file formats may be used if they conform to the data schemas. ISO 16739-1:2017 of IFC consists of the data schemas, represented as an EXPRESS schema and an XML schema, and reference data, represented as definitions of property and quantity names, and formal and informative descriptions. A subset of the data schema and referenced data is referred to as a Model View Definition (MVD). A particular MVD is defined to support one or many recognized workflows in the construction and facility management industry sector. Each workflow identifies data exchange requirements for software applications. Conforming software applications need to identify the model view definition they conform to.

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20	CEN	EN ISO 12006-2:2020	Building construction - Organization of information about construction works - Part 2: Framework for classification (ISO 12006-2:2015)	Published	Main	CEN/TC 442		2020	European		BIM	ISO 12006-2:2015 defines a framework for the development of built environment classification systems. It identifies a set of recommended classification table titles for a range of information object classes according to particular views, e.g. by form or function, supported by definitions. It shows how the object classes classified in each table are related, as a series of systems and sub-systems, e.g. in a building information model. ISO 12006-2:2015 does not provide a complete operational classification system, nor does it provide the content of the tables, though it does give examples. It is intended for use by organizations which develop and publish such classification systems and tables, which may vary in detail to suit local needs. However, if this part of ISO 12006 is applied in the development of local classification systems and tables, then harmonization between them will be facilitated. ISO 12006-2:2015 applies to the complete life cycle of construction works, including briefing, design, documentation, construction, operation and maintenance, and demolition. It applies to both building and civil engineering works, including associated engineering services and landscaping.
21	CEN	CEN/TR 17920:2023	BIM in infrastructure - standardization need and recommendations	Published	Main	CEN/TC 442	CEN/TC 442/WG 6	2023	European		BIM	- Identify key stakeholders, investigate existing activities and formulate the need for standardization related to the implementation of BIM for infrastructure in Europe, not covered by existing standards and ongoing standards development. - Make recommendation on whether standards should be developed and if so, how this should be done.
22	CEN	EN ISO 19650-4:2022	Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 4: Information exchange (ISO 19650-4:2022)	Published	Main	CEN/TC 442		2022	European		BIM	This document specifies the detailed process and criteria for decision makings when executing an information exchange as specified by the ISO 19650 series to ensure the quality of the resulting project information model or asset information model. It details the implementation of the concepts in ISO 19650-1 and is applicable to any information exchange within the delivery stages covered by ISO 19650-2 and operational trigger events covered by ISO 19650-3. This document is applicable to assets of all sizes and all levels of complexity. This includes portfolios of buildings, campuses, infrastructure networks, individual buildings and pieces of infrastructure. The requirements in this document should be applied in a way that is appropriate to the scale and complexity of the asset. This document makes use of the phrase "shall consider". This phrase is used to introduce a list of items that the person in question is required to think about carefully in connection with the primary requirement described in the subclause. The amount of thought involved, the time taken to complete it, and the need for supporting evidence depend on the complexity of the asset, the experience of the person(s) involved, and the requirements of any national policy on introducing building information modelling. On a relatively small or straightforward asset, it can be possible to complete, or dismiss as not relevant, some of these "shall consider" items very quickly. One way to help identify which of the "shall consider" statements are relevant can be to review each statement and create templates for assets of different sizes and complexity.
23	CEN	EN ISO 29481-3:2022	Building information models - Information delivery manual - Part 3: Data schema (ISO 29481-3:2022)	Published	Main	CEN/TC 442		2022	European		BIM	This document is the technical addition to the methodology set out in ISO 29481-1. It defines a specification to store, exchange and read information delivery manual (IDM) specifications in a standardized and machine-readable way.
24	CEN	not specified by CEN	Framework and Implementation of Common Data Environment Solutions, in accordance with EN ISO 19650	Draft	Main	CEN/TC 442	CEN/TC 442/WG 3	under development	European		BIM	This New Work Item will extend the basic information given in the EN ISO19650 and in the "Guidance to EN ISO 19650". It will detail and structure the concept of a Common Data Environment (CDE) as a workflow for the collaborative process of managing the information and information containers as solutions that fit to the management and project processes inherent for BIM It may be necessary to introduce further concept details as elements for understanding and implementation. Archiving and versioning of information containers can become very complex when considering various typical information situations of a project. Further elements, rules and terminology for information management and digitisation may need to be explained and technically framed in the context of a CDE. It will be a large advantage developing at the same time the "Open API for CDE" in TC442 WG2 In particular this Work Item will describe - how to link a CDE according to EN ISO 19650 to an already existing Asset Management Systems of the Asset Owner. - how to maintain and manage "living documents" like Information Models (AIM, PIM) - how to maintain, exchange and manage Information Requirements like (OIR, AIR, EIR) as well as BIM Execution Plans (BEP) - how to use and implement Information Delivery Plans for the above entities (MIDP and TIDP in ISO 19650) - how to manage and collaborate between various Information Containers like models, requirements, container states - how to support Process Workflow by a CDE based on the IDM concept It will simply have to describe how to provide "Common Data Environment" throughout the whole life cycle (horizontal aspect) and throughout the spectrum of management levels and stakeholders (vertical aspect). In the work item proposed here, all important terms, processes and targets are to be expanded around the CDE concept. Relations to already existing normatives will be given. Informative attachments such as templates and examples could be provided to the benefit of planner, supplier and operator as further guidelines.

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25	CEN	FprEN 17549-2	Building information modelling - Information structure based on EN ISO 16739 1 to exchange data templates and data sheets for construction objects - Part 2: Configurable construction objects and requirements	Draft	Main	CEN/TC 442	CEN/TC 442/WG 2	under development	European		BIM	The digital transformation of the construction industry includes also the digital transformation of the supply chain of construction products. With EN ISO 16739-1 exists an open language to design, transfer and maintain construction models. The construction models (e.g. of a building) contain a digital twin of real-life products. The data of these products should be transported in a digital format on the way from the factory to the building owner. This product data should be expressed also in an easy and open way. The creators of product data files should be able to do this manually or automatically, as they like it. The users of product data should be able to use it to: - Express their requirements related to products - Describe configurable products - Import product data easily in the BIM models at any stage of the project (design, construction, operation) - Export product data easily from the BIM models at any stage of the project (design, construction, operation) These scenarios fit in the business models of manufacturers, planners, construction companies and facility managers. The working group 4 of CEN-TC442 has published proposals for creating new work items in the sector of CEN regarding the storage and the transport of product data in the sector of building information modelling (BIM): EN ISO 16739-1:2018: Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries- Part 1: Data schema EN ISO 12006-3: Building construction – Organization of information about construction works – Part 3: Framework for object-oriented information prEN ISO 23386: Building information modelling and other digital processes used in Construction – Methodology to describe, author and maintain properties in interconnected dictionaries
26	CEN	prEN ISO 19650-6	ISO 19650-6: Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling – Part 6: Health and Safety	Draft	Main	CEN/TC 442	CEN/TC 442/WG 3	under development	European		BIM	This Document outlines the concepts and principles to ensure that Health and Safety information is developed, shared and managed collaboratively, ensuring the economic, environmental and social benefits are secured. This Document; 1) specifies requirements for the collaborative sharing of structured H&S information throughout the asset life-cycle. 2) supports the progressive development of structured H&S information for all built assets. 3) provides guidance on how H&S information is produced, flows and can be used throughout the asset lifecycle. Whilst all H&S risk information can be included within an information model, this document requires the contextualization and filtering of hazards and risks to prioritize the elevated risks and aspects that are safety critical. 4) sets out a framework (risk information cycle) for the application of H&S information-use through BIM processes and applications. This document specifies how to use H&S information in order to: a) provide a safer and healthier environment for end-users; b) mitigate the inherent hazards and risks across the asset lifecycle; c) result in improved H&S performance, fewer incidents and associated impacts; d) provide for clearer, more assured and relevant H&S information to the 'right-people' at the 'right time'; e) reduce costs across the whole lifecycle of the asset. The exchange and use of H&S information is intended to support: 1) representation of the nature and characteristics of the project, site, built asset and associated activities; 2) representation of H&S hazards, risks and associated factors; 3) the generalization, dissemination and re-use of H&S knowledge and experience. This document is applicable to individuals and organizations that contribute to and influence the definition of design, construction, use (including maintenance) and end of life of a built asset. This standard is intended to address information management at a stage of maturity described as "building information modelling" (BIM according to the ISO 19650 series. However, the principles and requirements of this document can be applied equally to non-BIM projects.
27	CEN	prEN ISO 16739-1 rev	Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries - Part 1: Data schema (ISO 16739-1:2018)	Draft	Main	CEN/TC 442		under development	European		BIM	The proposed revision of ISO 16739-1:2018 focusses on additions to the data schema and reference data to further support the infrastructure domains, particularly for bridges, roads, rails, ports and waterways and common foundations, such as alignment, terrain, strata and earthworks. The scope of the proposed revision is in line with the overall scope mention of ISO 16739-1:2018 "to include data definitions for infrastructure assets over their life cycle as well". The general scope and title of ISO 16739 being an international standard for "data sharing in the construction and facility management industries" remains valid.

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28	CEN	prEN ISO 22014	Library objects for architecture, engineering, and construction	Draft	Main	CEN/TC 442		under development	European		BIM	Recommendations for defining format and content for construction library objects to support project briefing, design, tendering, construction, and management of built assets. It is intended for all professionals and service providers using generic and product specific data, supporting then development of information throughout the process. To develop an International Standard giving principles and definitions for the symbolic and simplified visual presentation of objects in connection with Building Information Modelling (BIM), and their organization into libraries.
29	CEN	prEN 17632-2	EN 17632-2 Building Information Modelling (BIM) Semantic Modelling and Linking (SML), Part 2: Domain-specific modelling patterns	Draft	Main	CEN/TC 442	CEN/TC 442/WG 4	under development	European		BIM	This document, EN 17632-2, provides semantic modelling patterns for (at least) the following asset aspects: • Support for distinction between spatial regions and real ("tangible") objects; the latter being discrete or continuous ("bulk matter"); • Support for the materialization of physical objects, adding generic chemistry aspects directly relevant for the built environment dealing with concrete, steel and asphalt; • Support for the interaction between objects including connections, interfaces and ports (parts of objects where such interaction can take place). Interaction being defined as activities where material, information, energy/forces are transferred; • Support for the definition of requirements, unstructured and structured, coming from client needs, laws and regulations or sector recommendations; • Support for implicit groups having no explicit members (to model situations like "all main girders of some steel bridge"); • Support for the explicit modelling of measurements reusing the existing W3C Semantic Sensor Network (SSN)/Sensor, Observation, Sample, and Actuator (SOSA) ontology, incl. extended QUDT support. • Support for geospatial geometry (GeoSPARQL/wgs84) These patterns are currently inspired by NEN 2660-2 (that is itself finalized and tested in practice in parallel). These modelling patterns can all be positioned in the global modelling framework already provided in the form of the top level taxonomy by Part 1. Some of the information needs might be resolved by extending existing language level constructs. Finally there is a lot of 'pattern potential' under 'Discrete Object' and 'Spatial Region' in the built environment (road network, tunnel, bridge, road, building, installations). Care will be taken not to cross existing standards boundaries (like for open BIM and GIS).
30	CEN	prEN ISO 23387 rev	Building information modelling (BIM) - Data templates for construction objects used in the life cycle of built assets - Concepts and principles	Draft	Main	CEN/TC 442	CEN/TC 442/WG 4	under development	European		BIM	This document sets out the principles and structure for data templates for construction objects. It is developed to support digital processes using machine-readable formats using a standard data structure to exchange information about any type of construction object, e.g. product, system, assembly, space, building etc., used in the inception, brief, design, production, operation and demolition of facilities. This document provides the specification of a taxonomy model that defines concepts from ISO 12006-3:2007, i.e. objects, collections and relationships between them, to support the information need for the specific purpose of the data template. This document provides an EXPRESS specification with extensions of the EXPRESS-G notation and specification from ISO 12006-3:2007. These extensions have been provided to support market needs developed since the publication of ISO 12006-3 in 2007. This document provides the rules for linking between data templates and IFC classes within a data dictionary based on ISO 12006-3:2007. This document provides the rules for linking between data templates and classification systems within a data dictionary based on ISO 12006-3:2007. The target audience of this document is software developers and not construction industry domain experts appointed to create data templates based on sources describing information needs. It is not in the scope of this document to provide the content of any data templates. The data structure provided is intended to be used for developing specific data templates based on standards developed in ISO/IEC, CEN/CENELEC, national standardization organizations, or other sources describing information needs.
31	CEN	prEN ISO 16757-5	Data Structures for electronic product catalogues for building services – Part 5: Product catalogue exchange format	Draft	Main	CEN/TC 442	CEN/TC 442/WG 2	under development	European		BIM	The focus of ISO 16757 is the support of manufacturers to provide their product data in electronic product catalogues. This part of the standard – ISO 16757 Part 5: Product catalogue exchange format - describes how product catalogue data is exchanged as IFC format according to ISO 16739-1 from manufacturers to designers of building services systems. With ISO 16739-1 (IFC), an open language exists for the creation, transfer and maintenance of design models. prEN 17549-1 and prEN 17549-2 define the data exchange of scalable product properties within IFC. These standards provide a Model View Definition (MVD), a subset of ISO 16739-1 from an information technology perspective. It focuses on core classes and relies on external data dictionaries to describe business semantics. This document completes the description of the IFC-based data exchange format for manufacturer catalogues by describing how to model: • Catalogue metadata • Product classes • Constraints for parametric data • Product accessory structures • Constraints for assembling composable products and accessories • Reusable and multiply used data blocks • Product properties as defined in the related library • Static product properties • Dynamic computable properties • Geometric data of product spaces • Geometric data of product symbols • Geometric data of product shape • Geometric data of product ports • Article numbers • Etc. This document focuses only on the format of the data exchanged and not on how to process it. This document is aimed at both software manufacturers for the construction sector and professionals in the sector who use their software.

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32	CEN	prEN ISO 16757-4	Data Structures for electronic product catalogues for building services – Part 4: Dictionaries for product catalogues	Draft	Main	CEN/TC 442	CEN/TC 442/WG 4	under development	European		BIM	The focus of ISO 16757 is the support of manufacturers to provide their product data in electronic product catalogues. The standard - ISO 16757 Part 4: Dictionaries for product catalogues – describes which data structures are required in a dictionary to support the exchange of product data from manufacturers to designers of building services systems. Basis for this specification are the standards ISO 12006-3 and ISO 23386. In the scope of this standard are the following elements: - The definition of roles of ISO 12006-3 subjects that are needed to describe the concepts used in current product catalogue dictionaries. These roles include the following: o Product classes to represent product groups with similar property sets o Blocks that represent reusable and multiply used set of properties o System classes that represent the systems into which a product may be installed and provide the system properties which determine the values of dependent product properties o Port classes that allow the product independent description of different kinds of ports which can be used for the definition of product classes or blocks o Catalogue classes that describe the meta data of a catalogue o Tagging classes that allow the tagging of properties to distinguish property roles in the product description - A requirement model capturing the necessary structures to describe these roles - A mapping to the dictionary model of ISO 12006-3.
33	CEN	prEN ISO 7817	Building Information Modelling — Level of Information Need — Part 1 Concepts and principles	Draft	Main	CEN/TC 442	CEN/TC 442/WG 2	under development	European		BIM	This document specifies 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). This document specifies the characteristics of different levels used for defining the detail and extent of information required to be exchanged and delivered throughout the life cycle of built assets. It gives guidelines for principles required to specify information needs. The concepts and principles in this document can be applied for a general information exchange and whilst in progress, for a generally agreed way of information exchange between parties in a collaborative work process, as well as for an appointment with specified information delivery. The level of information need provides methods for describing information to be exchanged according to exchange information requirements. The exchange information requirements specify the wanted information exchange. The result of this process is an information delivery. This document is applicable to the whole life cycle of any built asset, including strategic planning, initial design, engineering, development, documentation and construction, day-to-day operation, maintenance, refurbishment, repair and end-of-life.
34	CEN	prEN ISO 12006-2 rev	Building construction — Organization of information about construction works — Part 2: Framework for classification	Draft	Main	CEN/TC 442		under development	European		BIM	EN ISO 12006-2 revision
35	CEN	CEN/TR 15941:2010	Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data	Published	Main	CEN/TC 350	CEN/TC 350/WG 3	2010	European		Sustainability	This Technical Report supports the development of Environmental Product Declarations (EPD). It assists in using generic data according to the core product category rules (prEN 15804) during the preparation of EPD of construction products, processes and services in a consistent way, and also in the application of generic data in the environmental performance assessment of buildings according to prEN 15978. The requirements for the use of generic data are described in prEN 15804.
36	CEN	EN 15978:2011	Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method	Published	Main	CEN/TC 350	CEN/TC 350/WG 1	2011	European		Sustainability	This European Standard specifies the calculation method, based on Life Cycle Assessment (LCA) and other quantified environmental information, to assess the environmental performance of a building, and gives the means for the reporting and communication of the outcome of the assessment. The standard is applicable to new and existing buildings and refurbishment projects. The standard gives: - the description of the object of assessment; - the system boundary that applies at the building level; - the procedure to be used for the inventory analysis; - the list of indicators and procedures for the calculations of these indicators; - the requirements for presentation of the results in reporting and communication; - and the requirements for the data necessary for the calculation. The approach to the assessment covers all stages of the building life cycle and is based on data obtained from Environmental Product Declarations (EPD), their "information modules" (prEN 15804) and other information necessary and relevant for carrying out the assessment. The assessment includes all building related construction products, processes and services, used over the life cycle of the building. The interpretation and value judgments of the results of the assessment are not within the scope of this European Standard.
37	CEN	EN 16627:2015	Sustainability of construction works - Assessment of economic performance of buildings - Calculation methods	Published	Main	CEN/TC 350	CEN/TC 350/WG 4	2015	European		Sustainability	This European Standard specifies the calculation methods, based on Life Cycle Costing (LCC) and other quantified economic information, to assess the economic performance of a building, and gives the means for the reporting and communication of the outcome of the assessment. This European Standard is applicable to new and existing buildings and refurbishment projects. This European Standard gives: - the description of the object of assessment; - the system boundary that applies at the building level; - the scope and procedure to be used for the analysis; - the list of indicators and procedures for the calculations of these indicators; - the requirements for presentation of the results in reporting and communication; - and the requirements for the data necessary for the calculation. The approach to the assessment covers all stages of the building life cycle and includes all building related construction products, processes and services, used over the life cycle of the building. The interpretation and value judgments of the results of the assessment are not within the scope of this European Standard.

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38	CEN	CEN/TR 16970:2016	Sustainability of construction works - Guidance for the implementation of EN 15804	Published	Main	CEN/TC 350	CEN/TC 350/WG 3	2016	European		Sustainability	This Technical Report provides general guidance to the users of EN 15804 and those preparing complementary Product Category Rules (c-PCR's) by: — stating general principles for the use of EN 15804 by CEN Technical Committees for construction products (Product TC's) in order to ensure consistency among the complementary PCR produced by Product TC's; — addressing the questions raised by Product TC's, manufacturers or their sub-contractors who provide LCA studies underlying an Environmental Product Declaration (EPD) and by EPD programme operators who include c-PCR of specific subcategories in their PCR registry.
39	CEN	CEN/TR 17005:2016	Sustainability of construction works - Additional environmental impact categories and indicators - Background information and possibilities - Evaluation of the possibility of adding environmental impact categories and related indicators and calculation methods for the assessment of the environmental performance of buildings	Published	Main	CEN/TC 350	CEN/TC 350/WG 1	2016	European		Sustainability	This Technical Report (TR) has been developed by CEN/TC 350/WG 1 and WG 3 to provide a clear and structured view on the relevance, robustness and applicability of a predefined set of additional impact categories and related indicators for the assessment of the environmental performance of construction works, construction products and building materials. The TR describes the evaluation criteria that are used to determine, for these impact categories, the suitability of indicators and calculation method(s) for inclusion in the standards EN 15978 and EN 15804 (or other CEN/TC 350 standards as appropriate) in terms of their: a) relevance to: 1) the environment, 2) construction works, 3) construction products, and 4) EU policy; b) scientific robustness and certainty; and c) applicability of the impact assessment method(s). The additional impact categories examined in the TR are: - human toxicity and ecotoxicity; - particulate matter; - land use; - biodiversity; - water scarcity; and - ionizing radiation. Because EN 15978 and EN 15804 are founded on a life cycle approach, the impact categories, indicators and methods reviewed are predominantly based on their potential suitability for application in LCA. In relation to some of the areas of concern, however, where LCA methods might not be sufficiently robust or developed, some non-LCA based indicators and methods are also considered. Due to the scope of LCA used in the EN 15804 and EN 15978, impacts to users of buildings due to direct exposure to harmful emissions fall outside the scope of this TR. This falls under the scope of CEN/TC 351. Important information related to this aspect found during the development of this TR, is however mentioned in the TR.
40	CEN	EN 16309:2014+A1:2014	Sustainability of construction works - Assessment of social performance of buildings - Calculation methodology	Published	Main	CEN/TC 350	CEN/TC 350/WG 5	2014	European		Sustainability	This European Standard is one part of a suite of European Standards. The standard provides the specific methods and requirements for the assessment of social performance of a building while taking into account the building's functionality and technical characteristics. This European Standard applies to all types of buildings, both new and existing. In this first version of the standard, the social dimension of sustainability concentrates on the assessment of aspects and impacts for the use stage of a building expressed using the following social performance categories (from EN 15643 3): - accessibility; - adaptability; - health and comfort; - impacts on the neighbourhood; - maintenance; - safety and security. NOTE 1 Only impacts and aspects of the above social performance categories are deemed to have an agreed basis for European standardization at this time. Two of the social performance categories included in EN 15643-3 (sourcing of materials and services and stakeholder involvement) are not deemed to be ready for standardization at this time and will be considered for inclusion in future versions of this standard (see informative Annex C). This standard does not set the rules for how building assessment schemes may provide valuation methods. Nor does it prescribe levels, classes or benchmarks of performance. Valuation methods, levels, classes or benchmarks may be prescribed in the requirements for environmental, social and economic performance in the client's brief, building regulations, national standards, national codes of practice, building assessment and certification schemes, etc. NOTE 2 Where National building regulations give minimum requirements and reference to assessment methods on these aspects, the social performance determined by assessment according to this standard can be used to determine the degree to which the building goes beyond the regulatory/legal requirements. The corporate social responsibility (CSR) of organizations is not covered by this standard. The standard gives requirements for: - the description of the object of assessment; - the system boundary that applies at the building level;

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41	CEN	EN 17472:2022	Sustainability of construction works - Sustainability assessment of civil engineering works - Calculation methods	Published	Main	CEN/TC 350	CEN/TC 350/WG 6	2022	European		Sustainability	This document establishes the requirements and specific methods for the assessment of environmental, economic and social performances of a civil engineering works while taking into account the civil engineering works' functionality and technical characteristics. By the means of this document the decision making for a project is supported by providing a standardized method for enabling comparability of scheme options. The assessment of environmental and economic performances of a civil engineering works is based on Life Cycle Assessment (LCA), Life Cycle Cost (LCC), Whole-Life Cost (WLC) and other quantified environmental and economic information. The approach to the assessment covers all stages of the civil engineering works life cycle and includes all civil engineering works related construction products, processes and services, used over its life cycle. This document is applicable to new and existing civil engineering works and refurbishment projects. The environmental performance is based on data obtained from Environmental Product Declarations (EPD) and additional indicators. This document is not applicable for the assessment of the environmental, social and economic performance of building(s) as part of the civil engineering works; instead, EN 15978, EN 16309 and EN 16627 apply.
42	CEN	prEN 17680	Sustainability of construction works - Evaluation of the potential for sustainable refurbishment of buildings	Draft	Main	CEN/TC 350	CEN/TC 350/WG 8	under development	European		Sustainability	This document provides a methodology for the evaluation of the potential for sustainable refurbishment of an existing building, as a means of contributing to the circular economy, to support the decision-making process. Sustainable refurbishment aims to close the gap between current performance and current requirements fulfilling authorities' sustainability regulations and contribute to meet sustainability goals which maximizes the environmental, social and economic performance. It also aims to allow the adaptability to fulfil future needs. It can be used for a building or part(s) of a building, as well as a portfolio of buildings. This document gives a methodology for assessing performance characteristics of existing buildings in terms of: 1) Technical aspects 2) Adaptability 3) Usability 4) Social aspects 5) Energy, water and operational impacts 6) Quality of indoor environment (including health aspects) 7) Economic feasibility 8) Climate change resilience 9) Embodied environmental impacts The document describes the work to be done in main applicable categories of a 6 steps process: • Step 0: Establish brief of the object of the assessment • Step 1: Evaluating the building • Step 2: Sustainable deconstruction • Step 3: Sustainable construction process • Step 4: Sustainable commissioning • Step 5: Sustainable in use NOTE In this document the users are people and organisations using the building, including the facility management. In some buildings visitors are also important users and need to be taken into account. This approach is generic for all types of buildings. At present this document does not cover civil engineering work and it does not give benchmarks for the evaluation. <u>Assessment of the impacts of sustainable refurbishment of buildings is covered by calculation methods</u>
43	CEN	prEN 15978-1	Sustainability of construction works - Methodology for the assessment of performance of buildings - Part 1: Environmental Performance	Draft	Main	CEN/TC 350	CEN/TC 350/WG 1	under development	European		Sustainability	This European Standard specifies the calculation method, based on Life Cycle Assessment (LCA) and other quantified environmental information, to assess the environmental performance of a building, and gives the means for the reporting and communication of the outcome of the assessment. The standard is applicable to new and existing buildings and refurbishment projects. The standard gives: - the description of the object of assessment; - the system boundary that applies at the building level; - the procedure to be used for the inventory analysis; - the list of indicators and procedures for the calculations of these indicators; - the requirements for presentation of the results in reporting and communication; - and the requirements for the data necessary for the calculation. The approach to the assessment covers all stages of the building life cycle and is based on data obtained from Environmental Product Declarations (EPD), their "information modules" (prEN 15804) and other information necessary and relevant for carrying out the assessment. The assessment includes all building related construction products, processes and services, used over the life cycle of the building. The interpretation and value judgments of the results of the assessment are not within the scope of this European Standard.

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44	CEN	EN 15643:2021	Sustainability of construction works - Framework for assessment of buildings and civil engineering works	Published	Main	CEN/TC 350	CEN/TC 350/WG 7	2021	European		Sustainability	This document provides principles and requirements for the assessment of environmental, social and economic performance of buildings and civil engineering works taking into account their technical characteristics and functionality. NOTE 1 Assessments of environmental, social and economic performance are the three aspects of sustainability assessment of buildings and civil engineering works, or combination thereof, (hereafter referred to as "construction works"). The framework applies to all types of construction works and it is relevant for new construction works over their entire life cycle, and of existing construction works over their remaining service life and end of life stage. The sustainability assessment of construction works covers aspects and impacts of construction works expressed with quantifiable indicators. It includes the assessment of the construction works' influence on the environmental, social and economic aspects and impacts on the local area (area of influence) and of the local infrastructure beyond the curtilage of the building and the civil engineering works. NOTE 2 The sustainability assessment in the standards developed under this framework encompasses potential impacts e.g. intrinsic hazards from chemicals that are not based on a full environmental risk assessment. The assessment of environmental, social and economic aspects of organizations, such as management systems, are not included in the standards developed under this framework. However, the decisions or actions that influence the environmental, social and economic performance of the object of assessment can be taken into account where the assessment includes management process related aspects.
45	CEN	EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products	Published	Main	CEN/TC 350	CEN/TC 350/WG 3	2019	European		Sustainability	This European standard provides core product category rules (PCR) for Type III environmental declarations for any construction product and construction service. NOTE The assessment of social and economic performances at product level is not covered by this standard. The core PCR: - defines the parameters to be declared and the way in which they are collated and reported, - describes which stages of a product's life cycle are considered in the EPD and which processes are to be included in the life cycle stages, - defines rules for the development of scenarios, - includes the rules for calculating the Life Cycle Inventory and the Life Cycle Impact Assessment underlying the EPD, including the specification of the data quality to be applied, - includes the rules for reporting predetermined, environmental and health information, that is not covered by LCA for a product, construction process and construction service where necessary, - defines the conditions under which construction products can be compared based on the information provided by EPD. For the EPD of construction services the same rules and requirements apply as for the EPD of construction products.
46	CEN	EN 15942:2021	Sustainability of construction works - Environmental product declarations - Communication format business-to-business	Published	Main	CEN/TC 350	CEN/TC 350/WG 3	2021	European		Sustainability	This document is applicable to all construction products and services related to buildings and construction works. It specifies and describes the communication format for the information defined in EN 15804 for business-to-business communication to ensure a common understanding through consistent communication of information. NOTE This document does not deal with business-to-consumer communication and is not intended for that purpose. Business-to-consumer communication format is planned to be the subject of a future document.
47	CEN	EN ISO 22057:2022	Sustainability in buildings and civil engineering works - Data templates for the use of environmental product declarations (EPDs) for construction products in building information modelling (BIM) (ISO 22057:2022)	Published	Main	CEN/TC 350	CEN/TC 350/WG 3	2022	European		Sustainability	This document provides the principles and requirements to enable environmental and technical data provided in EPDs for construction products and services, construction elements and integrated technical systems to be used in BIM to assist in the assessment of the environmental performance of a construction works over its life cycle. This document gives requirements on structuring EPD information using a data template according to ISO 23386 and ISO 23387, to make EPD data machine-interpretable and to enable their integration into information-driven design, construction, use and end-of-life stages. This document is applicable to structuring generic LCA data for use within a BIM environment, as these data are required in the absence of suitable EPD data to enable assessment of the environmental performance at the construction works level. The assessment of environmental performance at the construction works level is not covered by this document.
48	CEN	EN 17672:2022	Sustainability of construction works - Environmental product declarations - Horizontal rules for business-to-consumer communication	Published	Main	CEN/TC 350	CEN/TC 350/WG 3	2022	European		Sustainability	This document provides horizontal rules for business-to-consumer communication including benchmarking systems that aim to inform consumers about the life cycle environmental performance of construction products, assembled systems and construction elements. The communication is based on the results of the life cycle of the product, system or element, as incorporated to the construction asset, see EN 15804:2012+A2:2019. B2C communication includes information on benefits and loads beyond the system boundary. This document is aimed at organizations providing business-to-consumer communication and benchmarking systems and provides guidance on how to develop business-to-consumer communication and common rules for benchmarking methodologies using EPD, see EN 15804, and see EN 15942 for the communication format. Business-to-consumer communication and benchmarking methodology described in this document is based on a functional unit and cradle-to-grave assessments. B2C communication with no benchmarking is also described in this document.

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49	CEN	prEN 15941	Sustainability of construction works - Data quality for environmental assessment of products and construction work - Selection and use of data	Draft	Main	CEN/TC 350	CEN/TC 350/WG 3	under development	European		Sustainability	This document supports the data quality assessment and selection of data for product-level Environmental Product Declarations (EPD) according to the core product category rules of EN 15804 and for the environmental performance assessment of buildings according to prEN 15978 1 in a consistent way. It can also be used to assess and select data for the environmental assessment of civil engineering works according to EN 17472. It defines data quality requirements with respect to temporal, technological and geographical representativeness for the data used to calculate the Life Cycle Assessment (LCA) based indicator results of the EPD and for construction works when applying EPD, life cycle inventory data or other LCA based information, and generates a hierarchy to support the selection of the most appropriate data with regard to data quality. It also addresses the reporting of data quality at product and building level.
50	CEN	EN 15804:2012+A2:2019/AC:2021	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products	Published	Corrigendum	CEN/TC 350		2021	European		Sustainability	The corrigendum modifies EN 15804:2012+A2:2019, Tabel 3
51	CEN	EN 15221-3:2011	Facility Management - Part 3: Guidance on quality in Facility Management	Published	Main	CEN/TC 348	CEN/TC 348/WG 3	2011	European		Facility Management	This European Standard provides a guideline how to measure, achieve and improve quality in FM. It gives complementary guidelines to EN ISO 9000, EN ISO 9001 and EN 15221-2 within the framework of EN 15221 1. The standard provides a link into management methods and management theories. This European Standard is applicable to: - FM in public and private organizations; - client organization and service provider relationships; - full range of facility products or facility services; - both types of service providers in FM (internal and external); - all types of working environments (e.g. industrial, commercial, administration, military, healthcare etc.). This European Standard is applicable to business services (not consumer oriented). This European Standard does not: - replace the quality management systems of the client organization; - provide standard forms; - for performance and quality management systems (delivering a quality management system); - for defining requirements; - for a measurement tool; - for service level; - apply to the certification of the quality system of Facility Management (covered by EN ISO 9001).
52	CEN	EN 15221-4:2011	Facility Management - Part 4: Taxonomy, Classification and Structures in Facility Management	Published	Main	CEN/TC 348		2011	European		Facility Management	FM covers and integrates a very broad scope of processes, products / services, activities and facilities. The approach of this standard is to consider the added value provided to the primary activities by adopting a product perspective as recognised by the primary processes or core business in the organisation. This standard therefore introduces the concept of standardised (classified) facility products. The scope of this standard is to provide taxonomy for FM which includes: - relevant interrelationship of elements and their structures in FM; - definitions of terms and contents to standardise facility products which provide a basis for cross border trade, data management, cost allocation and benchmarking; - a high level classification and hierarchical coding structure for the standardised facility products; - expanding the basic FM model given in EN 15221-1 by adding a time scale in the form of the quality cycle called PDCA (Plan, Do, Check, Act); - a linkage to existing cost and facilities structures; - alignment with the primary activities requirements. Additional benefits from this standard are: - introducing a client rather than a specifically asset oriented view; - harmonisation of different existing national structures (e.g. building cost codes) on an upper level relevant for the organisation and its primary activities.
53	CEN	EN 15221-5:2011	Facility Management - Part 5: Guidance on Facility Management processes	Published	Main	CEN/TC 348		2011	European		Facility Management	This European standard provides guidance to FM organisations on the development and improvement of their processes to support the primary processes. This standard also sets out basic principles, describes high-level generic FM processes, lists strategic, tactical and operational processes and provides examples of process workflows. This standard is written from a primary processes, demand perspective for an audience of all stakeholders in FM processes
54	CEN	EN 15221-6:2011	Facility Management - Part 6: Area and Space Measurement in Facility Management	Published	Main	CEN/TC 348	CEN/TC 348/WG 6	2011	European		Facility Management	This European Standard establishes a common basis for planning and design, area and space management, financial assessment, as well as a tool for benchmarking in the field of Facility Management. This standard covers area and space measurement for existing owned or leased buildings as well as buildings in state of planning or development. This standard presents a framework for measuring floor areas within buildings and areas outside of buildings. In addition, it contains clear terms and definitions as well as methods for measuring horizontal areas and volumes in buildings and/or parts of buildings, independent of their function.

