
**Sustainability in buildings and civil
engineering works — Guidelines
on the application of the general
principles in ISO 15392**

*Durabilité des bâtiments et ouvrages de génie civil — Lignes
directrices sur l'application des principes généraux de l'ISO 15392*

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 17, *Sustainability in buildings and civil engineering works*.

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Introduction

This Technical Specification is intended for use by stakeholders involved during the life cycle of a construction works. More and more decision makers involved in construction projects are establishing goals to improve the sustainability performance of a construction works.

Decision making typically relates to the planning, design, construction, use and operation, and end-of-life processes. The planning and design phases usually include the project inception/initiation, conception of need and feasibility, and initial and detailed design, all of which lead to the actual construction and occupancy of the building.

The objective of providing the guidance included in this Technical Specification is to demonstrate to each actor at each phase of the construction project a way to implement the nine general principles of sustainability in buildings and civil engineering works, as described in ISO 15392.

Although the following topics are currently outside the scope of this Technical Specification, these guidelines can also facilitate the different actors in

- identifying and setting performance targets,
- elaborating relevant practical tools (criteria, indicators, measurement methods) for assessing/measuring the actual performance levels, and
- formalizing a management system based on the general principles of sustainability, which can be monitored, assessed, and improved.

Application of the nine general principles to the life cycle of construction works introduces a multidimensional puzzle leading to a complex framework. [Clause 4](#) presents the different primary elements of the framework and the related facets to be considered regarding each element. [Clause 5](#) introduces the methodological approach for applying sustainability thinking to the development of the construction works and identifies six phases of the decision-making process and 10 sustainability objectives. [Clause 6](#) gives application guidance developed on the basis of these objectives and related issues of concern (see [Table 3](#)) and detailed recommendations attached to each issue (see [Table 4](#)).

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Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392

1 Scope

This Technical Specification 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.

This Technical Specification 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.

NOTE See [Annex A](#) for the list of the nine general principles.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6707-1, *Building and civil engineering — Vocabulary — Part 1: General terms*

ISO 14020, *Environmental labels and declarations — General principles*

ISO 14021, *Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)*

ISO 14024, *Environmental labels and declarations — Type I environmental labelling — Principles and procedures*

ISO 14025, *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*

ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

ISO 14044, *Environmental management — Life cycle assessment — Requirements and guidelines*

ISO 14050, *Environmental management — Vocabulary*

ISO 15392:2008, *Sustainability in building construction — General principles*

ISO 15686-5, *Buildings and constructed assets — Service-life planning — Part 5: Life-cycle costing*

ISO 21929-1, *Sustainability in building construction — Sustainability indicators — Part 1: Framework for the development of indicators and a core set of indicators for buildings*

ISO 21930, *Sustainability in building construction — Environmental declaration of building products*

ISO 21931-1, *Sustainability in building construction — Framework for methods of assessment of the environmental performance of construction works — Part 1: Buildings*

ISO 26000, *Guidance on social responsibility*

ISO/TR 15686-11¹⁾, *Buildings and constructed assets — Service life planning — Part 11: Terminology*

ISO/TR 21932, *Sustainability in buildings and civil engineering works — A review of terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions related to sustainability in buildings and civil engineering works in ISO 15392 and ISO/TR 21932 apply. For general terms and definitions related to construction works, service life planning, and environmental management systems and life cycle assessment, the terms and definitions in ISO 6707-1, ISO/TR 15686-11, and ISO 14050 apply.

Where conflicts arise, the terms and definitions within ISO 15392 and ISO/TR 21932 govern.

4 Elements of the framework

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Sustainability related to buildings and civil engineering works is a complex issue, and the application of a holistic approach is one of its general principles. When incorporating sustainability thinking into the different processes involved in the development of a construction works, it is important and relevant to keep in mind the elements presented in Table 1, as pieces of a multidimensional puzzle to be assembled. It is important to note that, often, different individual aspects will interrelate with one another.

