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**Houses — Description of performance —  
Part 3:  
Structural durability**

*Constructions d'habitation — Description des performances —  
Partie 3: Durabilité de la structure*

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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.

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 15928-3 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 15, *Performance criteria for single family attached and detached dwellings*.

ISO 15928 consists of the following parts, under the general title *Houses — Description of performance*:

— *Part 1: Structural safety*

— *Part 2: Structural serviceability*

— *Part 3: Structural durability*

— *Part 4: Fire safety*

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## Introduction

This part of ISO 15928 is one of a series under the general title: *Houses — Description of performance*. The objective of this series is to identify the methods used to describe the performance of houses. Each part of ISO 15928 relates to a separate attribute. The parts of ISO 15928 do not specify levels of performance and they are not intended to replace national standards or regulations, but to provide a standardized framework to enable the development of national standards and regulations in accordance with World Trade Organization (WTO) requirements. The parts of ISO 15928 do not provide design methods and/or design criteria.

Based on the framework provided by ISO 15928 (all parts), purchasers, regulators and standard writers in their respective countries can describe their requirements in standardized performance terms. Additionally, the manufacturers/providers can respond by describing the performance of their products in a similar manner. The purpose of ISO 15928 (all parts) is to provide a standardized system that can be used to specify performance requirements and performance levels or to rate housing products.

NOTE The WTO *Agreement on technical barriers to trade*, Clause 2.8, states: “Whenever appropriate, members shall specify technical regulations based on product requirements in terms of performance rather than design or descriptive characteristics”.

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# Houses — Description of performance —

## Part 3: Structural durability

### 1 Scope

This part of ISO 15928 sets out a method for describing the structural durability performance of houses. It covers the needs of the user, provides performance descriptions, establishes parameter descriptions and outlines evaluation processes.

This part of ISO 15928 is intended for use in the evaluation of the design and construction of houses, in the international trading of houses or their subsystems and in developing quality systems for houses.

This part of ISO 15928 does not apply to structural safety, serviceability or other attributes, which are covered in other parts of ISO 15928.

### 2 Normative references

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

ISO 2394, *General principles on reliability for structures*

ISO 15928-1, *Houses — Description of performance — Part 1: Structural safety*

ISO 15928-2, *Houses — Description of performance — Part 2: Structural serviceability*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2394 and the following apply.

#### 3.1

##### **house**

building occupied for residential purposes, which may be separated or linked horizontally, but not linked vertically to another, which has its own access and which does not share any common space with another

#### 3.2

##### **parameters**

(structural durability) group of variables used to quantitatively describe the structural durability performance

#### 3.3

##### **performance**

behaviour of houses related to users' needs

**3.4 components**

(including fixtures) parts of a house that can be identified such as floor, wall, etc.

**3.5 structural durability**

capability of a structure or any component to satisfy, with planned maintenance, the structural design performance requirements over a specified period of time under the influence of the environmental actions, or a result of a self-ageing process

**3.6 design life**

period of time for which the structural unit or component performs above the specified level of structural safety and serviceability performance

**3.7 design working life**

design life assumed for the whole house

**3.8 maintenance schedule**

series of actions and time intervals between these actions to maintain the levels of structural safety and serviceability performance of the whole house over the design working life

**4 Structural durability performance**

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**4.1 User needs**

The structural safety and serviceability performance of the house shall be acceptable to the user over the specified design working life. <https://standards.iteh.ai/catalog/standards/sist/abbb850a-f970-4637-9edc-fb40dd441fa4/iso-15928-3-2009>

A specified maintenance schedule can be required to achieve this. It is assumed that no significant human abuse occurs.

**4.2 Performance descriptions**

The performance description for structural durability is the expression of the ability of the whole house and its parts, with an appropriate degree of reliability, to fulfil its intended safety and serviceability performance in the environment in which it is located over the specified design working life when subject to its intended use. This is expressed in terms of one or more of the following:

- a) external and internal environmental agents (including those associated with microclimates that can arise in buildings);
- b) maintenance schedule and specified component design life;
- c) changes in form or properties.

NOTE 1 Performance in the environment refers to performance when subjected to the environmental agents listed in Table A.1. This includes harmful substances and phenomena (e.g. aggressive ground water, acid rain, polluted air, insect or rodent attack and fungal decay). It is necessary to consider the effects of severe events when defining the environmental agents.



NOTE 2 Changes in form or properties of components and materials induced by the environment can be described in terms of:

- a) change in basic properties of materials;
- b) change in general or local dimensions of components;
- c) change in properties or form of connection between components.

