
**Houses — Description of
performance —**

**Part 2:
Structural serviceability**

Constructions d'habitation — Description des performances —

Partie 2: Aptitude au service de la structure

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ISO 15928-2:2015

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 15, *Performance description of houses*.

This second edition cancels and replaces the first edition (ISO 15928-2:2005), which has been technically revised.

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*
- *Part 5: Operating energy*

The following part is under preparation:

- *Part 6: Sustainable development contributions*

Introduction

This part of ISO 15928 is one of a series of standards. The objective of the ISO 15928- series is to identify the methods that will be used to describe the performance of houses. The ISO 15928- series is confined to buildings occupied for residential purposes that may be separated or linked horizontally, but not linked vertically, and which have their own access and do not share any common space.

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 provide a standardized framework to be used for development of national standards and regulations consistent 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 the ISO 15928- series, purchasers, regulators and standards-preparers in respective countries can describe their requirements in standardized performance terms, as appropriate. Additionally, the manufacturers/providers can respond by describing the performance of their products in a similar manner.

The purpose of this part of ISO 15928 is to provide a standardized system of describing performance that can be used to specify performance requirements and performance levels, or to rate houses, in terms of structural serviceability.

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 2: Structural serviceability

1 Scope

This part of ISO 15928 sets out a method for describing the structural serviceability performance of houses. It covers objectives, 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 sub-systems, and in developing risk-management tools for the protection of houses.

The ISO 15928- series does not specify a level of performance and it is not intended to provide a design method and/or criteria.

NOTE 1 [Annex A](#) includes background information on this part of ISO 15928, guidance on its use, and suggestions on good practice.

NOTE 2 Details on references referred to in Notes are provided in a Bibliography.

NOTE 3 Structural safety, durability and other attributes are covered in other parts of ISO 15928.

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 2394, *General principles on reliability for structures*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2394, ISO 6707-1 and the following, apply.

3.1 action

force acting on a structure, or cause of deformation imposed on a structure or constrained within it

Note 1 to entry: In North America, the term 'load' is preferred and used in place of 'action'.

Note 2 to entry: In this part of ISO 15928, the term 'load' is used to indicate the value of a force corresponding to an action.

Note 3 to entry: See ISO 6707-1:2014, 9.3.22 for the definition of 'force'.

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3.2 component

part of a house that can be identified

EXAMPLE Floor, wall.

Note 1 to entry: Includes fittings.

3.3 equipment

<hydraulic, mechanical electrical> device that is provided for use within a house

3.4 fitting

structure such as shelving, cupboards, equipment, etc., that is permanently fixed to the ceilings, walls, etc., of a house

3.5 house

building occupied for residential purposes and designed as one unit (dwelling) with its own access

Note 1 to entry: The house can be a separate building, or linked horizontally with another house but not linked vertically.

Note 2 to entry: Where houses are linked, each has its own access and does not share any space in common with another.

Note 3 to entry: Where houses are linked, services including those related to energy usage and supply, heating and ventilation may be shared.

Note 4 to entry: Where houses are linked, the wall between the houses is typically designed and constructed to limit the probability of fire spread between houses. [ISO 15928-2:2015](https://standards.iteh.ai/catalog/standards/sist/246af827-8d21-4b7d-bffb-66709dca597b/iso-15928-2-2015)

Note 5 to entry: See ISO 6707-1:2014, 3.1.3 for the definition of 'building'.

3.6 ground movement

displacement in any direction of the founding stratum by influences not solely dependent on the actions applied by the housing carcass

3.7 objective

statement concerning the purpose of the description of performance which is to express user needs

3.8 parameters

<structural serviceability> group of variables used to quantitatively describe the structural serviceability performance

3.9 performance

behaviour of houses related to use

3.10 representative value of an action

value used as a reference for the description of performance

4 Structural serviceability performance

4.1 Objective

The structural behaviour of a house, for normal use under all expected actions, that may affect the occupants and the functioning of the house, shall be such that the following characteristics of a house shall be kept within levels acceptable to the user:

- a) functioning and appearance of the house and its components;
- b) functioning of the occupants in the house;
- c) functioning of the equipment in the house;
- d) comfort of the occupants.

NOTE The relative importance of each of these characteristics varies and is reflected in the performance requirements that are specified.

4.2 Performance description

The performance description is the ability of the whole house and its parts, with an appropriate degree of reliability, to perform within established parameters under all expected actions for normal use in terms of:

- a) local damage, including cracking, (which can affect the efficiency and appearance of the house and its components),
- b) deformation (which can affect the efficient use or appearance of the house or the functioning of the people and equipment),
- c) vibration (which can cause discomfort or affect the activity of occupants or the functioning of equipment).

The structural serviceability performance can be described by the structural actions on the house under normal use and the structural responses under the effect of those actions. Only actions and responses relevant to serviceability issues of concern need to be described.

