
**Bases for design of structures —
Determination of snow loads on roofs**

*Bases du calcul des constructions — Détermination de la charge de neige
sur les toitures*



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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.

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.

International Standard ISO 4355 was prepared by Technical Committee ISO/TC 98, *Bases for design of structures*, Subcommittee SC 3, *Loads, forces and other actions*.

This second edition cancels and replaces the first edition (ISO 4355:1981), which has been technically revised.

The first edition was based on knowledge available up to 1977.

Snow loads specified in the first edition were mainly based on a wide range of experience and national standards. Consequently, the specified snow loads in some cases were rather high in order to be on the safe side. In this second edition, later investigations (e.g. field measurements, physical, theoretical and statistical analyses) have also been taken into account in order to improve the level of accuracy and to extend the domain of standardized specifications of snow loads.

Although this second edition has more detailed specifications, there is still a need for judgement by experts in practical snow load design as the database is still very limited for many types of roof.

In national design standards for loads, load coefficients are normally used to take into account the uncertainty in calculated design load values.

Annexes A to F of this International Standard are for information only.

Introduction

The intensity and distribution of snow load on roofs may be described as functions of climate, topography, shape of building, roof surface material, heat flow through the roof, and time. Only limited and local data describing some of these functions are available. Consequently, for this International Standard it was decided to treat the problem in a semi-probabilistic way.

The characteristic snow load on a roof area, or any other area above ground which is subject to snow accumulation, is in this International Standard defined as the product of the characteristic snow load on the ground, s_0 , specified for the region considered, and a shape coefficient μ which is defined as a product function, in which the various physical parameters are introduced as nominal coefficients.

The shape coefficients will depend on climate, especially the duration of the snow season, wind, local topography, geometry of the building and surrounding buildings, roof surface material, building insulation, etc. The snow may be redistributed as a result of wind action; melted water may flow into local areas and refreeze; snow may slide or may be removed.

The format for the snow load on roofs presented in this International Standard contains a number of additional parameters as compared with the first edition (in which such additional parameters were discussed in the text) for the designer to decide upon. In essence, however, the general format has not been changed. The effect of exposure may, with the new format, be treated in a more elaborate way than earlier. A variation with the slope of the roof is introduced in order to improve the physical representation and to make the format easily applicable to computer interpretation.

In order to apply this International Standard, each country will have to establish maps and/or other information concerning the geographical distribution of ground snow load in that country. Procedures for a statistical treatment of meteorological data are described in annex A.

Bases for design of structures — Determination of snow loads on roofs

1 Scope

This International Standard specifies methods for the determination of snow load on roofs.

It will serve as a basis for the development of national codes for the determination of snow load on roofs.

National codes should supply statistical data of the ground snow load in the form of zone maps, tables or formulae.

The shape coefficients presented in this International Standard are prepared for design application, and may thus be directly adopted for use in national codes, unless justification for other values is available.

For examining the effect of the wind on the distribution of snow loads on roofs of unusual shapes or shapes not dealt with in this International Standard or in national standards, suitable models (e.g. tests carried out in a wind tunnel especially equipped for reproducing accumulation phenomena) may give significant results.

The annexes describing methods for determining the characteristic snow load on the ground, exposure coefficient, thermal coefficient and loads on snow fences are for information only as a consequence of the limited amount of documentation and available scientific results.

In some regions, single winters with unusual weather conditions may cause severe load conditions not taken into account by this International Standard.

Specification of standard procedures and instrumentation for measurements is not dealt with in this International Standard.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1

characteristic snow load on the ground

s_0

load with accepted probability of not being exceeded during some reference period, T_r years

NOTE 1 It is expressed in kilonewtons per square metre (kN/m²).

NOTE 2 In meteorology the term “weight of the ground snow cover” is also used.