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User guidance to ISO 15928 — Houses — Description of performance

*Lignes directrices pour l'utilisateur de l'ISO 15928 — Constructions
d'habitation — Description des performances*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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

ISO/PAS 22539 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 15, *Performance criteria for single family attached and detached dwellings*.

Introduction

Traditionally, the construction of single-family houses has been a local or regional on-site activity, dominated by local builders and local forms of building control, with the latter often based on prescriptive codes and local practices. The approach to the regulation of buildings has shifted to a performance-based approach, reinforced by national commitments made in terms of the World Trade Organisation's Technical Barriers to Trade Agreement. Initiatives to standardize requirements at a national or federal level have also contributed to this shift to the performance-based approach.

There are locations where, due to cost constraints and rationalization of production, limited local resources, or where innovation is encouraged, markets have developed for standardized products in relation to the construction of houses. This is reflected in the increasing mass production of houses according to standardized designs. In some situations, this leads to the supply of houses assembled from sub-assemblies manufactured off-site, with on-site activity limited to site preparation, foundation construction, connection of services, and the assembly of the sub-assemblies. There has also been a growing international trade in housing, particularly where demands exceed the capacity of local resources to deliver, such as following disasters or as a result of rapid local population growth and development.

Because different countries, and often different regions within a country, have different ways of specifying their requirements in documents such as codes, standards and technical regulations, it can be very difficult for manufacturers to determine what exactly is required, and very difficult for purchasers to know whether what is being offered meets the requirements. This has led to a need for an internationally agreed form of communication, which will enable the various parties to exchange information using a common language. The ISO 15928 series is designed to provide this common language. The basis of this language is the specification of the requirements in terms of required performance, rather than in the form of prescriptive solutions that tend to be limited to local forms of construction. The objective of the ISO 15928 series is to define performance parameters for a range of attributes of houses.

The standard is not concerned with specifying the required **levels** of performance or the details of the methods of evaluation. The specification of the required levels of performance is the prerogative of the users, while the detailing of the methods of evaluation is the role of International Standards or other national or regional standards.

A major driver for the development of these standards has been the directive from the World Trade Organization (WTO) regarding the reduction of technical barriers to trade through the use of international performance-based standards and regulations. Although the primary purpose of the ISO 15928 series is to facilitate international trade for housing, its applicability is not limited to this. Anticipated users of the standards are expected to include the following factors:

- Purchasing organizations and specifiers, as an efficient and effective way of defining their needs in terms of the various parameters described in the standards.
- Regulating authorities, as an efficient and effective method of specifying their minimum performance requirements in terms of the parameters described in the standards.
- Designers, who will need to relate the performance requirements expressed in terms of the parameters in ISO 15928 to the detailed design standards and design methods used in the design of the houses.
- Certifiers, who will need to determine that the actual constructed house will meet the performance levels expressed in terms of the parameters described in these standards.
- Technical assessment organisations tasked with the establishment of the fitness for use and continuing quality of innovative housing systems that deviate from established standard specifications.

- Lending organizations that incorporate performance requirements in their conditions for providing loans.
- Insurers who base their premiums and policy conditions in part on the certified performance levels of houses.
- Researchers and product developers who need to describe, in quantitative terms, the performance of housing systems or components thereof that are researched or developed.

This user manual is intended to provide these potential users with information on the background to the standards, and how it is intended that they be used.

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User guidance to ISO 15928 — Houses — Description of performance

1 Scope

This Publicly Available Specification provides user guidance to ISO 15928, which provides the framework within which performance specifications for houses can be developed.

The ISO 15928 series is confined to buildings occupied for residential purposes which may be separated or linked horizontally, but not linked vertically, which have their own access and do not share any common space.

2 Objective of the ISO 15928 series

The objective of the ISO 15928 series is to identify the methods that will be used to describe the performance of houses. Each standard relates to a separate housing attribute. The standards do not specify levels of performance and are not intended to replace national building code standards or technical regulations¹⁾, but to provide a standardized framework to enable documents and regulations to be developed. The standards do not provide design methods and/or design criteria.