Table 1 — Primary elements for consideration

Primary elements	Facets to be considered
Primary aspects of sustainability	<ul style="list-style-type: none"> — environmental protection — economic efficiency — social needs
General principles of sustainability related to construction works (ISO 15392)	<ul style="list-style-type: none"> — continual improvement — equity — global thinking and local action — holistic approach — involvement of interested parties — long-term consideration — precaution and risk management — responsibility — transparency

1) This Technical Report is under preparation.

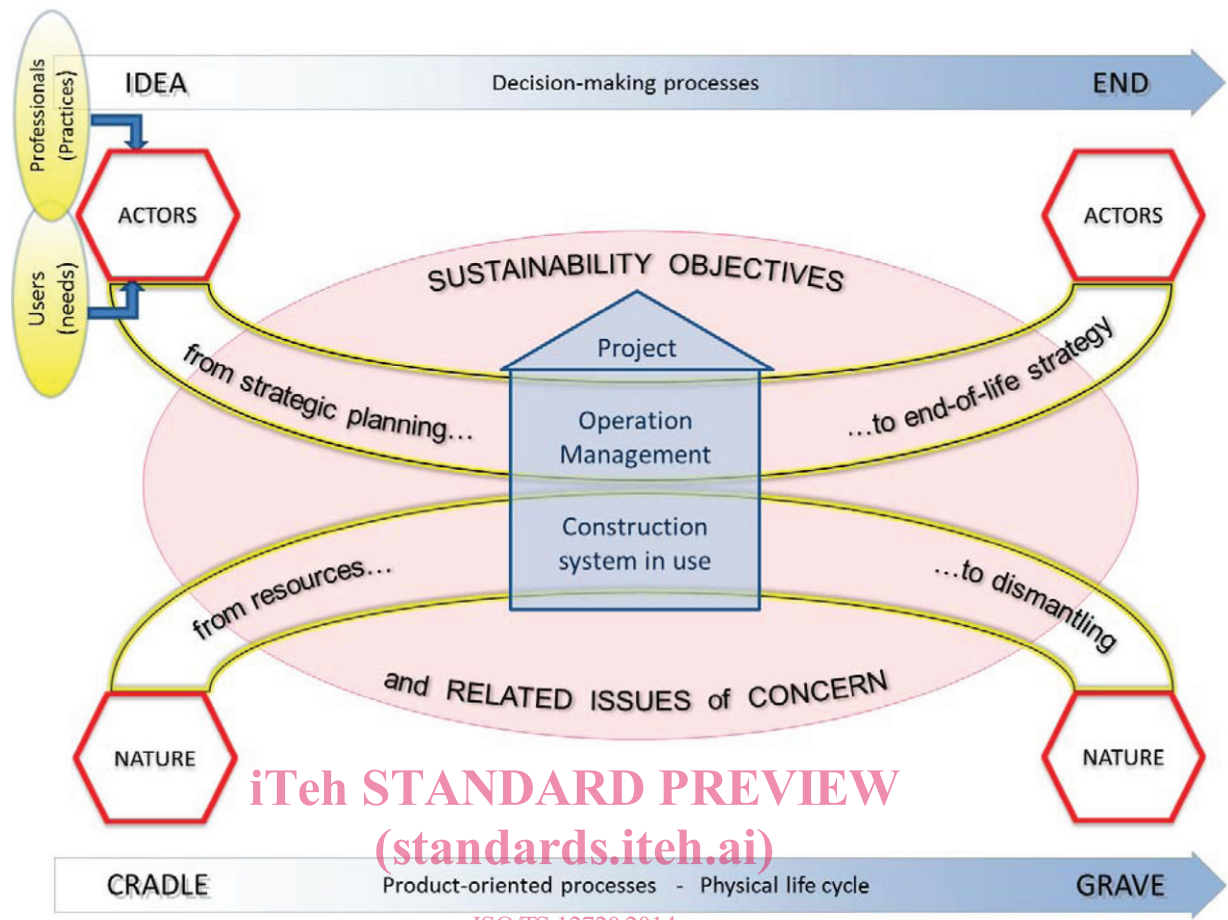
Table 1 (continued)

