SLOVENSKI STANDARD
oSIST prEN 12444:2021

01-januar-2021

Vrata v industrijske in javne prostore ter garažna vrata - Odpornost proti obremenitvi z vetrom - Preskušanje in izračun

Industrial, commercial and garage doors and gates - Resistance to wind load - Testing and calculation

Tore - Widerstand gegen Windlast - Prüfung und Berechnung

Portes et portails industriels, commerciaux et de garage - Résistance à la charge due au vent - Essais et calculs

Ta slovenski standard je istoveten z: **prEN 12444**

ICS:

91.060.50	Vrata in okna	Doors and windows
91.090	Konstrukcije zunaj stavb	External structures

oSIST prEN 12444:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 12444

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ICS 91.060.50

Will supersede EN 12444:2000

English Version

Industrial, commercial and garage doors and gates - Resistance to wind load - Testing and calculation

Portes et portails industriels, commerciaux et de garage - Résistance à la charge due au vent - Essais et calculs

Tore - Widerstand gegen Windlast - Prüfung und Berechnung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 33.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 12444:2020) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12444:2000.

Compared with EN 12444:2000, the following changes have been made:

— normative references were updated;

— references to the classification standard EN 12424:2000 were deleted as the classification of the characteristic resistance to wind load has been transferred to prEN 13241:2020, and references to prEN 13241:2020 have been added accordingly.

This document is one of a series of performance standards identified within the product standard prEN 13421:2020.

This document as well as relevant national regulations and standards will enable the actual exposure levels to be determined for the individual locations of the products.

As during the revision of this document the test procedures haven’t been changed, existing test results remain valid (historical data).

1 Scope

This document specifies the test method and/or calculation of resistance to wind load for industrial, commercial and garage doors and gates according prEN 13241:2020 in a closed position.

For the purposes of this document the term 'door' is used as a general term for 'industrial, commercial and garage doors and gates' unless clearly stated.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 12433-1, *Industrial, commercial and garage doors and gates — Terminology — Part 1: Types of doors*

EN 12433-2, *Industrial, commercial and garage doors and gates — Terminology — Part 2: Parts of doors*

EN 12604, *Industrial, commercial and garage doors and gates — Mechanical aspects — Requirements and test methods*

prEN 13241:2020, *Industrial, commercial and garage doors and gates — Product standard, performance characteristics*

EN ISO 7345, *Thermal performance of buildings and building components — Physical quantities and definitions (ISO 7345)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in in EN 12433-1 and EN 12433-2 as well as EN ISO 7345 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle of test

The principle of test is to apply a pressure differential across the test specimen, to determine failure. Full size specimen shall be tested. If it is impossible or uneconomical to achieve full scale testing, parts of door assemblies (elements *E*) shall be tested for calculating a result for a full door calculation.

Whether testing full door assemblies or elements of doors the maximum height/width dimension which is critical to the wind load resistance (e.g. width for vertically operating doors) shall be tested for each design criteria.

In order to provide information for the extrapolation of results for smaller sizes, at least one additional test shall be completed on an alternative dimension for each design criterium.

5 Apparatus

A surround for the test specimen or elements shall be prepared, it shall be able to withstand the pressures applied during the test without deflecting to an extent, likely to impair jointing or to impose bending stresses, that might effect the performances of test specimen.

6 Preparation of test specimen or elements (E)

6.1 The test specimen or elements shall be installed in the test position as advised by the manufacturer, taking into account the frame tracks and any wind resisting devices.

6.2 The test specimen or elements shall consist of parts that in detail conform to the production level of quality. Whenever possible the test specimen should be newly made. Doors and parts in stock are to be regarded as newly made if they fully comply with the specification of the running production.

7 Test procedure

7.1 Testing of complete doors

7.1.1 Loads applied to the sample should be in accordance with Annex B, Table B.1 and Figures B.1 to B.3.

7.1.2 An evenly distributed load or pressure may be applied to the surface. This can be achieved in various ways, for example, but not restricted to:

a) Air — pressurized chamber, in which case steps shall be taken to eliminate all air leakage on the product and its attachment to the supporting construction;

b) Bags filled with sand or water distributed over the surface of the test sample, see Annex B;

c) Air — pressurized bags applied across the whole surface between a fixed rigid surface, for example the floor and the surface of the test sample.

7.2 Testing of individual or collective elements

7.2.1 Uniformly distributed loads shall be applied in the same manner as described in 7.1.2 in gradual steps and the effect upon deflection of the product, permanent distortion, engagement within the door frame and ultimate failure shall be recorded after removing the loading when considered necessary (see Annex A). The original sub-assembly mass and self-deflection shall be taken into account.

NOTE For elements which contain only completely homogenous material a central point loading can be used as an alternative to uniformly distributed loading.

7.2.2 To calculate the resistance for the whole door assembly, according to the example in Annex A the strength of components may be individually tested to failure by applying a load in the same direction as will result from an applied windload.

NOTE The whole door can contain elements incorporating features such as windows or pass doors.

7.2.3 To ensure that production methods and material consistency will not adversely affect the results the test result shall contain a safety factor according to prEN 13241:2020, Annex D.