#### 4.3 Principles for describing structural durability performance

The structural durability performance can be described in terms of

- a) the component design life,
- b) the maintenance schedule, and
- c) the internal and external environmental agents that are likely to occur in the design working life.

The required maintenance should not be excessive, nor should the replacement of components be at inappropriate levels. Maintenance requirements should be specified only for readily accessible components.

### 5 Parameters for the description of performance

#### 5.1 Parameters for describing component design life

The component design life shall be described by specifying the minimum time, expressed in years, between the replacement of structural components under the specified maintenance schedule.

#### 5.2 Parameters for describing the maintenance schedule

The maintenance schedule shall be described by specifying the level of maintenance and frequency of maintenance for the structural components and units.

NOTE Guidance on parameters required can be found in ISO 15686-5.

#### 5.3 Parameters for describing internal and external environmental agents

##### 5.3.1 General

The parameters for describing internal and external environmental agents considered relevant to the structural durability are:

- a) the geographical location of the house;
- b) the parameters describing the influences of environmental agents affecting structural durability.

##### 5.3.2 Parameters for geographical location

The parameters for describing geographical location include:

- a) the distance from a coast-line, other geographical features or sources of pollutants;
- b) the climate zone;
- c) the physical location, e.g. latitude and longitude.

### 5.3.3 Parameters describing environmental agents

5.3.3.1 The following influences should be considered:

- a) moisture constituents;
- b) moisture contaminants;
- c) air constituents;
- d) air contaminants;
- e) ground constituents;
- f) ground contaminants;
- g) biological agents/life;
- h) temperature;
- i) solar radiation;
- j) incompatible chemicals;
- k) use or exposure.

5.3.3.2 Where appropriate, the following parameters should be used to quantify these influences:

- duration of wetness;
- duration of exposure; <https://standards.iteh.ai/catalog/standards/sist/abbb850a-f970-4637-9edc-fb40dd441fa4/iso-15928-3-2009>
- freeze-thaw cycles;
- temperature;
- pH value for acidity;
- concentration of chemicals and contaminants.

An assessment should be made as to whether these influences act either individually or in combination.

## 6 Evaluation

### 6.1 General

ISO 13823 describes the following two procedures for the evaluation of structural durability performance.

- a) Service life format: This procedure consists of ensuring that the predicted structural design life of a whole house or component, allowing for variations in durability, equals or exceeds the specified design life of the house or component.
- b) Limit state format: This procedure consists of ensuring that, at all the times during the specified design life of the whole house or component, the performance requirements for structural safety and serviceability are satisfied.

## 6.2 Evaluation methods

### 6.2.1 General

Performance or properties for both whole house and components and material over time for a specified environment and maintenance schedule can be determined by

- a) field testing,
- b) laboratory testing,
- c) service experience,
- d) analysis, or
- e) a combination of the above.

### 6.2.2 Field testing

Full-scale dwellings, assemblies, components or materials in dwellings can be exposed to a real environment for a stipulated length of time prior to the determination of structural safety or serviceability performance. It is necessary that scientifically justified principles be used to relate the performance after the exposed time to that at the design working life or component life, as appropriate.

NOTE Guidance on the relevant principles can be found in ISO 15686-2.

### 6.2.3 Laboratory testing

Accelerated ageing in laboratory facilities may be used for all testing (whether for whole dwellings, components, assemblies or materials) prior to the determination of structural safety or serviceability performance in accordance with the methods in ISO 15686-1 and ISO 15686-2. It is necessary that scientifically justified principles be used to relate the performance in the laboratory test to that in reality.

### 6.2.4 Service experience

Service experience may be used in the assessment of the working life either of the whole house or of the component life (see ISO 15686-2). It is necessary to derive the data from a sufficient number of representative examples exposed to similar or more severe conditions. It is also necessary that construction methods, components and materials be similar to those of the houses being analysed. It is necessary to have available adequate documentation of environments and the performance over time.

NOTE Guidance on appropriate methods to extract service life data from the appraisal of existing buildings can be found in ISO 15686-7.

### 6.2.5 Analysis

Analytical methods may be used to assess the durability performance of individual components. Individual component analysis is required to assess

- a) the change in form or properties over the component design lifetime, taking into account the maintenance schedule and the environmental agents;
- b) the effect of these changes on structural safety and serviceability performance.

### 6.2.6 Combination

A combination of field and laboratory testing, service experience and analysis may be used for evaluation.