Primary elements	Facets to be considered
Components of a vision for construction works to contribute to sustainability and sustainable development	<ul style="list-style-type: none"> — implementation of an efficient and responsible project management throughout the decision-making process — involvement of all interested parties and be designed to meet affected parties' needs, both individually and collectively — full integration into the relevant local building, town-planning, or environmental-planning schemes and infrastructure — be healthy, comfortable, safe, and accessible for all — be designed or refurbished from a life cycle perspective — minimization of the project's environmental impact over the estimated (or remaining) service life — delivery of economic value over time — delivery of social and cultural value over time for all — be designed (or refurbished) to be user-friendly, cost effective in operation, and with measurable technical and environmental performance over time — be designed (or refurbished) to be adaptable throughout its service life, with an end-of-life strategy
The functions of a building and its site	<p style="text-align: center; color: red; font-weight: bold;">iTeh STANDARD PREVIEW (standards.iteh.ai)</p> <p style="text-align: center; color: red; font-size: small;">ISO/TS 12720:2014 https://standards.iteh.ai/catalog/standards/sist/a95a8864-9a36-429e-82d7-32e9d127b91d-a95a8864-9a36-429e-82d7-32e9d127b91d</p> <ul style="list-style-type: none"> — support main activities corresponding to users' needs — provide useable and functional indoor and outdoor spaces — provide a healthy indoor environment — provide safety and security — provide for privacy — provide a sense of place
The functions of a civil engineering works	<ul style="list-style-type: none"> — convey and manage flows (material, water, energy, waste, goods, persons, information, etc.) — store, treat, or convert flows — produce, store, distribute, or manage energy — connect places, functions, or people — produce services for the community — accommodate medium- or large-scale activities — provide safety and security — protect the environment, goods, or people
Main stakeholder groups	<ul style="list-style-type: none"> — clients — designers: architects, engineers, and related consultants — contractors: builders, constructors, services engineers — suppliers and manufacturers — users — facility managers — community interest groups — regulatory authorities

Table 1 (continued)

Primary elements	Facets to be considered
Main types of construction works ^a	<ul style="list-style-type: none"> — buildings <ul style="list-style-type: none"> — residential buildings — commercial buildings — public buildings — industrial buildings — etc. — civil engineering works <ul style="list-style-type: none"> — parks and public spaces — transportation systems — water and sewerage systems — energy generation and distribution systems — waste systems — airports — etc.
Decision-making processes	<ul style="list-style-type: none"> — strategic planning — project definition — design — construction and handover — operation and maintenance — end-of-life strategy
Geographical scales linked to a project	<ul style="list-style-type: none"> — construction works and its site — local and extended neighbourhood — city or region
Physical life cycle stages of a construction works (“cradle to grave”)	<ul style="list-style-type: none"> — production stage (including extraction of raw materials and manufacturing of products) — construction stage — in-use stage (including use, operation, maintenance, repair, replacement, and refurbishment) — end-of-life stage
Combined product and process approach (see Figure 1)	<ul style="list-style-type: none"> — product-oriented, in terms of performance (technical, functional, environmental, social, economic) of the resulting works — process-oriented, in terms of decision making over the entire life of the works

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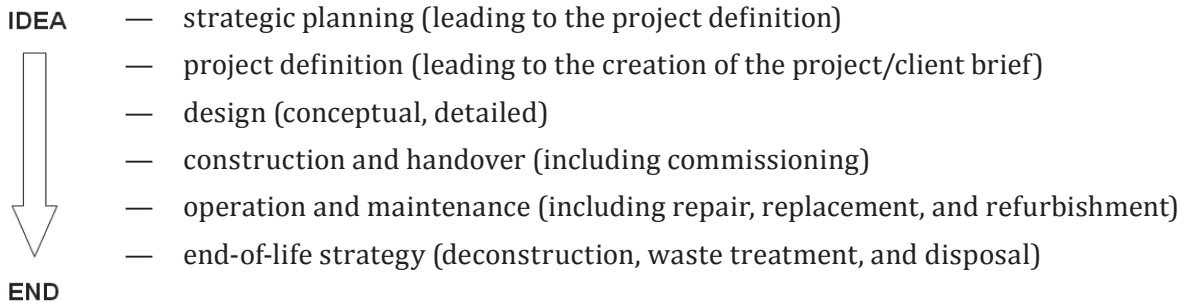
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Figure 1 — Diagram of process-oriented and product-oriented life cycles