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55	CEN	EN 15221-7:2012	Facility Management - Part 7: Guidelines for Performance Benchmarking	Published	Main	CEN/TC 348		2012	European		Facility Management	This European Standard gives guidelines for performance benchmarking and contains clear terms and definitions as well as methods for benchmarking facility management products and services as well as facility management organisations and operations. This European Standard establishes a common basis for benchmarking facility management costs, floor areas and environmental impacts as well as service quality, satisfaction and productivity. This European Standard is applicable to Facility Management as defined in EN 15221-1 and detailed in EN 15221-4.
56	CEN	EN ISO 41001:2018	Facility management - Management systems - Requirements with guidance for use (ISO 41001:2018)	Published	Main	CEN/TC 348		2018	European		Facility Management	ISO 41001:2018 specifies the requirements for a facility management (FM) system when an organization: a) needs to demonstrate effective and efficient delivery of FM that supports the objectives of the demand organization; b) aims to consistently meet the needs of interested parties and applicable requirements; c) aims to be sustainable in a globally-competitive environment. The requirements specified in ISO 41001:2018 are non-sector specific and intended to be applicable to all organizations, or parts thereof, whether public or private sector, and regardless of the type, size and nature of the organization or geographical location. Annex A provides additional guidance on the use of this document.
57	CEN	EN ISO 41011:2018	Facility management - Vocabulary (ISO 41011:2017)	Published	Main	CEN/TC 348		2018	European		Facility Management	ISO 41011:2017 defines terms used in facility management standards.
58	CEN	EN ISO 41012:2018	Facility management - Guidance on strategic sourcing and the development of agreements (ISO 41012:2017)	Published	Main	CEN/TC 348		2018	European		Facility Management	ISO 41012:2017 provides guidance on sourcing and development of agreements in facility management (FM). It highlights: · essential elements in FM sourcing processes; · FM roles and responsibilities in sourcing processes; · development processes and structures of typical agreement models. ISO 41012:2017 is applicable to: · strategic processes related to service and support functions for the core business; · development of FM strategies; · development of facility service provision agreements covering both public and private service demand and internal and external production/delivery options; · development of FM information systems; · FM education and research; · organization development and business re-engineering processes in major types of working environments (e.g. industrial, commercial, administration, military, healthcare, accommodation).
59	CEN	EN ISO 41014:2020	Facility management - Development of facility management strategy (ISO 41014:2020)	Published	Main	CEN/TC 348		2020	European		Facility Management	This document gives guidelines for the development of a strategy for facility management (FM) when the FM organization: a) intends to ensure alignment between FM requirements and the objectives, needs and constraints of the demand organization's core business; b) wants to improve the usefulness and benefits provided by the facilities for the betterment of the demand organization and its core business; c) aims to meet the needs of stakeholders and applicable provisions consistently; d) aims to be sustainable in a globally competitive environment.
60	CEN	FprEN ISO 41015	Facility management - Influencing organizational behaviours for improved facility outcomes (ISO/FDIS 41015:2023)	Draft	Main	CEN/TC 348		under development	European		Facility Management	The standard will outline the ways in which behaviours of management and facility users can significantly influence an organization's operational performance for better outcomes/outputs. It will draw on principles underlying existing standards covering, for example: • design for operability • sustainable use of materials • space utilization • lifecycle maintenance • procurement of services • environmental management • social responsibility • total cost of ownership • facility management It can be regarded as an example of emerging standards focusing on principles and values that allow organizations to succeed with their primary activities and which are also likely to stimulate changes in behaviour with regard to optimal operation of the facility. It takes, as its starting point, the need for thorough briefing of the design and construction team on operational performance requirements to influence positive outcomes of the design on people, place and process. Such performance requirements must be met while still delivering facilities that are safe, secure, efficient and effective and which satisfy the aspirations of the demand organization, facility users and society in general. The requirements, recommendations and guidance in this standard will be based on principles and evidence of appropriate practices in the operation and use of facilities. Collectively, they must demonstrate the impact of efficient operations to ensure they meet operational performance requirements and outcomes. Technical and commercial considerations, as well as cultural, social and psychological aspects, will be covered since there is a growing body of evidence that individuals' attitudes affect environmentally-related expectations and behavior. Facility users and other stakeholders must be adept in achieving defined goals and in communicating outcomes and encouraging positive change. Out of Scope • Influence behaviours that do not have an impact on or create a negative change on the operation of the ISO/TR 41013:2017 outlines the scope, key concepts and benefits of facility management (FM) and provides a context for the use and application of the terms defined in ISO 41011.
61	CEN	CEN ISO/TR 41013:2021	Facility management - Scope, key concepts and benefits (ISO/TR 41013:2017)	Published	Main	CEN/TC 348		2021	European		Facility Management	ISO/TR 41013:2017 outlines the scope, key concepts and benefits of facility management (FM) and provides a context for the use and application of the terms defined in ISO 41011.
62	CEN	prCEN ISO/TR 41016	Technology in facility management - Scope, key concepts and benefits	Draft	Main	CEN/TC 348		under development	European		Facility Management	N/A

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63	CEN	EN ISO 41018:2022	Facility management - Development of a facility management policy (ISO 41018:2022)	Published	Main	CEN/TC 348		2022	European		Facility Management	This document gives guidance on the development of a facility management (FM) policy when the organization: a) intends to establish a framework for setting FM objectives and the effective management of risk; b) intends to achieve alignment between the FM strategy and operational FM requirements; c) wants to improve the usefulness and benefits provided by the FM system; d) aims to meet the needs of interested parties and applicable FM requirements consistently; e) aims to be sustainable.
64	CEN	prEN ISO 41017	Facility management - Guidance on emergency preparedness and management of an epidemic (ISO/DIS 41017:2022)	Draft	Main	CEN/TC 348		under development	European		Facility Management	The purpose of this guide is to ensure the health and safety of people through facility management in response to outbreaks in all types of workplaces, in order to achieve the normal operation of the organization at the same time, but also to assume the responsibility of society. This guide specifies the general, epidemic prevention and control strategy deployment, organization and leadership, epidemic prevention work requirements, resource guarantee, prevention and control process management, prevention and control supervision as well as improvement requirements of the facility management industry. This guide is applicable to the epidemic prevention and control work in the facility management industry.
65	CEN	prCEN ISO/TR 41019	The role of FM in sustainability and resilience	Draft	Main	CEN/TC 348		under development	European		Facility Management	N/A
66	CEN	prEN ISO 41011	Facility management - Vocabulary (ISO/DIS 41011:2023)	Draft	Main	CEN/TC 348		under development	European		Facility Management	Revises EN ISO 41011:2018
67	CEN	prEN 15221-8	Facility Management – Part 8: Principles and processes	Draft	Main	CEN/TC 348	CEN/TC 348/WG 9	under development	European		Facility Management	This document - specifies fundamentals, principles, and processes for Facility Management and provides methods which enable the implementation and use of these within any organization; - specifies criteria to support organisational decisions; - gives guidance for development and improvement of the FM processes to support and enable the function of the primary activities. This standard is based on and replaces EN 15221- 3, - 4, - 5 and - 7.
68	ISO	ISO/TS 12911:2012	Framework for building information modelling (BIM) guidance	Published	Main	ISO/TC 59/SC 13		2012	International		BIM	ISO/TS 12911:2012 establishes a framework for providing specifications for the commissioning of building information modelling (BIM). It is applicable to any range of modelling of buildings and building-related facilities, from a portfolio of assets at a single site or multiple sites, to assets at a single small building and at any constituent system, subsystem, component or element. It is applicable to any asset type, including most infrastructure and public works, equipment and material. BIM processes are applicable across the entire life cycle of a portfolio, facility or component, which can span inception to end-of-use. The main user of the framework is the information manager, who utilizes the framework to assist in structuring an international-, national-project- or facility-level BIM guidance document. The framework can also be used for BIM guidance provided by application providers.
69	ISO	ISO 16354:2013	Guidelines for knowledge libraries and object libraries	Published	Main	ISO/TC 59/SC 13		2013	International		BIM	The aim of ISO 16354:2013 is to distinguish categories of knowledge libraries and to lay the foundation for uniform structures and content of such knowledge libraries and for commonality in their usage. By drawing up a number of guidelines, a guiding principle is provided for new libraries as well as for upgrading existing libraries. Without these guidelines there is an undesirable amount of freedom, so that the various libraries may become too heterogeneous. This would render the comparison, linking and integrated usage of these libraries very complex, if not impossible. The objective of ISO 16354:2013 is to categorize knowledge libraries and object libraries and to provide recommendations for the creation of such libraries. Libraries that are compliant with the guidelines of ISO 16354:2013 may be more easily linked to, or integrated with other libraries. The target audience of ISO 16354:2013 consists of developers of knowledge libraries, builders of translation software or interfaces between knowledge libraries, certifying bodies and builders of applications who must base their work on the knowledge libraries laid down.
70	ISO	ISO 22263:2008	Organization of information about construction works — Framework for management of project information	Published	Main	ISO/TC 59/SC 13		2008	International		BIM	ISO 22263:2008 specifies a framework for the organization of project information (process-related as well as product-related) in construction projects. Its purpose is to facilitate control, exchange, retrieval and use of relevant information about the project and the construction entity. It is intended for all agents in the project organization in management of the construction process as a whole and in coordination of its sub-processes and activities. This framework consists of a number of generic parameters that are applicable to projects of varying complexity, size and duration and is adaptable to national, local and project-specific variations of the construction process.
71	ISO	ISO/TR 23262:2021	GIS (geospatial) / BIM interoperability	Published	Main	ISO/TC 59/SC 13		2021	International		BIM	This document investigates barriers and proposes measures to improve interoperability between geospatial and BIM domains, namely, to align GIS standards developed by ISO/TC 211 and BIM standards developed by ISO/TC 59/SC 13. Where relevant this document takes into account work and documents from other organizations and committees, such as buildingSMART, International (bSI), Open Geospatial Consortium (OGC) and Comité Européen de Normalisation (CEN). The focus is to identify future topics for standardization and possible revision needs of existing standards. This document investigates conceptual and technological barriers between GIS and BIM domains at the data, service and process levels, as defined by ISO 11354 (all parts).

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72	ISO	ISO 12911	Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Framework for specification of BIM implementation	Draft	Main	ISO/TC 59/SC 13		under development	International		BIM	This standard establishes a framework for providing specifications for the internal commissioning and implementation of building information modelling (BIM) during both delivery and in-use phases. It is applicable to buildings, infrastructure, facilities and managed landscapes, of any size or complexity. Authors of BIM implementation specifications, including international and national institutions as well as individual organizations, can use this framework to document their expectations in a way that is clear, concise and checkable. Those supporting specific software application usage can also follow the framework. Implementers of information management processes will benefit from the clear structure and the ability to compare and merge BIM implementation specifications, potentially from multiple sources, to mobilize, execute and check their internal BIM implementations.
73	ISO	ISO/AWI TR 16214	Geospatial and BIM review of vocabularies	Draft	Main	ISO/TC 59/SC 13		under development	International		BIM	N/A
74	ISO	ISO/TR 14177:1994	Classification of information in the construction industry	Withdrawn	Main	ISO/TC 59/SC 13		1994	International		BIM	The primary purpose is to provide the basis for an improved information flow during the creation and use of facilities, and to give guidelines for organizing industry information. The recommendations are aimed at improving the information flow within particular countries and also from country to country. Is intended to be read in conjunction with a series of standards, each of which will define a recommended international classification table (e.g. for facilities, spaces, elements, construction products and attributes). Defines the underlying philosophy, the relationships between them, and the way in which, together, they will be an integrated whole.
75	ISO	ISO/TS 12720:2014	Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392	Published	Main	ISO/TC 59/SC 17		2014	International		Sustainability	ISO/TS 12720:2014 provides guidance for the application of the general principles of sustainability in buildings and civil engineering works elaborated in ISO 15392. It shows the different actors involved with the construction works how to take these principles into account in their decision-making processes in order to increase the contribution of the construction works to sustainability and sustainable development. ISO/TS 12720:2014 provides a step-by-step approach for: encouraging the application of the general principles by all stakeholders at each stage of the project and its use, from the decision to build and the initial development of the project brief until the end-of-life of the construction works; helping interested parties to consider and/or incorporate sustainability thinking in all phases of the building's or civil engineering works' life cycle, for all relevant issues of concern, by raising key questions in relation to the general principles; understanding the outcome (effect) of the application of the general principles; and building on acquired experience to develop best practices and engendering a continuous improvement process.
76	ISO	ISO 15392:2019	Sustainability in buildings and civil engineering works — General principles	Published	Main	ISO/TC 59/SC 17		2019	International		Sustainability	This document identifies and establishes general principles for the contribution of buildings, civil engineering works and other types of construction works (hereinafter referred to collectively as construction works) to sustainable development. It is based on the concept of sustainable development as it applies to the life cycle of construction works, from inception to the end-of-life. This document is applicable to new and existing construction works, individually and collectively, as well as to the materials, products, services and processes related to their life cycle. This document does not provide performance levels (benchmarks) that can serve as the basis for sustainability claims. NOTE 1 The principles established in this document are intended to be applied broadly in the context of construction works. Specific applications are the subject of other related documents. NOTE 2 Construction works are designed to meet numerous requirements, such as those expressed and established by authorities having jurisdiction. In some circumstances, it can be necessary to go beyond established requirements to contribute further to sustainable development. NOTE 3 In this document, unless explicitly stated, the term 'product(s)' implies construction product (3.7) and the term 'service(s)' implies construction service (3.8). This document is not intended to provide the basis for assessment of organizations or other stakeholders, but does acknowledge the importance of their role in the context of contributions to sustainable development by buildings, civil engineering works and other construction works. NOTE 4 More detailed discussions on social responsibility aspects, relative to organizations, can be found in ISO 26000.

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77	ISO	ISO 16745-1:2017	Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 1: Calculation, reporting and communication	Published	Main	ISO/TC 59/SC 17		2017	International		Sustainability	ISO 16745-1:2017 provides requirements for determining and reporting a carbon metric of an existing building, associated with the operation of the building. It sets out methods for the calculation, reporting and communication of a set of carbon metrics for GHG emissions arising from the measured energy use during the operation of an existing building, the measured user-related energy use, and other relevant GHG emissions and removals. These carbon metrics are separated into three measures designated CM1, CM2, and CM3 (see 5.1.1). ISO 16745-1:2017 follows the principles set out in ISO 15392 and those described in Clause 4. Where deviations from the principles in ISO 15392 occur, or where more specific principles are stated, this document takes precedence. The carbon metrics CM1 and CM2 are not quantified based on life cycle assessment (LCA) methodology. Carbon metric CM3 may include partial quantification based on the results of LCA. ISO 16745-1:2017 does not include any method of modelling of the operational energy use of the building but follows the conventions provided by other International Standards, as given in relevant clauses. ISO 16745-1:2017 is not an assessment method for evaluating the overall environmental performance of a building or a building-rating tool and does not include value-based interpretation of the carbon metric(s) through weightings or benchmarking. ISO 16745-1:2017 deals with the application of the carbon metric(s) for an existing building, either residential or commercial, or a building complex. It does not include provisions for regional and/or national building stock.
78	ISO	ISO 16745-2:2017	Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 2: Verification	Published	Main	ISO/TC 59/SC 17		2017	International		Sustainability	ISO 16745-2:2017 specifies requirements for the verification of a carbon metric calculation for GHG emissions of an existing building during the use stage, where the carbon metric calculation is performed in accordance with ISO 16745-1. NOTE Before verification, the carbon metric according to ISO 16745-1 is a claim. Only after the verification according to this document can the carbon metric be communicated as a carbon metric declaration.
79	ISO	ISO 20887:2020	Sustainability in buildings and civil engineering works — Design for disassembly and adaptability — Principles, requirements and guidance	Published	Main	ISO/TC 59/SC 17		2020	International		Sustainability	This document provides an overview of design for disassembly and adaptability (DfD/A) principles and potential strategies for integrating these principles into the design process. This document provides information for owners, architects, engineers, and product designers and manufacturers to assist in their understanding of potential DfD/A options and considerations, and for other parties who are responsible for financing, regulating, constructing, transforming, deconstructing, or demolishing construction works. This document is applicable to all types of buildings (e.g. commercial, industrial, institutional, and residential), civil engineering works (e.g., dams, bridges, roads, railways, runways, utilities, pipelines) and their constituent parts. It can be used for new construction, refurbishment and renovation, and in the design of incremental improvements in, or complete redesign of, buildings, building systems, civil engineering works, and their constituent parts. This document also provides guidance on measuring performance regarding each DfD/A principle and related objectives. This document is intended to be used in conjunction with and following the principles set out in ISO 15392 and the ISO 15686 series. This document does not set specific levels of performance for the disassembly or adaptability of constructed works, however, it does include requirements that are mandatory for the implementation of specific DfD/A principles that are applicable when these principles are adopted.
80	ISO	ISO 21678:2020	Sustainability in buildings and civil engineering works — Indicators and benchmarks — Principles, requirements and guidelines	Published	Main	ISO/TC 59/SC 17		2020	International		Sustainability	This document defines principles, requirements and guidelines for the development and use of benchmarks when assessing the economic, social and/or environmental performance of buildings and civil engineering works by using sustainability indicators. It complements and supports the application of ISO 21929-1 and ISO/TS 21929-2 by creating principles and requirements for the establishment of benchmarks that support target setting, decision making and communication to third parties. This document is also related to ISO 21931-1 and ISO 21931-2 by creating principles, requirements and guidelines for the establishment and use of benchmarks related to environmental performance and other aspects of sustainability. This document describes three types of values for benchmarks (performance levels for comparison purposes): — limit values; — reference values; — target values. This document does not set benchmarks.

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81	ISO	ISO 21929-1:2011	Sustainability in building construction — Sustainability indicators — Part 1: Framework for the development of indicators and a core set of indicators for buildings	Published	Main	ISO/TC 59/SC 17		2011	International		Sustainability	ISO 21929-1:2011 establishes a core set of indicators to take into account in the use and development of sustainability indicators for assessing the sustainability performance of new or existing buildings, related to their design, construction, operation, maintenance, refurbishment and end of life. Together, the core set of indicators provides measures to express the contribution of a building(s) to sustainability and sustainable development. These indicators represent aspects of buildings that impact on areas of protection related to sustainability and sustainable development. The object of consideration in ISO 21929-1:2011 is a building or a group of buildings and the external works within the site (curtilage). ISO 21929-1:2011 follows the principles set out in ISO 15392 and, where appropriate, is intended for use in conjunction with, and following the principles set out in, ISO 26000, ISO 14040 and the family of International Standards that includes ISO 14020, ISO 14021, ISO 14024 and ISO 14025. Where deviation occurs or where more specific requirements are stated, ISO 21929-1:2011 takes precedence. ISO 21929-1:2011 adapts general sustainability principles for buildings; includes a framework for developing sustainability indicators for use in the assessment of economic, environmental and social impacts of buildings; determines the aspects for consideration when defining a core set of sustainability indicators for buildings; establishes a core set of indicators; describes how to use sustainability indicators; and gives rules for establishing a system of indicators. ISO 21929-1:2011 does not give guidelines for the weighting of indicators or the aggregation of assessment results.
82	ISO	ISO/TS 21929-2:2015	Sustainability in building construction — Sustainability indicators — Part 2: Framework for the development of indicators for civil engineering works	Published	Main	ISO/TC 59/SC 17		2015	International		Sustainability	ISO/TS 21929-2:2015 establishes a list of aspects and impacts which should be taken as the basis for the development of sustainability indicators for assessing the sustainability performance of new or existing civil engineering works, related to their design, construction, operation, maintenance, refurbishment and end-of-life. Together, the indicators developed from this list of aspects and impacts provide measures to express the contribution of a civil engineering works to sustainability and sustainable development. The developed indicators should represent aspects of civil engineering works that impact on issues of concern related to sustainability and sustainable development. The object of consideration in ISO/TS 21929-2:2015 is a civil engineering works, a part of the civil engineering works or a combination of several civil engineering works.
83	ISO	ISO 21930:2017	Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services	Published	Main	ISO/TC 59/SC 17		2017	International		Sustainability	ISO 21930:2017 provides the principles, specifications and requirements to develop an environmental product declaration (EPD) for construction products and services, construction elements and integrated technical systems used in any type of construction works. ISO 21930:2017 complements ISO 14025 by providing specific requirements for the EPD of construction products and services. ISO 21930:2017 establishes a core set of requirements to be considered as core product category rules (PCR) to develop an EPD for any construction product or service. In addition, this document, as the core PCR document for construction products, construction elements and integrated technical systems: a) includes the rules for calculating the life cycle inventory analysis (LCI), the predetermined environmental indicators and the life cycle impact assessment (LCIA) results that are reported in the EPD; b) describes which life cycle stages are considered in a particular type of EPD, which processes are to be included in the life cycle stages and how the stages are subdivided into information modules; c) defines rules for the development of scenarios; d) includes the rules for reporting relevant environmental and technical information that are not covered by LCA; e) defines the core elements to be included in an EPD; f) establishes the structure of a project report; g) defines the conditions under which construction products can be compared, based on the information provided by an EPD; h) provides requirements and guidelines on PCR for sub-categories of construction products; i) includes mandatory and unalterable requirements for any PCR based on this document. EPDs for construction products, as described in this document, are primarily intended for use in B2B communication, but their use in B2C communication under certain conditions is not precluded. For EPDs intended for B2C communication, refer to ISO 14025 (see 5.4). The assessment of social and economic impacts at the product level is not covered by this document. NOTE 1 In this document, unless otherwise designated, the term construction product is used for any good(s) or service(s) related to construction works. NOTE 2 Construction assemblies, construction elements and integrated technical systems, incorporated

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84	ISO	ISO 21931-1:2022	Sustainability in buildings and civil engineering works — Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment — Part 1: Buildings	Published	Main	ISO/TC 59/SC 17		2022	International		Sustainability	This document provides a general framework for improving the quality and comparability of methods for assessing the environmental, social and economic performance of construction works, and their combination as a basis for the sustainability assessment of buildings. It identifies and describes issues to be taken into account in the development and use of methods of assessment of the environmental, social and economic characteristics, aspects and impacts of new or existing buildings. These relate to the building's design, production of construction products, materials and components, construction, operation, maintenance and refurbishment and end-of-life processes. This document is applicable to the assessment of the building (or part thereof) and the external works within its site (curtilage). NOTE The assessment of environmental, social and economic aspects related to the location of the building, such as those resulting from transportation of the users, can extend beyond the area of the building site. This document does not set benchmarks or levels of performance relative to environmental, social and economic impacts and aspects.
85	ISO	ISO 21931-2:2019	Sustainability in buildings and civil engineering works — Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment — Part 2: Civil engineering works	Published	Main	ISO/TC 59/SC 17		2019	International		Sustainability	This document provides a general framework for improving the quality and comparability of methods for assessing the contribution of civil engineering works and their related external works to sustainable development based on a life cycle approach. This document aims to bridge the gap between regional and national methods for the assessment of the sustainability performance of civil engineering works by providing a common framework for their expression. This document identifies and describes issues to be taken into account in the development and use of methods for the assessment of the sustainability performance for all types of civil engineering works, both new and existing, and it is relevant for the assessment of the environmental, social and economic performance of both new and existing civil engineering works over their entire life cycle. The object of assessment in this document is the civil engineering works itself and its area of influence. NOTE 1 For example, the assessment includes any local civil engineering works beyond the immediate area of the civil engineering works; the transportation of the users of the civil engineering works; and the use and exploitation of the civil engineering works itself. Assessments can be undertaken either for the whole civil engineering works, for a part of the civil engineering works, or for a combination of several civil engineering works. This document excludes environmental, social and economic risk assessment, but the results of a risk assessment can be taken into consideration. This document is intended to be used in conjunction with, and following the principles set out in, ISO 15392 and the ISO 14000 family of International Standards. The evaluation of technical and functional performance of the civil engineering works is outside the scope of this document, but the technical and functional characteristics are considered within this framework by reference to the functional equivalent. The functional equivalent takes into account the technical and functional requirements and forms the basis for comparisons of the results of the assessment. Assessment methods that consider only one or two of the three dimensions of sustainability are outside the scope of this document. This document does not set benchmarks or levels of performance relative to environmental, social and economic aspects and impacts. NOTE 2 Valuation methods, levels, classes or benchmarks can be prescribed in the requirements for environmental, social and economic performance in the client's brief, construction regulations, national ISO/TR 21932:2013 provides a compilation of terms and definitions of concepts related to both the construction and use of a building or civil engineering works, and the effect of such construction works on sustainability and sustainable development, as applied in the documents of ISO/TC 59/SC 17, Sustainability in buildings and civil engineering works.
86	ISO	ISO/TR 21932:2013	Sustainability in buildings and civil engineering works — A review of terminology	Published	Main	ISO/TC 59/SC 17		2013	International		Sustainability	ISO/TR 21932:2013 provides a compilation of terms and definitions of concepts related to both the construction and use of a building or civil engineering works, and the effect of such construction works on sustainability and sustainable development, as applied in the documents of ISO/TC 59/SC 17, Sustainability in buildings and civil engineering works.
87	ISO	ISO/AWI TS 12720	Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392	Draft	Main	ISO/TC 59/SC 17		under development	International		Sustainability	ISO/TS 12720:2014 provides guidance for the application of the general principles of sustainability in buildings and civil engineering works elaborated in ISO 15392. It shows the different actors involved with the construction works how to take these principles into account in their decision-making processes in order to increase the contribution of the construction works to sustainability and sustainable development. ISO/TS 12720:2014 provides a step-by-step approach for: encouraging the application of the general principles by all stakeholders at each stage of the project and its use, from the decision to build and the initial development of the project brief until the end-of-life of the construction works; helping interested parties to consider and/or incorporate sustainability thinking in all phases of the building's or civil engineering works' life cycle, for all relevant issues of concern, by raising key questions in relation to the general principles; understanding the outcome (effect) of the application of the general principles; and building on acquired experience to develop best practices and engendering a continuous improvement process.
88	ISO	ISO/PRF 21928-2	Sustainability in buildings and civil engineering works — Sustainability indicators — Part 2: Framework for the development of indicators for civil engineering works	Draft	Main	ISO/TC 59/SC 17		under development	International		Sustainability	N/A
89	ISO	ISO/AWI TR 41030	Facility management — Existing performance management in facility management organizations — State of the industry	Draft	Main	ISO/TC 267		under development	International		Facility Management	N/A

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90	BSI	BS EN ISO 19650-2:2018/NA	Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Information management using building information modelling - Delivery phase of the assets - National Annex	Published	National Annex	B/555		2021	National		BIM	The UK National Annex to BS EN ISO 19650-2:2018 Organization of information about construction works — Information management using building information modelling — Part 2: Delivery phase of the assets is part of the UK BIM framework and contains the UK-specific recommendations for information management on projects. The NA was revised in close collaboration with users of the document, making seven main changes that clarify and streamline ISO 19650-2. The main changes include: A new table summarizing field codes and their purposes in the information container ID The removal of field code length recommendations The renaming of several fields for greater accuracy and clarity The revision of some standard codes to make lists more succinct The revision of status code lists for the common data environment to simplify them Clarification of how classification can be used
91	ASTM	ASTM E2114 - 19	Standard Terminology for Sustainability Relative to the Performance of Buildings	Published	ASTM - United States			2021	International		Sustainability	This terminology consists of terms and definitions pertaining to sustainable development and, in particular, to sustainability relative to the performance of buildings. The purpose of this terminology is to provide meanings and explanations of terms applicable to sustainable development. In the interest of common understanding and standardization, consistent word usage is encouraged to help eliminate the major barrier to effective technical communication. It is recommended that terms used only within an individual standard, and having a meaning unique to that standard, be defined or explained in the terminology section of that individual standard. Certain standard definitions herein are adopted from other sources. Each is an exact copy. The source is identified at the right margin following the definition and is listed in Section 2. Terms are listed in alphabetical sequence. Compound terms appear in the natural spoken order.
92	ASTM	ASTM E2432 - 19	Standard Guide for General Principles of Sustainability Relative to Buildings	Published	ASTM - United States			2019	International		Sustainability	1.1 Sustainability has three types of general principles: environmental, economic, and social. This guide covers the fundamental concepts and associated building characteristics for each of the general principles of sustainability. 1.2 This guide distinguishes between ideal sustainability and applied sustainability. Ideally, human activities would not require making trade-offs among environmental, economic, and social goals. However, this guide recognizes that, in applying sustainability principles to buildings, decision makers must often balance opportunities and challenges associated with each of the general principles. 1.3 This guide identifies general methodologies associated with the decision-making process used in pursuing sustainability. 1.4 This guide addresses buildings individually and in aggregate (collectively). 1.4.1 The general principles identified in this guide are applicable to all scales of building projects, including: interior spaces, individual buildings and groups of buildings, infrastructure systems, and land use. 1.4.2 The general principles identified in this guide are applicable to all life-cycle stages of a building and its components, including: material extraction, product manufacturing, product transportation, planning, siting, design, specification, construction, operation, maintenance, renovation, retrofit, reuse, deconstruction, and waste disposal of buildings. 1.5 A variety of tools and standards exist that qualify and quantify impacts of buildings, building materials, and building methods in terms of one or more of the general principles of sustainability. It is not within the scope of this standard to recreate or replace these tools. 1.6 This guide does not provide direction as to the specific implementation of the general principles; nor does it provide direction as to the specific weighting of principles necessary for achieving balance. 1.7 Applying the principles in this guide will require professional judgment. Such judgment should be informed by experience with environmental, economic, and social issues as appropriate to the building use, type, scale, and location. 1.8 This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this guide may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged. nor should this document be applied without consideration of a

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93	ASTM	ASTM E2129 - 18	Standard Practice for Data Collection for Sustainability Assessment of Building Products	Published	ASTM - United States			2018	International		Sustainability	1.1 This practice covers a set of instructions for collecting data to be used in assessing the sustainability of building products for use in both commercial and residential buildings. 1.1.1 There are many features of a building that contribute to sustainability; one of them is the selection of products for use in a building. Other key features influencing sustainability include, but are not limited to: overall efficiency of the design of the building, the impact the building has on the habits of the occupants, and the impact the building has on the microclimate and macroclimate. This practice addresses sustainability issues related to building products. This practice does not address sustainability issues related to overall building design, site selection, building operations, or other features influencing sustainability. 1.1.2 While it is recommended that users rely on professional judgment informed by both environmental expertise and specific knowledge of the intended use of the product, this practice provides no instruction as to interpretation of the data obtained. Interpretation of the data obtained is the responsibility of the user of this practice. 1.1.3 This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This practice is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "standard" in the title means only that the document has been approved through the ASTM consensus process.
94	ASTM	ASTM D8418 - 21	Standard Guide for Material and Construction Standards Related to Sustainability	Published	ASTM - United States			2021	International		Sustainability	1.1 This guide is intended to be a reference for locating specific test methods relating to materials and construction standards within the jurisdiction of Committee D04 on Road and Paving Materials that could be a strategy used to meet project sustainability goals. 1.2 The guide needs to be reviewed and updated by Subcommittee D04.99 on Sustainable Asphalt Pavement Materials and Construction, on an as-needed basis, to remain viable. 1.2.1 Additions or deletions to the reference list in Section 2 shall be submitted to Subcommittee D04.99 and balloted. 1.3 Units-The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard. 1.4 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.
95	BSI	BS 8902:2009	Responsible sourcing sector certification schemes for construction products. Specification	Published	BSI standard	SDS/1/6		2009	National		Sustainability	As the importance of green procurement strategies in the building and construction sectors grows, government is requiring suppliers and contractors to improve their sustainability performance. Responsible sourcing schemes are a major part of this activity. Responsible sourcing is the management of sustainable development in the provision or procurement of a product. BS 8902 provides a framework for the development of sector certification schemes for responsible sourcing of construction products. It gives requirements for the management, development, content and operation of sector certification schemes for responsible sourcing and supply of construction products. It does so in alignment with the guidance given in BS 8900:2006 Guidance for managing sustainable development. The main differences from BS 8900 are that BS 8902 includes specific requirements for audit and review, which are not to be found in BS 8900. BS 8902 embraces the principles in BS 8900 but is specific to the supply of construction products within a responsible sourcing scheme. However, whereas BS 8900 has the broadest application to organizations (and individuals) and is independent of the nature of their activities, this standard focuses more specifically on bodies that certify construction products. The relationship between BS 8902, any sector certification schemes developed in conformity with it and the organizations likely to be involved is included in the standard. Note that, although accreditation of certification schemes is desirable, accreditation is not and cannot be a requirement of this standard.
96	BSI	BS 8587:2012	Guide to facility information management	Published	BSI standard	FMW/1		2012	National		Facility Management	BS 8587 is a British standard on facility information management and its guidance. BS 8587 provides owners, operators, tenants, facility managers and property managers with guidance and recommendations in regard to the management of information and data concerning the facilities they own and/or operate. BS 8587 is applicable to organizations managing an existing facility as well as those planning the delivery of a new facility. Whilst primarily intended for organizations in the private sector, the standard might have benefits for public sector bodies. Note: BS 8587 does not cover the information and data required to deliver the operational asset, but includes recommended actions to assist in safe, correct, efficient and effective operation of the asset.

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97	ASTM	ASTM E1836/E1836M - 09(2016)	Standard Practice for Building Floor Area Measurements for Facility Management	Published	ASTM - United States			2012	International		Facility Management	1.1 This practice provides a definitive procedure for measuring and classifying floor area in buildings for use in facility management, specifying occupant requirements, space planning, and for strategic facility planning. 1.2 This practice specifies the sequence in which to measure floor area. 1.3 This practice is applicable to owned, rented, and leased buildings. 1.4 Use Annex A1 to measure floor area in office facilities. The measurement practice in Annex A1 may also be suitable for use in other functional types of building which include offices, such as research, laboratory, or manufacturing buildings and building-related facilities. 1.5 The practice in Annex A1 is not intended for use in lease negotiations with owners of commercial office buildings or related properties. For that purpose, refer to the American National Standard published by the American National Standards Institute under the designation ANSI/BOMA Z65.1-1996 and commonly known as the ANSI-BOMA standard. 1.6 This practice is not intended for and not suitable for use for regulatory purposes, fire hazard assessment, and fire risk assessment. 1.7 This practice was developed for use within North America and includes some rules comparable to ISO 9836 Performance Standards in Building-Definition and Calculation of Area and Space Indicators. 1.8 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.
98	ISO	ISO/IEC TS 4213:2022	Information technology — Artificial intelligence — Assessment of machine learning classification performance	Published	Main	ISO/IEC JTC 1/SC 42		2022	International		Artificial intelligence	This document specifies methodologies for measuring classification performance of machine learning models, systems and algorithms.
99	ISO	ISO/IEC 20546:2019	Information technology — Big data — Overview and vocabulary	Published	Main	ISO/IEC JTC 1/SC 42		2019	International		Artificial intelligence	This document provides a set of terms and definitions needed to promote improved communication and understanding of this area. It provides a terminological foundation for big data-related standards. This document provides a conceptual overview of the field of big data, its relationship to other technical areas and standards efforts, and the concepts ascribed to big data that are not new to big data.
100	ISO	ISO/IEC TR 20547-1:2020	Information technology — Big data reference architecture — Part 1: Framework and application process	Published	Main	ISO/IEC JTC 1/SC 42		2020	International		Artificial intelligence	This document describes the framework of the big data reference architecture and the process for how a user of the document can apply it to their particular problem domain.
101	ISO	ISO/IEC TR 20547-2:2018	Information technology — Big data reference architecture — Part 2: Use cases and derived requirements	Published	Main	ISO/IEC JTC 1/SC 42		2018	International		Artificial intelligence	ISO/IEC TR 20547-2:2018 provides examples of big data use cases with application domains and technical considerations derived from the contributed use cases.
102	ISO	ISO/IEC 20547-3:2020	Information technology — Big data reference architecture — Part 3: Reference architecture	Published	Main	ISO/IEC JTC 1/SC 42		2020	International		Artificial intelligence	This document specifies the big data reference architecture (BDRA). The reference architecture includes concepts and architectural views. The reference architecture specified in this document defines two architectural viewpoints: — a user view defining roles/sub-roles, their relationships, and types of activities within a big data ecosystem; — a functional view defining the architectural layers and the classes of functional components within those layers that implement the activities of the roles/sub-roles within the user view. The BDRA is intended to: — provide a common language for the various stakeholders; — encourage adherence to common standards, specifications, and patterns; — provide consistency of implementation of technology to solve similar problem sets; — facilitate the understanding of the operational intricacies in big data; — illustrate and understand the various big data components, processes, and systems, in the context of an overall big data conceptual model; — provide a technical reference for government departments, agencies and other consumers to understand, discuss, categorize and compare big data solutions; and — facilitate the analysis of candidate standards for interoperability, portability, reusability, and extensibility.
103	ISO	ISO/IEC TR 20547-5:2018	Information technology — Big data reference architecture — Part 5: Standards roadmap	Published	Main	ISO/IEC JTC 1/SC 42		2018	International		Artificial intelligence	ISO/IEC TR 20547-5:2018 describes big data relevant standards, both in existence and under development, along with priorities for future big data standards development based on gap analysis.
104	ISO	ISO/IEC 22989:2022	Information technology — Artificial intelligence — Artificial intelligence concepts and terminology	Published	Main	ISO/IEC JTC 1/SC 42		2022	International		Artificial intelligence	This document establishes terminology for AI and describes concepts in the field of AI. This document can be used in the development of other standards and in support of communications among diverse, interested parties or stakeholders. This document is applicable to all types of organizations (e.g. commercial enterprises, government agencies, not-for-profit organizations).
105	ISO	ISO/IEC 23053:2022	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)	Published	Main	ISO/IEC JTC 1/SC 42		2022	International		Artificial intelligence	This document establishes an Artificial Intelligence (AI) and Machine Learning (ML) framework for describing a generic AI system using ML technology. The framework describes the system components and their functions in the AI ecosystem. This document is applicable to all types and sizes of organizations, including public and private companies, government entities, and not-for-profit organizations, that are implementing or using AI systems.
106	ISO	ISO/IEC TR 24027:2021	Information technology — Artificial intelligence (AI) — Bias in AI systems and AI aided decision making	Published	Main	ISO/IEC JTC 1/SC 42		2021	International		Artificial intelligence	This document addresses bias in relation to AI systems, especially with regards to AI-aided decision-making. Measurement techniques and methods for assessing bias are described, with the aim to address and treat bias-related vulnerabilities. All AI system lifecycle phases are in scope, including but not limited to data collection, training, continual learning, design, testing, evaluation and use.