Based on the framework provided by these ISO 15928 standards, users can describe their requirements in standardized performance terms. Additionally the suppliers and constructors will be able to respond by describing the performance of their products in a similar manner. The purpose of these standards is to provide a standardized system that can be used to specify performance requirements and performance levels, or to rate houses in terms of a range of attributes²⁾.

The series when completed will address the principal attributes (the performance characteristic which identifies a basic user need being addressed by an individual performance standard) in houses, to facilitate the evaluation of the design and construction of houses in the international trading of houses or their sub-systems, and in developing quality systems for houses.

1) In this document, the terms Building Code, Standards and Technical Regulations are generic terms describing the local requirements. The actual terminology used varies internationally.

2) World Trade Organisation (WTO) *Agreement on technical barriers to trade* (WTO 1997) Clause 2.8 states that 'Whenever appropriate, members shall specify technical regulations based on product requirements in terms of performance, rather than design or descriptive characteristics'.

Paragraph 2 of Article V (Technical Specifications) of the World Trade Organisation's Plurilateral Agreement on Government Procurement requires that technical specifications, where appropriate, be in term of performance rather than design or descriptive characteristics.

3 Performance-based standards

3.1 General approach advocated in International Standards

ISO 6240 requires that each performance requirement shall be defined in terms of a function which is to be fulfilled, together with the properties on which verification and assessment will be based, and that each requirement shall have specified methods of assessment or verification of performance values, as follows;

- the means (measurement, calculation, test or method of examination) by which the achieved performance of the component or assembly will be assessed or verified;
- the means of predicting the performance over time of the component or assembly.

ISO 6241 (1984) (*Performance standards in building — Principles for their preparation and factors to be considered*) suggests that the method of assessment or verification of each performance requirement may be made by means of a test, calculation or judgment.

ISO 15928 is consistent with the requirements of both ISO 6240 and ISO 6241.

3.2 Framework for performance provided in ISO 15928

The performance-based approach advocated in the ISO 15928 series has a hierarchy that starts with a user need for each house attribute, followed by a performance description and performance parameters. (See Figure 1.)

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Each part of ISO 15928 establishes, in respect of a range of housing attributes:

- user requirements (design objectives) (see Annex B);
- performance descriptions (see Annex B);
- the principles for describing performance;
- the parameters for quantifying performance; and
- the evaluation methods for confirming that the nominated performance will be achieved.

NOTE ISO 15928 provides the framework within which performance specifications for houses can be developed (see Annex C).