5 Methodological approach

The starting point of the methodology of applying sustainability thinking to development of construction works is the following sentence, from ISO 15392:

“Sustainable development of buildings and other construction works brings about the required performance and functionality with minimum adverse environmental impact, while encouraging improvements in economic and social (and cultural) aspects at local, regional and global levels. Sustainable development of buildings and other construction works may include consideration of buildings and infrastructure individually and collectively, as well as consideration of single products, functional components, services and processes related to their life cycle”.

Six main phases are identified within the decision-making processes that relate to the life cycle of a construction works, from the first expression of a need (idea) until the end-of-life of the works. These are:



NOTE 1 National practice can give alternative descriptions and groupings of phases in the life cycle of a construction works. The above presents the terms used in this Technical Specification to identify the key elements that take place in all projects.

NOTE 2 Refurbishment is considered as a sub-project of the use phase including, in itself, strategic planning, project definition, design and construction, and also the end-of-life of some elements such as exterior claddings, windows, partitions, and interior finishes.

From a process or management point of view, the main phases of the decision-making process related to a construction project, together with the stakeholders and their actions/decisions at each phase, are the core elements for this Technical Specification (see [Table 2](#)).

From a point of view of sustainability objectives, the thematic issues of concern provide the basis for operational guidance and the technical and management recommendations (see [Tables 3](#) and [4](#)).

In simple terms, each phase will

- raise questions that need to be addressed,
- implicate the various stakeholders or actors needing to answer these questions, and
- end with an optimal result or deliverable.

This is made more explicit in [Table 2](#).

Table 2 — The six phases of the decision-making process

Decision-making process	Questions raised	Main stakeholders (or actors)	Result/deliverables
Strategic planning	<ul style="list-style-type: none"> — What is the demand? — What are the needs? — What are the sustainability objectives? — What are the opportunities and constraints of the site? 	Clients, users, community interest groups	<ul style="list-style-type: none"> — Preliminary objectives — Decision to proceed or not
Project definition	<ul style="list-style-type: none"> — What are the technical and functional requirements? — What are the environmental, economic, and social performance requirements? 	Clients, users, community interest groups	<ul style="list-style-type: none"> — Project detailed objectives — Creation of the project/client brief^a
Design	How is the demand expressed into a project, first schematically and then in detail?	Designers, engineers, clients, users, regulatory authorities, community interest groups	A sustainable construction project, with detailed drawings and specifications
Construction and handover	How is the design realized and the works handed over to users?	Contractors, suppliers, manufacturers, clients, users	A sustainable construction process, a sustainable works/asset, a user guide, specifications for use
Operation and maintenance	How to operate and maintain the built environment in an effective, sustainable way?	Clients, users, facility managers, suppliers, community interest groups	A sustainable service life, including continuous improvement
End-of-life strategy	Once full obsolescence is reached, how to deal with the end-of-life, without creating damage to the environment or the community?	Clients, suppliers, contractors, community interest groups	A sustainable exit strategy and its realization, a clean site

^a The resulting brief is expected to balance the consideration of the technical, functional, environmental, economic, and social aspects and to prioritize the related performance requirements.

The guidance in [Clause 6](#) demonstrates to each actor, at each phase of the construction project, a way to implement the nine general principles. Although they might be seen as rather conceptual, they can be used, from an intellectual perspective, as a framework against which decisions can be checked. The most practical way to implement them is to translate them into sustainability objectives and related issues of concern, with both a product-oriented and a process-oriented approach.