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107	ISO	ISO/IEC TR 24028:2020	Information technology — Artificial intelligence — Overview of trustworthiness in artificial intelligence	Published	Main	ISO/IEC JTC 1/SC 42		2020	International		Artificial intelligence	This document surveys topics related to trustworthiness in AI systems, including the following: — approaches to establish trust in AI systems through transparency, explainability, controllability, etc.; — engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and — approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security and privacy of AI systems. The specification of levels of trustworthiness for AI systems is out of the scope of this document.
108	ISO	ISO/IEC TR 24029-1:2021	Artificial Intelligence (AI) — Assessment of the robustness of neural networks — Part 1: Overview	Published	Main	ISO/IEC JTC 1/SC 42		2021	International		Artificial intelligence	This document provides background about existing methods to assess the robustness of neural networks.
109	ISO	ISO/IEC TR 24030:2021	Information technology — Artificial intelligence (AI) — Use cases	Published	Main	ISO/IEC JTC 1/SC 42		2021	International		Artificial intelligence	This document provides a collection of representative use cases of AI applications in a variety of domains.
110	ISO	ISO/IEC TR 24368:2022	Information technology — Artificial intelligence — Overview of ethical and societal concerns	Published	Main	ISO/IEC JTC 1/SC 42		2022	International		Artificial intelligence	This document provides a high-level overview of AI ethical and societal concerns. In addition, this document: — provides information in relation to principles, processes and methods in this area; — is intended for technologists, regulators, interest groups, and society at large; — is not intended to advocate for any specific set of values (value systems). This document includes an overview of International Standards that address issues arising from AI ethical and societal concerns.
111	ISO	ISO/IEC TR 24372:2021	Information technology — Artificial intelligence (AI) — Overview of computational approaches for AI systems	Published	Main	ISO/IEC JTC 1/SC 42		2021	International		Artificial intelligence	This document provides an overview of the state of the art of computational approaches for AI systems, by describing: a) main computational characteristics of AI systems; b) main algorithms and approaches used in AI systems, referencing use cases contained in ISO/IEC TR 24030.
112	ISO	ISO/IEC 24668:2022	Information technology — Artificial intelligence — Process management framework for big data analytics	Published	Main	ISO/IEC JTC 1/SC 42		2022	International		Artificial intelligence	This document provides a framework for developing processes to effectively leverage big data analytics across the organization irrespective of the industries or sectors. This document specifies process management for big data analytics with its various process categories taken into account along with their interconnectivities. These process categories are organization stakeholder processes, competency development processes, data management processes, analytics development processes and technology integration processes. This document describes processes to acquire, describe, store and process data at an organization level which provides big data analytics services.
113	ISO	ISO/IEC 38507:2022	Information technology — Governance of IT — Governance implications of the use of artificial intelligence by organizations	Published	Main	ISO/IEC JTC 1/SC 42		2022	International		Artificial intelligence	This document provides guidance for members of the governing body of an organization to enable and govern the use of Artificial Intelligence (AI), in order to ensure its effective, efficient and acceptable use within the organization. This document also provides guidance to a wider community, including: — executive managers; — external businesses or technical specialists, such as legal or accounting specialists, retail or industrial associations, or professional bodies; — public authorities and policymakers; — internal and external service providers (including consultants); — assessors and auditors. This document is applicable to the governance of current and future uses of AI as well as the implications of such use for the organization itself. This document is applicable to any organization, including public and private companies, government entities and not-for-profit organizations. This document is applicable to an organization of any size irrespective of their dependence on data or information technologies.
114	ISO	ISO/IEC CD 5259-1	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 1: Overview, terminology, and examples	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goal: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
115	ISO	ISO/IEC CD 5259-2	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 2: Data quality measures	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goals: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Responsible Consumption and Production. Ensure sustainable consumption and production patterns
116	ISO	ISO/IEC CD 5259-3	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 3: Data quality management requirements and guidelines	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goals: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Responsible Consumption and Production. Ensure sustainable consumption and production patterns
117	ISO	ISO/IEC CD 5259-4	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 4: Data quality process framework	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goals: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Responsible Consumption and Production. Ensure sustainable consumption and production patterns
118	ISO	ISO/IEC AWI 5259-5	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 5: Data quality governance	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document provides a data quality governance framework for analytics and machine learning to enable governing bodies of organizations to direct and oversee the implementation and operation of data quality measures, management, and related processes with adequate controls throughout the data life cycle. This document can be applied to any analytics and machine learning. This document does not define specific management requirements or process requirements specified in 5259-3 and 5259-4 respectively.

No crt	Standards developing organization (SDO)	Standard reference	Standard Title	Standard Status (published/draft /withdrawn)	Standard Category (basic standard, process standard, product standard)	Responsible Body Technical Committee (TC)	Drafting Body Working group (WG)	Date of publication (Year)	Level (international , european, national)	Status Updated by the end of the project	Domain (BIM, Facility Management, Sustainability etc)	Abstract
119	ISO	ISO/IEC DIS 5338	Information technology — Artificial intelligence — AI system life cycle processes	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goal: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
120	ISO	ISO/IEC DIS 5339	Information technology — Artificial intelligence — Guidance for AI applications	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goal: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
121	ISO	ISO/IEC DIS 5392	Information technology — Artificial intelligence — Reference architecture of knowledge engineering	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goals: Good Health and Well-being. Ensure healthy lives and promote well-being for all at all ages; Quality Education. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; Decent Work and Economic Growth. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
122	ISO	ISO/IEC CD TR 5469	Artificial intelligence — Functional safety and AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	Not available
123	ISO	ISO/IEC AWI TS 6254	Information technology — Artificial intelligence — Objectives and approaches for explainability of ML models and AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document describes approaches and methods that can be used to achieve explainability objectives of stakeholders with regards to ML models and AI systems' behaviours, outputs, and results. Stakeholders include but are not limited to, academia, industry, policy makers, and end users. It provides guidance concerning the applicability of the described approaches and methods to the identified objectives throughout the AI system's life cycle, as defined in ISO/IEC 22989.
124	ISO	ISO/IEC DIS 8183	Information technology — Artificial intelligence — Data life cycle framework	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document provides an overarching data life cycle framework that is instantiable for any AI system from data ideation to decommission. This document is applicable to the data processing throughout the AI system life cycle including the acquisition, creation, development, deployment, maintenance and decommissioning. This document does not define specific services, platforms or tools. This document is applicable to all organizations, regardless of type, sizes and nature, that use data in the development and use of AI systems.
125	ISO	ISO/IEC AWI TS 8200	Information technology — Artificial intelligence — Controllability of automated artificial intelligence systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document defines a basic framework with principles, characteristics and approaches for the realization and enhancement for automated artificial intelligence (AI) systems' controllability. The following areas are covered: — State observability and state transition — Control transfer process and cost — Reaction to uncertainty during control transfer — Verification and validation approaches This document is applicable to all types of organizations (e.g. commercial enterprises, government agencies, not-for-profit organizations) developing and using AI systems during their whole life cycle.
126	ISO	ISO/IEC AWI TS 12791	Information technology — Artificial intelligence — Treatment of unwanted bias in classification and regression machine learning tasks	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document provides mitigation techniques that can be applied throughout the AI system life cycle in order to treat unwanted bias. This document describes how to address unwanted bias in AI systems that use machine learning to conduct classification and regression tasks. This document is applicable to all types and sizes of organization.
127	ISO	ISO/IEC AWI 12792	Information technology — Artificial intelligence — Transparency taxonomy of AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document defines a taxonomy of information elements to assist AI stakeholders with identifying and addressing the needs for transparency of AI systems. The document describes the semantics of the information elements and their relevance to the various objectives of different AI stakeholders. This document uses a horizontal approach and is applicable to any kind of organization and application involving AI. V02/
128	ISO	ISO/IEC AWI TS 17847	Information technology — Artificial intelligence — Verification and validation analysis of AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document describes approaches and provides guidance on processes for the verification and validation analysis of AI systems (comprising AI system components and the interaction of non-AI components with the AI system components) including formal methods, simulation and evaluation. This document is applicable for AI systems verification and validation in the context of the AI system life cycle stages described in ISO/IEC 22989. This document is applicable to all types of organizations engaged in the development, deployment and use of AI systems.
129	ISO	ISO/IEC AWI TR 17903	Information technology — Artificial intelligence — Overview of machine learning computing devices	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	Not available
130	ISO	ISO/IEC AWI TR 20226	Information technology — Artificial intelligence — Environmental sustainability aspects of AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	Not available
131	ISO	ISO/IEC 23894	Information technology — Artificial intelligence — Guidance on risk management	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goals: Gender Equality. Achieve gender equality and empower all women and girls; Decent Work and Economic Growth. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Reduced Inequalities. Reduce inequality within and among countries; Responsible Consumption and Production. Ensure sustainable consumption and production patterns
132	ISO	ISO/IEC FDIS 24029-2	Artificial intelligence (AI) — Assessment of the robustness of neural networks — Part 2: Methodology for the use of formal methods	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goal: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
133	ISO	ISO/IEC CD TR 24030	Information technology — Artificial intelligence (AI) — Use cases	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document provides a collection of representative use cases of AI applications in a variety of domains.
134	ISO	ISO/IEC AWI TS 25058	Software and systems engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guidance for quality evaluation of AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goal: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; No Poverty. End poverty in all its forms everywhere

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135	ISO	ISO/IEC DIS 25059	Software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality model for AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goal: Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Decent Work and Economic Growth. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
136	ISO	ISO/IEC AWI TS 29119-11	Software and systems engineering — Software testing — Part 11: Testing of AI systems	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document describes testing techniques (including those described in ISO/IEC/IEEE 29119-4) applicable for AI systems in the context of the AI system life cycle model stages defined in ISO/IEC 22989. It describes how AI and ML assessment metrics can be used in the context of those testing techniques. It also maps testing processes, including those described in ISO/IEC/IEEE 29119-2, to the verification and validation stages in the AI system life cycle.
137	ISO	ISO/IEC DIS 42001	Information technology — Artificial intelligence — Management system	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This standard contributes to the following Sustainable Development Goals: Gender Equality. Achieve gender equality and empower all women and girls; Affordable and Clean Energy. Ensure access to affordable, reliable, sustainable and modern energy for all; Decent Work and Economic Growth. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Industry, Innovation and Infrastructure. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Reduced Inequalities. Reduce inequality within and among countries; Responsible Consumption and Production. Ensure sustainable consumption and production patterns; Life Below Water. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
138	ISO	ISO/IEC AWI 42005	Information technology — Artificial intelligence — AI system impact assessment	Draft	Main	ISO/IEC JTC 1/SC 42		under development	International		Artificial intelligence	This document provides guidance for organizations performing AI system impact assessments for individuals and societies that can be affected by an AI system and its intended and foreseeable applications. It includes considerations for how and when to perform such assessments and at what stages of the AI system lifecycle, as well as guidance for AI system impact assessment documentation. Additionally, this guidance includes how this AI system impact assessment process can be integrated into an organization's AI risk management and AI management system. This document is intended for use by organizations developing, providing, or using AI systems. This document is applicable to any organization, regardless of size, type and nature.
139	ISO	ISO/IEC 14772-1:1997	Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language — Part 1: Functional specification and UTF-8 encoding	Published	Main	ISO/IEC JTC 1/SC 24		1997	International		Virtual Reality	ISO/IEC 14772, the Virtual Reality Modeling Language (VRML), defines a file format that integrates 3D graphics and multimedia. Conceptually, each VRML file is a 3D time-based space that contains graphic and aural objects that can be dynamically modified through a variety of mechanisms. This part of ISO/IEC 14772 defines a primary set of objects and mechanisms that encourage composition, encapsulation, and extension. The semantics of VRML describe an abstract functional behaviour of time-based, interactive 3D, multimedia information. ISO/IEC 14772 does not define physical devices or any other implementation-dependent concepts (e.g., screen resolution and input devices). ISO/IEC 14772 is intended for a wide variety of devices and applications, and provides wide latitude in interpretation and implementation of the functionality. For example, ISO/IEC 14772 does not assume the existence of a mouse or 2D display device. Each VRML file: a. implicitly establishes a world coordinate space for all objects defined in the file, as well as all objects included by the file; b. explicitly defines and composes a set of 3D and multimedia objects; c. can specify hyperlinks to other files and applications; d. can define object behaviours. An important characteristic of VRML files is the ability to compose files together through inclusion and to relate files together through hyperlinking. For example, consider the file earth.wrl which specifies a world that contains a sphere representing the earth. This file may also contain references to a variety of other VRML files representing cities on the earth (e.g., fileparis.wrl). The enclosing file, earth.wrl, defines the coordinate system that all the cities reside in. Each city file defines the world coordinate system that the city resides in but that becomes a local coordinate system when contained by the earth file. Hierarchical file inclusion enables the creation of arbitrarily large, dynamic worlds. Therefore, VRML ensures that each file is completely described by the objects contained within it. Another essential characteristic of VRML is that it is intended to be used in a distributed environment such as the World Wide Web. There are various objects and mechanisms built into the language that support multiple distributed files, including: e. in-lining of other VRML files; f. hyperlinking to other files; g. using established Internet and ISO standards for other file formats;
140	ISO	ISO/IEC 14772-1:1997/Amd 1:2003	Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language — Part 1: Functional specification and UTF-8 encoding — Amendment 1: Enhanced interoperability	Published	Amendment	ISO/IEC JTC 1/SC 24		2003	International		Virtual Reality	Not available

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141	ISO	ISO/IEC 14772-2:2004	Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language (VRML) — Part 2: External authoring interface (EAI)	Published	Main	ISO/IEC JTC 1/SC 24		2004	International		Virtual Reality	ISO/IEC 14772-1, the Virtual Reality Modeling Language (VRML), defines a file format that integrates 3D graphics and multimedia. Conceptually, each VRML file is a 3D time-based space that contains graphic and aural objects that can be dynamically modified through a variety of mechanisms. This part of ISO/IEC 14772 defines the interface that applications external to the VRML browser may use to access and manipulate the objects defined in ISO/IEC 14772-1. The interface described here is designed to allow an external environment to access nodes in a VRML scene using the existing VRML event model. In this model, an eventOut of a given node can be routed to an eventIn of another node. When the eventOut generates an event, the eventIn is notified and its node processes that event. Additionally, if a script in a Script node has a reference to a given node it can send events directly to any eventIn of that node and it can read the last value sent from any of its eventOuts. The scope of this standard is to cover all forms of access to a VRML browser from external applications. It is equally valid for a database with an object interface to access a standalone browser in a presentation slide as it is for a Java applet operating within a web browser and the available services do not vary. This standard does not provide a byte level protocol description as there can be many valid ways of expressing an interaction with a browser. Instead, it represents the interface in terms of the services provided and the parameters that are passed to access these services. Individual language and protocol bindings to these services are available as annexes to this part of ISO/IEC 14772.
142	CEN	prCEN/CLC/TR 17894	Artificial Intelligence Conformity Assessment	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	This document sets out a review of the current methods and practices (including tools, assets, and conditions of acceptability) for conformity assessment in respect to, among others, products, services, processes, management systems, organizations, or persons, as relevant for the development and use of AI systems. It includes an industry horizontal (vertical agnostic) perspective as well as an industry vertical perspective. This document focuses only on the process of assessment and gap analysis of conformity. It defines the objects of conformity related to AI systems and all other related aspects of the process of conformity assessment. The document also reviews to what extent AI poses specific challenges with respect to assessment of, for example, software engineering, data quality and engineering processes. This document takes into account requirements and orientations from policy frameworks such as the EU AI strategy and those from CEN and CENELEC member countries. This document is intended for technologists, standards bodies, regulators and interested parties.
143	CEN	prCEN/CLC/TR XXXX (pr=JT021002)	Artificial Intelligence - Overview of AI tasks and functionalities related to natural language processing	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	Not available
144	CEN	prCEN/TR XXX (WI=JT021007)	Data Governance and data quality for AI in the European context	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	The document to be produced aims to be a Guideline for European organizations implementing AI systems, aligned with EU Regulation. It provides a governance framework to define and use, in particular for data throughout the data life cycle of AI solutions. Processes and products should be supplied with management functions and an adequate control mechanism for data. This document does not define specific management or process requirements. Treating something valuable that provides a current, future, or potential benefit for an individual or other entity, means defining a quality model along the whole life cycle of data. This means to adopt internal procedures and policies according to current and future regulations in Europe. General data governance in line with the EU proposal for a regulation on AI (AIA) and standard purposes aims to determine: a) conditions for the reuse of certain categories of data held by public sector; b) a notification and supervisory framework for the provision of data sharing; c) a framework for voluntary registration of entities which collect and process data made for altruistic purposes. The proposal of Data Governance Act (EU) wishes to set up a solid mechanism to facilitate the reuse of data according to certain categories: public-sector, private-sector, smart-facturing, e-health, Intelligent transport, and so on. AI systems are fed by massive sources of data (IoT, cloud, Big data platforms). Organisations need to control the data supply chain sourcing from digital devices and third-party organisations. Sourcing strategies implies having a clear picture of the business objectives and performance required by the AI system including quality and the legitimate use and processing of such data.
145	CEN	prCEN/TR XXX (WI=JT021009)	AI Risks - Check List for AI Risks Management	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	This document provides a check list of risk criteria for assessment guidance as well as risk events and their assessment for any system using AI. It does not offer an explicit method or solution, but rather a set of criteria and possibly measures and contingency plan structure. Detailed examples of risks, harms and possible countermeasures are included in annex. This document is applicable by all types of organizations including SMEs, large enterprises, public administration etc.
146	CEN	prEN ISO/IEC 22989 (WI=JT021004)	Information technology - Artificial intelligence - Artificial intelligence concepts and terminology (ISO/IEC 22989:2022)	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	This document establishes terminology for AI and describes concepts in the field of AI. This document can be used in the development of other standards and in support of communications among diverse, interested parties or stakeholders. This document is applicable to all types of organizations (e.g. commercial enterprises, government agencies, not-for-profit organizations).
147	CEN	prEN ISO/IEC 23053 (WI=JT021005)	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML) (ISO/IEC 23053:2022)	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	This document establishes an Artificial Intelligence (AI) and Machine Learning (ML) framework for describing a generic AI system using ML technology. The framework describes the system components and their functions in the AI ecosystem. This document is applicable to all types and sizes of organizations, including public and private companies, government entities, and not-for-profit organizations, that are implementing or using AI systems.

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148	CEN	prEN XXX (WI=JT021008)	Artificial Intelligence trustworthiness characterisation	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	This European Standard provides a horizontal framework for specifying assessable criteria and controls in relation to AI services and products trustworthiness. It does not cover the measurable aspects of organisations or processes, unless relevant to measurement of trustworthiness. Vertical standardizations and applications may use the trustworthiness concepts, adopt or adapt the criteria and controls or even build new ones if needed. The scope includes: - A model that will provide a set of trustworthiness characteristics, adopting and, where necessary, adapting definitions from international standards. It will provide example metrics that can be used to assess characteristics of trustworthiness. - A baseline criteria and controls set that will provide general minimum set of elements for trustworthiness conformity assessment in the context of the AI Act, of the intended purpose and of the risk management process. The criteria and controls will be limited to those that directly affect the measurement of the trustworthiness of a product or service. It may also provide references to controls in other standards projects to increase ease of use.
149	CENELEC	prCEN/TR XXX (pr=JT021010)	Information Technology - Artificial Intelligence - Green and Sustainable AI	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	the proposed document will establish a framework for quantification of environmental impact of AI and its long-term sustainability, and encourage AI developers and users to improve efficiency of AI use. It will also provide a summary of the state of the art of AI technology for direct control and optimisation of energy use in energy systems. The document will provide life-cycle assessment of AI development, deployment and use. Emissions that are produced directly by combustion of fossil fuels are Scope 1 emissions. These are observed in transport system and in fossil-fuel energy generators, and the like. AI may help reduce Scope 1 emissions via smart interventions (demand-side response, optimisation of combustion, etc.) Scope 2 are indirect emissions from electricity use, and AI will play a major role in reducing these emissions. Scope 3 are emissions produced during a life cycle of a technology – these emissions are important in assessment of AI solution and will be in scope of this project. Emissions of Scope 4 are the avoided emissions – AI has great potential in quantifying avoided emissions (carbon savings), and the report will address this as well.
150	CENELEC	prEN XXXX (pr=JT021006)	AI-enhanced nudging	Draft	Main	CEN/CLC/JTC 21		under development	European		Artificial intelligence	This document provides definitions, concepts, and guidelines to address specifically AI-enhanced nudging mechanisms by organisations. It focuses on a standard that aims to support existing legislations and allow industry to deal with AI-enhanced Nudging Mechanisms according to applicable standards, guidelines and processes. It is applicable to "AI-enhanced nudging mechanisms" as a sub category of digital nudges empowered and enhanced by AI systems. AI-enhanced nudging mechanisms can occur at a very fine level of granularity and are difficult to be regulated by hard law or hard ethics. Case studies have shown that although regulations exist at EU level (e.g. GDPR for personal data or UCPD for unfair commercial practices), the subtlety and spread of nudging mechanisms makes it difficult to enforce the law. It also provides use-cases to illustrate the subcategory of digital nudge enhanced by AI systems. It also provides requirements for designing Responsible AI-enhanced nudging mechanisms. Processes and key indicators will accompany requirements, both horizontally (by industry and sectors) and vertically (by applications and technologies), to develop guidance, self-assessment methodologies and methodologies for third-party audits. It is not applicable for nudge mechanisms designed by the architects of the decision-making process and embedded in the interfaces of deterministic systems, where the allocation of moral responsibility is direct (i.e. digital nudging mechanisms not enhanced by AI systems).
151	IEC	IEC TR 63308:2021	Virtual reality equipment and systems. Market, technology and standards requirements	Published	Main	TC 100		2021	International		Virtual Reality	IEC TR 63308:2021 discusses the market of virtual reality (VR) and the technical domains pertaining to a VR system. This document provides clarity on how existing standards can be used and highlights further requirements for standards within the scope of TC 100.
152	IEC	IEC 62243:2012	Artificial Intelligence Exchange and Service Tie to All Test Environments (AI-ESTATE)	Published	Main	TC 91		2012	International		Artificial intelligence	IEC 62243:2012(E) defines formal specifications for supporting system diagnosis. These specifications support the exchange and processing of diagnostic information and the control of diagnostic processes. Diagnostic processes include, but are not limited to, testability analysis, diagnosability assessment, diagnostic reasoning, maintenance support, and diagnostic maturation.
153	ISO	ISO/IEC 9126-1:2001	Software engineering — Product quality — Part 1: Quality model	Withdrawn and replaced by ISO/IEC 25010:2011	Main	ISO/IEC JTC 1/SC 7		2001	International		Software engineering	Not available
154	ISO	ISO 5806:1984	Information processing — Specification of single-hit decision tables	Published	Main	ISO/IEC JTC 1/SC 7		1984	International		Software engineering	The basic format of single-hit decision tables and relevant definitions are described, together with recommended conventions for preparation and use. Is concerned with the use of decision tables in the context of documentation of computer-based information systems.
155	ISO	ISO 5807:1985	Information processing — Documentation symbols and conventions for data, program and system flowcharts, program network charts and system resources charts	Published	Main	ISO/IEC JTC 1/SC 7		1985	International		Software engineering	Defines symbols to be used in information processing documentation and gives guidance on conventions for their use in data flowcharts, program flowcharts, system flowcharts, program network charts, system resources charts. Applicable in conjunction with ISO 2382/1.
156	ISO	ISO/IEC 8631:1989	Information technology — Program constructs and conventions for their representation	Published	Main	ISO/IEC JTC 1/SC 7		1989	International		Software engineering	Is concerned with the expression of procedure-oriented algorithms. Defines: 1 - the nature of program constructs; 2 - the manner in which constructs can be combined; 3 - specifications for a set of constructs; a variety of subsets of the defined constructs.
157	ISO	ISO 8790:1987	Information processing systems — Computer system configuration diagram symbols and conventions	Published	Main	ISO/IEC JTC 1/SC 7		1987	International		Software engineering	Defines graphical symbols and their conventions for use in configuration diagrams for computer systems, including automatic data processing systems.

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158	ISO	ISO 8807:1989	Information processing systems — Open Systems Interconnection — LOTOS — A formal description technique based on the temporal ordering of observational behaviour	Published	Main	ISO/IEC JTC 1/SC 7		1989	International		Software engineering	Defines the syntax and semantics of the Formal Description Technique LOTOS used for the formal description of distributed, concurrent information processing systems. LOTOS can be used to describe formally the service definitions and protocol specifications of the layers of Open Systems Interconnection (OSI) architecture described in ISO 7498, and related standards, and conformance tests for implementations of OSI protocols and/or OSI functions. It can also be applied for the formal description of other distributed systems, such as telephone switching networks. References: ISO 7498; CCITT Recommendation Z. 100, SDL.
159	ISO	ISO/IEC TR 10000-1:1998	Information technology — Framework and taxonomy of International Standardized Profiles — Part 1: General principles and documentation framework	Published	Main	ISO/IEC JTC 1/SC 7		1998	International		Software engineering	This part of ISO/IEC TR 10000 defines the concept of profiles, and the way in which they are documented in International Standardized Profiles. It gives guidance to organizations making proposals for Draft International Standardized Profiles on the nature and content of the documents they are producing. This part of ISO/IEC TR 10000 outlines concepts of profiles and taxonomies (or Classification Schemes), and the format and content of ISPs. Annex A gives details of the format and the content of ISPs as required by ISO/IEC JTC 1. ISO/IEC TR 10000-2 provides principles and a classification scheme for OSI profiles which may be or have been submitted for ratification as International Standardized Profiles.
160	ISO	ISO/IEC 10746-1:1998	Information technology — Open Distributed Processing — Reference model: Overview — Part 1:	Published	Main	ISO/IEC JTC 1/SC 7		1998	International		Software engineering	This Recommendation International Standard: ? gives an introduction and motivation for ODP; ? provides an overview of the Reference Model of Open Distributed Processing (RM-ODP) and an explanation of its key concepts; ? gives guidance on the application of the RM-ODP. This Recommendation International Standard covers both overview and detailed explanation, and can be consulted in various ways when reading the standards: a) if you intend to read only this Recommendation International Standard, to gain a general understanding of the importance of ODP to your organization, concentrate on clause 6; b) if you intend to study the whole RM-ODP, you should also read clause 6 before moving on to ITU-T Rec. X.902 ISO/IEC 10746-2 and ITU-T Rec. X.903 ISO/IEC 10746-3; c) as you read ITU-T Rec. X.902 ISO/IEC 10746-2 and ITU-T Rec. X.903 ISO/IEC 10746-3 you may wish to consult clauses 7 to 10, which give supporting explanation for the various concepts that these common texts define; d) when you have completed a first reading of ITU-T Rec. X.902 ISO/IEC 10746-2 and ITU-T Rec. X.903 ISO/IEC 10746-3, read clauses 11 and 12 which discuss the use of standards in ODP system specifications, and provide some examples of applying the ODP concepts in the specification of systems.
161	ISO	ISO/IEC 10746-2:2009	Information technology — Open distributed processing — Reference model: Foundations — Part 2:	Published	Main	ISO/IEC JTC 1/SC 7		2009	International		Software engineering	ISO/IEC 10746 provides a coordinating framework for the standardization of open distributed processing (ODP). This supports distribution, interworking, portability, and platform and technology independence. It establishes an enterprise architecture framework for the specification of ODP systems. ISO/IEC 10746 defines the essential concepts necessary to specify open distributed processing systems from five prescribed viewpoints. It provides a well-developed framework for the structuring of specifications for large-scale, distributed systems. The framework for system specification provided by ISO/IEC 10746 has four fundamental elements: an object modelling approach to system specification; the specification of a system in terms of separate but interrelated viewpoint specifications; the definition of a system infrastructure providing distribution transparencies for system applications; a framework for assessing system conformance. ISO/IEC 10746-2:2009 contains the definition of the concepts and analytical framework for normalized description of any distributed processing system. It introduces the principles of conformance to ODP standards and the way in which they are applied. These concepts and principles are used in ISO/IEC 10746-3 and to establish requirements for new ODP specification techniques.

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162	ISO	ISO/IEC 10746-3:2009	Information technology — Open distributed processing — Reference model: Architecture — Part 3:	Published	Main	ISO/IEC JTC 1/SC 7		2009	International		Software engineering	ISO/IEC 10746 provides a coordinating framework for the standardization of open distributed processing (ODP). This supports distribution, interworking, portability, and platform and technology independence. It establishes an enterprise architecture framework for the specification of ODP systems. ISO/IEC 10746 defines the essential concepts necessary to specify open distributed processing systems from five prescribed viewpoints. It provides a well-developed framework for the structuring of specifications for large-scale, distributed systems. The framework for system specification provided by ISO/IEC 10746 has four fundamental elements: an object modelling approach to system specification; the specification of a system in terms of separate but interrelated viewpoint specifications; the definition of a system infrastructure providing distribution transparencies for system applications; a framework for assessing system conformance. ISO/IEC 10746-3:2009 specifies the required characteristics that qualify distributed processing as open, i.e. the constraints to which ODP standards must conform. It uses the descriptive techniques from ISO/IEC 10746-2 to define five ISO/IEC 10746 viewpoints. These viewpoints are subdivisions of the specification of a whole system, established to bring together the particular pieces of information relevant to some stakeholder or particular area of concern. ISO/IEC 10746-3:2009 also defines a taxonomy for functions and structures to realize distribution transparencies.
163	ISO	ISO/IEC 10746-4:1998	Information technology — Open Distributed Processing — Reference Model: Architectural semantics — Part 4:	Published	Main	ISO/IEC JTC 1/SC 7		1998	International		Software engineering	The rapid growth of distributed processing has lead to a need for a coordinating framework for the standardization of Open Distributed Processing (ODP). This Reference Model of ODP provides such a framework. It creates an architecture within which support of distribution, interworking, interoperability and portability can be integrated. The Basic Reference Model of Open Distributed Processing (RM-ODP), (see ITU-T Recs. X.901 to X.904 ISO/IEC 10746), is based on precise concepts derived from current distributed processing developments and, as far as possible, on the use of formal description techniques for specification of the architecture.
164	ISO	ISO/IEC 10746-4:1998/Amd 1:2001	Information technology — Open Distributed Processing — Reference Model: Architectural semantics — Part 4: — Amendment 1: Computational formalization	Published	Amendment	ISO/IEC JTC 1/SC 7		1998	International		Software engineering	Not available
165	ISO	ISO/IEC 11411:1995	Information technology — Representation for human communication of state transition of software	Published	Main	ISO/IEC JTC 1/SC 7		1995	International		Software engineering	Defines diagrams and symbols for representing software functions and transitions and in improving human communication. Covers development, communication and review of software requirement analysis and design. Effective in interactive software, data communication software and language/command.
166	ISO	ISO/IEC TR 12182:2015	Systems and software engineering — Framework for categorization of IT systems and software, and guide for applying it	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC TR 12182 specifies the manner in which categorizations of IT systems and software are organized and expressed. It provides the framework for categorizations, and a guide for applying it. This allows any community to clarify their scope of the systems by using their own definition of categories. The scope of application of the framework is intended to IT systems and software, including services provided by IT systems, where they can be of main targets but not limited to. The purpose of this Technical Report includes the following: a) developers of systems and software engineering standards can define their applicability to different categories of target systems and software using annexes or guidelines, so that their users can easily identify relevant standards and clauses that they can apply; b) suppliers of systems and software engineering tools and methods can clarify the types of target systems and software to which their technologies are applicable or limited so that their users can easily choose the right tools and methods among many candidates for their use; c) providers of services can define characteristics of their services using classification axes so that they can specify the quality of their services; d) developers and evaluators of the systems and software can categorize systems and software of similar characteristics by using classification axes so that they can obtain a better estimation and quality evaluation of their target systems and software to be developed; e) the systems and software engineering community can exchange their research ideas and best practices with defined scope of application. ISO/IEC TR 12182 does not provide a specific set of categorizations but the framework for categorizations and a guide for applying it to achieve the above purposes. It is important that standards on systems and software engineering are properly applied to the procurement or development of certain kinds of systems. This Technical Report provides a categorization framework and a guide for applying it to assist in (1) defining the area of application of standards, and (2) positioning new standards. The annex of this Technical Report provides descriptive examples for relevant standards, each of which describes the area of application of the standard by using defined categorization. NOTE Giving guidance on applicability might not be relevant to all standards.

