



**SLOVENSKI STANDARD**  
**SIST EN 12444:2001**  
**01-september-2001**

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**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

**iTeh STANDARD PREVIEW**

Portes équipants les locaux industriels, commerciaux et de garage - Résistance a la charge de vent - Essais et calculs

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**ICS:**

91.060.50	Vrata in okna	Doors and windows
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EUROPEAN STANDARD

EN 12444

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2000

ICS 91.060.50

English version

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

Portes équipants les locaux industriels, commerciaux et de garage - Résistance à la charge de vent - Essais et calculs

Tore - Widerstand gegen Windlast - Prüfung und Berechnung

This European Standard was approved by CEN on 27 October 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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## Contents

	<b>Page</b>
Foreword	2
Introduction	3
1 Scope	3
2 Normative References	4
3 Terms and definitions	4
4 Principle of test	4
5 Apparatus	5
6 Preparation of test specimen or elements (E)	5
7 Test procedure	5
8 Calculation	6
9 Failure criteria	6
10 Test report	6
Annex A (informative) Example for calculation and test of door leaves.	8
Annex B (informative) Differential pressure - Test loading of door leaves	15

### Foreword

This European Standard 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 European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This standard is one of a series of performance standards identified within the product standard prEN 13 421:1999.

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

Annexes A and B are informative.

## Introduction

The objective of strength tests and calculations according to this standard is to assess that the strength of the door assembly is sufficient to fulfil the essential requirements in the directives, to ensure that the products remain safe independent of their conditions. Tests and / or calculations may be performed by the manufacturer and / or approved laboratory.

## 1 Scope

### 1.1 General

This European Standard specifies the test method and / or calculation of resistance to wind load for doors in a closed position.

The doors are intended for installation in areas in the reach of people, for which the main intended uses are giving safe access for goods, vehicles and persons in industrial, commercial or residential premises.

The doors may be manually or power operated.

This document applies to all doors provided in accordance with prEN 13241:1998.

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### 1.2 Exclusions

It does not apply to:

- lock gates and dock gates;
- doors on lifts;
- doors on vehicles;
- armoured doors;
- door mainly for the retention of animals;
- theatre textile curtains;
- horizontally moving doors less than 2,5 m wide and 6,25 m<sup>2</sup> area, designed principally for pedestrian use;
- revolving doors of any size;
- doors outside the reach of people (such as crane gantry fences);
- railway barriers;
- barriers used solely for vehicles.

## 2 Normative References

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12424:2000	Industrial, commercial and garage doors and gates - Resistance to wind load – Classification
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
prEN 13241:1998	Industrial, commercial and garage doors and gates - Product standard
EN ISO 7345	Thermal insulation – Physical quantities and definitions (ISO 7345:1987)

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## 3 Terms and definitions

For the purpose of this standard the terms and definitions in EN 12433-1 and EN 12433-2 as well as EN ISO 7345 shall apply.

## 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 to give the classification as noted in table 1 from EN 12424:2000.

**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 - pressurised 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 - pressurised 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 may 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 may 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 EN 12604.

## 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 EN 12424:2000 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.

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

**8.3** 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 EN 12604.

## 9 Failure criteria

SIST EN 12444:2001

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**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 EN 12424:2000;
- n) signature of the responsible person.