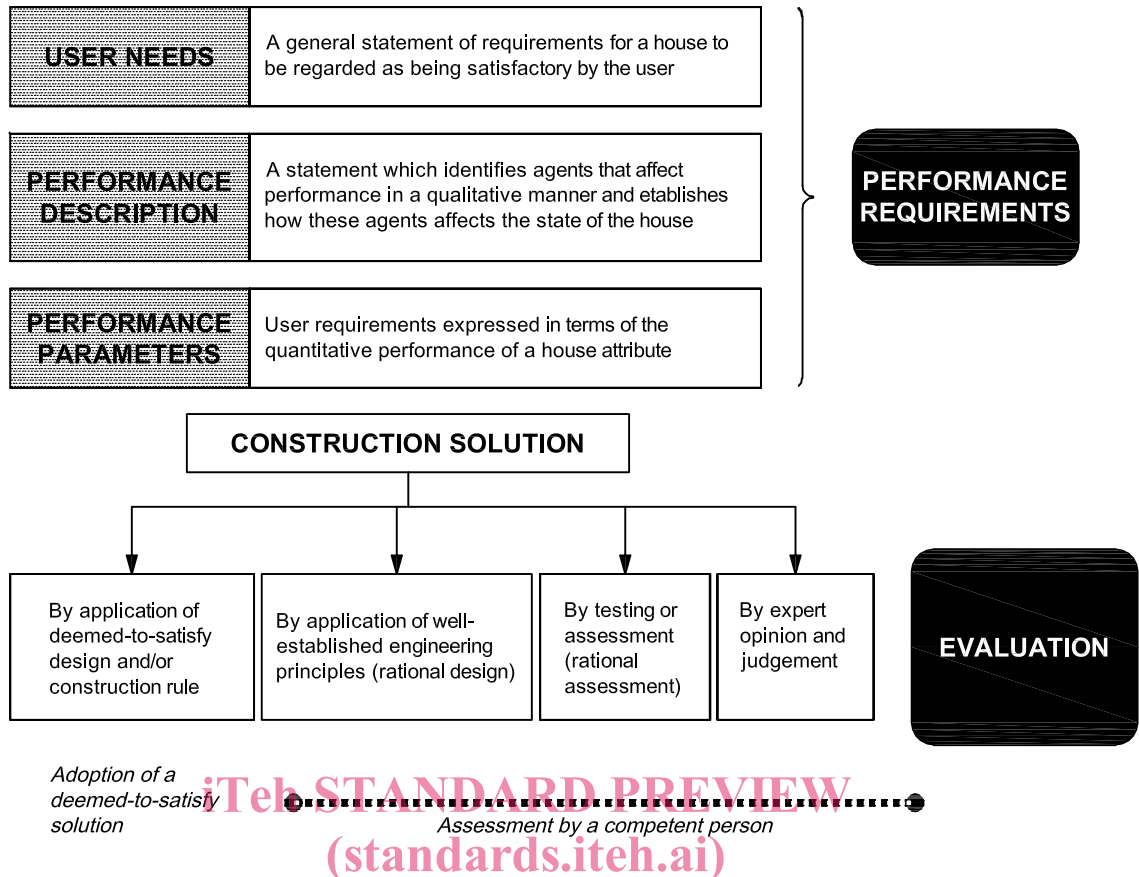


Figure 1 — Performance-based approach to the specification of houses as advocated by ISO 15928

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3.3 Performance-based regulatory frameworks for buildings

The Nordic five-level structure, which is illustrated in Figure 2, has had a significant influence on the development of performance-based building regulations