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167	ISO	ISO/IEC/IEEE 12207-2:2020	Systems and software engineering — Software life cycle processes — Part 2: Relation and mapping between ISO/IEC/IEEE 12207:2017 and ISO/IEC 12207:2008	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document provides the mapping expressing corresponding relations between software life cycle processes in ISO/IEC/IEEE 12207:2017 and the processes in ISO/IEC 12207:2008. These relations are demonstrated by means of mapping tables that show relationships between activities and tasks, and process outcomes. This mapping assists users of ISO/IEC 12207:2008 to transition to using ISO/IEC/IEEE 12207:2017. This document will help users understand the differences between the reference processes and requirements of the two editions of ISO/IEC/IEEE 12207, and any potential gaps or process enhancements that can be needed in seeking conformance to and/or using ISO/IEC/IEEE 12207:2017. Also, this document provides to such users the mapping which helps to identify corresponding process outcomes, activities and tasks of processes for software systems in ISO/IEC/IEEE 12207:2017. The mapping between ISO/IEC/IEEE 12207:2017 and ISO/IEC 12207:2008 in this document can be used as a basis to continuously conduct, improve and extend current process assets including software specific process assets based on ISO/IEC 12207:2008 for effective implementation of ISO/IEC/IEEE 12207:2017. These process activities and tasks can be applied iteratively.
168	ISO	ISO/IEC/IEEE 12207:2017	Systems and software engineering — Software life cycle processes — Part 2: Relation and mapping between ISO/IEC/IEEE 12207:2017 and ISO/IEC 12207:2008	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC/IEEE 12207:2017 also provides processes that can be employed for defining, controlling, and improving software life cycle processes within an organization or a project. The processes, activities, and tasks of this document can also be applied during the acquisition of a system that contains software, either alone or in conjunction with ISO/IEC/IEEE 15288:2015, Systems and software engineering?System life cycle processes. In the context of this document and ISO/IEC/IEEE 15288, there is a continuum of human-made systems from those that use little or no software to those in which software is the primary interest. It is rare to encounter a complex system without software, and all software systems require physical system components (hardware) to operate, either as part of the software system-of-interest or as an enabling system or infrastructure. Thus, the choice of whether to apply this document for the software life cycle processes, or ISO/IEC/IEEE 15288:2015, Systems and software engineering?System life cycle processes, depends on the system-of-interest. Processes in both documents have the same process purpose and process outcomes, but differ in activities and tasks to perform software engineering or systems engineering, respectively.
169	ISO	ISO/IEC 13235-1:1998	Information technology — Open Distributed Processing — Trading function: Specification — Part 1:	Published	Main	ISO/IEC JTC 1/SC 7		1998	International		Software engineering	The scope of this Recommendation International Standard is: ? an enterprise specification for the trading function; ? an information specification for the trading function; ? a computational specification for traders (i.e. objects providing the trading function); ? conformance requirements in terms of conformance points. It is not a goal of this Recommendation International Standard to state how the trading function should be realized. Therefore this Recommendation International Standard does not include an engineering specification. The field of application for this Recommendation International Standard is any ODP system in which it is required to introduce and discover services incrementally, dynamically and openly.
170	ISO	ISO/IEC 13235-3:1998	Information technology — Open Distributed Processing — Trading Function — Part 3: Provision of Trading Function using OSI Directory service	Published	Main	ISO/IEC JTC 1/SC 7		1998	International		Software engineering	This Specification describes how the ODP Trading Function can be realised using information entries and support mechanisms of the OSI Directory. This Specification is to be used in conjunction with the ODP Trading Function Standard (ITU-T Rec. X.950 ISO/IEC 13235-1). If there are any discrepancies between the prescriptive statements in ITU-T Rec. X.950 ISO/IEC 13235-1 and those in this Specification, the prescriptive statements in ITU-T Rec. X.950 ISO/IEC 13235-1 take precedence. The scope of this Specification is: ? standardised templates for Trading Function information objects in the DIT; ? descriptions of mapping of Trading Function operations to appropriate Directory operations; ? description of use of other Directory features to provide the support mechanisms for implementing the ODP Trading Function. This Specification does not prescribe that a trader must be engineered by using OSI Directory. But if OSI Directory is used, this Specification defines standardised templates for information entries (e.g. service offer and link information objects) in the Directory DIT. This Specification does not put any restrictions on where these entries are placed in the Directory DIT. That is, this Specification does not standardise any structure rules. This Specification does describe a mechanism to provide the Trading Function using OSI Directory. The field of application of this Specification is for the construction of the ODP Trading Function using the OSI Directory, when required.
171	ISO	ISO/IEC 13235-3:1998/Cor 1:2006	Information technology — Open Distributed Processing — Trading Function — Part 3: Provision of Trading Function using OSI Directory service — Technical Corrigendum 1	Published	Corrigendum	ISO/IEC JTC 1/SC 7		2006	International		Software engineering	Not available

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172	ISO	ISO/IEC 14102:2008	Information technology — Guideline for the evaluation and selection of CASE tools	Published	Main	ISO/IEC JTC 1/SC 7		2008	International		Software engineering	Information systems and software engineering: computer-based software engineering (CASE) tools represent a major part of the supporting technologies used to develop and maintain information technology systems. Their selection must be carried out with careful consideration of both the technical and management requirements. ISO/IEC 14102:2008 defines both a set of processes and a structured set of CASE tool characteristics for use in the technical evaluation and the ultimate selection of a CASE tool. It follows the software product evaluation model defined in ISO/IEC 14598-5:1998. ISO/IEC 14102:2008 adopts the general model of software product quality characteristics and subcharacteristics defined in ISO/IEC 9126-1:2001 and extends these when the software product is a CASE tool; it provides product characteristics unique to CASE tools. This larger set of characteristics is then organized into four groups: - characteristics related to life cycle process functionality; - characteristics related to CASE tool usage functionality; - general quality characteristics; - general characteristics not related to quality. This grouping provides a more manageable approach to the overall evaluation and selection process. The technical evaluation can indicate how well a CASE tool meets its user's stated requirements. It can also indicate how well the tool meets its claimed functionality. The objective of the technical evaluation process is to provide quantitative results on which the final selection can be based. Measurement assigns numbers (or other ratings) to attributes of entities; a major activity of evaluation is to obtain these measurements for use in selection. The final selection results should aim to achieve objectivity, repeatability and impartiality. These objectives and the confidence in the outcomes will in part depend on the resources allocated to the overall evaluation and selection process. The user of ISO/IEC 14102:2008 is asked to deal with these issues at an early stage. To be widely acceptable, these CASE tool evaluation and selection processes must be of value to the users of CASE tools, and to the suppliers of CASE to the community at large. The information outlined in ISO/IEC 14102:2008 should lead to more cost effective selections of CASE tools and to a greater uniformity in how CASE tool functions and features are described.
173	ISO	ISO/IEC 14143-1:2007	Information technology — Software measurement — Functional size measurement — Part 1: Definition of concepts	Published	Main	ISO/IEC JTC 1/SC 7		2007	International		Software engineering	ISO/IEC 14143-1:2007 defines the concepts of FSM (Functional Size Measurement). The concepts of Functional Size Measurement (FSM) are designed to overcome the limitations of earlier methods of sizing software by shifting the focus away from measuring how the software is implemented to measuring size in terms of the functions required by the user.
174	ISO	ISO/IEC 14143-1:2007/Cor 1:2011	Information technology — Software measurement — Functional size measurement — Part 1: Definition of concepts — Technical Corrigendum 1	Published	Corrigendum	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	Not available
175	ISO	ISO/IEC 14143-2:2011	Information technology — Software measurement — Functional size measurement — Part 2: Conformity evaluation of software size measurement methods to ISO/IEC 14143-1	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	ISO/IEC 14143-2:2011: - establishes a framework for the conformity evaluation of a Candidate FSM Method against the provisions of ISO/IEC 14143-1; - describes a process for conformity evaluation of whether a Candidate FSM Method meets the (type) requirements of ISO/IEC 14143-1 such that it is an actual FSM method, i.e. they are of the same type; - describes the requirements for performing a conformity evaluation in order to ensure repeatability of the conformity evaluation process, as well as consistency of decisions on conformity and the final result; - aims to ensure that the output from the conformity evaluation process is objective, impartial, consistent, repeatable, complete and auditable; - provides informative guidelines for determining the competence of the conformity evaluation teams; - provides an example checklist to assist in the conformity evaluation of a Candidate FSM Method; and - provides an example template for the conformity evaluation report.
176	ISO	ISO/IEC TR 14143-3:2003	Information technology — Software measurement — Functional size measurement — Part 3: Verification of functional size measurement methods	Published	Main	ISO/IEC JTC 1/SC 7		2003	International		Software engineering	ISO/IEC TR 14143-3:2003 establishes a framework for verifying the statements of an FSM Method and/or for conducting tests requested by the verification sponsor, relative to the following performance properties: repeatability and reproducibility; accuracy; convertibility; discrimination threshold; applicability to Functional Domains. NOTE Statements and test requests relative to other performance properties are outside the scope of ISO/IEC TR 14143-3:2003. ISO/IEC TR 14143-3:2003 aims to ensure that the output from the verification is objective, impartial, consistent and repeatable. The verification report, produced as a result of applying ISO/IEC TR 14143-3:2003, will enable the prospective user to select the FSM Method which best meets their needs.

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177	ISO	ISO/IEC TR 14143-4:2002	Information technology — Software measurement — Functional size measurement — Part 4: Reference model	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	Part 4 of ISO/IEC 14143 defines the reference model (Figure 0.1) to be used when verifying a Functional Size Measurement (FSM) method. The reference model consists of two components: - a classification framework of Reference User Requirements (RUR) which can be sized using an FSM Method. Included are examples of such RUR as well as references to further publications of User Requirements (UR) which can be used for RUR, and - guidance on selecting Reference FSM Methods, against which an FSM Method can be compared. The reference model is an input to the evaluation process of an FSM Method. The formulation and execution of evaluation tests and the interpretation of their results is outside the scope of this Technical Report. The RUR and additional references contained in this Technical Report only represent examples of UR in some domains and situations. Additional RUR and RUR for domains and situations not covered by Annex A, B, or C may be generated with the assistance of the framework described in this Technical Report. The requirements for Reference FSM Methods may assist in selecting Reference FSM Methods.
178	ISO	ISO/IEC TR 14143-5:2004	Information technology — Software measurement — Functional size measurement — Part 5: Determination of functional domains for use with functional size measurement	Published	Main	ISO/IEC JTC 1/SC 7		2004	International		Software engineering	ISO/IEC TR 14143-5:2004 describes the characteristics of Functional Domains and the procedures by which characteristics of Functional User Requirements (FUR) can be used to determine Functional Domains. Two example methods for implementing these principles are provided in the annexes. Either of the methods may be used directly, or by using Functional Domains defined locally by: FSM Method to determine if a particular FSM Method is applicable to the Functional Domain(s) represented by their specific FUR; Describing, for a given set of FUR, the Functional Domain to which the FUR belong; and FSM Method owners and designers describing the Functional Domain(s) to which the FSM Method can be applied as outlined in ISO/IEC 14143-1:1998.
179	ISO	ISO/IEC 14143-6:2012	Information technology — Software measurement — Functional size measurement — Part 6: Guide for use of ISO/IEC 14143 series and related International Standards	Published	Main	ISO/IEC JTC 1/SC 7		2012	International		Software engineering	ISO/IEC 14143-6:2012 provides a summary of the FSM (Functional Size Measurement) related standards and the relationship between: a) the ISO/IEC 14143 series FSM framework standards that provide the definitions and concepts of FSM and conformance and verification of FSMs (Functional Size Measurement Methods), and b) the ISO/IEC standard FSMs, i.e. ISO/IEC 19761 (COSMIC), ISO/IEC 20926 (FPUG), ISO/IEC 20968 (Mk II), ISO/IEC 24570 (NESMA), and ISO/IEC 29881 (FISMA). An FSM is a software sizing method that conforms to the mandatory requirements of ISO/IEC 14143-1. ISO/IEC 14143-6:2012 also provides a process to assist users to select an FSM that meets their requirements. It also gives guidance on how to use Functional Size (FS). FSMs include, but are not limited to, ISO/IEC 19761, ISO/IEC 20926, ISO/IEC 20968, ISO/IEC 24570, and ISO/IEC 29881 as well. Recommending a specific FSM is outside the scope of ISO/IEC 14143-6:2012.
180	ISO	ISO/IEC TR 14471:2007	Information technology — Software engineering — Guidelines for the adoption of CASE tools	Published	Main	ISO/IEC JTC 1/SC 7		2007	International		Software engineering	Since CASE (computer aided software engineering) adoption is a subject of the broader technology transition problem, ISO/IEC TR 14471:2007 addresses the adoption practices appropriate for a wide range of computing organizations. ISO/IEC TR 14471:2007 neither dictates nor advocates particular development standards, software processes, design methods, methodologies, techniques, programming languages, or life-cycle paradigms. ISO/IEC TR 14471:2007 will: identify critical success factors (CSF); propose a set of adoption processes; guide successful adoption in consideration of organizational and cultural environment. The following groups are targeted as potential audiences: CASE users; information systems managers; chief information officers (CIO); CASE suppliers; software engineering consultants; those involved in the acquisition of CASE tools and technology. Therefore ISO/IEC TR 14471:2007 addresses aspects of CASE tools adoption. It is best used in conjunction with ISO/IEC 14102 for CASE tool evaluation and selection. It is complementary to related ISO/IEC documents which deal with the general aspects of these topics. The purpose of ISO/IEC TR 14471:2007 is to provide a recommended practice for CASE adoption. It provides guidance in establishing processes and activities that are to be applied for the successful adoption of CASE technology. The use of ISO/IEC TR 14471:2007 will help to maximize the return and minimize the risk of investing in CASE technology. However, ISO/IEC TR 14471:2007 does not establish compliance criteria.

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181	ISO	ISO/IEC 14568:1997	Information technology — DXL: Diagram eXchange Language for tree-structured charts	Published	Main	ISO/IEC JTC 1/SC 7		1997	International		Software engineering	This International Standard specifies the semantics and syntax of DXL. DXL is a language for exchanging tree-structured charts among CASE tools. DXL is applicable to: 1. exchanging ISO/IEC 8631 compliant tree-structured charts (examples of which are shown in annex A (informative) of ISO/IEC 8631); 2. exchanging program flowcharts defined in ISO/IEC 5807 if they are well-structured and don't have data defined in ISO/IEC 5807; and 3. describing procedure oriented algorithms.
182	ISO	ISO/IEC 14598-6:2001	Software engineering — Product evaluation — Part 6: Documentation of evaluation modules	Published	Main	ISO/IEC JTC 1/SC 7		2001	International		Software engineering	This part of ISO/IEC 14598 defines the structure and content of the documentation to be used to describe an Evaluation Module. Evaluation modules are intended to be used within the context of the ISO/IEC 9126 and the ISO/IEC 14598 multipart standards. This part of ISO/IEC 14598 is intended to be used by experts in evaluation technology such as testing laboratories, research institutes and others when producing new evaluation modules.
183	ISO	ISO/IEC 14750:1999	Information technology — Open Distributed Processing — Interface Definition Language	Published	Main	ISO/IEC JTC 1/SC 7		1999	International		Software engineering	This Recommendation International Standard is intended to provide the ODP Reference Model (see ITU-T Rec. X.902 ISO/IEC 10746-2 and ITU-T Rec. X.903 ISO/IEC 10746-3) with a language and environment neutral notation to describe computational operation interface signatures. Use of this notation does not imply use of specific supporting mechanisms and protocols.
184	ISO	ISO/IEC 14752:2000	Information technology — Open Distributed Processing — Protocol support for computational interactions	Published	Main	ISO/IEC JTC 1/SC 7		2000	International		Software engineering	This Recommendation International Standard is based on the framework of abstractions and concepts developed in the Reference Model for Open Distributed Processing (ITU-T Rec. X.902 ISO/IEC 10746-2 and ITU-T Rec. X.903 ISO/IEC 10746-3). This Recommendation International Standard defines how interactions between computational objects in a computational specification of a system relate to protocol support for those interactions in an engineering specification of that system. In particular it: — defines a General Interworking Framework (GIF); — within the GIF, defines a set of facilities each comprising a set of functionally-related service primitives as abstract definitions of the interactions of basic engineering objects and channel objects; — defines the parameters of the service primitives of the GIF; — defines the permitted sequence of the service primitives by means of state tables; — specifies, in annexes, the mapping of the GIF service primitives and their parameters to the messages and fields of particular protocols. As specified in this Recommendation International Standard, the GIF defines protocol support for a pragmatic subset of the possible computational interactions defined in ITU-T Rec. X.903 ISO/IEC 10746-3. It is also restricted in the features of the protocol support and the supported transparencies.
185	ISO	ISO/IEC 14753:1999	Information technology — Open Distributed Processing — Interface references and binding	Published	Main	ISO/IEC JTC 1/SC 7		1999	International		Software engineering	Interface references are crucial to interworking between ODP systems and federation of groups of ODP systems. An interface reference embodies the information needed to establish bindings, including binding to objects at nodes that support several different communication protocols and binding to objects in different management domains. An interface reference further embodies the information required for the engineering mechanism to maintain bindings between computational objects in the presence of distribution transparencies such as migration transparency. They are the foundation of ODP location and relocation transparency. This Recommendation International Standard includes: · a framework for binding interfaces and a generic binding protocol (for both stream and operational interfaces); · a specification of the generic information structure of interface references (for both stream and operational interfaces); · representation(s) for interface references when transferred using standardized protocols; · identification of procedures for the management and transfer of interface references with respect to individual transparencies; · identification of node management interfaces related to binding and federation which create or transform interface references; · identification of requirements for quality of service information and for invocation of QoS or related measurement procedures. This Recommendation International Standard provides an engineering description of the functionality needed to support the computational binding of objects in ODP systems. Security and support for group communication are important issues, but not within the scope of this Recommendation International Standard. 1.2 Field of Application

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186	ISO	ISO/IEC 14756:1999	Information technology — Measurement and rating of performance of computer-based software systems	Published	Main	ISO/IEC JTC 1/SC 7		1999	International		Software engineering	This International Standard defines how user oriented performance of computer-based software systems (CBSS) may be measured and rated. A CBSS is a data processing system as it is seen by its users, e.g. by users at various terminals, or as it is seen by operational users and business users at the data processing center. A CBSS includes hardware and all its software (system software and application software) which is needed to realize the data processing functions required by the users or what may influence to the CBSS's time behaviour. This International Standard is applicable for tests of all time constrained systems or system parts. Also a network may be part of a system or may be the main subject of a test. The method defined in this International Standard is not limited to special cases like classic batch or terminal-host systems, e.g. also included are client server systems or, with a broader comprehension of the definition of 'task', real time systems. But the practicability of tests may be limited by the expenditure required to test large environments. This International Standard specifies the key figures of user oriented performance terms and specifies a method of measuring and rating these performance values. The specified performance values are those which describe the execution speed of user orders (tasks), namely the triple of: - execution time, - throughput, - timeliness. The user orders, subsequently called tasks, may be of simple or complex internal structure. A task may be a job, transaction, process or a more complex structure, but with a defined start and end depending on the needs of the
187	ISO	ISO/IEC/IEEE 14764:2022	Software engineering — Software life cycle processes — Maintenance	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document provides guidance for the maintenance of software, based on the maintenance process and its activities and tasks defined in ISO/IEC/IEEE 12207:2017, 6.4.13. Moreover, this document describes the maintenance process in greater detail and establishes definitions for the various types of maintenance. This includes maintenance for multiple software products with the same maintenance resources. "Maintenance" in this document means software maintenance unless otherwise stated. The document does not address the operation of software and the operational functions, e.g. backup, recovery, system administration, which are normally performed by those who operate the software. However, it does include the related disposal process defined in ISO/IEC/IEEE 12207:2017, 6.4.14. This document is written primarily for managers, maintenance organizations, quality managers, users and acquirers of systems containing software. Many of the activities and tasks discussed in this document apply equally to maintenance services, as well as to maintained software products. For example, in a COTS intensive system, maintenance services are performed to sustain the product in operations.
188	ISO	ISO/IEC 14769:2001	Information technology — Open Distributed Processing — Type Repository Function	Published	Main	ISO/IEC JTC 1/SC 7		2001	International		Software engineering	The concept of "type" is fundamental to ODP systems; the interaction model of ODP-RM involves strongly-typed interactions. This Recommendation International Standard: — defines a framework for describing types of interest in ODP systems by determining what entities need to be typed and what needs to be said about the identified types. The primary focus of this work is the computational interface type system; — identifies and characterizes type languages sufficient to describe the types identified above in an informative annex; — provides enterprise, information, and computational specifications of a generic type repository function within the type description framework which can be specialized to select a specific type system or type notation. The type repository function provides: • storage and retrieval of type descriptions; • management of type descriptions; • management of the relationship between types including matching of types; • naming of types (in a manner consistent with ODP Naming Framework); • interworking and federation of different type repositories. This Recommendation International Standard provides a standard method of accessing type descriptions used within open distributed processing systems, where the type descriptions can be in various concrete syntaxes and type languages used in these open distributed processing systems. This Recommendation International Standard also facilitates the dynamic matching of types for interactions, binding and trading purposes.

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189	ISO	ISO/IEC 14771:1999	Information technology — Open Distributed Processing — Naming framework	Published	Main	ISO/IEC JTC 1/SC 7		1999	International		Software engineering	This Recommendation I International Standard: defines a general framework for context-relative naming, refining and elaborating on the naming concepts defined in Part 2 of the ODP-RM; identifies and characterizes functions necessary to handle names in the context of a federation of different naming systems; and clarifies the relationship between the concepts of name management (i.e. federation and naming) in distributed computing systems. It provides a general framework for the naming of entities of interest in ODP systems, which includes naming in the infrastructure of an ODP system, naming in the applications built on the infrastructure, and naming in the enterprise the system serves.
190	ISO	ISO/IEC/IEEE 15026-1:2019	Systems and software engineering — Systems and software assurance — Part 1: Concepts and vocabulary	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document defines assurance-related terms and establishes an organized set of concepts and relationships to form a basis for shared understanding across user communities for assurance. It provides information to users of the other parts of ISO/IEC/IEEE 15026 including the combined use of multiple parts. The essential concept introduced by ISO/IEC/IEEE 15026 (all parts) is the statement of claims in an assurance case and the support of those claims through argumentation and evidence. These claims are in the context of assurance for properties of systems and software within life cycle processes for the system or software product. Assurance for a service being operated and managed on an ongoing basis is not covered in ISO/IEC/IEEE 15026 (all parts). A variety of potential users of ISO/IEC/IEEE 15026 (all parts) exists including developers and maintainers of assurance cases and those who wish to develop, sustain, evaluate or acquire a system that possesses requirements for specific properties in such a way as to be more certain of those properties and their requirements. ISO/IEC/IEEE 15026 (all parts) uses concepts and terms consistent with ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288 and generally consistent with the ISO/IEC 25000 series, but the potential users of ISO/IEC/IEEE 15026 (all parts) need to understand the differences from concepts and terms to which they may be accustomed. This document attempts to clarify these differences. The primary purpose of this document is to aid users of the other parts of ISO/IEC/IEEE 15026 by providing context, concepts and explanations for assurance, assurance cases and integrity levels. While essential to assurance practice, details regarding exactly how to measure, demonstrate or analyse particular properties are not covered. These are the subjects of more specialized standards of which a number are referenced and included in the Bibliography.
191	ISO	ISO/IEC/IEEE 15026-2:2022	Systems and software engineering — Systems and software assurance — Part 2: Assurance case	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document specifies requirements for structure terminology of assurance cases. This document is applicable for developing and maintaining assurance cases.
192	ISO	ISO/IEC 15026-3:2015	Systems and software engineering — Systems and software assurance — Part 3: System integrity levels	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 15026-3:2015 specifies the concept of integrity levels with corresponding integrity level requirements that are required to be met in order to show the achievement of the integrity level. It places requirements on and recommends methods for defining and using integrity levels and their corresponding integrity level requirements. It covers systems, software products, and their elements, as well as relevant external dependences. This part of ISO/IEC 15026 is applicable to systems and software and is intended for use by the following: a) definers of integrity levels such as industry and professional organizations, standards organizations, and government agencies; b) users of integrity levels such as developers and maintainers, suppliers and acquirers, system or software users, assessors of systems or software and administrative and technical support staff of systems and/or software products. One important use of integrity levels is by suppliers and acquirers in agreements; for example, to aid in assuring safety, financial, or security characteristics of a delivered system or product. ISO/IEC 15026-3:2015 does not prescribe a specific set of integrity levels or their integrity level requirements. In addition, it does not prescribe the way in which integrity level use is integrated with the overall system or software engineering life cycle processes. It does, however, provide an example of use of this part of ISO/IEC 15026 in Annex A.
193	ISO	ISO/IEC/IEEE 15026-4:2021	Systems and software engineering — Systems and software assurance — Part 4: Assurance in the life cycle	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document provides guidance and recommendations for assurance of a selected claim about the system-of-interest by achieving the claim and showing the achievement. The guidance and recommendations are given in a system assurance process view on top of ISO/IEC/IEEE 15288 and a software assurance process view on top of ISO/IEC/IEEE 12207.
194	ISO	ISO/IEC/IEEE 15288:2015	Systems and software engineering — System life cycle processes	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC/IEEE 15288:2015 establishes a common framework of process descriptions for describing the life cycle of systems created by humans. It defines a set of processes and associated terminology from an engineering viewpoint. These processes can be applied at any level in the hierarchy of a system's structure. Selected sets of these processes can be applied throughout the life cycle for managing and performing the stages of a system's life cycle. This is accomplished through the involvement of all stakeholders, with the ultimate goal of achieving customer satisfaction. ISO/IEC/IEEE 15288:2015 also provides processes that support the definition, control and improvement of the system life cycle processes used within an organization or a project. Organizations and projects can use these processes when acquiring and supplying systems. ISO/IEC/IEEE 15288:2015 concerns those systems that are man-made and may be configured with one or more of the following system elements: hardware, software, data, humans, processes (e.g., processes for providing service to users), procedures (e.g., operator instructions), facilities, materials and naturally occurring entities.

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195	ISO	ISO/IEC/IEEE 15289:2019	Systems and software engineering — Content of life-cycle information items (documentation)	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document specifies the purpose and content of all identified systems and software life-cycle and service management information items (documentation). The information item contents are defined according to generic document types, as presented in Clause 7, and the specific purpose of the document, as presented in Clause 10. This document assumes an organization is performing life-cycle processes, or delivering system or software engineering services, using either or both of the following: — ISO/IEC/IEEE 12207:2017 software life cycle processes; — ISO/IEC/IEEE 15288:2015 system life cycle processes. ISO/IEC/IEEE 12207:2017 and ISO/IEC/IEEE 15288:2015 define an Information Management process, but do not "detail information items in terms of name, format, explicit content, and recording media" (ISO/IEC/IEEE 12207:2017, 1.4). These standards identify, recommend or require a number of documentation items. This document provides a mapping of processes from the above standards to a set of information items. It provides a consistent approach to meeting the information and documentation requirements of systems and software engineering and engineering service management.
196	ISO	ISO/IEC 15414:2015	Information technology — Open distributed processing — Reference model — Enterprise language	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 15414:2015 provides: a) a language (the enterprise language) comprising concepts, structures, and rules for developing, representing and reasoning about a specification of an ODP system from the enterprise viewpoint (as defined in Rec. ITU-T X.903 ISO/IEC 10746-3); b) rules which establish correspondences between the enterprise language and the other viewpoint languages (defined in Rec. ITU-T X.903 ISO/IEC 10746-3) to ensure the overall consistency of a specification. The language is specified to a level of detail sufficient to enable the determination of the compliance of any modelling language to this Recommendation International Standard and to establish requirements for new specification techniques. ISO/IEC 15414:2015 is intended for use in preparing enterprise viewpoint specifications of ODP systems, and in developing notations and tools to support such specifications. As specified in clause 5 of Rec. ITU-T X.903 ISO/IEC 10746-3, an enterprise viewpoint specification defines the purpose, scope and policies of an ODP system. ISO/IEC 15414:2015 is a refinement and extension of Rec. ITU-T X.903 ISO/IEC 10746-3, clauses 5 and 10, but does not replace them.
197	ISO	ISO/IEC 15437:2001	Information technology — Enhancements to LOTOS (E-LOTOS)	Published	Main	ISO/IEC JTC 1/SC 7		2001	International		Software engineering	This International Standard defines the syntax and semantics of the enhanced LOTOS language (ISO 8807), named E-LOTOS. E-LOTOS is used for the formal description of the behavioural aspects of distributed and concurrent systems in general and in the area of open distributed processing in particular.
198	ISO	ISO/IEC 15474-1:2002	Information technology — CDIF framework — Part 1: Overview	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The CDIF family of standards includes a semantic metamodel and a transfer format definition. It also includes the specification of a meta-metamodel and associated rules that define a framework for the semantic metamodel and the transfer format. The language that is defined for the transfer format also has applicability as a general language for Import/Export for repositories. The CDIF semantic metamodel also has applicability as the basis of standard definitions for use in repositories. The diagram in Figure 1 depicts the various standards that comprise the CDIF family of standards. The shaded box depicts this Standard and its position in the CDIF family of standards.
199	ISO	ISO/IEC 15474-2:2002	Information technology — CDIF framework — Part 2: Modelling and extensibility	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The CDIF family of standards includes a semantic metamodel and a transfer format definition. It also includes the specification of a meta-metamodel and associated rules that define a framework for the semantic metamodel and the transfer format. The language that is defined for the transfer format also has applicability as a general language for Import/Export for repositories. The CDIF semantic metamodel also has applicability as the basis of standard definitions for use in repositories. The standards that form the complete family of CDIF Standards are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
200	ISO	ISO/IEC 15475-1:2002	Information technology — CDIF transfer format — Part 1: General rules for syntaxes and encodings	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the Transfer Format also has applicability as a general language for Import/Export from repositories. The CDIF Semantic Metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF Semantic Metamodel.

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201	ISO	ISO/IEC 15475-2:2002	Information technology — CDIF transfer format — Part 2: Syntax SYNTAX.1	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
202	ISO	ISO/IEC 15475-3:2002	Information technology — CDIF transfer format — Part 3: Encoding ENCODING.1	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
203	ISO	ISO/IEC 15476-1:2002	Information technology — CDIF semantic metamodel — Part 1: Foundation	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
204	ISO	ISO/IEC 15476-2:2002	Information technology — CDIF semantic metamodel — Part 2: Common	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
205	ISO	ISO/IEC 15476-3:2006	Information technology — CDIF semantic metamodel — Part 3: Data definitions	Published	Main	ISO/IEC JTC 1/SC 7		2006	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
206	ISO	ISO/IEC 15476-4:2005	Information technology — CDIF semantic metamodel — Part 4: Data models	Published	Main	ISO/IEC JTC 1/SC 7		2005	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.
207	ISO	ISO/IEC 15476-6:2006	Information technology — CDIF semantic metamodel — Part 6: State/event models	Published	Main	ISO/IEC JTC 1/SC 7		2006	International		Software engineering	The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF. The language that is defined for the transfer format also has applicability as a general language for Import/Export from repositories. The CDIF semantic metamodel defined for modelling tools also has applicability as the basis of standard definitions for use in repositories. The standards, which form the complete family of CDIF Standards, are documented in ISO/IEC 15474-1:2002, Information technology — CDIF framework — Part 1: Overview. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.

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208	ISO	ISO/IEC TS 15504-10:2011	Information technology — Process assessment — Part 10: Safety extension	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	ISO/IEC 15504 provides a framework for the assessment of processes. This framework can be used by organizations involved in planning, managing, monitoring, controlling, and improving the acquisition, supply, development, operation, evolution and support of product and services. The published ISO/IEC 15504 process assessment models for systems and software do not currently provide a sufficient basis for performing a process capability assessment of processes with respect to the development of complex safety-related systems. Developing safety-related systems requires specialized processes, techniques, skills and experience. Process amplifications (safety extension) are needed in the area of safety management, safety engineering and safety qualification. ISO/IEC TS 15504-10:2011 presents these amplifications (a safety extension) as three process descriptions: safety management, safety engineering and safety certification processes. The aim of ISO/IEC TS 15504-10:2011 is not to provide a way to verify the compliance with one or more domain-specific safety standards, nor to extend ISO/IEC 15504 in order to use it as a safety standard against which to verify compliance. The aim is to provide assessors with the necessary means and information for measuring the capability of processes and also defining possible process improvement actions when the software/system under development is safety-related.
209	ISO	ISO/IEC 15909-1:2019	Systems and software engineering — High-level Petri nets — Part 1: Concepts, definitions and graphical notation	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document defines a Petri net modeling language or technique, called high-level Petri nets, including its syntax and semantics. It provides a reference definition that can be used both within and between organizations, to ensure a common understanding of the technique and of the specifications written using the technique. This document also facilitates the development and interoperability of Petri net computer support tools. This document is applicable to a wide variety of concurrent discrete event systems and in particular distributed systems. Generic fields of application include: — requirements analysis; — development of specifications, designs and test suites; — descriptions of existing systems prior to re-engineering; — modeling business and software processes; — providing the semantics for concurrent languages; — simulation of systems to increase confidence; — formal analysis of the behavior of systems; — and development of Petri net support tools.
210	ISO	ISO/IEC 15909-2:2011	Systems and software engineering — High-level Petri nets — Part 2: Transfer format	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	ISO/IEC 15909-2:2011 defines an XML-based transfer format for Petri nets, which are defined conceptually and mathematically in ISO/IEC 15909-1. This transfer format enables the exchange of Petri nets among different Petri net tools and among different parties. Moreover, ISO/IEC 15909-2:2011 defines some concepts and XML-based syntax for defining the detailed graphical appearance of Petri nets. The focus of ISO/IEC 15909-2:2011 is on the transfer format for Place/Transition Nets, High-level Petri Nets and Symmetric Nets. The presentation, however, is structured in such a way that it is open for future extensions, so that other versions of Petri nets can be added later. The exact definition of this extension mechanism, called Petri net type definition, is not defined in ISO/IEC 15909-2:2011; it will be defined in ISO/IEC 15909-3. The transfer format will be used to transfer specifications of systems developed in High-level Petri Nets between tools to facilitate the development of systems in teams. ISO/IEC 15909-2:2011 is written as a reference for developers of Petri net tools. It will also be useful for researchers who define new versions and variants of Petri nets.
211	ISO	ISO/IEC 15909-2:2011/Cor 1:2013	Systems and software engineering — High-level Petri nets — Part 2: Transfer format — Technical Corrigendum 1	Published	Corrigendum	ISO/IEC JTC 1/SC 7		2013	International		Software engineering	Not available

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212	ISO	ISO/IEC 15909-3:2021	Systems and software engineering — High-level Petri nets — Part 3: Extensions and structuring mechanisms	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document defines enrichments, extensions and structuring mechanisms of Petri nets, applied on the definitions proposed in ISO/IEC 15909-1. This document facilitates the definitions of new kinds of Petri nets and their interoperability, while remaining compatible with those defined in ISO/IEC 15909-1. This document is written as a reference for designers of new Petri net variants, by defining common enrichments, extensions and structuring mechanisms, as well as a generalized process for defining new ones. This document is applicable to a wide variety of concurrent discrete event systems and in particular distributed systems. Generic fields of application include: — requirements analysis; — development of specifications, designs and test suites; — descriptions of existing systems prior to re-engineering; — modelling business and software processes; — providing the semantics for concurrent languages; — simulation of systems to increase confidence; — formal analysis of the behaviour of systems; — and development of Petri net support tools. This document can be applied to the design of a broad range of systems and processes, including aerospace, air traffic control, avionics, banking, biological and chemical processes, business processes, communication protocols, computer hardware architectures, control systems, databases, defence command and control systems, distributed computing, electronic commerce, fault-tolerant systems, games, hospital procedures, information systems, Internet protocols and applications, legal processes, logistics, manufacturing systems, metabolic processes, music, nuclear power systems, operating systems, transport systems (including railway control), security systems, telecommunications and workflow.
213	ISO	ISO/IEC/IEEE 15939:2017	Systems and software engineering — Measurement process	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC/IEEE 15939:2017 provides an elaboration of the measurement process from ISO/IEC 15288 and ISO/IEC 12207. The measurement process is applicable to system and software engineering and management disciplines. The process is described through a model that defines the activities of the measurement process that are required to adequately specify what measurement information is required, how the measures and analysis results are to be applied, and how to determine if the analysis results are valid. The measurement process is flexible, tailorable, and adaptable to the needs of different users. ISO/IEC/IEEE 15939:2017 identifies a process that supports defining a suitable set of measures that address specific information needs. It identifies the activities and tasks that are necessary to successfully identify, define, select, apply, and improve measurement within an overall project or organizational measurement structure. It also provides definitions for commonly used measurement terms.
214	ISO	ISO/IEC 15940:2013	Systems and software engineering — Software Engineering Environment Services	Published	Main	ISO/IEC JTC 1/SC 7		2013	International		Software engineering	ISO/IEC 15940:2013 aims to update ISO/IEC 15940:2006 to take into account the changes of ISO/IEC 12207:2008 and to add/complete the set of Software Engineering Environment services for software and system processes. Software engineering environments services, or SEE services, refers to a collection of services, partially or fully automated by software tools, that are used to support the execution of human activities in systems and software engineering. ISO/IEC 12207:2008 describes a comprehensive set of processes, activities and tasks to be performed when acquiring or developing a system/software. It does not address their implementation or their automation. These activities are usually carried out within a software or system development/maintenance project, and cover such areas as the specification, development, re-engineering or maintenance of systems. ISO/IEC 15940:2013 describes SEE services and relates them to ISO/IEC 12207:2008 in a manner applicable to a range of organizations. In defining a life cycle process for an organization, the user needs to find the appropriate level of automation provided by a software engineering environment. This may result in establishing a new SEE service or improving an existing one. The suite of SEE services described supports the process definitions in ISO/IEC 12207:2008. The purpose is to define a set of SEE services that are compatible with ISO/IEC 12207:2008, and that can be used either as a general reference, or to define an automated software and system process.