Sustainability objectives and issues of concern are the items or requirements that need to be raised and taken into consideration at different critical points throughout the project life cycle, starting with the choice of the site and the elaboration of the brief, which is a critical document. These items/requirements need practical solutions to help ensure the maximum contribution to sustainability and sustainable development from the construction works. All the actors involved in the process should have these items/requirements in mind, while knowing that solutions shall be given, and be conscious that each of the actors has a role and a responsibility in enabling those solutions to be progressively elaborated throughout the project's life cycle.

The sustainability objectives identified in this Technical Specification, corresponding to the “vision” presented in [Table 1](#), are as follows:

- a) efficient and responsible management throughout the process;
- b) involvement of interested parties and consideration of their needs;
- c) integration into the relevant planning schemes and policies (including sustainability planning) related to local building/town-planning and infrastructure;
- d) functionality, health, comfort, safety, and accessibility;
- e) consideration of a life cycle perspective;
- f) limitation of adverse environmental impacts;
- g) provision of economic value over time;
- h) provision of social and cultural value over time and for all;
- i) performance management during operation;
- j) adaptability and end-of-life strategy.

6 Application guidance

In this Clause, the sustainability objectives are detailed in issues of concern, each being expressed as a short list of statements, actions, or recommendations. These are intended to make the objectives and issues more evident for the various stakeholders' consideration.

[Table 3](#) presents the list of sustainability objectives and related issues of concern, and indicates whether they are linked to

- the three primary aspects of sustainability,
- the nine general principles of sustainability related to construction works,
- either a building or civil engineering works, or both, and
- either a product- or process-oriented approach, or both.

It is particularly important that all the issues presented in [Table 3](#) are considered from the initiation of the project, during the project definition, and the elaboration of the brief. A brief that appropriately integrates these issues (detailing the three primary aspects of sustainability) is likely to result in a project that contributes positively to sustainable development.

NOTE Buildings and other types of construction works are designed to meet numerous requirements, expressed and established in national and international standards or regulations. None of these requirements is replaced or changed by this Technical Specification. Compliance with legislation and regulations represent prerequisites for any project and are not addressed within the tables.

Table 3 — List of sustainability objectives and issues versus primary aspects, general principles of sustainability, works, and approach

Sustainability objectives and related issues of concern	Aspects			General principles of sustainability								Works		Approach		
	Envi-ron-men-tal	Eco-nomic	So-cial	Con-tin-ual im-prove-ment	Equi-ty	Glo-bal thin-king and local ac-tion	Holis-tic ap-proach	In-volve-ment of in-ter-ested par-ties	Long-term con-si-dera-tion	Pre-cau-tion and risk ma-nage-ment	Res-pon-si-bi-li-ty	Tran-spa-rency	Build-ing	Civil en-gi-neer-ing	Pro-duct-orient-ed	Pro-cess-orient-ed
<p>Purpose: Early identification of needs and roles of interested parties, clear project organization and planning at each phase, shared decision making, traceability, with good anticipation of risks, problems, and conflicts</p> <p>Outcome: Elaboration of a sustainable and concerted brief, then an optimized project meeting the brief requirements, and a construction works reaching and maintaining the expected performances: satisfaction of the client, the users, and the local community, while applying responsible patterns of production and consumption</p>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<p>A1 — Establishment of the sustainability policy of the client or main decision-maker and communication of the vision</p> <p>A2 — Availability of resources (e.g. financial, technical, human, etc.)</p> <p>A3 — Implementation of an integrated multidisciplinary approach throughout the process</p> <p>A4 — Adoption of an iterative process and validation of the choices at each key stage</p> <p>A5 — Management of risks</p> <p>A6 — Responsible sourcing</p> <p>A7 — Formalization of contracts and responsibilities between parties</p> <p>A8 — Achievement of the expected performance</p>	x	x	x			x					x	x	x			x