NOTE 1 The appropriate degree of reliability can be judged with due regard to the possible consequences of serviceability failure and the expense level of effort and procedures necessary to reduce those risk of failure. Aspects that are important in achieving the proper degree of reliability include choice of structural systems, design and analysis, durability design, quality control, maintenance and protective measures.

NOTE 2 Expected actions for normal use can include those arising from soil/structure interaction, probable ground movements, compatibility of connections between subsystems and the effects of openings.

NOTE 3 For the purposes of this part of ISO 15928, the durability of materials is not considered to have a bearing on the structural serviceability performance of the house.

NOTE 4 For design specification, it is necessary to nominate the levels of structural actions and the acceptable limits of the structural responses corresponding to those levels of actions.

5 Parameters for the description of performance

5.1 Parameters for describing actions

5.1.1 Permanent actions

The permanent actions, other than self-weight, are described by the magnitude(s), expressed in kilonewtons, and the location(s) of the imposed load(s).

5.1.2 Imposed actions

The imposed actions are described by the representative values of one or more of the following:

- a) uniformly distributed floor or roof load, expressed in kilonewtons per square metre;
- b) concentrated floor or roof load, expressed in kilonewtons per specified area, expressed in square metres;
- c) concentrated wall impact load, expressed in kilonewtons, applied at a specified height, expressed in metres, above the floor;
- d) uniformly distributed horizontal line load, expressed in kilonewtons per metre, applied at a specified height, expressed in meters, above the floor.

EXAMPLE A hand-rail.

NOTE ISO 2103[1] provides minimum recommended imposed actions for different types of use and occupancy.

5.1.3 Wind actions

Wind actions are described by the representative value of the wind velocity, expressed in metres per second, under normal conditions, derived from the basic wind speed, factored as appropriate to take into account local effects, terrain, shielding, topography, site altitude and the like, based on one of the following wind velocity types:

- a) 3 s gust;
- b) 1 min mean (fastest mile);
- c) 10 min mean;
- d) hourly mean.

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NOTE ISO 4354[2] provides details on the conversion of wind velocity to wind forces and the conversion between different types of wind velocity.

5.1.4 Seismic actions

Seismic actions are described by stating the representative value, under normal conditions, of one of the following parameters:

- a) effective peak ground acceleration, expressed as a fraction of gravity;
- b) base shear coefficient;
- c) horizontal force applied to the structure, in kilonewtons, and its location;
- d) ground acceleration response spectrum for the site;
- e) floor acceleration response (for equipment and fittings).

NOTE 1 Item e) relates to phenomena where equipment and/or fittings cannot be used due to the acceleration.

If either a) or b) is used, then the proportion of the imposed loads to be included in the seismic mass shall also be nominated. The representative value shall be based on a consideration of the seismic activity, the soil characteristics of the construction site and the response behaviour of the structure.

NOTE 2 ISO 3010[3] provides additional information on seismic action on structures.

5.1.5 Snow actions

The snow actions are described by stating the representative values, under normal conditions, of the following:

- a) ground snow depth, expressed in metres, derived from the basic snow depth, factored to take into account local effects such as terrain, shielding, topography and the like;
- b) snow density, expressed in kilograms per cubic metre, i.e., the density used in converting the ground snow depth into a load;
- c) duration, in days per year.

NOTE ISO 4355[4] provides information on the conversion of ground snow depths to roof snow loads.

5.1.6 Vibration sources

Consideration shall be given to the description of vibration sources inside and outside the house, such as that caused by machinery, vehicular traffic and human activity, if these sources affect the occupants of the house on a regular basis.

NOTE ISO 10137[5] provides information on the description of vibration sources.

5.1.7 Impact sources

If these impacts are likely to occur during normal use, consideration shall be given to the description of impact sources due to human activities or the environment in terms of the following:

- a) specified in mass, expressed in kilograms;
- b) specified energy, expressed in joules;
- c) type of impact (soft or hard body impact).

EXAMPLE Accidental human body impacts due to slip, trip and fall (soft body impact) and impacts of falling objects (hard body impact).

NOTE ISO 7892[6] provides information on impact test on vertical building elements.

5.1.8 Actions derived from fittings

Consideration shall be given to the description of actions resulting from fittings in terms of a load, expressed in kilonewtons, at a specific location, such as on a ceiling, on a wall or at a distance from a wall.

EXAMPLE Examples of wall-mounted fittings are cupboards and mirrors, and of ceiling-mounted fittings, lights and fans.

NOTE Depending on the situation, an action arising from “fittings” can be categorized as, for example, the following:

- a) imposed action;
- b) vibration sources;
- c) impact sources.

5.1.9 Other actions

Consideration shall be given to the description of other actions, if these actions are likely to affect the structural serviceability of the house.