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215	ISO	ISO/IEC/IEEE 16085:2021	Systems and software engineering — Life cycle processes — Risk management	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document: — provides risk management elaborations for the processes described in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, — provides the users of ISO/IEC/IEEE 15288, ISO/IEC/IEEE 12207 and their associated elaboration standards with common terminology and specialized guidance for performing risk management within the context of systems and software engineering projects, — specifies the required information items that are to be produced through the implementation of risk management process for claiming conformance, and — specifies the required contents of the information items. This document provides a universally applicable standard for practitioners responsible for managing risks associated with systems and software over their life cycle. This document is suitable for the management of all risks encountered in any organization or project appropriate to the systems or software projects regardless of context, type of industry, technologies utilized, or organizational structures involved. This document does not provide detailed information about risk management practices, techniques, or tools which are widely available in other publications. Instead this document focuses on providing a comprehensive reference for integrating the large and wide variety of processes, practices, techniques, and tools encountered in systems and software engineering projects and other lifecycle activities into a unified approach for risk management, with the purpose of providing effective and efficient risk management while meeting the expectations and requirements of organization and project stakeholders.
216	ISO	ISO/IEC/IEEE 16326:2019	Systems and software engineering — Life cycle processes — Project management	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document is intended to aid project managers in managing to successful conclusion those projects concerned with systems, including software systems. This document specifies the required content of the project management plan (PMP). This document also quotes the extracted purpose and outcome statements from the technical management processes of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, and adds detailed guidance for managing projects that use these processes for systems, including software systems. 1.2 Field of application This document is written for those who use or plan to use ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 on projects dealing with systems, including software systems, regardless of project scope, products, methodology, size or complexity. The field of application of this document spans the whole system or software life cycle and addresses all project management roles, specifically: - those responsible for establishing and continuously improving their organization's policies for implementing ISO/IEC/IEEE 15288 system life cycle processes and ISO/IEC/IEEE 12207 software life cycle processes; - those responsible for executing any ISO/IEC/IEEE 15288 system life cycle process or ISO/IEC/IEEE 12207 software life cycle process at a project level. - organizations or individuals subcontracting a project management effort. In many organizations, the various responsibilities of project management are assigned to more than one person. Where the term "project manager" is used in this document, the guidance, advice or normative requirement is taken as applying to the applicable role within the organization. This document is intended to provide guidance for two-party situations and can be equally applied where the two parties are from the same organization. This document can also be used by a single party as self-imposed tasks. This document can also serve as guidance in multi-party situations, where high risks are inherent in the supply and integration of complex software-based systems, and procurement can involve several vendors, organizations or contracting parties. 1.3 Limitations The normative content specifications for PMPs and the guidance for application of the technical management processes have general application across the scope of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, but are developed with a focus on projects dealing with systems with a significant software element. ISO 16350:2015 establishes a common framework for application management processes with well-defined terminology that can be referenced by the software industry. It contains processes, activities, and tasks that apply during the stage of operation and use from the point of view of the supplier organization that enhances, maintains, and renews the application software and the software-related products such as data-structures, architecture, designs, and other documentation. It applies to the supply, maintenance, and renewal of applications, whether performed internally or externally with respect to the organization that uses the applications.
217	ISO	ISO/IEC 16350:2015	Information technology — Systems and software engineering — Application management	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO 16350:2015 establishes a common framework for application management processes with well-defined terminology that can be referenced by the software industry. It contains processes, activities, and tasks that apply during the stage of operation and use from the point of view of the supplier organization that enhances, maintains, and renews the application software and the software-related products such as data-structures, architecture, designs, and other documentation. It applies to the supply, maintenance, and renewal of applications, whether performed internally or externally with respect to the organization that uses the applications.

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218	ISO	ISO/IEC TR 16351:2019	Information technology — Systems and software engineering — Application management guidance on the relationship between ISO/IEC 16350:2015 and Application Service Library*	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides guidance on the relationship between ISO/IEC 16350:2015 and a commonly used application management framework, ASL. It can be used by any organization or person wishing to understand how ASL can be used with ISO/IEC 16350:2015, including: a) an internal or external application management organization that has demonstrated or intends to demonstrate conformity to the requirements specified in ISO/IEC 16350:2015 and is seeking guidance on the use of ASL to establish and improve an AMS and the processes; b) an application management organization that already uses ASL and is seeking guidance on how ASL can be used to support efforts to demonstrate conformity to the requirements specified in ISO/IEC 16350:2015; c) an assessor or auditor who wishes to understand the use of ASL as support to achieve the requirements specified in ISO/IEC 16350:2015. The correlations provided in this document relate to the 2nd version of ASL* (ASL2). Clause 4 describes how ASL* can support the demonstration of conformity to ISO/IEC 16350:2015. Clause 5 relates chapters in ASL* to clauses in ISO/IEC 16350:2015.
219	ISO	ISO/IEC TR 18018:2010	Information technology — Systems and software engineering — Guide for configuration management tool capabilities	Published	Main	ISO/IEC JTC 1/SC 7		2010	International		Software engineering	Configuration management (CM) is a process central to the software engineering life cycle. CM has been established as an ISO/IEC standard life cycle process in ISO/IEC 12207:2008, Information technology — Software life cycle processes and ISO/IEC 15288: 2008, Information technology — System life cycle processes. ISO/IEC 12207:2008 and ISO/IEC 15288:2008 describe a comprehensive set of processes, activities and tasks to be performed when acquiring or developing software. However, these documents do not address the capabilities that a CM tool user can expect from a tool in order to support the CM process and other software engineering life cycle activities. There is a gap between CM process descriptions and corresponding CM process automation services which affects both tool users and tool suppliers. ISO/IEC TR 18018:2010 provides guidance in the evaluation and selection for CM tools during acquisition. CM tool evaluation by prospective users can be complex, time consuming, and expensive. ISO/IEC TR 18018:2010 helps to characterize what a CM tool can and cannot do in the CM process. ISO/IEC TR 18018:2010 provides guidance for tool manufacturers in implementing a minimum set of capabilities. The capabilities defined in ISO/IEC TR 18018:2010 are linked to ISO/IEC 12207:2008 and ISO/IEC 15288:2008, and will provide tool manufacturers with guidance on the characteristics their tools should support to meet these International Standards.
220	ISO	ISO/IEC TR 19759:2015	Software Engineering — Guide to the software engineering body of knowledge (SWEBOOK)	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC TR 19759:2015 characterizes the boundaries of the software engineering discipline and provides topical access to the literature supporting that discipline.
221	ISO	ISO/IEC 19761:2011	Software engineering — COSMIC: a functional size measurement method	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	ISO/IEC 19761:2011 specifies the set of definitions, conventions and activities of the COSMIC Functional Size Measurement Method. It is applicable to software from the following functional domains: application software; real-time software; hybrids of the above. ISO/IEC 19761:2011 has not been designed for measuring the functional size of a piece of software, or its parts, which is characterized by complex mathematical algorithms or other specialized and complex rules, such as can be found in expert systems, simulation software, self-learning software and weather forecasting systems, or processes continuous variables such as audio sounds or video images, such as can be found in computer game software, musical instruments and the like.
222	ISO	ISO/IEC 19770-1:2017	Information technology — IT asset management — Part 1: IT asset management systems — Requirements	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC 19770-1:2017 specifies requirements for an IT asset management system within the context of the organization. ISO/IEC 19770-1:2017 can be applied to all types of IT assets and by all types and sizes of organizations. NOTE 1 This document is intended to be used for managing IT assets in particular, but it can also be applied to other asset types. It can be suitable, in whole or in part, for managing embedded software and firmware, however its use for these purposes has not been determined. It is not intended for managing information assets per se, i.e. it is not intended for managing information as an asset independent of hardware and software assets. Certain types of data and information are covered, such as data and information about IT assets in scope, and depending on how the scope is defined, it can cover digital information content assets. See the Introduction for an explanation about IT assets. NOTE 2 This document does not specify financial, accounting, or technical requirements for managing specific IT asset types. NOTE 3 For the purposes of this document, the term "IT asset management system" is used to refer to a management system for IT asset management. ISO/IEC 19770-1:2017 is a discipline-specific extension of ISO 55001:2014, with changes, and is not a sector-specific application of that International Standard. ISO 55001:2014 is intended to be used for managing physical assets in particular, but it can also be applied to other asset types. This document specifies requirements for the management of IT assets which are additional to those specified in ISO 55001:2014. Conformance to this document does not imply conformance to ISO 55001:2014. ISO/IEC 19770-1:2017 can be used by internal and external parties to assess the organization's ability to meet the organization's own IT asset management requirements.

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223	ISO	ISO/IEC 19770-2:2015	Information technology — IT asset management — Part 2: Software identification tag	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 19770-2:2015 establishes specifications for tagging software to optimize its identification and management. This part of ISO/IEC 19770 applies to the following: a) Tag producers: these organizations and/or tools create software identification (SWID) tags for use by others in the market. A tag producer may be part of the software creator organization, the software licensor organization, or be a third-party organization. These organizations and/or tools can broadly be broken down into the following categories. Platform providers: entities responsible for the computer or hardware device and/or associated operating system, virtual environment, or application platform, on which software may be installed or run. Platform providers which support this part of ISO/IEC 19770 may additionally provide tag management capabilities at the level of the platform or operating system. Software providers: entities that create, license, or distribute software. For example, software creators, independent software developers, consultants, and repackagers of previously manufactured software. Software creators may also be in-house software developers. Tag tool providers: entities that provide tools to create software identification tags. For example, tools within development environments that generate software identification tags, or installation tools that may create tags on behalf of the installation process, and/or desktop management tools that may create tags for installed software that did not originally have a software identification tag. b) Tag consumers: these tools and/or organizations utilize information from SWID tags and are typically broken down into the following two major categories: software consumers: entities that purchase, install, and/or otherwise consume software; IT discovery and processing tool providers: entities that provide tools to collect, store, and process software identification tags. These tools may be targeted at a variety of different market segments, including software security, compliance, and logistics. ISO/IEC 19770-2:2015 does not prescribe Information Technology Asset Management (ITAM) or other IT-related processes required for reconciliation of software entitlements with software identification tags or other IT requirements. ISO/IEC 19770-2:2015 is not intended to conflict either with any organization's policies, procedures or standards or with any national or international laws and regulations.
224	ISO	ISO/IEC 19770-3:2016	Information technology — IT asset management — Part 3: Entitlement schema	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	ISO/IEC 19770-3:2016 establishes a set of terms and definitions which may be used when discussing software entitlements (an important part of software licenses). It also provides specifications for a transport format which enables the digital encapsulation of software entitlements, including associated metrics and their management. This common set of terms and associated transport format is intended to facilitate the management of software entitlements. The intended benefits of the better management of entitlements include easier demonstration of proof of ownership, cost optimization of the use of entitlements and easier license compliance management. Furthermore, one of the benefits of having a standard for entitlement structure is that it may encourage the normalization by industry of names for and the details of, different types of entitlements. A common lexicon is critical to standardization and shared understanding. The terms in this part of ISO/IEC 19770 should form a part of that lexicon over time. It should be noted that within this text, attributes of an XML entity will be denoted with angle brackets, <attribute>. XML elements are noted with quotes, "Element". ISO/IEC 19770-3:2016 deals only with software entitlements, which are defined as the subset of software licenses that are concerned with usage rights. It is expected that the original documentation of licensing terms and conditions will be definitive for legal purposes, and will always take precedence over the Ent encapsulation. ISO/IEC 19770-3:2016 does not detail ITAM processes required for discovery and management of software (which is provided for in ISO/IEC 19770-1) or software identification tags (as defined by ISO/IEC 19770-2). ISO/IEC 19770-3:2016 does not consider identifying mechanisms for product activation. ISO/IEC 19770-3:2016 is not intended to conflict with any organization's policies, procedures and standards, or with any national laws and regulations. Any such conflict should be resolved before using this part of ISO/IEC 19770. In case the conflict cannot be resolved, the specification shall not be implemented.
225	ISO	ISO/IEC 19770-4:2017	Information technology — IT asset management — Part 4: Resource utilization measurement	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC 19770-4:2017 establishes specifications for an information structure to contain Resource Utilization Measurement information to facilitate IT asset management (ITAM). This document is applicable to all types of organization (for example, commercial enterprises, government agencies, and non-profit organizations).
226	ISO	ISO/IEC 19770-5:2015	Information technology — IT asset management — Part 5: Overview and vocabulary	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 19770-5:2015 provides a) an overview of the ISO/IEC 19770 family of standards, b) an introduction to IT asset management (ITAM) and software asset management (SAM), c) a brief description of the foundation principles and approaches on which SAM is based, and d) consistent terms and definitions for use throughout the ISO/IEC 19770 family of standards. ISO/IEC 19770-5:2015 is applicable to all types of organization (e.g. commercial enterprises, government agencies, and non-profit organizations).

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227	ISO	ISO/IEC 19770-8:2020	Information technology — IT asset management — Part 8: Guidelines for mapping of industry practices to/from the ISO/IEC 19770 family of standards	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document defines requirements, guidelines, formats and approaches for use when producing a mapping document that defines how industry practices map to/from the ISO/IEC 19770 series. This edition is focused solely on mappings to/from both the second edition of ISO/IEC 19770-1 that was published in 2012, or the third edition of ISO/IEC 19770-1 that was published in 2017. However, the title of this document is deliberately more general as it is expected that future editions of this document also include mapping frameworks related to other parts of the ISO/IEC 19770 series. In this document where reference is made to ISO/IEC 19770-1 without the specification of an edition number or a publication year, then the text applies to all editions of ISO/IEC 19770-1.
228	ISO	ISO/IEC 19770-11:2021	Information technology — IT asset management — Part 11: Requirements for bodies providing audit and certification of IT asset management systems	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document specifies requirements and provides guidance for certification bodies providing audit and certification of an ITAMS in accordance with ISO/IEC 19770-1. It does not change the requirements specified in ISO/IEC 19770-1. This document can also be used by accreditation bodies for the accreditation of certification bodies. However, this document does not specify requirements or provides guidance for accreditation bodies to audit certification bodies. A certification body providing ITAMS certification is expected to be able to demonstrate fulfilment of the requirements specified in this document, in addition to the requirements in ISO/IEC 17021-1.
229	ISO	ISO/IEC 19793:2015	Information technology — Open Distributed Processing — Use of UML for ODP system specifications	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 19793:2015 defines use of the unified modelling language (UML 2.4.1 superstructure specification, ISO/IEC 19505-2, for expressing system specifications in terms of the viewpoint specifications defined by the reference model of open distributed processing (RM-ODP, Rec. ITU-T X.901 to X.904 ISO/IEC 10746 Parts 1 to 4) and the Enterprise Language (Rec. ITU-T X.911 ISO/IEC 15414). It covers: a) the expression of a system specification in terms of RM-ODP viewpoint specifications using defined UML concepts and extensions (e.g., structuring rules, technology mappings, etc.); b) relationships between the resultant RM-ODP viewpoint specifications. ISO/IEC 19793:2015 is intended for the following audiences: ? ODP modellers who want to use the UML notation for expressing their ODP specifications in a graphical and standard way; ? UML modellers who want to use the RM-ODP concepts and mechanisms to structure their UML system specifications; ? modelling tool suppliers, who wish to develop UML-based tools that are capable of expressing RM-ODP viewpoint specifications.
230	ISO	ISO/IEC 20246:2017	Software and systems engineering — Work product reviews	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC 20246:2017 establishes a generic framework for work product reviews that can be referenced and used by all organizations involved in the management, development, test and maintenance of systems and software. It contains a generic process, activities, tasks, review techniques and documentation templates that are applied during the review of a work product. A work product is any artefact produced by a process. This document defines work product reviews that can be used during any phase of the life cycle of any work product. This document is intended for, but not limited to, project managers, development managers, quality managers, test managers, business analysts, developers, testers, customers and all those involved in the development, testing and maintenance of systems and software.
231	ISO	ISO/IEC 20741:2017	Systems and software engineering — Guideline for the evaluation and selection of software engineering tools	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC 20741:2017 gives guidelines for the evaluation and selection of software engineering tools, covering a partial or full portion of the software engineering life cycle. It establishes processes and activities to be applied for the evaluation of software engineering tools and selecting the most appropriate software engineering tools from several candidates. It establishes, for selected processes, the tasks and activities that can be applied for the evaluation of software engineering tools and selecting the most appropriate software engineering tools from several candidates. It establishes processes that can be applied for the evaluation of software engineering tools and selecting the most appropriate software engineering tools from several candidates. As these processes are generic, organizations can adapt these generic processes to meet organizational needs. The software engineering tool evaluation and selection processes can be viewed in the larger context of the organization's technology adoption process. ISO/IEC 20741:2017 provides the following: a) guidance on identifying organizational requirements for software engineering tools; b) guidance on mapping those requirements to software engineering tool characteristics to be evaluated; c) a process for selecting the most appropriate software engineering tool from several tools, based on measurements of the defined characteristics. NOTE 1 Guidance on mapping those requirements to software engineering tool capabilities to be evaluated is not covered by this document, but is covered by a series of standards for each tool area. Primary users of this document are organizations that intend to adopt software engineering tools to support their software life cycle processes. Software tool suppliers can also use this document to describe characteristics of their software engineering tools. ISO/IEC 20741:2017 is not intended to apply to: a) software engineering frameworks whose purpose is to provide mechanisms for data, control and presentation integration; b) general purpose tools (e.g. word processors, spreadsheets) which can be used in software engineering activities, nor software engineering tools of very narrow scope or specific purpose (e.g. a compiler); c) planning for the implementation of software engineering tools within an organization. NOTE 2 A user of this document can make the best possible selection of a software engineering tool and vet

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232	ISO	ISO/IEC 20926:2009	Software and systems engineering — Software measurement — IFPUG functional size measurement method 2009	Published	Main	ISO/IEC JTC 1/SC 7		2009	International		Software engineering	ISO/IEC 20926:2009 specifies the set of definitions, rules and steps for applying the IFPUG (International Function Point Users Group) functional size measurement (FSM) method. ISO/IEC 20926:2009 is conformant with all mandatory provisions of ISO/IEC 14143-1:2007. It can be applied to all functional domains and is fully convertible to prior editions of IFPUG sizing methods. IFPUG function point analysts have identified different delivery rates (hours to deliver a function point) related to building applications in different functional domains calibrated for varying project sizes and software complexities. ISO/IEC 20926:2009 can be applied by anyone requiring a measurement of functional size. Persons experienced with the method will find ISO/IEC 20926:2009 to be a useful reference.
233	ISO	ISO/IEC 20968:2002	Software engineering — Mk II Function Point Analysis — Counting Practices Manual	Published	Main	ISO/IEC JTC 1/SC 7		2002	International		Software engineering	ISO/IEC 20968:2002 specifies the set of definitions, conventions and activities of the MkII FPA Functional Size Measurement Method. The method can be used to measure the functional size of any software application that can be described in terms of logical transactions, each comprising an input, process and output component. The sizing rules were designed to apply to application software from the domain of business information systems, where the processing component of each transaction tends to be dominated by considerations of the storage or retrieval of data. The method may be applicable to software from other domains, but the user should note that the sizing rules do not take into account contributions to size such as from complex algorithms as typically found in scientific and engineering software, nor do the rules specifically take into account real-time requirements. MK II FPA is independent of the project management method to be used and of the development method employed. It is a measure of the logical, business requirements, independent of how they are implemented.
234	ISO	ISO/IEC/IEEE 21839:2019	Systems and software engineering — System of systems (SoS) considerations in life cycle stages of a system	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides a set of critical system of systems (SoS) considerations to be addressed at key points in the life cycle of the system of interest (Sol). This document refers to considerations that apply to an Sol that is a constituent system that interacts in an SoS. The considerations and life cycle model align with those which are already defined in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 24748-1. Selected subsets of these considerations can be applied throughout the life of systems through the involvement of stakeholders. The ultimate goal is to achieve customer satisfaction, so that when delivered, the Sol will operate effectively in the operational or business environment which is typically characterized as one or more systems of systems. This document concerns those systems that are man-made and are configured with one or more of the following: hardware, software, humans, procedures and facilities. 1.2 Field of application This document addresses SoS considerations that apply to systems at each stage of their respective life cycles. There is a wide variety of systems in terms of their purpose, domain of application, complexity, size, novelty, adaptability, quantities, locations, life spans and evolution. This document is concerned with describing the system of systems considerations that apply to a system that is the Sol; that is a constituent system within a system of systems. It applies to one-of-a-kind systems, mass produced systems or customized, adaptable systems. 1.3 Limitations This document does not detail the approach to addressing system of systems considerations in terms of methods or procedures. This document does not detail the described documentation in terms of name, format, explicit content and recording media of documentation.
235	ISO	ISO/IEC/IEEE 21840:2019	Systems and software engineering — Guidelines for the utilization of ISO/IEC/IEEE 15288 in the context of system of systems (SoS)	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides guidance on the application of processes in ISO/IEC/IEEE 15288 to systems of systems (SoS). The scope of this document is the same as ISO/IEC/IEEE 15288, which addresses more than systems engineering activities. NOTE 1 Throughout the document, there is mixed use of "system of systems" and "systems of systems". "SoS" could refer to a system of systems or systems of systems. Similarly, "CS" could refer to a constituent system or constituent systems. This document provides general guidance for each ISO/IEC/IEEE 15288 process and process outcome in the context of SoS, but it does not address specific activities, tasks, methods, or procedures. Additional processes and process outcomes unique to SoS can still be needed and are not covered by this document. This document explores the similarities and differences between systems and SoS and, by extension, the similarities and differences between engineering of systems and SoS. The guidance contained in this document is expected to evolve as the discipline matures. NOTE 2 In many cases, this document notes that ISO/IEC/IEEE 15288 processes or process outcomes "?" applies as stated to SoS." Some interpretation within the context of SoS can still be needed.
236	ISO	ISO/IEC/IEEE 21841:2019	Systems and software engineering — Taxonomy of systems of systems	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document defines a normalized taxonomy for systems of systems (SoS) to facilitate communications among stakeholders. It also briefly explains what a taxonomy is and how it applies to the SoS to aid in understanding and communication.

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237	ISO	ISO/IEC/IEEE 23026:2015	Systems and software engineering — Engineering and management of websites for systems, software, and services information	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC/IEEE 23026:2015 defines system engineering and management requirements for the life cycle of websites, including strategy, design, engineering, testing and validation, and management and sustainment for Intranet and Extranet environments. The goal of ISO/IEC/IEEE 23026:2015 is to improve the usability of informational websites and ease of maintenance of managed Web operations in terms of locating relevant and timely information, applying information security management, facilitating ease of use, and providing for consistent and efficient development and maintenance practices. It applies to those using web technology to present information and communications technology (ICT) information, such as user documentation for systems and software, life-cycle documentation for systems and software engineering projects, and documentation of policies, plans, and procedures for IT service management. ISO/IEC/IEEE 23026:2015 provides requirements for website owners and website providers, managers responsible for establishing guidelines for website development and operations, for software developers and operations and maintenance staff who may be external or internal to the website owner's organization. It applies to websites for public access and for limited access, such as for users, customers, and subscribers seeking information on IT products and services. It includes increased emphasis on the human factors concerns for making information easily retrievable and usable for the intended audience. It focuses on vendor- and product-independent considerations.
238	ISO	ISO/IEC 23396:2020	Systems and software engineering — Capabilities of review tools	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	The evaluation and selection of the review tools are performed in accordance with ISO/IEC 20741 which defines the general evaluation selection process and evaluation characteristics. This document defines capabilities specific to review tools in the process. By using these two standards together, it is possible to derive objective and reasonable results of the evaluation and selection of review tools. The review work is based on the process, activities, and tasks defined in ISO/IEC 20246. It is also assumed that the review targets are defined in ISO/IEC 20246. The review work in this document is assumed not to be performed by a 3rd party, but within a project. The review tool capabilities specified in this document harmonize with the review process defined in ISO/IEC 20246. This document does not include automated process, activities, or tasks for conducting reviews such as automated source code checkers defined in ISO/IEC 30130. Issues which are identified in the review are recorded and managed by the tool; but defects found in tests and issues found in general except for reviews are out of the scope of this document.
239	ISO	ISO/IEC 23531:2020	Systems and software engineering — Capabilities of issue management tools	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document defines the capabilities of issue management tools and is used to select the most appropriate one from many issue management tools. The evaluation and selection of the issue management tools is performed in accordance with ISO/IEC 20741 which defines the general evaluation selection process and evaluation characteristics. Issue management is based on the tasks described in several activities in their processes (e.g. project assessment and control, decision management, and system/software requirements definition) of ISO/IEC/IEEE 12207. This document is independent of development methodology or approaches (e.g. Waterfall or Agile) or lifecycle processes (e.g. implementation or operation).
240	ISO	ISO/IEC 23643:2020	Software and systems engineering — Capabilities of software safety and security verification tools	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document specifies requirements for the vendors and gives guidelines for both the users and the developers of software safety and security verification tools. The users of such tools include, but are not limited to, bodies performing verification and software developers who need to be aware and pay attention to safety and/or security of software. This document guides the verification tool vendors to provide as high-quality products as possible and helps the users to understand the capabilities and characteristics of verification tools. This document introduces use cases for software safety and security verification tools and entity relationship model related to them. This document also introduces tool categories for software safety and security verification tools and gives category specific guidance and requirements for the tool vendors and developers.
241	ISO	ISO/IEC TR 24587:2021	Software and systems engineering — Agile development — Agile adoption considerations	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document provides an overview of agile readiness factors that are likely to determine whether an organization, project, product or team is ready to start the transition to using an agile approach to their system and software development and maintenance activities. This document provides a general approach that is applicable to all agile methodologies and does not cover specific agile methodologies, such as Scrum, SAFe and eXtreme Programming (XP).
242	ISO	ISO/IEC 24744:2014	Software engineering — Metamodel for development methodologies	Published	Main	ISO/IEC JTC 1/SC 7		2014	International		Software engineering	Development methodologies may be described in the context of an underpinning metamodel, but the precise mechanisms that permit them to be defined in terms of their metamodels are usually difficult to explain and do not cover all needs. For example, it is difficult to devise a practice that allows the definition of properties of the elements that compose the methodology and, at the same time, of the entities (such as work products) created when the methodology is applied. ISO/IEC 24744:2014 introduces the Software Engineering Metamodel for Development Methodologies (SEMDM), a comprehensive metamodel that makes use of a new approach to defining methodologies based on the concept of power type. The aim of SEMDM is to define methodologies in information-based domains, i.e. areas characterized by their intensive reliance on information management and processing, such as software, business or systems engineering. The SEMDM combines key advantages of other metamodeling approaches with none of their known drawbacks, allowing the seamless integration of process, modelling and people aspects of methodologies. Examples are given where other metamodels are mapped to SEMDM and a brief synopsis of problems is provided. Various methodologies are defined, used, or implied by a growing number of standards, and it is desirable that the concepts used by each methodology be harmonized. A vehicle for harmonization is the SEMDM. Conformance to this metamodel will ensure a consistent approach to defining each methodology with consistent concepts and terminology.

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243	ISO	ISO/IEC/IEEE 24748-1:2018	Systems and software engineering — Life cycle management — Part 1: Guidelines for life cycle management	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document provides guidelines for the life cycle management of systems and software, complementing the processes described in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207. This document: — addresses systems concepts and life cycle concepts, models, stages, processes, process application, key points of view, adaptation and use in various domains and by various disciplines; — establishes a common framework for describing life cycles, including their individual stages, for the management of projects to provide, or acquire either products or services; — defines the concept and terminology of a life cycle; — supports the use of the life cycle processes within an organization or a project. Organizations and projects can use these life cycle concepts when acquiring and supplying either products or services; — provides guidance on adapting a life cycle model and the content associated with a life cycle or a part of a life cycle; — describes the relationship between life cycles and their use in applying the processes in ISO/IEC/IEEE 15288 (systems aspects) and ISO/IEC/IEEE 12207 (software aspects); — shows the relationships of life cycle concepts to the hardware, human, services, process, procedure, facility and naturally occurring entity aspects of projects; and — describes how its concepts relate to detailed process standards, for example, in the areas of measurement, project management and risk management.
244	ISO	ISO/IEC/IEEE 24748-2:2018	Systems and software engineering — Life cycle management — Part 2: Guidelines for the application of ISO/IEC/IEEE 15288 (System life cycle processes)	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document is a guideline for the application of ISO/IEC/IEEE 15288:2015. It addresses system, life cycle, organizational, project, and process, concept application, principally through reference to ISO/IEC/IEEE 24748-1 and ISO/IEC/IEEE 15288:2015. It gives guidance on applying ISO/IEC/IEEE 15288:2015 from the aspects of strategy, planning, application in organizations, and application on projects. It also provides comparison of the differences between ISO/IEC/IEEE 15288:2015 and the prior versions, ISO/IEC 15288:2008. This document is intended to be consistent with both ISO/IEC/IEEE 24748-1 and ISO/IEC/IEEE 15288:2015 in its treatment of life-cycle concepts and systems engineering processes. NOTE Systems engineering for defense programs is addressed in IEEE Std 15288.1, Application of Systems Engineering on Defense Programs.
245	ISO	ISO/IEC/IEEE 24748-3:2020	Systems and software engineering — Life cycle management — Part 3: Guidelines for the application of ISO/IEC/IEEE 12207 (software life cycle processes)	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document is a guideline for the application of ISO/IEC/IEEE 12207:2017. This document establishes guidance to implement a common framework for software life cycle processes, with well-defined terminology, that can be referenced by the software industry. This document provides guidance on defining, controlling, and improving software life cycle processes within an organization or a project. This document recommends methods and approaches suitable for a variety of life cycle models. The guidance emphasizes the importance of establishing a strategy, planning, and the involvement of stakeholders, with the ultimate goal of achieving customer satisfaction. This document applies to the acquisition, supply, design and development, transition, operation, maintenance, and disposal (whether performed internally or externally to an organization) of software systems, products, and services (including software as a service (SaaS)), and the software portion of any system. Software includes the software portion of firmware. The guidance on processes, activities, and tasks in this document can also be applied during the acquisition of a system that contains software. The guidance in this document can also be used as a basis for selecting, establishing, and improving organizational environments, e.g., methods, procedures, techniques, tools, and trained personnel. In the context of this document, there is a continuum of human-made systems from those that use little or no software to those in which software is the primary interest. It is rare to encounter a complex system without software, and all software systems require physical system components (hardware) to operate, either as part of the software system-of-interest (Sol) or as an enabling system or infrastructure. Thus, the choice of whether to apply this document for guidance to the software life cycle processes, or ISO/IEC/IEEE 24748-2, depends on the Sol. At a high level, both documents have the same life cycle process framework, but differ in guidance for activities and tasks to perform software engineering or systems engineering, respectively. The processes and process groups in this document are identical in their purpose and outcomes with those in ISO/IEC/IEEE 12207:2017 and in ISO/IEC/IEEE 15288:2015, with one exception: the System/Software Requirements Definition process of ISO/IEC/IEEE 12207:2017 and this document has a different name from the System Requirements Definition process of ISO/IEC/IEEE 15288:2015. Use of the guidance in this document is appropriate regardless of software system size or complexity or organizational size. The process outcomes from the ISO/IEC/IEEE 12207:2017 life cycle processes are meant to be generic and applicable to the engineering of any software system in any size organization.
246	ISO	ISO/IEC/IEEE 24748-4:2016	Systems and software engineering — Life cycle management — Part 4: Systems engineering planning	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	The evolution of the harmonized set of ISO/IEC/IEEE 15288-12207 related standards and technical reports that are discussed in this International Standard provides detailed requirements and guidance on the application of system life cycle processes. This International Standard unifies technical and management requirements and guidance from several of these sources to specify the requirements for the content of a SEMP and to provide a common SEMP format. This International Standard also identifies the processes as defined in ISO/IEC/IEEE 15288 to perform the necessary project planning activities to accomplish the project's technical effort and to develop the project's SEMP. Due to close alignment with the content of ISO/IEC 24748, ISO/IEC 26702 is now Part 4 of the multi-part International Standard, ISO/IEC 24748 (Systems and software engineering ? Life cycle management).

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247	ISO	ISO/IEC/IEEE 24748-5:2017	Systems and software engineering — Life cycle management — Part 5: Software development planning	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	his document provides a common framework for planning and controlling the technical processes and activities to produce and sustain software products. The complete life cycle is covered by this document, from idea conception to the retirement of a software product. The framework described by this document provides for best practices in communication and cooperation among parties that plan for, develop, utilize, and manage modern software. This document: — specifies the required information items to be produced through the implementation of the required planning and control processes; — specifies the required content of the required information items; — gives guidelines for the format and content of the required and related information items; and — details the processes necessary to develop and implement a software plan. This document is intended to provide (guidance for parties involved in the planning of software engineering at all stages of the software life cycle. It is intended to provide a common framework for two-party and multi-party collaborations and can be applied where the parties are from the same organization. This document can also be used by a single party.
248	ISO	ISO/IEC TS 24748-6:2016	Systems and software engineering — Life cycle management — Part 6: System integration engineering	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This document — specifies activities and processes to be implemented for engineering the integration of systems-of-interest throughout the life cycle (systems made of products and/or services; see Note 1), — provides guidance for the integration process and its relationships to other system life cycle processes as described in ISO/IEC/IEEE 15288, — specifies the information items to be produced through the implementation of the integration engineering (integration process and its relationships to other system life cycle processes), — specifies the contents of the information items, and — provides guidelines for the format of the information items. This document can be applied to — those who use or plan to use ISO/IEC/IEEE 15288 on projects dealing with man-made systems, software-intensive systems, products and services related to those systems, regardless of project scope, methodology, size or complexity, and — anyone performing integration engineering activities to aid in ensuring that the application of the integration process and its relationships to other system life cycle processes conform to ISO/IEC/IEEE 15288.
249	ISO	ISO/IEC/IEEE 24748-7:2019	Systems and software engineering — Life cycle management — Part 7: Application of systems engineering on defense programs	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document establishes the requirements for systems engineering activities to be performed on projects of the United States (US) Department of Defense (DoD) and other defense agencies across the entire system life cycle, including the planning, acquisition, modification, and sustainment of defense systems. It provides the foundation for systems engineering within the context of ISO/IEC/IEEE 15288 and the acquisition environment of DoD and other defense agencies at all levels of system hierarchy. This document provides detailed requirements for the application of the life cycle processes, activities, and tasks of ISO/IEC/IEEE 15288 for use on any defense system and includes the effective integration of agreement processes, technical processes, technical management processes, and essential specialty engineering requirements.
250	ISO	ISO/IEC/IEEE 24748-8:2019	Systems and software engineering — Life cycle management — Part 8: Technical reviews and audits on defense programs	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document establishes the requirements for technical reviews and audits to be performed throughout the acquisition life cycle for the US Department of Defense (DoD) and other defense agencies. This document provides the definition, description, and intent, as well as the entry, exit and success criteria, for each technical review and audit. It is to be used to establish agreement between acquirers and suppliers on the technical reviews and audits that are needed for the project, as well as the focus and expectations of each technical review and audit.
251	ISO	ISO/IEC/IEEE 24748-7000:2022	Systems and software engineering — Life cycle management — Part 7000: Standard model process for addressing ethical concerns during system design	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	The standard establishes a set of processes by which engineers and technologists can include consideration of ethical values throughout the stages of concept exploration and development, which encompass system initiation, analysis, and design. This standard provides engineers and technologists with an implementable process aligning innovation management processes, system design approaches, and software engineering methods to help address ethical concerns or risks during system design. IEEE Std 7000™ does not give specific guidance on the design of algorithms to apply ethical values such as fairness and privacy.
252	ISO	ISO/IEC/IEEE 24765:2017	Systems and software engineering — Vocabulary	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	ISO/IEC/IEEE 24765:2017 provides a common vocabulary applicable to all systems and software engineering work. It was prepared to collect and standardize terminology. ISO/IEC/IEEE 24765:2017 is intended to serve as a useful reference for those in the information technology field, and to encourage the use of systems and software engineering standards prepared by ISO and liaison organizations IEEE Computer Society and Project Management Institute. ISO/IEC/IEEE 24765:2017 includes references to the active source standards for definitions so that systems and software engineering concepts and requirements can be further explored.
253	ISO	ISO/IEC TR 24766:2009	Information technology — Systems and software engineering — Guide for requirements engineering tool capabilities	Published	Main	ISO/IEC JTC 1/SC 7		2009	International		Software engineering	Requirements engineering (RE) is an essential process of the systems and software engineering life cycles. RE has been established as an ISO/IEC standard life cycle process in both ISO/IEC 15288:2008, Systems and software engineering — System life cycle processes and ISO/IEC 12207:2008, Systems and software engineering — Software life cycle processes. This Technical Report provides guidance on desirable capabilities of RE tools. It supplements ISO/IEC 14102:2008, Information technology — Guideline for the evaluation and selection of CASE tools, which details a set of evaluation criteria for CASE tools without referencing a specific activity or service area.