8 Calculation

8.1 Calculations shall be done in accordance with normal engineering practice. Calculations can be performed by using parameters which have been determined by preliminary tests on defined elements, such as finite-element methods.

Annex A describes such a simplified method.

8.1.1 Calculations shall be carried out to verify that the largest size of product to be manufactured is capable of withstanding the highest load (differential pressure) within the classification group according to prEN 13241:2020, Table 2, that the product is to perform.

8.1.2 It is not a requirement of this standard that every assembly that is produced shall have a set of calculations produced to suit. It is expected that factory control procedures and design control procedures will ensure consistent product quality and performance.

8.1.3 The structural opening size and area shall be used to determine the load to be applied.

8.1.4 When strength calculations are carried out on fixings and/or location features between a door and frame, the number of such features on a door assembly shall share the load, with an included safety factor in accordance with prEN 13241:2020, Annex D.

9 Failure criteria

9.1 Full scale tests, calculations, indicative testing shall all show that materials are not subjected to such loads that would cause the product to collapse.

9.1.1 Breakage of any component shall not occur.

9.1.2 Permanent deformation of components which will influence the functional and safety performance of the door shall not occur.

9.2 Deflections of materials shall be limited such that:

9.2.1 Failure and collapse through disengagement is prevented i.e. the door from its tracks or frame.

9.2.2 The functional performance of the door is not permanently affected, i.e. seals are not broken where thermal resistance or water resistance or acoustic properties are affected in a negative way.

10 Test report

In case of a test, the report shall contain as a minimum the following information:

a) date;

b) reference to this standard;

c) name of the approved laboratory if applicable;

d) all necessary references to identify the specimen;

e) all relevant details concerning the dimensions of the specimen, its materials, design, construction and manufacture and its finished surface and fittings and also its method of delivery;

f) drawings of details of the specimen shall be of a suitable scale;

g) drawing and description of the test equipment;

h) test method;

i) test procedures, including storage and conditioning prior to test and mounting the specimen ready for test;

j) test climates used;

k) test results recording loads, deflection, permanent deformation, damages;

l) summary with observations;

m) determine the classification according to prEN 13241:2020;

n) signature of the responsible person.

Annex A
(informative)

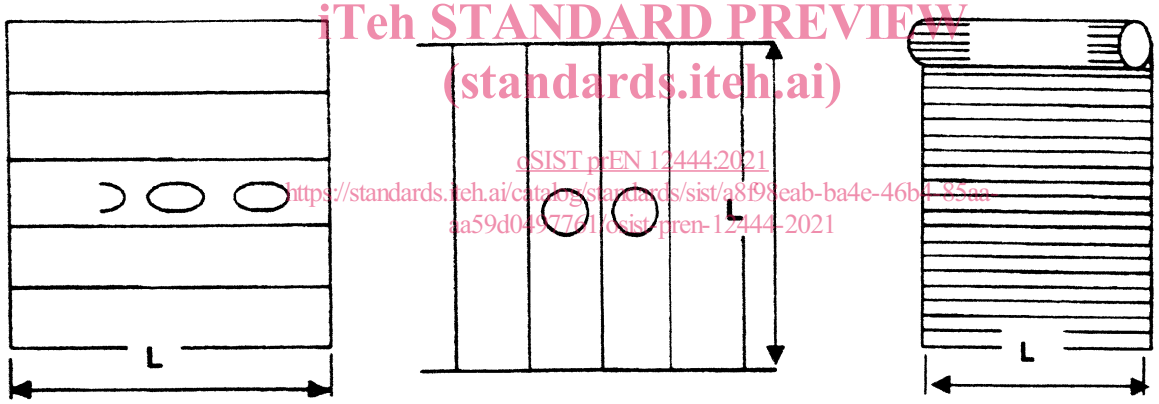
Example for calculation and test of door leaves

A.1 Preamble

As most industrial and commercial doors are required to be supplied in a variation of sizes, some of which preclude the products from full size testing, the following simplified method of elemental testing followed by calculation presents a suitable alternative route to classification.

Most types of door leaves can be sub-divided into single (or plural) elements. For instance, individual sections of sectional overhead or folding doors, or groups of laths in rolling shutter doors as indicated in Figure A.1. The elements (E) for rolling shutter doors may incorporate benefits to be derived from guide/track interlocks, top sections which include support shafts/rollers and bottom sections with bottom rails.

In cases where the various elements E are not of the same homogeneous content, then each variation of the element such as E_b (bottom section), E_w (window section), E_t (top section) and E_i (intermediate section) shall be evaluated separately.



a) Vertically moving door b) Horizontally moving door c) Vertically moving door

Figure A.1 — Examples of elements of door leaves

A.2 Hypothesis

The failure of elements depends greatly on the benefit or lack of benefit from the end restraints used in real installations. These two completely different options permit two forms of simplified evaluation.

A.2.1 Without significant end restraint assistance

Where the mode of failure is largely independent of any derived benefit from end restraints, each element can be tested by either central point loading or uniformly distributed loading of the element supported on knife edge supports as detailed in A.3.1.1.