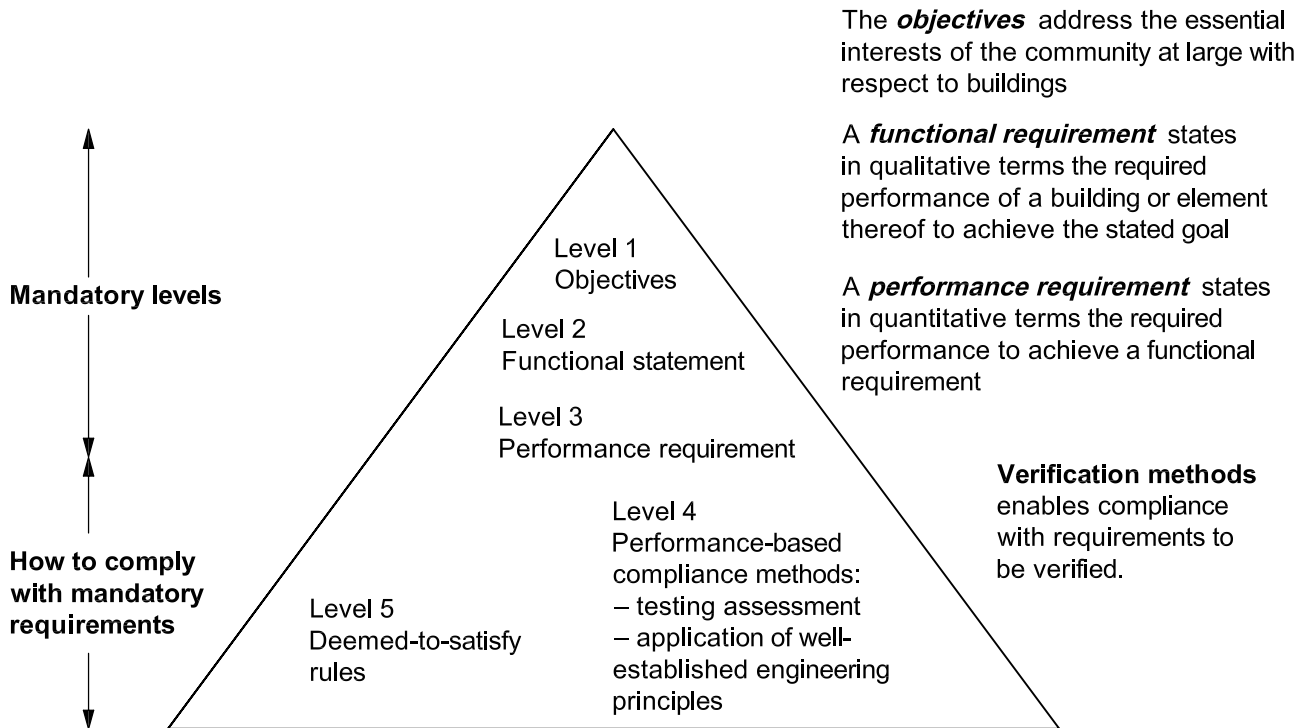


Figure 2 — Nordic five-level structure for performance-based codes

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3.4 Relationship between ISO 15928 and performance-based regulatory frameworks

ISO 15928 has adopted a modified form of the Nordic model to performance-based standards as shown in Figure 1. The common descriptions applied in the systems based on the Nordic model are compared with those contained in ISO 15928 (see Table D.1 of Annex D).

4 Structure of the ISO 15928 series

4.1 General

This Clause provides information and background on the structure of the ISO 15928 series. An example of the structure of clauses is provided in Annex A.

Each standard follows the same basic format, only differing in applications specific to the attribute in question.

The format comprises the following major clauses.

- a) Scope, normative references and definitions.
- b) Performance specification, comprising
 - user needs,
 - performance description, and
 - principles for describing performance.

- c) Parameters for description of performance:
 - for example, for structural safety, parameters for describing actions and parameters for describing resistance.
- d) Evaluation.
- e) Annexes for Commentary and Bibliography.

The following subclauses show how this format is applied in the first part of the ISO 15928 series, *Structural safety*.

4.2 Scope, normative references and definitions

4.2.1 Scope

The Scope of each part of the ISO 15928 series is a brief statement of content and its relationship with other parts.

4.2.2 Normative references

Normative references are those documents, usually other International Standards, which are an integral part of the standard.

4.2.3 Definitions

The definitions are, as far as possible, consistent with current International Standards and are included in each part.

4.3 User needs

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The needs of the user are the key to the use of the standards. This clause sets out, in definitive terms, what the user's expectations are.

For example, in ISO 15928-1, the structural safety user needs are described as follows:

“the risk of collapse or other kind of severe damage resulting from structural failure, which may affect the life safety of the house occupants, or people in its vicinity, shall not exceed a level acceptable to the user”

In ISO 15928-1, it is pointed out in the commentary on this subclause, that the acceptable level of performance will vary from user to user. In this case, the anticipation is that, in terms of structural safety, the people inside the house would not want to be hurt by structural collapse and those outside by flying debris. Additionally, there is, of course, concern for the potentially high cost of repairs in the event of structural failure.

4.4 Performance description

This clause introduces the method by which the required performance will be described.

For example, in the case of structural safety, it is expressed in terms of the capacity of the whole house and its parts, with an appropriate degree of reliability, to maintain their resistance and equilibrium under all actions likely to occur during its design working life.

In the commentary, it is indicated that the degree of reliability is up to the user. There will, of course, be external constraints (such as building regulations), but the appropriate degree of reliability can be judged with due regard to the possible consequences of failure and the expense level of effort and procedures necessary to reduce the risk of failure.