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254	ISO	ISO/IEC 24773-1:2019	Software and systems engineering — Certification of software and systems engineering professionals — Part 1: General requirements	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document is part one of the ISO/IEC 24773 series. It contains the requirements which will be common to all other parts of the ISO/IEC 24773 series, for certifications (schemes and bodies) in the domain of software and systems engineering.
255	ISO	ISO/IEC 24773-3:2021	Software and systems engineering — Certification of software and systems engineering professionals — Part 3: Systems engineering	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document elaborates requirements and recommendations for certifications schemes based on ISO/IEC 24773-1, which are specific to the domain of systems engineering.
256	ISO	ISO/IEC/IEEE 24774:2021	Systems and software engineering — Life cycle management — Specification for process description	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document provides an explanation of considerations involved in defining a process. This document gives requirements and recommendations for the description of processes by identifying elements and rules for their formulation. This document also describes the use of process views. This document explains how conformance to a process can be defined, when the process is described in accordance with this document. This document does not describe how processes are composed or otherwise aggregated into larger frameworks or life cycle models. Nor does the document cover how to assess or evaluate the performance of a process, or the output (products) of a process. NOTE Two prominent International Standards in process description for software and system engineering are ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288. These two standards have very similar process models. The information items associated with their process definitions are given in ISO/IEC/IEEE 15289. Other International Standards provide further characterization of a single life cycle process by elaborating the process elements and levying specific requirements on the execution of the process. This document is applicable when processes are described for various process definitions in any party, organization or standard relating to systems and software engineering processes.
257	ISO	ISO/IEC 25000:2014	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guide to SQuaRE	Published	Main	ISO/IEC JTC 1/SC 7		2014	International		Software engineering	ISO/IEC 25000:2014 provides guidance for the use of the new series of International Standards named Systems and software Quality Requirements and Evaluation (SQuaRE). The purpose of ISO/IEC 25000:2014 is to provide a general overview of SQuaRE contents, common reference models and definitions, as well as the relationship among the documents, allowing users of the Guide a good understanding of those series of standards, according to their purpose of use. It also contains an explanation of the transition process between the old ISO/IEC 9126 and the ISO/IEC 14598 series and SQuaRE.
258	ISO	ISO/IEC 25001:2014	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Planning and management	Published	Main	ISO/IEC JTC 1/SC 7		2014	International		Software engineering	This International Standard provides requirements and recommendations for an organization responsible for implementing and managing the systems and software product quality requirements specification and evaluation activities through the provision of technology, tools, experiences, and management skills. The role of the evaluation group includes motivating employees and training them for the requirements specification and the evaluation activities, preparing appropriate documents, identification or development of required methods, and responding to queries on relevant technologies. Technology management is related to the planning and management of a systems and software quality requirements specification and evaluation process, measurements and tools. This includes the management of development, acquisition, standardisation, control, transfer and feedback of requirements specification and evaluation technology experiences within the organisation.
259	ISO	ISO/IEC 25010:2011	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — System and software quality models	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	This International Standard defines: a) A quality in use model composed of five characteristics (some of which are further subdivided into subcharacteristics) that relate to the outcome of interaction when a product is used in a particular context of use. This system model is applicable to the complete human-computer system, including both computer systems in use and software products in use. b) A product quality model composed of eight characteristics (which are further subdivided into subcharacteristics) that relate to static properties of software and dynamic properties of the computer system. The model is applicable to both computer systems and software products. The characteristics defined by both models are relevant to all software products and computer systems. The characteristics and subcharacteristics provide consistent terminology for specifying, measuring and evaluating system and software product quality. They also provide a set of quality characteristics against which stated quality requirements can be compared for completeness.

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260	ISO	ISO/IEC TS 25011:2017	Information technology — Systems and software Quality Requirements and Evaluation (SQuaRE) — Service quality models	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document is applicable to IT services that support the needs of an individual user or a business. IT services can be delivered personally or remotely by people, or by an IT application that could be in a local or remote location (see Annex A). These include two types of IT services: a) services completely automated provided by an IT system; b) services provided by a human using an IT system. This document describes the use of two quality models for IT services. a) This document defines an IT service quality model composed of eight characteristics (which are further subdivided into sub-characteristics) that relate to properties of the IT service made up from a combination of elements including people, processes, technology, facilities and information. b) This document describes how the quality in use model in ISO/IEC 25010 which is composed of five characteristics (some of them are further subdivided into sub-characteristics) can be applied to the outcome when an IT service is used in a particular context of use. This model is applicable to the complete service provision system composed of people, processes, technology, facilities and information.
261	ISO	ISO/IEC 25012:2008	Software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Data quality model	Published	Main	ISO/IEC JTC 1/SC 7		2008	International		Software engineering	ISO/IEC 25012:2008 defines a general data quality model for data retained in a structured format within a computer system. ISO/IEC 25012:2008 can be used to establish data quality requirements, define data quality measures, or plan and perform data quality evaluations. It could be used, for example, to define and evaluate data quality requirements in data production, acquisition and integration processes, to identify data quality assurance criteria, also useful for re-engineering, assessment and improvement of data, to evaluate the compliance of data with legislation and/or requirements. ISO/IEC 25012:2008 categorizes quality attributes into fifteen characteristics considered by two points of view: inherent and system dependent. Data quality characteristics will be of varying importance and priority to different stakeholders. ISO/IEC 25012:2008 is intended to be used in conjunction with the other parts of the SQuaRE series of International Standards, and with ISO/IEC 9126-1 until superseded by ISO/IEC 25010.
262	ISO	ISO/IEC 25020:2019	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality measurement framework	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides a framework for developing quality measurement. The contents of this document are as follows: — quality measurement reference model; — relationships among different types of quality measures; — guidelines for selecting quality measures; — guidelines for constructing quality measures; — guidelines for planning and performing measurements; — guidelines for the application of measurement results. It includes considerations for selecting quality measures and quality measure elements (Annex A), assessing the reliability of measurement and the validity of quality measures (Annex B), elements for documenting quality measures (Annex C), normalized measurement function for quality measures (Annex D) and the measurement information model in ISO/IEC/JEEE 15939 (Annex E). This document can be applied for designing, identifying, evaluating and executing the measurement model of system and software product quality, quality in use, data quality and IT service quality. This reference model can be used by developers, acquirers, quality assurance staff and independent evaluators—essentially by people responsible for specifying and evaluating the quality of information and communication technology (ICT) systems and services.
263	ISO	ISO/IEC 25021:2012	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality measure elements	Published	Main	ISO/IEC JTC 1/SC 7		2012	International		Software engineering	ISO/IEC 25021:2012 provides guides to specify Quality Measure Elements (QME) and initial set of QME as examples. QME is a measure defined in terms of a property and the measurement method for quantifying it, including optionally the transformation by a mathematical function. ISO/IEC 25021:2012 is intended to be used throughout the system and software product life cycle used with other documents of the ISO/IEC 250nn SQuaRE series, especially ISO/IEC 25022, ISO/IEC 25023 and ISO/IEC 25024.
264	ISO	ISO/IEC 25022:2016	Systems and software engineering — Systems and software quality requirements and evaluation (SQuaRE) — Measurement of quality in use	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This International Standard defines quality in use measures for the characteristics defined in ISO/IEC 25010, and is intended to be used together with ISO/IEC 25010. It can be used in conjunction with the ISO/IEC 2503n and the ISO/IEC 2504n standards or to more generally meet user needs with regard to product or system quality. This International Standard contains the following: — a basic set of measures for each quality in use characteristic; — an explanation of how quality in use is measured. This International Standard provides a suggested set of quality in use measures to be used with the quality in use model in ISO/IEC 25010. They are not intended to be an exhaustive set. It includes as informative annexes examples of how to measure context coverage (Annex A), options for normalising quality in use measures (Annex B), use of ISO/IEC 25022 for measuring usability in ISO 9241-11 (Annex C), a quality in use evaluation process (Annex D), the relationship between different quality models (Annex E), and quality measurement concepts (Annex F). The measures are applicable to the use of any human-computer system, including both computer systems in use and software products that form part of the system.

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265	ISO	ISO/IEC 25023:2016	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Measurement of system and software product quality	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This International Standard defines quality measures for quantitatively evaluating system and software product quality in terms of characteristics and subcharacteristics defined in ISO/IEC 25010 and is intended to be used together with ISO/IEC 25010. It can be used in conjunction with the ISO/IEC 2503n and the ISO/IEC 2504n standards or to more generally meet user needs with regard to software product or system quality. This International Standard contains the following: — a basic set of quality measures for each characteristic and subcharacteristics; — an explanation of how to apply software product and system quality measures. It includes, as informative annexes, considerations for the use of quality measures (Annex A), QMEs used to define product or system quality measures (Annex B), and detailed explanation of measurement types (Annex C).
266	ISO	ISO/IEC 25024:2015	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Measurement of data quality	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard defines data quality measures for quantitatively measuring the data quality in terms of characteristics defined in ISO/IEC 25012. This International Standard contains the following: — a basic set of data quality measures for each characteristic; — a basic set of target entities to which the quality measures are applied during the data-life-cycle; — an explanation of how to apply data quality measures; — a guidance for organizations defining their own measures for data quality requirements and evaluation. It includes, as informative annexes, a synoptic table of quality measure elements defined in this International standard (Annex A), a table of quality measures associated to each quality measure element and target entity (Annex B), considerations about specific quality measure elements (Annex C), a list of quality measures in alphabetic order (Annex D), and a table of quality measures grouped by characteristics and target entities (Annex E).
267	ISO	ISO/IEC TS 25025:2021	Information technology — Systems and software Quality Requirements and Evaluation (SQuaRE) — Measurement of IT service quality	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document defines quality measures useful for requirements and evaluation of IT service quality in terms of characteristics and sub-characteristics defined in ISO/IEC TS 25011. This document contains a basic set of quality measures for each characteristic and sub-characteristic. This document does not assign ranges of values of the quality measures to rated levels or to grades of compliance. Such values are defined based on the nature of the IT service, and so depends on factors such as category of the IT service or users' needs. Some attributes can have a desirable range of values, which does not depend on specific user needs but generic factors, for example, service downtime. This document includes, in Annex A, considerations for the selection and application of quality measures. The quality measures in this document are primarily intended to be used for quality evaluation and improvement of IT services during or after the development life cycle. The main users of this document are people carrying out quality requirements specification and evaluation activities for IT services as part of the following: — development: including requirements analysis, design, implementation, testing and deployment during the development life cycle; — quality management: monitoring activities of quality assurance and performing quality control of an IT service; — supply: making a contract with the user for supplying an IT service under the terms of a contract; — acquisition: including IT service selection, when acquiring or procuring an IT service from a service provider; — maintenance: improvement of an IT service based on quality measurement.
268	ISO	ISO/IEC 25030:2019	Systems and software engineering — Systems and software quality requirements and evaluation (SQuaRE) — Quality requirements framework	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides the framework for quality requirements for systems, software products and data, which includes concept of the quality requirements, and requirements and recommendations for the processes and methods to elicit, define, use and govern them. Intended readers of this document include, but are not limited to: — acquirers: evaluate if the system/software products/data fulfills their value proposition, i.e., meets the expected quality, — developers: design, implement and test the system/software products/data to ensure that it meets the expected quality, — testers: verify and validate that the system/software products/data meets the expected quality, — project managers: plan, monitor and control the achievement of the expected quality, and — independent evaluators: evaluate the system/software products/data with the objective criteria. This document complies with the technical processes defined in ISO/IEC/IEEE 15288, which are relevant for elicitation of stakeholders' quality needs and for defining, analyzing and maintaining quality requirements. In this document, the quality models in ISO/IEC 25010 and ISO/IEC 25012 are used to categorize quality requirements and to provide a basis for quantifying them in terms of quality measures in the quality measure division of ISO/IEC 2502n. This document does not cover specification of the other requirements (such as functional requirements, process requirements, etc.), and prescribes neither any specific quality measure nor any specific development process.

No crt	Standards developing organization (SDO)	Standard reference	Standard Title	Standard Status (published/draft /withdrawn)	Standard Category (basic standard, process standard, product standard)	Responsible Body Technical Committee (TC)	Drafting Body Working group (WG)	Date of publication (Year)	Level (international , european, national)	Status Updated by the end of the project	Domain (BIM, Facility Management, Sustainability etc)	Abstract
269	ISO	ISO/IEC 25040:2011	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Evaluation process	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	ISO/IEC 25040:2011 contains requirements and recommendations for the evaluation of software product quality and clarifies the general concepts. It provides a process description for evaluating software product quality and states the requirements for the application of this process. The evaluation process can be used for different purposes and approaches. The process can be used for the evaluation of the quality of pre-developed software, commercial-off-the-shelf software or custom software and can be used during or after the development process. ISO/IEC 25040:2011 establishes the relationship of the evaluation reference model to the SQuaRE documents as well as shows how each SQuaRE document should be used during the activities of the evaluation process. It is intended for those responsible for software product evaluation and is appropriate for developers, acquirers and independent evaluators of software products. These three different approaches are detailed in ISO/IEC 14598-3, ISO/IEC 14598-4, and ISO/IEC 14598-5. It is not intended for evaluation of other aspects of software products (such as functional requirements, process requirements, business requirements, etc.).
270	ISO	ISO/IEC 25041:2012	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Evaluation guide for developers, acquirers and independent evaluators	Published	Main	ISO/IEC JTC 1/SC 7		2012	International		Software engineering	ISO/IEC 25041:2012 provides requirements, recommendations and guidelines for system and software product quality evaluation, for the application of ISO/IEC 25040. Intended audiences of ISO/IEC 25041:2012 are developers, acquirers and independent evaluators of the system and software product. ISO/IEC 25041:2012 is part of ISO/IEC 25000 SQuaRE series of International Standards. It is not limited to any specific application area, and can be used for quality evaluation of any type of system and software product.
271	ISO	ISO/IEC 25045:2010	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Evaluation module for recoverability	Published	Main	ISO/IEC JTC 1/SC 7		2010	International		Software engineering	ISO/IEC 25045:2010 is one of the SQuaRE series of International Standards, which provides a framework for software products quality requirements and evaluation including the requirements for methods of software product measurement and evaluation. ISO/IEC 25045:2010 uses a methodology involving two types of evaluation for recoverability. One part of the method makes use of the disturbance injection methodology and a list of disturbances based on common categories of operational faults and events to evaluate the quality measure of resiliency. The second quality measure is based on a set of questions that is defined for each disturbance to evaluate the quality measure of autonomic recovery index by assessing how well the system detects, analyses, and resolves the disturbance without human intervention. ISO/IEC 25045:2010 is applicable to information systems executing transactions in a system supporting single or multiple concurrent users, where speedy recovery and ease of managing recovery is important to the acquirer, owner/operator, and the developer.
272	ISO	ISO/IEC 25051:2014	Software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Requirements for quality of Ready to Use Software Product (RUSP) and instructions for testing	Published	Main	ISO/IEC JTC 1/SC 7		2014	International		Software engineering	ISO/IEC 25051:2014 establishes: quality requirements for Ready to Use Software Product (RUSP); requirements for test documentation for the testing of RUSP, including test plan, test description, and test results; instructions for conformity evaluation of RUSP. It includes also recommendations for safety or business critical RUSP. ISO/IEC 25051:2014 deals only with providing the user with confidence that the RUSP will perform as offered and delivered. It does not deal with the production realization (including activities and intermediate products, e.g. specifications). The quality system of a supplier is outside the scope of ISO/IEC 25051:2014.
273	ISO	ISO/IEC TS 25052-1:2022	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE): cloud services — Part 1: Quality model	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	Not available

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274	ISO	ISO/IEC/IEEE 26511:2018	Systems and software engineering — Requirements for managers of information for users of systems, software, and services	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document supports the needs of users for consistent, complete, accurate, and usable information. It provides requirements for strategy, planning, managing, staffing, translation, production, and quality and process-maturity assessment for managers of information for users. It specifies processes and procedures for managing information for users throughout the product- or systems-development life cycle. It also includes requirements for key documents produced for managing information for users, including strategic and project plans. This document provides an overview of the information-management processes that are specific for the management of information for users. It addresses the following activities: — developing a comprehensive strategy for information development; — assessing user information needs; — planning and managing an information-development project; — staffing and forming information-development teams; — reviewing and testing information for users; — managing the translation process; — publishing and delivering information for users; — evaluating customer satisfaction and information quality; — measuring productivity, efficiency, and costs; and — evaluating organizational maturity. The guidance in this document applies to multiple project management approaches, including both agile and traditional practices. Traditional practices can encompass predictive, waterfall, or other top-down management methods. Where certain practices are common in agile project management, they are noted.
275	ISO	ISO/IEC/IEEE 26512:2018	Systems and software engineering — Requirements for acquirers and suppliers of information for users	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document supports the interest of system users in having consistent, complete, accurate, and usable information. It addresses both available approaches to standardization: a) process standards, which specify the way that information products are to be acquired and supplied; and b) information product standards, which specify the characteristics and functional requirements of the information. As defined in ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288:2015, the acquisition and supply activities make up the agreement processes of the software or system life cycle. Acquisition and supply of information for users and related services are specializations of those processes. Such services can be acquired and supplied for any part of the information management process, such as the following: — information management; — information design and development; — information editing and review coordination; — information testing, particularly usability testing; — information production and packaging; — information distribution and delivery; — advice on the selection and implementation of information development tools and supporting systems; and — information development process improvement.
276	ISO	ISO/IEC/IEEE 26513:2017	Systems and software engineering — Requirements for testers and reviewers of information for users	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document supports the interest of software users in receiving consistent, complete, accurate, and usable documentation and specifies processes for use in testing and reviewing of user documentation (Clause 6). It is not limited to the test and review stage of the lifecycle, but includes activities throughout the information management and documentation management process. This document is intended for use in all types of organizations, whether or not a dedicated documentation department is present. In all cases, it can be used as a basis for local standards and procedures. Readers are assumed to have experience or general knowledge of testing or reviewing processes. This document deals with the evaluation of end-user content only, and not with the evaluation of the software it supports.
277	ISO	ISO/IEC/IEEE 26514:2022	Systems and software engineering — Design and development of information for users	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document covers the development process for designers and developers of information for users of software. It describes how to establish what information users need, how to determine the way in which that information should be presented, and how to prepare the information and make it available. It is not limited to the design and development stage of the life cycle, but includes information on design throughout the life cycle, such as design strategy and maintaining a design. This document provides requirements for the structure, information content, and format of information for users of software. This document can be applied to developing the following types of information, although it does not cover all aspects of them: — information for users of products other than software; — multimedia systems using animation, video, and sound; — computer-based training (CBT) packages and specialized course materials intended primarily for use in formal training programs; — maintenance information describing the internal operation of systems software; — information for users incorporated into the user interface itself.

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278	ISO	ISO/IEC/IEEE 26515:2018	Systems and software engineering — Developing information for users in an agile environment	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document supports the interest of information developers and associated roles responsible for producing information for users of software and systems developed within an agile environment. This document takes a process standard approach to specify the way in which information for users can be developed in agile development projects. This document provides requirements of information management and information development processes appropriate for software projects that are using agile development methods. Clause 5 covers the overall requirements for information in agile software development. Clause 6 covers requirements for the information development lead or project manager to plan an agile information development project and manage the information development activities in an agile environment. Clause 7 covers requirements for designing, developing, and providing information for users in an agile environment. Annex A describes agile development practices and methods. This document is intended neither to encourage nor to discourage the use of any particular agile development tools or methods. This document provides guidance on processes appropriate for information developers of information for users in software and systems projects that are using agile development methodologies. It is not limited to the development phase of the life cycle of information for users, but includes activities throughout the whole life cycle. This document is intended for use in all organizations that are using agile development or are considering implementing their projects using these techniques. It is assumed that users of this document have experience or general knowledge of information for users (traditionally called “user documentation”) and agile processes.
279	ISO	ISO/IEC/IEEE 26531:2015	Systems and software engineering — Content management for product life-cycle, user and service management documentation	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This standard states requirements for efficient development and management of content produced • throughout the life-cycle of a system and software product; • for the provision of user documentation for systems and software; • for the management of IT services. This standard is independent of the tools, protocols, and systems used for content management. It does not address configuration management of software assets. The content to be managed with this standard includes • user information such as topic collections, manuals, guides, embedded user assistance, style guides, videos and other media, and other content that supports the effective use of a system or software product; • product life cycle information such as design documents, use cases, personas, project management plans, feature requests, models, scripts, testing plans, test scripts, defect reports; • service management items such as service-level agreements, records, policies, procedures, and other documents. The purpose of this standard is to define a process for content management and the requirements of a component content management system through which content is gathered, managed, and published, including the requirements of a system that is supported by an electronic database. Such a database should support documents or topics and content units that may be assembled to produce complete documents for print, electronic output, or content collections published through electronic media. This database is defined as a Component Content Management System (CCMS), which differs from a document management system. The objective of component content management is to create content objects once and use them through linking mechanisms in multiple output formats, including but not limited to documents.
280	ISO	ISO/IEC 26550:2015	Software and systems engineering — Reference model for product line engineering and management	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard is the entry point of the whole suite of International Standards for software and systems product line engineering and management. The scope of this International Standard is to — provide the terms and definitions specific to software and systems product line engineering and management, — define a reference model for the overall structure and processes of software and systems product line engineering and management and describe how the components of the product line reference model fit together, and — define interrelationships between the components of the product line reference model. This International Standard does not describe any methods and tools associated with software and systems product line engineering and management. Descriptions of such methods and tools will appear in the consecutive International Standards (ISO/IEC 26551.1 to ISO/IEC 26556.2). This International Standard does not deal with terms and definitions addressed by ISO/IEC/IEEE 24765:2010 that provides a common vocabulary applicable to all systems and software engineering work. Whenever this International Standard refers to “products”, it means “system-level products” consisting of software systems or both hardware and software systems. It may be useful for the engineering and management of product lines that consist of only hardware systems but it has not been explicitly created to support such hardware product lines. This International Standard is not intended to help the engineering, production, warehousing, logistics, and management of physical items that, possibly combined with software, comprise the products. These processes belong to other disciplines (e.g. mechanics, electronics).

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281	ISO	ISO/IEC 26551:2016	Software and systems engineering — Tools and methods for product line requirements engineering	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This International Standard, within the context of tools and methods of requirements engineering for software and systems product lines: — provides the terms and definitions specific to requirements engineering for software and systems product lines and associated member products; — defines process groups and their processes performed during product line requirements engineering (those processes are described in terms of purpose, inputs, tasks, and outcomes); — defines method capabilities to support the defined tasks of each process; — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This International Standard concerns processes and capabilities of requirements tools and methods for a family of products, not for a single system. This International Standard is not applicable to physical artefacts. Instead, system-level artefacts and software lifecycle artefacts such as requirements documents, architectural data, validation plans, behavioural models, etc. are produced using methods and tools in this International Standard. In the case of the software components of a system, this International Standard can apply twice: once to handle the system elements of the product line and a second time to handle the software elements of the product line, if any. The product line processes are recursive within the different levels of products. NOTE The requirements in this International Standard apply to the family of systems, software or services.
282	ISO	ISO/IEC 26552:2019	Software and systems engineering — Tools and methods for product line architecture design	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document, within the context of methods and tools for architecture design for software and systems product lines: — defines processes and their subprocesses performed during domain and application architecture design. Those processes are described in terms of purpose, inputs, tasks and outcomes; — defines method capabilities to support the defined tasks of each process; — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This document does not concern processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
283	ISO	ISO/IEC 26553:2018	Information technology — Software and systems engineering — Tools and methods for product line realization	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document, within the context of tools and methods of detailed design and implementation for software and system product lines: — provides the terms and definitions specific to realization for software and systems product lines; — defines processes performed during product line realization (those processes are described in terms of purpose, inputs, tasks and outcomes); — defines method capabilities to support the defined tasks of each process; and — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This document concerns processes and capabilities of realization tools and methods for a family of products, not for a single system.
284	ISO	ISO/IEC 26554:2018	Information technology — Software and systems engineering — Tools and methods for product line testing	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document, within the methods and tools of testing for software and systems product lines: — provides the terms and definitions specific to testing for software and systems product lines; — defines processes performed during product line testing (those processes are described in terms of purpose, inputs, tasks and outcomes); — defines method capabilities to support the defined tasks of each process; and — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This document concerns processes and capabilities of testing methods and tools for a family of products, not for a single system.
285	ISO	ISO/IEC 26555:2015	Software and systems engineering — Tools and methods for product line technical management	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard deals with the tools and methods of technical management for software products, software services, software-intensive systems (including System Architecture and excluding hardware) within a product line. The scope of this International Standard is as follows: — Enable the users of this standard to holistically understand, adopt, and enact the processes, tools, and methods for product line technical management. In addition, this International Standard helps the users evaluate and select relevant tools and methods based on business and user-related criteria. — Help product line engineers, developers, and tool vendors become informed about capabilities of tools and methods that are required for supporting product line implementation from technical aspects. — Provide product line-specific processes and capabilities of tools and methods in technical management. This International Standard does not concern processes and capabilities of tools and methods for technical management for a one-of-a-kind system but rather deals with those belonging to a family of systems. NOTE System Architecture is a set of logical and physical principles used to achieve a mission within a given environment. From System Architecture are derived components that can be subsystems, software products, human-based products like crew or operators or hardware product like mechanical structures, electronic boards, chemicals, etc. The scope of the International Standard spans from the system, to sub-systems, and software products. Other types of components and especially those related to human beings and to hardware parts are not within the scope of this International Standard.

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286	ISO	ISO/IEC 26556:2018	Information technology — Software and systems engineering — Tools and methods for product line organizational management	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document, within the methods and tools of organizational management for software and systems product lines: — enables the users of this document to holistically understand, adopt and enact the processes, tools and methods for product line organizational management; — helps the users evaluate and select relevant tools and methods based on business and user-related criteria; — helps make product line engineers, developers and tool vendors informed about capabilities of tools and methods that are required for supporting product line implementation from organizational aspects; and — provides product line-specific processes and capabilities of tools and methods in organizational management. This document concerns processes and capabilities of methods and tools for organizational management for a family of products, not for a single system. NOTE System Architecture is a set of logical and physical principles used to achieve a mission within a given environment. Components that can be subsystems derived from System Architecture are: software products, human-based products such as crew or operators, or hardware products like mechanical structures, electronic boards and chemicals. The scope of this document spans from the system to subsystems and components. Both hardware-intensive and software-intensive systems are included, if they are part of a product family.
287	ISO	ISO/IEC 26557:2016	Software and systems engineering — Methods and tools for variability mechanisms in software and systems product line	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This document, within the context of tools and methods of variability mechanisms for software and system product lines: — provides the terms and definitions related to variability mechanisms for software and systems product lines; — defines processes and their subprocesses for operating variability mechanisms at each product line life cycle stages and those for providing managerial supports. Those processes are described in terms of purpose, inputs, tasks and outcomes; — defines method capabilities to support the defined tasks of each process; — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This document does not concern processes and capabilities of tools and methods for a single system, but rather deals with those for a family of products.
288	ISO	ISO/IEC 26558:2017	Software and systems engineering — Methods and tools for variability modelling in software and systems product line	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document, within the context of methods and tools for supporting explicit and/or separate variability modelling, variability model management and variability model support in software and systems product lines: — provides the terms and definitions specific to variability modelling for software and systems product line; — defines processes for variability modelling, variability model management and variability model support throughout the product line lifecycle. Those processes are described in terms of purpose, inputs, tasks and outcomes; — defines method capabilities to support the defined tasks of each process; — defines tool capabilities that automate or semi-automate tasks and methods. This document does not concern processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
289	ISO	ISO/IEC 26559:2017	Software and systems engineering — Methods and tools for variability traceability in software and systems product line	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document, within the context of the tools and methods of variability traceability for software and system product lines: — provides the terms and definitions specific to variability traceability for software and systems product lines; — defines process groups and their processes for establishing and managing variability traceability at product line lifecycle processes. Those processes are described in terms of purpose, inputs, tasks, and outcomes; — defines method capabilities to support the defined tasks of each process; — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This document does not concern processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
290	ISO	ISO/IEC 26560:2019	Software and systems engineering — Tools and methods for product line product management	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document, within the context of methods and tools for product line product management: — defines product line-specific processes and their subprocesses for product management of software and systems product lines. Those processes are described in terms of purpose, inputs, tasks and outcomes; — defines method capabilities to support the defined tasks of each process; — defines tool capabilities to automate/semi-automate tasks or defined method capabilities. This document does not concern processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
291	ISO	ISO/IEC 26561:2019	Software and systems engineering — Methods and tools for product line technical probe	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document, within the context of methods and tools for supporting the diagnosis of the organization's capability to adopt or improve software and systems product line engineering: — defines processes for product line technical probe; those processes are described in terms of purpose, inputs, tasks and outcomes; — defines method capabilities to support the defined tasks of each process; and — defines tool capabilities that automate or semi-automate tasks and methods. This document does not concern processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.

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292	ISO	ISO/IEC 26562:2019	Software and systems engineering — Methods and tools for product line transition management	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document, within the context of methods and tools for supporting the transitioning the organization's current development approach to software and systems product line engineering: — defines processes for product line transition management. Those processes are described in terms of purpose, inputs, tasks and outcomes; — defines method capabilities to support the defined tasks of each process; — defines tool capabilities that automate or semi-automate tasks and methods. This document does not concern processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
293	ISO	ISO/IEC 26563:2022	Software and systems engineering — Methods and tools for product line configuration management	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document, within the context of methods and tools that support the configuration management (CM) capability of software and systems product line engineering: — specifies processes for product line CM (the processes are described in terms of purpose, inputs, tasks, and outcomes); — specifies method capabilities to support the defined tasks of each process; — specifies tool capabilities that automate or semi-automate tasks and methods. This document does not concern the processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
294	ISO	ISO/IEC 26564:2022	Software and systems engineering — Methods and tools for product line measurement	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document, within the context of methods and tools that support the product line measurement and management and that demonstrate the quality of the products and a product line: — specifies processes for product line measurement (the processes are described in terms of purpose, inputs, tasks and outcomes); — specifies method capabilities to support the defined tasks of each process; — specifies tool capabilities that automate or semi-automate tasks and methods. This document does not concern the processes and capabilities of tools and methods for a single system but rather deals with those for a family of products.
295	ISO	ISO/IEC 26580:2021	Software and systems engineering — Methods and tools for the feature-based approach to software and systems product line engineering	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document is a specialization of the more general reference model for software and systems product line engineering and management described in ISO/IEC 26550. The specialization defined herein addresses a class of methods and tools referred to as feature-based software and systems product line engineering, or feature-based PLE, which has emerged as a proven and repeatable product line engineering and management (PLE) practice supported by commercial tool providers. This document: — provides the terms and definitions specific to feature-based PLE; — defines how feature-based PLE is a specialization within the general ISO/IEC 26550 reference model for product line engineering and management; — defines a reference model for the overall structure and processes of feature-based PLE and describes how the elements of the reference model fit together; — defines interrelationships and methods for applying the elements and tools of the product line reference model; — defines required and supporting tool capabilities.
296	ISO	ISO/IEC TR 29110-1:2016	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 1: Overview	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This part of ISO/IEC 29110 introduces the major concepts required to understand and use the ISO/IEC 29110 series. It introduces the characteristics and requirements of a VSE and clarifies the rationale for VSE-specific profiles, documents, standards and guides. This part of ISO/IEC 29110 also introduces process, lifecycle, standardization concepts and defines the organizational terms common to the VSE Profile Set of Documents. This part of ISO/IEC 29110 is applicable to a VSE. A VSE is an entity (enterprise, organization, department or project) having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series, Standardized Profiles and Technical Reports are not intended to preclude nor discourage their use by an entity that is larger than a VSE.
297	ISO	ISO/IEC 29110-2-1:2015	Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 2-1: Framework and taxonomy	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 29110 is applicable to Very Small Entities (VSEs). The lifecycle processes described in ISO/IEC 29110 are not intended to preclude or discourage their use by organizations bigger than VSEs. However, certain issues faced by large organizations might not be covered by ISO/IEC 29110. The lifecycle processes defined in ISO/IEC 29110 can be used by VSEs when acquiring and using, as well as when creating and supplying, a software, and systems. They can be applied at any level in a software and systems structure and at any stage in the lifecycle. The processes described in ISO/IEC 29110 are not intended to preclude or discourage the use of additional processes that VSEs find useful. This part of ISO/IEC 29110 introduces the major concepts for software and systems engineering profiles for VSEs, and defines the terms common to the set of documents associated with VSE profiles. It establishes the logic behind the definition and application of profiles. It specifies the elements common to all standardized profiles (structure, conformance, assessment). This part of ISO/IEC 29110 is applicable to all profiles.
298	ISO	ISO/IEC 29110-3-2:2018	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 3-2: Conformity certification scheme	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document: — defines the rules applicable for certification of the implementation of systems engineering, software engineering and service delivery processes complying with the requirements given in ISO/IEC 29110-4-m, Profile specifications; and — provides the necessary information and confidence to customers about the way certification of their suppliers has been granted. Certification of the implementation of systems and software engineering processes (named "certification" in this document) is a third-party conformity assessment activity (see ISO/IEC 17000:2004, 5.5). Bodies performing this activity are therefore third-party conformity assessment bodies (named "certification body/bodies" in this document).

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299	ISO	ISO/IEC 29110-3-3:2016	Systems and software engineering — Lifecycle profiles for Very Small Enterprises (VSEs) — Part 3-3: Certification requirements for conformity assessments of VSE profiles using process assessment and maturity models	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This document contains the requirements for certification bodies performing conformity assessments, of the requirements contained in VSE profile specifications (e.g. ISO/IEC 29110-4-1 for VSE software basic profile), using process assessments and maturity models. This document is based on published ISO/IEC standards and guides for a) certification bodies (see ISO/IEC 17065) b) the process assessment and organizational process maturity performed according to the requirements of the ISO/IEC 33001 to ISO/IEC 33099 family of process assessment standards, and c) based on ISO/IEC 29169 to support an environment which encourages worldwide recognition of VSE profiles conformity assessment results. The overall framework for conformity assessment follows the approach defined in ISO/IEC 17065:2012.
300	ISO	ISO/IEC 29110-4-2:2021	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 4-2: Software engineering: Profile specifications: Organizational management profile group	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document provides a profile specification for the organizational management profile. The organizational management profile applies to VSEs involved in systems engineering and/or software engineering development. This document provides links to the subset of ISO/IEC/IEEE 12207 and ISO 9001 organizational, resources, processes and project portfolio process elements from the organizational perspective.
301	ISO	ISO/IEC 29110-4-3:2018	Systems and software engineering — Lifecycle profiles for very small entities (VSEs) — Part 4-3: Service delivery — Profile specification	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document is applicable to Very Small Entities (VSEs). A VSE is an enterprise, an organization, a department or a project having up to 25 people. The purpose of this document is to provide a set of auditable requirements based on multiple standards (i.e., ISO/IEC/IEEE 15288, ISO/IEC/IEEE 15289, ISO 9000, ISO 9001, ISO 31000, ISO/IEC 38500, ISO 10004, ISO 10007, ISO/IEC 20000, ISO/IEC 27035) that supports the delivery of services by a VSE. Services can be delivered to internal or external customers. This document is not a Management System Standard (MSS), nor does it provide guidance on fulfilling the requirements of an MSS. ISO/IEC 20000-1:2011 is the MSS for service management (see Annex D for information). This document does not promote uniformity in the approach across all organizations, as specific objectives and initiatives are tailored to suit an individual organization's needs.
302	ISO	ISO/IEC TR 29110-2-2:2016	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 2-2: Guide for the development of domain-specific profiles	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	ISO/IEC TR 29110-2-2:2016 provides a guide for developing a profile which is domain-specific for VSEs (Very Small Entities) business situation. It may be used by technical advisers, including consultants, to help VSEs on software process problems. It also provides a conceptual framework for standardized profile developers using the ISO/IEC 29110 series concept.
303	ISO	ISO/IEC TR 29110-3-4:2015	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 3-4: Autonomy-based improvement method	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC TR 29110-3-4:2015 provides a guide for an autonomy-based improvement method for Very Small Entities (VSEs) developing systems or software products.
304	ISO	ISO/IEC TR 29110-5-1-1:2012	Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-1: Management and engineering guide: Generic profile group: Entry profile	Published	Main	ISO/IEC JTC 1/SC 7		2012	International		Software engineering	This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects up to 25 people. The life cycle processes described in the set of International Standards (IS) Profiles and Technical Reports (TR) are not intended to preclude or discourage their use by organizations bigger than VSEs. This part of ISO/IEC 29110 provides the management and engineering guide to the Entry profile described in ISO/IEC 29110-4-1 through project management and software implementation processes. This part of ISO/IEC 29110 is a stand alone guide. It is not intended for a VSE to use the standardized profile to implement this part of the ISO/IEC 29110. This part of ISO/IEC 29110 applies for software development project. The project may be to fulfil an external or internal contract. The internal contract need not be explicit between the project team and their customer. Using this part of ISO/IEC 29110, a VSE can obtain the following benefits: — An agreed set of project requirements and expected products is delivered to the customer; — A disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed; — A systematic software implementation process, that satisfies customer needs and ensures quality products, is followed.
305	ISO	ISO/IEC TR 29110-5-1-2:2011	Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-2: Management and engineering guide: Generic profile group: Basic profile	Published	Main	ISO/IEC JTC 1/SC 7		2011	International		Software engineering	ISO/IEC TR 29110-5-1-2:2011 is applicable to Very Small Entities (VSEs). A VSE is defined as an enterprise, organization, department or project having up to 25 people. A set of standards and guides have been developed according to a set of VSEs' characteristics and needs. The guides are based on subsets of appropriate standards elements, referred to as VSE Profiles. The purpose of a VSE Profile is to define a subset of ISO/IEC International Standards relevant to the VSEs' context. The ISO/IEC 29110 series is targeted by audience. ISO/IEC TR 29110-5 is targeted to VSEs. ISO/IEC TR 29110-5-1-2:2011 provides the management and engineering guide to the Basic VSE Profile specified in ISO/IEC 29110-4-1 through project management and software implementation processes. The Basic Profile is one profile of the Generic profile group. The Generic profile group is applicable to VSEs that do not develop critical software. The Generic profile group does not imply any specific application domain.

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307	ISO	ISO/IEC TR 29110-5-1-3:2017	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-3: Software engineering — Management and engineering guide: Generic profile group — Intermediate profile	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document provides management and engineering guide to the intermediate profile described in terms of business management, project management, software implementation and acquisition processes. This document is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The life cycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organizations bigger than VSEs. ISO/IEC 29110-4-1 identifies the requirements applicable to the tasks and work products described in this document. This document has been developed using the management and engineering guide of the Basic profile and by modifying and adding elements (e.g. process, task, work product, role) for VSEs involved in the development of more than one project in parallel with more than one work team. This document applies for VSEs developing non-critical software. Using this document, VSEs can obtain the following benefits: — the management and monitoring of more than one project in parallel with more than one work team; — reuse existing software components (e.g. code and document) in new projects; — continuously measure projects and improve processes. Once the software, developed by a VSE, has been accepted by their customers, the VSE that wants to provide after delivery services can refer to ISO/IEC TR 29110-5-3.1 This document is targeted to VSEs which are familiar with ISO/IEC TR 29110-5-1-2 for their software development projects and are involved in the development of more than one project in parallel with more than one work team. This document is intended to be used with any lifecycles, processes, techniques and methods that enhance the VSEs customer satisfaction and productivity.
308	ISO	ISO/IEC TR 29110-5-1-4:2018	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-4: Software engineering: Management and engineering guidelines: Generic profile group: Advanced profile	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document is applicable to Very Small Entities (VSEs). VSEs are enterprises, organisations, departments or projects having up to 25 people. The life cycle processes described in the set of International Standards (IS) and Technical Reports (TR) are not intended to preclude or discourage their use by organisations bigger than VSEs. The Advanced profile is the fourth profile of a four-profile software engineering roadmap (i.e. Entry, Basic, Intermediate and Advanced). This document describes processes targeted at VSEs that want to sustain and grow as an independent competitive software development business. ISO/IEC 29110-4-1 identifies the requirements applicable to the tasks and work products described in this document. These guidelines apply to VSEs that develop non-critical software. Using these guidelines, VSEs can obtain the following benefits: — management and monitoring of more than one project in parallel with more than one work team; — reuse of existing software components (e.g. code and document) in new projects; — continuous measurement and evaluation of projects; — continuous evaluation and improvement processes; — continuous sustainability and growth; and — support to customers in the disposal of software and installation of new software. Once the software, developed by a VSE, has been accepted by their customer, the VSE that wants to provide after-delivery services can refer to ISO/IEC TR 29110-5-3.
309	ISO	ISO/IEC TR 29110-5-2-1:2016	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-2-1: Organizational management guidelines	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organizations bigger than VSEs. This part of ISO/IEC 29110 is the Organizational management guidance for profiles described in ISO/IEC 29110-4-1 through Organizational Management, Project Portfolio Management, Resource Management and Process Management Processes. It is not intended for a VSE to use the standardized profile to implement this part of ISO/IEC 29110. Using this part of ISO/IEC 29110, a VSE can obtain benefits in the following aspects: — multiple project execution and supervision of its performance, making sure all processes are executed according to the organizational strategy; — continuous monitoring of the customer satisfaction; — deployment and improvement of the organizational standard processes in all projects; — controlled provision of required resources.

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310	ISO	ISO/IEC TR 29110-5-3:2018	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-3: Service delivery guidelines	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	These Service Delivery guidelines are applicable to Very Small Entities (VSEs). A VSE is an enterprise, an organization, a department or a project having up to 25 people. This document provides guidance to manage a set of services delivered to customers. The VSE can act as an internal service provider (providing services internal to the VSE) or as an external service provider (providing services commercially to external customers). These lifecycle processes (Governance, Service Control, Service Relationship and Service Incident) support and enhance the activities of software and system operations (further to development and installation) to create effective and efficient products and services. This document provides guidance for Service Delivery. This document, when implemented, will assist and guide the VSE in the delivery of services which can benefit customers. This document does not promote uniformity in approach across all organizations as specific objectives and initiatives are tailored to suit an individual organization's needs. Tasks described in this guideline document (and therefore activities and processes) are related by input/output relationships which imply a logical execution sequence. The order of presentation of the processes or the associated numbering scheme is for identification purposes only, NOT to indicate implementation or execution order. As every VSE is different; tasks can be implemented in an order that is suitable for the organization, while respecting the relationships between tasks.
311	ISO	ISO/IEC TR 29110-5-6-1:2015	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-1: Systems engineering — Management and engineering guide: Generic profile group: Entry profile	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the set of International Standards (IS) and Technical Reports (TR) are not intended to preclude or discourage their use by organizations bigger than VSEs. This part of ISO/IEC 29110 provides the management and engineering guide to the Entry Profile described in ISO/IEC 29110-4-6 through Project Management and System Definition and realization processes. This part of ISO/IEC 29110 is a standalone guide; it is not intended for a VSE to use the standardized profile to implement this part of ISO/IEC 29110. This part of ISO/IEC 29110 applies for non-critical systems development projects. The system development should fulfil the project requirements and the system description. Using this part of ISO/IEC 29110, a VSE can obtain benefits in the following aspects: — an agreed set of project requirements (technical part of contract) and expected products are agreed by the Acquirer; — a disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed; — a systematic System Definition and Realization process, that satisfies Acquirer needs and ensures quality products, is followed. VSEs developing software that is part of a larger system and for standalone software pro
312	ISO	ISO/IEC TR 29110-5-6-2:2014	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-2: Systems engineering — Management and engineering guide: Generic profile group: Basic profile	Published	Main	ISO/IEC JTC 1/SC 7		2014	International		Software engineering	This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the set of International Standards (IS) and Technical Reports (TR) are not intended to preclude or discourage their use by organizations bigger than VSEs. This part of ISO/IEC 29110 provides the management and engineering guide to the Basic Profile described in ISO/IEC 29110-4-6 through Project Management and System Definition and realization processes. This part of ISO/IEC 29110 is a standalone guide; it is not intended for a VSE to use the standardized profile to implement this part of ISO/IEC 29110. This part of ISO/IEC 29110 applies for non-critical systems development projects. The system development should fulfil the project requirements and the system description. Using this part of ISO/IEC 29110, a VSE can obtain benefits in the following aspects: — An agreed set of project requirements (technical part of contract) and expected products are agreed by the Acquirer. — A disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed. — A systematic System Definition and Realization process, that satisfies Acquirer needs and ensures quality products, is followed. VSEs developing software that is part of a larger system, and for stand-alone software products and services, are encouraged to use the management and engineering guide of the Basic Profile (ISO/IEC 29110-5-1-2[9]).
313	ISO	ISO/IEC TR 29110-5-6-3:2019	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-3: Systems engineering: Management and engineering guide: Generic profile group: Intermediate profile	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides management and engineering guidance within the Intermediate profile for the Business Management, Project Management, System Definition and Realisation and Acquisition Management processes. This document is applicable to Very Small Entities (VSEs). VSEs are enterprises, organisations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organisations bigger than VSEs. This document has been developed using the management and engineering guide from the systems engineering Basic profile. Elements were added or modified (e.g. process, task, work product, role) to support VSEs involved in the development of more than one project in parallel with more than one work team. This guide is oriented towards the management of more than one project in parallel with more than one work team. This document applies for the development of non-critical systems.

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314	ISO	ISO/IEC 29110-2-1:2015/Amd 1:2022	Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 2-1: Framework and taxonomy — Amendment 1: Update of references and editorial improvements	Published	Amendment	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	Not available
315	ISO	ISO/IEC 29110-4-1:2018	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 4-1: Software engineering - Profile specifications: Generic profile group	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	The ISO/IEC 29110 series is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by larger organizations than VSEs. The lifecycle processes defined in the ISO/IEC 29110 series can be used by VSEs when using, as well as when creating and supplying, a software system. They can be applied at any level in a software system's structure and at any stage in the lifecycle. The processes described in the ISO/IEC 29110 series are not intended to preclude or discourage the use of additional processes that VSEs find useful. This document is not intended to preclude the use of different life cycles such as: waterfall, iterative, incremental, evolutionary or agile. This document provides a profile specification for the Basic profile. The Basic profile applies to VSEs involved in software development. It selects ISO/IEC/IEEE 12207 project management and software implementation process elements from the single project perspective. This document provides the normative and informative links to the subset of ISO/IEC/IEEE 12207.
316	ISO	ISO/IEC TR 29110-3-1:2020	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 3-1: Process assessment guidelines	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	The ISO/IEC 29110 series is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by larger organizations than VSEs. The lifecycle processes defined in the ISO/IEC 29110 series can be used by VSEs when using, as well as when creating and supplying, a software system. They can be applied at any level in a software system's structure and at any stage in the lifecycle. The processes described in the ISO/IEC 29110 series are not intended to preclude or discourage the use of additional processes that VSEs find useful. This document is not intended to preclude the use of different life cycles such as: waterfall, iterative, incremental, evolutionary or agile. This document provides a profile specification for the Basic profile. The Basic profile applies to VSEs involved in software development. It selects ISO/IEC/IEEE 12207 project management and software implementation process elements from the single project perspective. This document provides the normative and informative links to the subset of ISO/IEC/IEEE 12207.
317	ISO	ISO/IEC/IEEE 29119-1:2022	Software and systems engineering — Software testing — Part 1: General concepts	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document specifies general concepts in software testing and presents key concepts for the ISO/IEC/IEEE 29119 series.
319	ISO	ISO/IEC/IEEE 29119-2:2021	Software and systems engineering — Software testing — Part 2: Test processes	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document specifies test processes that can be used to govern, manage and implement software testing for any organization, project or testing activity. It comprises generic test process descriptions that define the software testing processes. Supporting informative diagrams describing the processes are also provided. This document is applicable to testing in all software development lifecycle models. This document is intended for, but not limited to, testers, test managers, developers and project managers, particularly those responsible for governing, managing and implementing software testing.
320	ISO	ISO/IEC/IEEE 29119-3:2021	Software and systems engineering — Software testing — Part 3: Test documentation	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document specifies software test documentation templates that can be used for any organization, project or testing activity. It describes the test documentation that is an output of the processes specified in ISO/IEC/IEEE 29119-2. This document is applicable to testing in all software development lifecycle models. This document is intended for, but not limited to, testers, test managers, developers, and project managers, particularly those responsible for governing, managing, and implementing software testing.
321	ISO	ISO/IEC/IEEE 29119-4:2021	Software and systems engineering — Software testing — Part 4: Test techniques	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document defines test design techniques that can be used during the test design and implementation process that is defined in ISO/IEC/IEEE 29119-2. Each technique follows the test design and implementation process that is defined in ISO/IEC/IEEE 29119-2 and shown in Figure 1. This document is intended for, but not limited to, testers, test managers, and developers, particularly those responsible for managing and implementing software testing.

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322	ISO	ISO/IEC/IEEE 29119-5:2016	Software and systems engineering — Software testing — Part 5: Keyword-Driven Testing	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This part of ISO/IEC/IEEE 29119 defines an efficient and consistent solution for Keyword-Driven Testing by: — giving an introduction to Keyword-Driven Testing; — providing a reference approach to implement Keyword-Driven Testing; — defining requirements on frameworks for Keyword-Driven Testing to enable testers to share their work items, such as test cases, test data, keywords, or complete test specifications; — defining requirements for tools that support Keyword-Driven Testing. These requirements could apply to any tool that supports the Keyword-Driven approach (e.g., test automation, test design and test management tools); — defining interfaces and a common data exchange format to ensure that tools from different vendors can exchange their data (e.g. test cases, test data and test results); — defining levels of hierarchical keywords, and advising use of hierarchical keywords. This includes describing specific types of keywords (e.g. keywords for navigation or for checking a value) and when to use "flat" structured keywords; — providing an initial list of example generic technical (low-level) keywords, such as "inputData" or "checkValue". These keywords can be used to specify test cases on a technical level, and may be combined to create business-level keywords as required. NOTE This standard is applicable to all those who want to create keyword-driven test specifications, create corresponding frameworks, or build test automation based on keywords. corresponding frameworks, or build test automation based on keywords.
323	ISO	ISO/IEC TR 29119-6:2021	Software and systems engineering — Software testing — Part 6: Guidelines for the use of ISO/IEC/IEEE 29119 (all parts) in agile projects	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document provides guidance for the application of ISO/IEC/IEEE 29119 (all parts) in agile life cycles. This document is intended for (and not limited to) testers, test managers, business analysts, product owners, Scrum masters and developers involved in agile projects. The mappings provided in this document are designed to benefit any team or organization that is either moving away from traditional/waterfall life cycles and into agile or vice versa as well as new organizations that are commencing agile as their chosen life cycle. It is designed to be understandable regardless of the reader's familiarity with ISO/IEC/IEEE 29119 (all parts).
324	ISO	ISO/IEC TR 29119-11:2020	Software and systems engineering — Software testing — Part 11: Guidelines on the testing of AI-based systems	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document provides an introduction to AI-based systems. These systems are typically complex (e.g. deep neural nets), are sometimes based on big data, can be poorly specified and can be non-deterministic, which creates new challenges and opportunities for testing them. This document explains those characteristics which are specific to AI-based systems and explains the corresponding difficulties of specifying the acceptance criteria for such systems. This document presents the challenges of testing AI-based systems, the main challenge being the test oracle problem, whereby testers find it difficult to determine expected results for testing and therefore whether tests have passed or failed. It covers testing of these systems across the life cycle and gives guidelines on how AI-based systems in general can be tested using black-box approaches and introduces white-box testing specifically for neural networks. It describes options for the test environments and test scenarios used for testing AI-based systems. In this document an AI-based system is a system that includes at least one AI component.
325	ISO	ISO/IEC TR 29119-13:2022	Software and systems engineering — Software testing — Part 13: Using the ISO/IEC/IEEE 29119 series in the testing of biometric systems	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document: — gives information for software testers for the systematic, risk-based testing of biometric systems and larger systems which include biometric subsystems; — establishes the importance of both biometric standards and software testing standards and provides overviews of both areas and their standardization; — specifies the most important biometric standards for software testers of biometric systems; — provides information for software testers who wish to conform to both the relevant biometrics standards and the ISO/IEC/IEEE 29119 series of software testing standards by providing mappings between the two sets of standards; — is not limited to the testing of the technical performance of biometric systems in terms of error rates and throughput rates, but instead covers the testing of the full range of relevant quality characteristics, such as reliability, availability, maintainability, security, conformance, usability, human factors, and privacy regulation compliance; — gives information on applying a risk-based testing approach to the testing of biometric systems that covers the full range of product and project risks; — provides testers with an example set of product and project risks associated with biometric systems along with suggestions on how these risks can be treated as part of a risk-based approach to the testing; — includes mappings between the documentation requirements of ISO/IEC 19795-1, ISO/IEC 19795-2 and ISO/IEC 19795-6 and the software test documentation defined by ISO/IEC/IEEE 29119-3.

No crt	Standards developing organization (SDO)	Standard reference	Standard Title	Standard Status (published/draft /withdrawn)	Standard Category (basic standard, process standard, product standard)	Responsible Body Technical Committee (TC)	Drafting Body Working group (WG)	Date of publication (Year)	Level (international , european, national)	Status Updated by the end of the project	Domain (BIM, Facility Management, Sustainability etc)	Abstract
326	ISO	ISO/IEC/IEEE 29148:2018	Systems and software engineering — Life cycle processes — Requirements engineering	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This document: — specifies the required processes implemented in the engineering activities that result in requirements for systems and software products (including services) throughout the life cycle; — provides guidelines for applying the requirements and requirements-related processes described in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207; — specifies the required information items produced through the implementation of the requirements processes; — specifies the required contents of the required information items; — provides guidelines for the format of the required and related information items. This document is applicable to: — those who use or plan to use ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 on projects dealing with man-made systems, software-intensive systems, software and hardware products, and services related to those systems and products, regardless of the project scope, product(s), methodology, size or complexity; — anyone performing requirements engineering activities to aid in ensuring that their application of the requirements engineering processes conforms to ISO/IEC/IEEE 15288 and/or ISO/IEC/IEEE 12207; — those who use or plan to use ISO/IEC/IEEE 15289 on projects dealing with man-made systems, software-intensive systems, software and hardware products and services related to those systems and products, regardless of the project scope, product(s), methodology, size or complexity; — anyone performing requirements engineering activities to aid in ensuring that the information items developed during the application of requirements engineering processes conforms to ISO/IEC/IEEE 15289.
327	ISO	ISO/IEC 29155-1:2017	Systems and software engineering — Information technology project performance benchmarking framework — Part 1: Concepts and definitions	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document identifies a framework for information technology (IT) project performance benchmarking (e.g. development or maintenance productivity) and related aspects (e.g. data collection and software classification). The framework consists of activities and components that are necessary to successfully identify, define, select, apply, and improve benchmarking for IT project performance. It also provides definitions for IT project performance benchmarking terms, which are also applicable to other parts of the ISO/IEC 29155 series. The target audience of this document are stakeholders of IT project performance benchmarking. NOTE The following are examples of how this document can be used: — by a benchmarking service provider who wants to align their benchmarking process to be consistent with this document; — by a benchmarking user (or third-party agents) for evaluating the performance of an IT project; — by an organization internally to answer specific information needs. This document does not cover how to organize benchmarking. It is out of the scope of this document to prescribe the name, format, or explicit content of the documentation to be produced from the benchmarking process.
328	ISO	ISO/IEC 29155-2:2013	Systems and software engineering — Information technology project performance benchmarking framework — Part 2: Requirements for benchmarking	Published	Main	ISO/IEC JTC 1/SC 7		2013	International		Software engineering	This part of ISO/IEC 29155 provides general requirements for processes of “the information technology (IT) project performance benchmarking framework” by prescribing: — the requirements for the processes for individual activities within the benchmarking framework (e.g. conduct benchmarking, maintain repository, submit data), — the tasks necessary to successfully execute activities and equip them with components, both of which are defined in ISO/IEC 29155-1. This part of ISO/IEC 29155 is intended for use by any stakeholder(s) of IT project performance benchmarking (e.g. benchmarking user, benchmark provider, benchmarking service provider, and IT project team). NOTE The following are examples of how this part of ISO/IEC 29155 can be used: — by a systems and software supplier to implement a benchmarking process to estimate and/or evaluate performance of an IT project, — by a systems and software acquirer (or a third-party agent) for evaluating the performance of the supplier’s IT project, — by a benchmark provider to implement processes to collect and analyze IT project data and provide benchmarks, — by a benchmarking service provider to implement various services (e.g. providing instruments for benchmarking, or conducting an instance of benchmarking for a benchmarking user). This part of ISO/IEC 29155 does not prescribe how to utilize benchmarking results, nor does it prescribe the name, format, or explicit content of the documentation that results from the benchmarking processes.

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329	ISO	ISO/IEC 29155-3:2015	Systems and software engineering — Information technology project performance benchmarking framework — Part 3: Guidance for reporting	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This part of ISO/IEC 29155 provides general requirements and guidance for reporting processes and contents of typical reports within benchmarking activities of "the information technology (IT) project performance benchmarking framework" by prescribing: — requirements and guidance for the reporting processes within the benchmarking framework; — requirements and guidance for the contents of reports. This part of ISO/IEC 29155 focuses on three major activities, i.e. "conduct benchmarking", "maintain repository", and "issue benchmarks" activities. NOTE 1 These activities are selected, not only because the importance of the outcomes of these activities, but also the outcomes of these activities are the direct input for benchmarking users who execute "core benchmarking" activities. In addition, benchmarking users are not usually so deeply involved to these activities even though they need in-deep information to understand the benchmarking results or to select appropriate data (i.e. benchmarking repository and benchmarks).
330	ISO	ISO/IEC 29155-3:2015	Systems and software engineering — Information technology project performance benchmarking framework — Part 3: Guidance for reporting	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This part of ISO/IEC 29155 provides general requirements and guidance for reporting processes and contents of typical reports within benchmarking activities of "the information technology (IT) project performance benchmarking framework" by prescribing: — requirements and guidance for the reporting processes within the benchmarking framework; — requirements and guidance for the contents of reports. This part of ISO/IEC 29155 focuses on three major activities, i.e. "conduct benchmarking", "maintain repository", and "issue benchmarks" activities. NOTE 1 These activities are selected, not only because the importance of the outcomes of these activities, but also the outcomes of these activities are the direct input for benchmarking users who execute "core benchmarking" activities. In addition, benchmarking users are not usually so deeply involved to these activities even though they need in-deep information to understand the benchmarking results or to select appropriate data (i.e. benchmarking repository and benchmarks).
332	ISO	ISO/IEC 29155-4:2016	Systems and software engineering — Information technology project performance benchmarking framework — Part 4: Guidance for data collection and maintenance	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This document provides general requirements and guidance for collecting and maintaining data of information technology (IT) projects and for delivering the benchmarking repository within benchmarking activities of "the IT project performance benchmarking framework" by prescribing the following: a) requirements and guidance for data element definitions; b) requirements and guidance for the data collection and maintenance processes within the benchmarking framework; c) requirements and guidance for maintaining benchmarking repository product and issued benchmarks. This document mainly focuses on three major activities, which are "maintain repository", "submit IT project data", and "measure IT project" activities. This document is intended for use by stakeholder(s) of IT project performance benchmarking (e.g. benchmarking user, benchmark provider, benchmarking service provider, and IT project team).
333	ISO	ISO/IEC 29169:2016	Information technology — Process assessment — Application of conformity assessment methodology to the assessment to process quality characteristics and organizational maturity	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This International Standard aims to define the application of a conformity assessment methodology, based on the existing published ISO/IEC standards and guides, to the process assessment of process quality characteristics and organizational process maturity, performed in accordance with the requirements of the ISO/IEC 33001 to ISO/IEC 33099 family of process assessment standards. Conformity assessment, also known as compliance assessment, is any activity to determine, directly or indirectly, that a process, product, or service meets relevant standards and fulfils relevant requirements. The subject of conformity assessment activities may include testing, inspection or certification. Conformity assessment in this International Standard can be performed by various types of bodies that meet the requirements of ISO/IEC 17020. The term "inspection" as used in ISO/IEC 17020 is synonymous with the term "process assessment" as defined in ISO/IEC 33001 and used throughout the ISO/IEC 33001 to ISO/IEC 33099 family of standards. While a process assessment may be performed solely according to the ISO/IEC 33002 requirements for performing an assessment, performing a process assessment in the context of conformity assessment according to a conformity assessment scheme brings with it additional requirements. Conformity assessment involves a functional approach consisting of a number of stages: selection–determination–review and attestation, plus surveillance when there is a need to provide continuing assurance of conformity.
334	ISO	ISO/IEC 29881:2010	Information technology — Systems and software engineering — FISMA 1.1 functional size measurement method	Published	Main	ISO/IEC JTC 1/SC 7		2010	International		Software engineering	ISO/IEC 29881:2010 specifies the set of definitions, conventions and activities of FISMA 1.1. The target audience of ISO/IEC 29881:2010 includes anyone who applies FISMA 1.1 to measure the functional size of a piece of software. FISMA 1.1 is intended for use by those persons associated with the acquisition, development, use, support, maintenance, and audit of software. FISMA 1.1 is based on an assessment of the Functional User Requirements. It measures the functional size of a piece of software from the perspective of the users.

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335	ISO	ISO/IEC TS 30103:2015	Software and Systems Engineering — Lifecycle Processes — Framework for Product Quality Achievement	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This Technical Specification provides guidance on — applying processes from ISO/IEC/IEEE 15288:2008[1] in conjunction with other standards to contribute to achieving quality of systems and software products and services during the development stage of the life cycle (6.4), — the information items that should be produced through the implementation of the relevant processes (6.5), and — the new information items (Clauses 9 and 10). The scope of this Technical Specification is to indicate how to apply the life cycle processes in ISO/IEC/IEEE 15288:2008 to achieve quality in the context of a specific product. It is independent of any tailoring that may be made to modify the generic process descriptions to suit the needs of a particular context. Even after any applicable tailoring, there is a need to apply the resulting process guidance and determine the specific detailed activities, tasks and associated success criteria for each of the process instances needed to deliver the target system. That is the focus of the framework described in this Technical Specification.
336	ISO	ISO/IEC 30130:2016	Software engineering — Capabilities of software testing tools	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	This International Standard defines the framework to which capabilities of software testing tools are allocated in order to identify the capabilities of products being used by any project for software testing. Software testing processes are identified in ISO/IEC/IEEE 29119-2 and software verification processes are identified in ISO/IEC 12207. This International Standard is fully harmonized with these existing standards in terms of software testing processes. This International Standard focuses on the following areas that the existing ISO/IEC standards do not deal with the following: — categorization of software test entities and software testing tools (Clauses 4 and 5); — characterization of each software testing tool category (Clauses 5 and 6); — mapping of software testing tool capabilities and characteristics (Clauses 6 and 7).
337	ISO	ISO/IEC/IEEE 31320-1:2012	Information technology — Modeling Languages — Part 1: Syntax and Semantics for IDEF0	Published	Main	ISO/IEC JTC 1/SC 7		2012	International		Software engineering	ISO/IEC/IEEE 31320-1:2012 identifies the basic components of Integration Definition 0 (IDEF0) syntax (the drawn, visual elements of the language and how they may be used together) and IDEF0 semantics (what it means when the visual elements are used together in specific, allowable ways), specifies the rules that govern the use of these modelling components, and describes the types of diagrams used in an IDEF0 model. ISO/IEC/IEEE 31320-1:2012 identifies and discusses the model pages with which each diagram in an IDEF0 model is associated and discusses specific features found in an IDEF0 diagram. It describes IDEF0 reference expressions and IDEF0 diagram feature references. It also presents an abstract formalization of the IDEF0 language.
338	ISO	ISO/IEC/IEEE 31320-2:2012	Information technology — Modeling Languages — Part 2: Syntax and Semantics for IDEF1X97 (IDEFobject)	Published	Main	ISO/IEC JTC 1/SC 7		2012	International		Software engineering	ISO/IEC/IEEE 31320-2:2012 describes the semantics and syntax of IDEF1X, a language used to represent a conceptual schema. Two styles of IDEF1X model are described. The key style is used to produce information models that represent the structure and semantics of data within an enterprise and is backward-compatible with the US government's Federal Information Processing Standard (FIPS) PUB 184, Integration Definition for Information Modeling (IDEF1X). The identity style is used to produce object models that represent the knowledge, behaviour, and rules of the concepts within an enterprise. It can be used as a growth path for key-style models. The identity style can, with suitable automation support, be used to develop a model that is an executable prototype of the target object-oriented system.
339	ISO	ISO/IEC/IEEE 32430:2021	Software engineering — Trial use standard for software non-functional sizing measurements	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This standard defines a method for the sizing of non-functional software requirements. It complements ISO/IEC 20926:2009, which defines a method for the sizing of functional user requirements (FUR).1 This standard also describes the complementarity of functional and non-functional sizes, so that sizing both functional and non-functional requirements (NFR) do not overlap. It also describes how non-functional size, together with functional size, should be used for measuring the performance of software projects, setting benchmarks, and estimating the cost and duration of software projects. In general, there are many types of non-functional software requirements. Moreover, non-functional aspects evolve over time and may include additional aspects in the as technology advances. This standard does not intend to define the type of NFR for a given context. Users may choose ISO 25010:2011 or any other standard for the definition of NFR. It is assumed that users will size the NFR based on the definitions they use. This standard covers a subset of non-functional types. It is expected that, with time, the state of the art can improve and that potential future versions of this standard can define an extended coverage. The ultimate goal is a version that, together with ISO/IEC 20926:2009, covers every aspect that may be required of any prospective piece of software, including aspects such as process and project directives that are hard or impossible to trace to the software's algorithm or data. The combination of functional and non-functional size would then correspond to the total size necessary to bring the software into existence. Calculating the effort and duration of the implementation of the NFR is outside the scope of this standard.

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340	ISO	ISO/IEC/IEEE 32675:2022	Information technology — DevOps — Building reliable and secure systems including application build, package and deployment	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document provides requirements and guidance on the implementation of DevOps to define, control, and improve software life cycle processes. It applies within an organization or a project to build, package, and deploy software and systems in a secure and reliable way. This document specifies practices to collaborate and communicate effectively in groups including development, operations, and other key stakeholders. This document applies a common framework for software life cycle processes, with well-defined terminology. It contains processes, activities, and tasks that are to be applied to the full life cycle of software systems, products, and services, including conception, development, production, utilization, support, and retirement. It also applies to the acquisition and supply of software systems, whether performed internally or externally to an organization. These life cycle processes are accomplished through the involvement of stakeholders, with the ultimate goal of achieving customer satisfaction. The life cycle processes of this document can be applied concurrently, iteratively, and recursively to a software system and incrementally to its elements.
341	ISO	ISO/IEC 33001:2015	Information technology — Process assessment — Concepts and terminology	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	ISO/IEC 33001:2015 provides a repository for key terminology relating to process assessment. It gives overall information on the concepts of process assessment, the application of process assessment for evaluating the achievement of process quality characteristics, and the application of the results of process assessment to the conduct of process management. ISO/IEC 33001:2015 provides an introduction to the ISO/IEC 330xx family of standards for process assessment; it describes how the parts of the family of standards for process assessment fit together and provides guidance for their selection and use. It explains the requirements contained within the suite and their applicability to performing assessments.
342	ISO	ISO/IEC 33002:2015	Information technology — Process assessment — Requirements for performing process assessment	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard defines the minimum set of requirements for performing an assessment that will ensure assessment results are objective, consistent, repeatable, and representative of the assessed processes. The requirements defined in this International Standard can be used by or on behalf of an organization to a) facilitate self-assessment, b) provide a basis for improving process performance and mitigating process-related risk, c) produce a rating of the achievement of the relevant process quality characteristic, and d) provide an objective benchmark between organizations. This International Standard is applicable across all application domains and sizes of organization. NOTE An organization can implement a set of integrated processes in a system.
343	ISO	ISO/IEC 33003:2015	Information technology — Process assessment — Requirements for process measurement frameworks	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard sets out the requirements for process measurement frameworks for use in process assessment. The requirements defined in this International Standard form a structure which a) establish the requirements for process measurement frameworks in the context of process assessment, b) establish the requirements for the validation of process measurement frameworks for use in process assessment, and c) establish requirements that are applicable to any process measurement frameworks to develop composite measures across domains. This International Standard is applicable to the development of process measurement frameworks for any process quality characteristic across all application domains. Annex A presents a map of terminologies used in this International Standard. Annex B provides an explanation of construct specifications. Annex C reviews statistical validation methods. Annex D provides some methods including references that can be utilized in implementing the requirements for process measurement frameworks. These Annexes will be moved to a guide for constructing process measurement frameworks to be developed as part of the set of International Standards. NOTE ISO/IEC 33020 is a process measurement framework for assessment of process capability based on this International Standard.
344	ISO	ISO/IEC 33004:2015	Information technology — Process assessment — Requirements for process reference, process assessment and maturity models	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard sets out the requirements for process reference models, process assessment models, and maturity models. The requirements defined in this International Standard form a structure which specifies a) the relationship between the classes of process model associated with the performance of process assessment, b) the relationship between process reference models and prescriptive/normative models of process performance, as constituted by, for example, the activities and tasks defined in ISO/IEC 12207[1] and ISO/IEC 15288 [2], c) the integration of process reference models and process measurement frameworks to establish process assessment models, d) the use of common sets of assessment indicators of process performance and process quality in process assessment models, and e) the relationship between maturity models and process assessment models and the extent to which a maturity model can be constructed using elements from different process assessment models.

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345	ISO	ISO/IEC TR 33014:2013	Information technology — Process assessment — Guide for process improvement	Published	Main	ISO/IEC JTC 1/SC 7		2013	International		Software engineering	This Technical Report provides informative guidance on using process assessment as part of a complete framework for performing process improvement as part of a continual improvement activity. It also provides guidance on how to strengthen and maintain the organization's abilities to ensure success with continual process improvement. This Technical Report does not presume specific organizational structures, management strategies, life cycle models or development methods. This Technical Report has its focus on continual process improvement, and the support for succeeding in continual process improvement – organizational improvability. Improvability is addressed both at the organizational perspective and at the project perspective. The organizational perspective is for large process improvement programmes and project perspective is for process improvement projects. In the case of process improvement, the concepts and principles are appropriate for the full range of different business goals, application domains and sizes of organization, so that all types of organizations may use them. It is the same in the case of improvability. Although the focus for this Technical Report is continual process improvement based on using process assessment as part of a complete framework and method for performing and ensuring success with continual process improvement, this Technical Report can also be used in related areas. One such related area is where continual improvement of processes takes a part in the development of the business. An example of this is when a process improvement initiative is identified in IT Service Management (ISO/IEC 20000). Continual process improvement can also be used to strengthen an organization's ability to carry out the improvement of services.
346	ISO	ISO/IEC TR 33015:2019	Information technology — Process assessment — Guidance for process risk determination	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides guidance on the application of the results of a process assessment for process risk determination. The guidance provided does not presume specific organizational structures, management philosophies, life cycle models or development methods. In relation to process risk determination, this guidance is applicable within any customer/supplier relationship, and to any organization wishing to perform a process risk determination of its processes.
347	ISO	ISO/IEC TR 33017:2021	Information technology — Process assessment — Framework for assessor training	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document provides a framework for assessor training aimed at training providers who design, develop, and/or deliver training courses for assessors conducting assessments conformant with ISO/IEC 33002. The document defines four training course elements: — Foundation — Process assessment model — Assessor — Practical assessment performance Whilst the training is defined as separate training course elements, the elements can be combined into one or more training courses for delivery. Furthermore, training modules and learning objectives can be addressed in training courses in any combination or sequence.
348	ISO	ISO/IEC TR 33018:2019	Information technology — Process assessment — Guidance for assessor competency	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document provides general and specific guidance for the competency of assessors performing assessments in accordance with the ISO/IEC 330xx family of standards.
349	ISO	ISO/IEC 33020:2019	Information technology — Process assessment — Process measurement framework for assessment of process capability	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document defines a process measurement framework that supports the assessment of process capability, in accordance with the requirements of ISO/IEC 33003. The process measurement framework provides a schema that can be used to construct a process assessment model conformant with ISO/IEC 33004 which can be used in the performance of assessment of process capability according to the requirements of ISO/IEC 33002. In the context of this document and related standards, process capability is a process quality characteristic related to the ability of a process to consistently meet current or projected business goals. The process measurement framework defined in this document forms a structure which - facilitates self-assessment, - provides a basis for use in process improvement and process quality determination, - is applicable across all application domains and sizes of organization, - produces a set of process (capability) attribute ratings (process profile), and - derives a process capability level. This document also includes as informative annexes a set of assessment indicators of process capability that can be used in the construction of a process assessment model using this process measurement framework, and guidance on the meaning of the process capability levels and the achievement of the process attributes.

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350	ISO	ISO/IEC TS 33030:2017	Information technology — Process assessment — An exemplar documented assessment process	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document contains an exemplar documented assessment process, and serves as guidance on the nature of activities required by this document. The content of this exemplar contains the minimum elements of a documented assessment process applicable for performing all classes of assessments as defined in ISO/IEC 33002. See also Annex B. This document is suitable for all classes of assessments defined in ISO/IEC 33002. This exemplar includes the activities by describing the tasks, inputs, outputs and the assessment-related roles and responsibilities. This description implicitly contains other elements that could comprise the process, like purpose, initial/end conditions, additional supporting roles/responsibilities or necessary resources. While this exemplar contains all of the activities that are considered to be required for a process assessment, it is the case that variation exists in individual process assessments, and therefore, some degree of tailoring of this assessment process could be required. Tailoring of the assessment process is permitted, though it is the responsibility of the Lead Assessor and it would need to be conformant to the requirements of ISO/IEC 33002. This document is not intended for use in performing organizational maturity assessments.
351	ISO	ISO/IEC TS 33052:2016	Information technology — Process reference model (PRM) for information security management	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	ISO/IEC TS 33052:2016 defines a process reference model (PRM) for the domain of information security management. The model architecture specifies a process architecture for the domain and comprises a set of processes, with each described in terms of process purpose and outcomes.
352	ISO	ISO/IEC TS 33053:2019	Information technology — Process assessment — Process Reference Model (PRM) for quality management	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document defines a process reference model for the domain of quality management. The model specifies a process architecture for the domain and comprises a set of processes. Each process is described in terms of process purpose and outcomes. NOTE Users of this document can freely reproduce the detailed descriptions contained in this process reference model as part of any tool or other material to support the performance of process assessments, so that it can be used for its intended purpose.
353	ISO	ISO/IEC TS 33054:2020	Information technology — Process assessment — Process reference model for service management	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document defines a process reference model for the domain of service management. The model specifies a process architecture for the domain and comprises a set of processes. Each process is described in terms of process purpose and outcomes. The process reference model in this document is directed at assessment sponsors and competent assessors who wish to select a model, and associated documented process method, for assessment (for either capability determination or process improvement).
354	ISO	ISO/IEC TS 33060:2020	Information technology — Process assessment — Process assessment model for system life cycle processes	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document defines a process assessment model for system life cycle processes, conformant with the requirements of ISO/IEC 33004, for use in performing a conformant assessment in accordance with the requirements of ISO/IEC 33002.
355	ISO	ISO/IEC TS 33061:2021	Information technology — Process assessment — Process assessment model for software life cycle processes	Published	Main	ISO/IEC JTC 1/SC 7		2021	International		Software engineering	This document defines a process assessment model for software life cycle processes, conformant with the requirements of ISO/IEC 33004, for use in performing a conformant assessment in accordance with the requirements of ISO/IEC 33002.
356	ISO	"ISO/IEC 33063:2015	Information technology — Process assessment — Process assessment model for software testing"	Published	Main	ISO/IEC JTC 1/SC 7		2015	International		Software engineering	This International Standard — defines a process assessment model that meets the requirements of ISO/IEC 33004 and that supports the performance of an assessment of process capability using the process measurement framework defined in ISO/IEC 33020. The process assessment model provides indicators for guidance on the interpretation of the process purposes and outcomes as defined in ISO/IEC/IEEE 29119-2 and the process attributes as defined in ISO/IEC 33020, and — provides guidance, by example, on the definition, selection, and use of assessment indicators. A process assessment model comprises a set of indicators of process performance and process capability. The indicators are used as a basis for collecting the objective evidence that enables an assessor to assign ratings, following the requirements of ISO/IEC 33002. The set of indicators included in this International Standard is not intended to be an all-inclusive set nor is it intended to be applicable in its entirety. Subsets that are appropriate to the context and scope of the assessment should be selected.
357	ISO	ISO/IEC TS 33072:2016	Information technology — Process assessment — Process capability assessment model for information security management	Published	Main	ISO/IEC JTC 1/SC 7		2016	International		Software engineering	ISO/IEC TS 33072:2016: - defines a process assessment model (PAM) that meets the requirements of ISO/IEC 33004 and that supports the performance of an assessment of process capability by providing indicators for guidance on the interpretation of the process purposes and outcomes as defined in ISO/IEC TS 33052 and the process attributes as defined in ISO/IEC 33020; - provides guidance, by example, on the definition, selection and use of assessment indicators.
358	ISO	ISO/IEC TS 33073:2017	Information technology — Process assessment — Process capability assessment model for quality management	Published	Main	ISO/IEC JTC 1/SC 7		2017	International		Software engineering	This document: — defines an integrated PRM and PAM that meets the requirements of ISO/IEC 33004 and that supports the performance of an assessment by providing indicators for guidance on the interpretation of the process purposes and outcomes and the process attributes as defined in ISO/IEC 33020; — provides guidance, by example, on the definition, selection and use of assessment indicators. A PAM comprises a set of indicators of process performance and process capability. The indicators are used as a basis for collecting the objective evidence that enables an assessor to assign ratings. The set of indicators included in this document is not intended to be an all-inclusive set nor is it intended to be applicable in its entirety.

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359	ISO	ISO/IEC TS 33074:2020	Information technology — Process assessment — Process capability assessment model for service management	Published	Main	ISO/IEC JTC 1/SC 7		2020	International		Software engineering	This document: — defines a process assessment model that relies on the process reference model published as ISO/IEC TS 33054 that meets the requirements of ISO/IEC 33004 and that supports the performance of an assessment by providing indicators for guidance on the interpretation of the process purposes and outcomes and the process attributes as defined in ISO/IEC 33020; — provides guidance, by example, on the definition, selection and use of assessment indicators. A process assessment model comprises a set of indicators of process performance and process capability. The indicators are used as a basis for collecting the objective evidence that enables an assessor to assign ratings. The set of indicators included in this document is not intended to be an all-inclusive set. The process assessment model in this document is directed at assessment sponsors and competent assessors who wish to select a model, and associated documented process method, for assessment (for either capability determination or process improvement). Additionally, it can be of use to developers of assessment models in the construction of their own model, by providing examples of good service management practices. It can be used by: a) service providers to assess and improve a service management system (SMS); b) service providers to demonstrate their capability for the planning, design, development, transition and delivery of services that meet agreed service management requirements.
360	ISO	ISO/IEC/IEEE 41062:2019	Software engineering — Recommended practice for software acquisition	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This recommended practice describes a set of useful quality considerations that can be selected and applied during one or more steps in a software acquisition process. The recommended practices can be applied to software that runs on any computer system regardless of the size, complexity, or criticality of the software. The software supply chain may include integration of commercial-off-the-shelf (COTS), custom, or free and open source software (FOSS). Each organization or individual using this recommended practice will need to identify the specific quality and activities that need to be included within the organization's acquisition process. Security will be included as a quality attribute considered during the acquisition.
361	ISO	ISO/IEC/IEEE 42010:2022	Software, systems and enterprise — Architecture description	Published	Main	ISO/IEC JTC 1/SC 7		2022	International		Software engineering	This document specifies requirements for the structure and expression of an architecture description (AD) for various entities, including software, systems, enterprises, systems of systems, families of systems, products (goods or services), product lines, service lines, technologies and business domains. This document distinguishes the architecture of an entity of interest from an AD expressing that architecture. Architectures are not the subject of this document. This document specifies requirements for use of the architectural concepts and their relationships as captured in an AD. It does not specify requirements for any entity of interest or its environment. This document specifies requirements for an architecture description framework (ADF), an architecture description language (ADL), architecture viewpoints and model kinds in order to usefully support the development and use of an AD. This document specifies conformance to the requirements for an AD, ADF, ADL, architecture viewpoint and model kind. This document does not specify the processes, architecting methods, models, notations, techniques or tools by which an AD is created, utilized or managed. This document does not specify any format or media for recording an AD.
362	ISO	ISO/IEC/IEEE 42020:2019	Software, systems and enterprise — Architecture processes	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document establishes a set of process descriptions for the governance and management of a collection of architectures and the architecting of entities. This document also establishes an enablement process description that provides support to these other architecture processes. The processes defined in this document are applicable for a single project, as well as for an organization performing multiple projects. These processes are applicable throughout the life of an architecture or a collection of architectures. These processes are applicable for managing and performing the activities within any stage in the life cycle of the architecture entities. Annex D describes the relationships between this document and other standards.
363	ISO	ISO/IEC/IEEE 42030:2019	Software, systems and enterprise — Architecture evaluation framework	Published	Main	ISO/IEC JTC 1/SC 7		2019	International		Software engineering	This document specifies the means to organize and record architecture evaluations for enterprise, systems and software fields of application. The aim of this document is to enable architecture evaluations that are used to: a) validate that architectures address the concerns of stakeholders; b) assess the quality of architectures with respect to their intended purpose; c) assess the value of architectures to their stakeholders; d) determine whether architecture entities address their intended purpose; e) provide knowledge and information about architecture entities; f) assess progress towards achieving architecture objectives; g) clarify understanding of problem space and of stakeholder needs and expectations; h) identify risks and opportunities associated with architectures; and i) support decision making where architectures are involved.

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364	ISO	ISO/IEC/IEEE 90003:2018	Software engineering — Guidelines for the application of ISO 9001:2015 to computer software	Published	Main	ISO/IEC JTC 1/SC 7		2018	International		Software engineering	This International Standard specifies requirements for a quality management system when an organization: a) needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and b) aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements. All the requirements of this International Standard are generic and are intended to be applicable to any organization, regardless of its type or size, or the products and services it provides. NOTE 1 In this International Standard, the terms "product" or "service" only apply to products and services intended for, or required by, a customer. NOTE 2 Statutory and regulatory requirements can be expressed as legal requirements.
365	ISO	ISO/IEC DTR 7052	Software engineering — Controlling frequently occurring risks during development and maintenance of custom software	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
366	ISO	ISO/IEC CD 9837-1	Software and systems engineering — Systems resilience — Part 1: Concepts and vocabulary	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
367	ISO	ISO/IEC/IEEE DIS 15026-3	Systems and software engineering — Systems and software assurance — Part 3: System integrity levels	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document specifies the concept of integrity levels with corresponding integrity level requirements. It places requirements on and recommends methods for defining and using integrity levels and their corresponding integrity level requirements. It covers systems, software products, and their elements, as well as relevant external dependences. This document is applicable to systems and software and is intended for use by: a) definers of integrity levels such as industry and professional organizations, standards organizations, and government agencies; b) users of integrity levels such as developers and maintainers, suppliers and acquirers, system or software users, assessors of systems or software and administrative and technical support staff of systems or software products. One important use of integrity levels is by suppliers and acquirers in agreements; for example, to aid in assuring safety, financial, or security characteristics of a delivered system or product. This document does not prescribe a specific set of integrity levels or their integrity level requirements. In addition, it does not prescribe the way in which integrity level use is integrated with the overall system or software engineering life cycle processes.
368	ISO	ISO/IEC/IEEE FDIS 15288	Systems and software engineering — System life cycle processes	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
369	ISO	ISO/IEC DIS 19770-6	Information technology — IT asset management — Part 6: Hardware identification tag	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
370	ISO	ISO/IEC AWI TR 20499	Systems and software engineering — Conceptual framework for standards interoperability	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
371	ISO	ISO/IEC/IEEE FDIS 23026	Systems and software engineering — Engineering and management of websites for systems, software, and services information	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document defines system engineering and management requirements for the life cycle of websites including strategy, design, engineering, testing and validation, and management and sustainment for Intranet and Extranet environments. This document applies to those using web technology to present information and communications technology (ICT) information, such as information for users of systems and services, plans and reports for systems and software engineering projects, and documentation of policies, plans, and procedures for IT service management. This document provides requirements for website owners and website providers, managers responsible for establishing guidelines for website development and operations, for software developers and operations and maintenance staff who may be external or internal to the website owner's organization. It applies to websites for public access and for limited access, such as for users, customers, and subscribers seeking information on IT products and services. The goal of this document is to improve the usability of informational websites and ease of maintenance of managed Web operations in terms of: a) locating relevant and timely information, b) applying information security management, c) facilitating ease of use, d) providing for consistent and efficient development and maintenance practices. This document is not primarily for websites used primarily for marketing or sales, or to deliver instructional material, or to provide Graphical User Interfaces (GUI) for business or consumer transactional application processing. However, this document may provide useful insights for managing such sites. This document focuses on vendor- and product-independent considerations. It does not include specifications for application development tools, programming languages used for archiving site content or for presentation of content on the web, metadata tags, or protocols for web page design based on World Wide Web Consortium (W3C*) and related industry guidelines. It does not address tools or systems used for management or storage of information content (data, documents) that may be presented on websites. This document does not address the design and architecture of software supporting the Internet.
372	ISO	ISO/IEC AWI TR 24586-1	Software and systems engineering — Agile and DevOps principles and practices — Part 1: Agile principles and practices	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available

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373	ISO	ISO/IEC AWI TR 24586-2	Software and systems engineering — Agile and DevOps principles and practices — Part 2: DevOps principles and practices	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
374	ISO	ISO/IEC/IEEE FDIS 24641	Systems and Software engineering — Methods and tools for model-based systems and software engineering	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
375	ISO	ISO/IEC/IEEE DIS 24748-1	Systems and software engineering — Life cycle management — Part 1: Guidelines for life cycle management	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	The proposed project is a revision of ISO/IEC/IEEE 24748-1:2018, Guidelines for life cycle management. There are no scope changes. The document provides guidelines for the life cycle management of systems and software, complementing the processes described in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207. This document: — addresses systems concepts and life cycle concepts, models, stages, processes, process application, key points of view, adaptation and use in various domains and by various disciplines; — establishes a common framework for describing life cycles, including their individual stages, for the management of projects to provide, or acquire either products or services; — defines the concept and terminology of a life cycle; — supports the use of the life cycle processes within an organization or a project. Organizations and projects can use these life cycle concepts when acquiring and supplying either products or services; — provides guidance on adapting a life cycle model and the content associated with a life cycle or a part of a life cycle; — describes the relationship between life cycles and their use in applying the processes in ISO/IEC/IEEE 15288 (systems aspects) and ISO/IEC/IEEE 12207 (software aspects); — shows the relationships of life cycle concepts to the hardware, human, services, process, procedure, facility and naturally occurring entity aspects of projects; and - describes how its concepts relate to detailed process standards, for example, in the areas of measurement, project management and risk management.
376	ISO	ISO/IEC/IEEE DIS 24748-2	Systems and software engineering — Life cycle management — Part 2: Guidelines for the application of ISO/IEC/IEEE 15288 (System life cycle processes)	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	The proposed project is a revision of ISO/IEC/IEEE 24748-2:2018, Systems and software engineering — Life cycle management — Part 2: Guidelines for the application of ISO/IEC/IEEE 15288 (System life cycle processes). There are no scope changes. ISO/IEC/IEEE 24748-2 is a guideline for the application of ISO/IEC/IEEE 15288. It addresses system, life cycle, organizational, project, and process, concept application, principally through reference to ISO/IEC/IEEE 24748-1 and ISO/IEC/IEEE 15288. It gives guidance on applying ISO/IEC/IEEE 15288 from the aspects of strategy, planning, application in organizations, and application on projects. It also provides comparison of the differences between ISO/IEC/IEEE 15288 current revision and the prior version, ISO/IEC 15288:2015.
377	ISO	ISO/IEC/IEEE FDIS 24748-6	Systems and software engineering — Life cycle management — Part 6: System and software integration	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
378	ISO	ISO/IEC/IEEE FDIS 24748-9	Systems and software engineering — Life cycle management — Part 9: Application of system and software life cycle processes in epidemic prevention and control systems	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
379	ISO	ISO/IEC CD 24773-2.2	Software and systems engineering — Certification of software and systems engineering professionals — Part 2: Guidance regarding description of knowledge, skills, and competencies contained in schemes	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
380	ISO	ISO/IEC FDIS 24773-4	Software and systems engineering — Certification of software and systems engineering professionals — Part 4: Software engineering	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
381	ISO	ISO/IEC DIS 25002	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality models overview and usage	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
382	ISO	ISO/IEC DIS 25010	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Product quality model	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
383	ISO	ISO/IEC DIS 25019	Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality-in-use model	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available

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384	ISO	ISO/IEC CD 25040	Systems and software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE) – Quality evaluation framework	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document provides the concepts relating to the quality evaluation of the ICT products, IT service, and data, and requirements for its planning. It intends to be used by those who need to perform quality evaluations on target entities, including development organization (integrators, developers, and quality assurance group), acquirers, and independent evaluators. It does not cover any conformance assessment by a certification body.
385	ISO	ISO/IEC/IEEE FDIS 26531	Systems and software engineering — Content management for product life cycle, user and service management information for users	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
386	ISO	ISO/IEC CD 29110-1-1	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 1-1: Overview	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
387	ISO	ISO/IEC CD 29110-1-2	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 1-2: Vocabulary	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
388	ISO	ISO/IEC CD 29110-5-1-1	Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-1: Management and engineering guide: Generic profile group: Entry profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects up to 25 people. The life cycle processes described in the set of International Standards (IS) Profiles and Technical Reports (TR) are not intended to preclude or discourage their use by organizations bigger than VSEs. The scope of these projects is the conversion of documents published or approved as Technical Reports (TR) to International Standards (IS). There will be no changes to the original and actual scope of the original project as documented in SC7N3288, which is an update version of the original NWIP ISO/IEC JTC1/SC7 N3288 New Work Item Proposal – Software Life Cycles for Very Small Enterprises - Dated 2005-06-21, N3215, Resolution 847. The guidelines are informative, and contain no requirements (profile requirements corresponding to each guideline can be found in parts 29110-4-n). Each guideline will also be revised to accommodate changes in the profile base documents; to process a backlog of minor changes detected by the users and authors of the documents; and as a result of processing ballot comments.
389	ISO	ISO/IEC CD 29110-5-1-2	Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-2: Management and engineering guide: Generic profile group: Basic profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects of up to 25 people. The lifecycle processes described in ISO/IEC 29110 are not intended to preclude or discourage their use by organizations bigger than VSEs. This part of ISO/IEC 29110 provides the management and engineering guide to the Basic VSE Profile specified in ISO/IEC 29110-4-1 through project management and software implementation processes. This part of ISO/IEC 29110 is a standalone guide; it is not intended for a VSE to use the standardized profile to implement this part of ISO/IEC 29110. This part of ISO/IEC 29110 applies for software development projects, which can be to fulfil an external or internal contract. The internal contract need not be explicit between the project team and their Customer. Using this part of ISO/IEC 29110, a VSE can obtain the following benefits. – An agreed set of project requirements and expected products is delivered to the Customer. – A disciplined management process that provides project visibility and corrective actions of project problems and deviations is performed. – A systematic software implementation process that satisfies Customer needs and ensures quality products is followed.
390	ISO	ISO/IEC CD 29110-5-1-3	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-3: Software engineering — Management and engineering guide: Generic profile group — Intermediate profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	ISO/IEC TR 29110-5-1-3:2017 provides management and engineering guide to the intermediate profile described in terms of business management, project management, software implementation and acquisition processes. ISO/IEC TR 29110-5-1-3:2017 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The life cycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organizations bigger than VSEs. ISO/IEC 29110:4-1 identifies the requirements applicable to the tasks and work products described in this document. ISO/IEC TR 29110-5-1-3:2017 has been developed using the management and engineering guide of the Basic profile and by modifying and adding elements (e.g. process, task, work product, role) for VSEs involved in the development of more than one project in parallel with more than one work team. ISO/IEC TR 29110-5-1-3:2017 applies for VSEs developing non-critical software. Using this document, VSEs can obtain the following benefits: - the management and monitoring of more than one project in parallel with more than one work team; - reuse existing software components (e.g. code and document) in new projects; - continuously measure projects and improve processes. Once the software, developed by a VSE, has been accepted by their customers, the VSE that wants to provide after delivery services can refer to ISO/IEC TR 29110-5-3.[1] ISO/IEC TR 29110-5-1-3:2017 is targeted to VSEs which are familiar with ISO/IEC TR 29110-5-1-2 for their software development projects and are involved in the development of more than one project in parallel with more than one work team. ISO/IEC TR 29110-5-1-3:2017 is intended to be used with any lifecycles, processes, techniques and methods that enhance the VSEs customer satisfaction and productivity. [1] To be published.

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391	ISO	ISO/IEC CD 29110-5-1-4	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-1-4: Software engineering; Management and engineering guidelines: Generic profile group: Advanced profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document is applicable to Very Small Entities (VSEs). VSEs are enterprises, organisations, departments or projects having up to 25 people. The life cycle processes described in the set of International Standards (IS) and Technical Reports (TR) are not intended to preclude or discourage their use by organisations bigger than VSEs. The Advanced profile is the fourth profile of a four-profile software engineering roadmap (i.e. Entry, Basic, Intermediate and Advanced). This document describes processes targeted at VSEs that want to sustain and grow as an independent competitive software development business. ISO/IEC 29110-4-1 identifies the requirements applicable to the tasks and work products described in this document. These guidelines apply to VSEs that develop non-critical software. Using these guidelines, VSEs can obtain the following benefits: - management and monitoring of more than one project in parallel with more than one work team; - reuse of existing software components (e.g. code and document) in new projects; - continuous measurement and evaluation of projects; - continuous evaluation and improvement processes; - continuous sustainability and growth; and - support to customers in the disposal of software and installation of new software. Once the software, developed by a VSE, has been accepted by their customer, the VSE that wants to provide after-delivery services can refer to ISO/IEC TR 29110-5-3.
392	ISO	ISO/IEC CD 29110-5-2-1	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-2-1: Organizational management guidelines	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	ISO/IEC 29110-5-2-1:2016 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110:2016 series are not intended to preclude or discourage their use by organizations bigger than VSEs. ISO/IEC 29110-5-2-1:2016 is the Organizational management guidance for profiles described in ISO/IEC 29110-4-1 through Organizational Management, Project Portfolio Management, Resource Management and Process Management Processes. It is not intended for a VSE to use the standardized profile to implement ISO/IEC 29110-5-2-1:2016. Using ISO/IEC 29110-5-2-1:2016, a VSE can obtain benefits in the following aspects: ? multiple project execution and supervision of its performance, making sure all processes are executed according to the organizational strategy; ? continuous monitoring of the customer satisfaction; ? deployment and improvement of the organizational standard processes in all projects; ? controlled provision of required resources.
393	ISO	ISO/IEC CD 29110-5-3	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-3: Service delivery guidelines	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	These Service Delivery guidelines are applicable to Very Small Entities (VSEs). A VSE is an enterprise, an organization, a department or a project having up to 25 people. ISO/IEC TR 29110-5-3:2018 provides guidance to manage a set of services delivered to customers. The VSE can act as an internal service provider (providing services internal to the VSE) or as an external service provider (providing services commercially to external customers). These lifecycle processes (Governance, Service Control, Service Relationship and Service Incident) support and enhance the activities of software and system operations (further to development and installation) to create effective and efficient products and services. ISO/IEC TR 29110-5-3:2018 provides guidance for Service Delivery. This document, when implemented, will assist and guide the VSE in the delivery of services which can benefit customers. This document does not promote uniformity in approach across all organizations as specific objectives and initiatives are tailored to suit an individual organization's needs. Tasks described in this guideline document (and therefore activities and processes) are related by input/output relationships which imply a logical execution sequence. The order of presentation of the processes or the associated numbering scheme is for identification purposes only, NOT to indicate implementation or execution order. As every VSE is different; tasks can be implemented in an order that is suitable for the organization, while respecting the relationships between tasks. ISO/IEC TR 29110-5-3:2018 is intended to be used by VSEs to establish processes to implement effective and efficient service delivery. This service delivery guidelines document can be used by VSEs that are offering only services to its customers or it can be combined with the information from ISO/IEC 29110 systems and/or software management and engineering guidelines.
394	ISO	ISO/IEC CD 29110-5-4	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-4: Agile software development guidelines	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document provides guidelines for VSEs that want to reinforce their agile environment to develop software using an agile approach based on Scrum and XP. This document also provides guidelines that facilitates the implementation of an agile approach for VSEs that are already using the software Basic profile of the ISO/IEC 29110 series. This document is targeting VSEs that do not develop business or safety critical products.

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395	ISO	ISO/IEC CD 29110-5-6-1	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-1: Systems engineering — Management and engineering guide: Generic profile group: Entry profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	ISO/IEC 29110:2015 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the set of International Standards (IS) and Technical Reports (TR) are not intended to preclude or discourage their use by organizations bigger than VSEs. ISO/IEC 29110:2015 provides the management and engineering guide to the Entry Profile described in ISO/IEC 29110-4-6 through Project Management and System Definition and realization processes. This part of ISO/IEC 29110 is a standalone guide; it is not intended for a VSE to use the standardized profile to implement ISO/IEC 29110:2015. ISO/IEC 29110:2015 applies for non-critical systems development projects. The system development should fulfil the project requirements and the system description. ISO/IEC 29110:2015, a VSE can obtain benefits in the following aspects: — an agreed set of project requirements (technical part of contract) and expected products are agreed by the Acquirer; — a disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed; — a systematic System Definition and Realization process, that satisfies Acquirer needs and ensures quality products, is followed. VSEs developing software that is part of a larger system and for standalone software products and services are encouraged to use the management and engineering guide of the Entry Profile (ISO/IEC TR 29110-5-1-1).
396	ISO	ISO/IEC CD 29110-5-6-2	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-2: Systems engineering — Management and engineering guide: Generic profile group: Basic profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the set of International Standards (IS) and Technical Reports (TR) are not intended to preclude or discourage their use by organizations bigger than VSEs. ISO/IEC 29110-5-6-2:2014 provides the management and engineering guide to the Basic Profile described in ISO/IEC 29110-4-6 through Project Management and System Definition and realization processes. It is a standalone guide; it is not intended for a VSE to use the standardized profile to implement ISO/IEC 29110-5-6-2:2014. ISO/IEC 29110-5-6-2:2014 applies for non-critical systems development projects. The system development should fulfil the project requirements and the system description. ISO/IEC 29110-5-6-2:2014, a VSE can obtain benefits in the following aspects: An agreed set of project requirements (technical part of contract) and expected products are agreed by the Acquirer. A disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed. A systematic System Definition and Realization process, that satisfies Acquirer needs and ensures quality products, is followed. VSEs developing software that is part of a larger system, and for stand-alone software products and services, are encouraged to use the management and engineering guide of the Basic Profile (ISO/IEC 29110 5 1-2).
397	ISO	ISO/IEC CD 29110-5-6-3	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-3: Systems engineering: Management and engineering guide: Generic profile group: Intermediate profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document provides management and engineering guidance within the Intermediate profile for the Business Management, Project Management, System Definition and Realisation and Acquisition Management processes. This document is applicable to Very Small Entities (VSEs). VSEs are enterprises, organisations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organisations bigger than VSEs. This document has been developed using the management and engineering guide from the systems engineering Basic profile. Elements were added or modified (e.g. process, task, work product, role) to support VSEs involved in the development of more than one project in parallel with more than one work team. This guide is oriented towards the management of more than one project in parallel with more than one work team. This document applies for the development of non-critical systems. Using this document, a VSE can obtain benefits in the following aspects: — An agreed set of project requirements (technical part of contract) and expected work products are agreed by the Acquirer. — A disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed. — A systematic System Definition and Realisation process, that satisfies Acquirer needs and helps ensure quality work products, is followed. Once the system, developed by a VSE, has been accepted by their customers, the VSE that wants to provide after delivery services can refer to ISO/IEC TR 29110-5-3. In the context of systems engineering, that is the System Definition and Realisation (SR) process, the group that is part of the VSE responsible for developing software elements that are part of the system are encouraged to use the management and engineering guide of the software engineering Intermediate profile (ISO/IEC TR 29110-5-1-3). This document is targeted at VSEs that do not develop critical systems and have little or no experience with systems engineering (SE) process planning and implementation using ISO/IEC/IEEE 15288. This document is also targeted to VSEs which are familiar with management and engineering guide of the systems engineering Basic profile (ISO/IEC TR 29110 5-6-2) for their system development projects and are

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398	ISO	ISO/IEC CD 29110-5-6-4	Systems and software engineering — Systems engineering lifecycle profiles for Very Small Entities (VSEs) — Part 5-6-4: Management and engineering guidelines: Generic profile group: Advanced profile	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organisations bigger than VSEs. This document applies for the development of non safety critical products. The ISO/IEC 29110-4-6 will identify the requirements applicable to the tasks and work products described in this document. This document is targeted for VSEs that do not develop safety critical products and have little or no experience with systems engineering (SE) process planning and implementation using the ISO/IEC/IEEE 15288. This document is also targeted for VSEs which are familiar with the management and engineering guide of the systems engineering intermediate profile (ISO/IEC TR 29110 5-6-3) for their system development projects and are involved in the development of more than one project in parallel with more than one work team. This document is intended to be used with any process, technique and method that enhances the VSE's stakeholder satisfaction and productivity.
399	ISO	ISO/IEC CD 29110-5-5	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 5-5: DevOps guidelines	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
400	ISO	ISO/IEC DIS 29110-6-1	Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 6-1: Software engineering — Specific Space Profile Specifications	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
401	ISO	ISO/IEC CD TR 29119-8.2	Software and systems engineering — Software testing — Part 8: Model-based testing	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
402	ISO	ISO/IEC TS 33010	Information technology — Process assessment — Guidance for performing process assessments	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	This document provides an overview of process assessment and interprets the requirements through the provision of guidance on the selection and use of assessment models, documented assessment processes, and instruments or tools for assessment. Process assessment is applicable in the following circumstances: a) by or on behalf of an organization with the objective of understanding the state of its own processes for process improvement; b) by or on behalf of an organization with the objective of determining the suitability of its own processes for a particular requirement or class of requirements; c) by or on behalf of one organization with the objective of determining the suitability of another organization's processes for a particular contract or class of contracts.
403	ISO	ISO/IEC CD 33202	Software and systems engineering — Core Agile practices	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
404	ISO	ISO/IEC/IEEE CD 41062.2	Software engineering — Life cycle processes — Software acquisition	Draft	Main	ISO/IEC JTC 1/SC 7		under development	International		Software engineering	Not available
405	ISO	ISO 3535:1977	Forms design sheet and layout chart	Withdrawn	Main	ISO/IEC JTC 1/SC 7		1977	International		Software engineering	Lays down the basic principles for the design of forms, whether discrete forms or continuous forms, and establishes a forms design sheet and a layout chart based on these principles. Applies to the design of forms for administrative, commercial and technical use, whether for completion in handwriting or by mechanical means such as typewriters and automatic printers.
406	ISO	ISO/IEC 6592:2000	Information technology — Guidelines for the documentation of computer-based application systems	Withdrawn and replaced by ISO/IEC 26514:2008 (withdrawn)	Main	ISO/IEC JTC 1/SC 7		2000	International		Software engineering	Not available
407	ISO	ISO 6593:1985	Information processing — Program flow for processing sequential files in terms of record groups	Withdrawn	Main	ISO/IEC JTC 1/SC 7		1985	International		Software engineering	Describes two alternative general procedures for any program for preprocessing sequential files logically organized in groups of records: Method A - checking of control head conditions after termination of appropriate level; Method B - checking of control head condition before initiation of appropriate level.
408	ISO	ISO/IEC TR 9126-2:2003	Software engineering — Product quality — Part 2: External metrics	Withdrawn and replaced by ISO/IEC 25023:2016	Main	ISO/IEC JTC 1/SC 7		2003	International		Software engineering	ISO/IEC TR 9126-2:2003 provides external metrics for measuring attributes of six external quality characteristics defined in ISO/IEC 9126-1. ISO/IEC TR 9126-2:2003 defines external metrics, ISO/IEC TR 9126-3 defines internal metrics and ISO/IEC 9126-4 defines quality in use metrics, for measurement of the characteristics or the subcharacteristics. Internal metrics measure the software itself, external metrics measure the behaviour of the computer-based system that includes the software, and quality in use metrics measure the effects of using the software in a specific context of use. The metrics listed in ISO/IEC TR 9126-2:2003 are not intended to be an exhaustive set. Developers, evaluators, quality managers and acquirers may select metrics from ISO/IEC TR 9126-2:2003 for defining requirements, evaluating software products, measuring quality aspects and other purposes.
409	ISO	ISO/IEC TR 9126-3:2003	Software engineering — Product quality — Part 3: Internal metrics	Withdrawn and replaced by ISO/IEC 25023:2016	Main	ISO/IEC JTC 1/SC 7		2003	International		Software engineering	ISO/IEC TR 9126-3:2003 provides internal metrics for measuring attributes of six external quality characteristics defined in ISO/IEC 9126-1. ISO/IEC TR 9126-2 defines external metrics, ISO/IEC TR 9126-3:2003 defines internal metrics and ISO/IEC 9126-4 defines quality in use metrics, for measurement of the characteristics or the subcharacteristics. Internal metrics measure the software itself, external metrics measure the behaviour of the computer-based system that includes the software, and quality in use metrics measure the effects of using the software in a specific context of use. The metrics listed in ISO/IEC TR 9126-3:2003 are not intended to be an exhaustive set. Developers, evaluators, quality managers, maintainers, suppliers, users and acquirers may select metrics from ISO/IEC TR 9126-3:2003 for defining requirements, evaluating software products, measuring quality aspects and other purposes.

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410	ISO	ISO/IEC TR 9126-4:2004	Software engineering — Product quality — Part 4: Quality in use metrics	Withdrawn and replaced by ISO/IEC 25022:2016	Main	ISO/IEC JTC 1/SC 7		2004	International		Software engineering	ISO/IEC TR 9126-4:2004 provides quality in use metrics for measuring the attributes defined in ISO/IEC 9126-1. ISO/IEC TR 9126-2 defines external metrics and ISO/IEC TR 9126-3 defines internal metrics for measurement of the subcharacteristics defined in ISO/IEC 9126-1. Internal metrics measure the software itself, external metrics measure the behaviour of the computer-based system that includes the software, and quality in use metrics measure the effects of using the software in a specific context of use. The metrics listed in ISO/IEC TR 9126-4 are not intended to be an exhaustive set. Developers, evaluators, quality managers and acquirers may select metrics from ISO/IEC TR 9126-4 for defining requirements, evaluating software products, measuring quality aspects and other purposes.

Attachment II: Interview Questionnaire



WP1.1 Goals, KPI and Applications Requirements

The survey will take approximately 30 minutes to complete.

The answers shall be submitted by Monday the 20th, to match the deadline....

Goal: analyse and define key indicators and metrics with baseline values for buildings and then "transpose" them into functional requirements to ensure open access and inclusivity to improve user experience.

Later we will develop a **roadmap for standardization** for proposing improvements to existing standards and new standardization topics

* Required

1. ISO/IEC 9126: which standards have major impacts on users of buildings and on the openDBL Platform?

2. CEN/TC 442 (WG 6 and WG7 in particular): which standards have major impacts on users of buildings and on the openDBL Platform?

3. CEN/TC 350 (subcommittee 1 - circular economy): which standards have major impacts on users of buildings and on the openDBL Platform?

4. CEN/TC 59/SC13: which standards have major impacts on users of buildings and on the openDBL Platform?

5. Towards the roadmap: Which approach is to suggest to write the roadmap? *

6. Which players can we interview in your country? We shall produce at least 50 interviews with key players to qualify their Information Requirements. Please indicate company name, main activity, point of contact (email and phone number) *

7. Which KPI do you think we need to measure the baseline value of buildings (ie. energy and resource efficiency, performances, decarbonisation of buildings and their construction/renovation, etc). Please feel free to indicate a few for each category. *

8. Which Functional Requirements do you think openDBL must have to be innovative and succesfull (ie. structural health monitoring; cost effectiveness, efficiency gains in terms of time, enhanced climate resilience, etc) Please feel free to indicate a few for each category. *

9. Which Functional Requirements can be related to "smart doors"? Which data shall be collected from "smart doors" during planning and installation of doors to enable the owner to operate more efficiently? Please feel free to indicate a few for each category. *

10. Which Functional Requirements can be related to other "smart equipments)? Which data shall be collected from HVAC (heating, ventilation and cooling), electric components (lighting), H&S, multimedia and security devices during planning and installation to enable the owner to operate more efficiently? Please feel free to indicate a few for each category. *

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