SLOVENSKI STANDARD
SIST EN 12453:2001

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Vrata v industrijske in javne prostore ter garažna vrata - Varnost pri uporabi pogonskega mehanizma - Zahteve

Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements

Tore - Nutzungssicherheit kraftbetätigter Tore - Anforderungen

Portes équipants les locaux industriels, commerciaux et de garage - Sécurité a l'utilisation des portes motorisées -Prescriptions

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EUROPEAN STANDARD
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English version

Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements

Portes équipants les locaux industriels, commerciaux et de garage - Sécurité à l'utilisation des portes motorisées - Prescriptions

Tore - Nutzungssicherheit kraftbetätigter Tore - Anforderungen

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

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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.

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

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Contents

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of an identical text or by endorsement, at the latest by May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.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 part of a series of European Standards for industrial, commercial and garage doors and gates that are identified in prEN 13241:1998.

No existing European Standard is superseded.

This standard covers the requirements for power operated doors, based on hazardous situations which can be encountered when a door is used normally and also hazardous situations likely to occur because of foreseeable misuse.

The requirements specified in this standard are in the form of safety objectives. Where a technical means or solution is described, this should not be considered to be the only method of meeting the requirement, but simply an example.

Annex A is normative. Annex B is informative.

1 Scope

1.1 General

This standard specifies the performance requirements in regard of the safety in use for any type of power operated doors, gates and barriers intended for installation in areas in the reach of persons, and for which the main intended uses are giving safe access for goods and vehicles accompanied or driven by persons in industrial, commercial or residential premises.

1.2 Exclusions

It does not apply to

- lock gates and dock gates;
- doors on lifts;
- doors on vehicles;
- armoured doors;
- doors mainly for the retention of animals;
- theatre textile curtains;
- horizontally moving doors < 2,5 m wide and 6,25 m² 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.

1.3 Specific applications

Doors, gates and barriers can be of sliding, sidefolding, tilting, pivoting, rolling, vertical lifting and other types with many variances for each type. If not specified otherwise, the word "door" refers to any of these types and variances of doors, gates and barriers.

In the following, a power-operated door is considered as a whole. Nevertheless such a door can be the result of the implementation of a drive unit onto a manual door. In that case, this standard is applicable for the completed final installation.

Requirements for specific characteristics (such as fire resistance, blast-resistance, acoustic, escape route function, burglar resistance or thermal insulation, etc.) which certain doors are required to comply with, are not specified in this standard. If the specifications of a standard on the special characteristics of such doors are in conflict with the requirements of this standard, that standard has preference.

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 418, *Safety of machinery – Emergency stop equipment, functional aspects – Principles for design.*

EN 954-1, *Safety of Machinery – Safety related parts of control systems – Part 1: General principle for design.*

EN 982, *Safety of machinery – Safety requirements for fluid power systems and their components – Hydraulics.*

EN 983, *Safety of machinery – Safety requirements for fluid power systems and their components – Pneumatics.*

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 12445, *Industrial, commercial and garage doors and gates – Safety in use of power operated doors – Test methods.*

EN 12604, *Industrial, Commercial and garage doors and gates – Mechanical aspects – Requirements.*

prEN 12635:1996, *Industrial, Commercial and garage doors and gates – Procedures for the safe installation and use.*

prEN 12978:2000, *Industrial, commercial and garage doors and gates – Safety devices for power operated doors and gates – Requirements and test methods.*

prEN 13241:1998, *Industrial, commercial and garage doors and gates – Product standard.*

EN 50081-1, *Electromagnetic compatibility – Generic emission standard – Part 1: Residential, commercial and light industry.*

EN 50081-2, *Electromagnetic compatibility – Generic emission standard – Part 2: Industrial environment.*

EN 50082-1, *Electromagnetic compatibility – Generic immunity standard – Part 1: Residential, commercial and light industry.*

EN 50082-2, *Electromagnetic compatibility – Generic immunity standard – Part 2: Industrial environment.*

EN 55014-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission – Product family standard (CISPR 14-1:1993).*

EN 55014-2, *Electromagnetic compatibility – Requirements for household appliances, electronic tools and similar apparatus – Part 2: Immunity - Product family standard (CISPR 14-2:1997).*

EN 60068-2-52, *Environmental testing – Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52:1996).*

EN 60204-1:1997, *Safety of Machinery – Electrical equipment of machines – Part 1: General requirements (IEC 60204-1:1997).*

EN 60335-1:1994, *Safety of household and similar electrical appliances – Part 1: General requirements (IEC 335-1:1991, modified).*

prEN 60335-2-95:1999, *Safety of household and similar electrical appliances – Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use (IEC 60335-2-95:1998, modified).*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989).*

IEC 60245-4, *Rubber insulated cables – Rated voltage up to and including 450/750V – Part 4: Cords and flexible cables.*

3 Terms and definitions

For the purpose of this standard, the terms and definitions EN 12433-1, EN 12433-2 and prEN 12978:2000 apply, together with the following:

3.1
inherent protective equipment
protective equipment integrated into the drive system which is actuated by the variations of the input and/or the output characteristics of the drive itself, in order to provide protection against hazards

3.2
domestic garage door
door used on a domestic garage which is provided for one single household only and where the door does not protrude into a public area

4 Hazards, hazardous situations, hazardous events

4.1 General

As the main function of a door is to open up or close off an opening, the actual movement of the door can produce hazardous situations for persons, goods and vehicles in the vicinity which by nature cannot all be avoided by design.

The possible hazards are dependant on the condition of the door and the way the door is used.

When door and equipment are in working order and either used correctly (i.e. as specified by the manufacturer in the instruction manual) or misused in a foreseeable manner, the hazards which can be generated by a power operated door are as follows:

4.1.1 Hazards caused by crushing, shearing and drawing-in points

A hazardous point is considered to exist up to a height of 2,5 m above the floor or any other permanent access level, and when it occurs:

- between the main closing edge of any door and an opposing edge, and between secondary closing edges of hinged, folding, tilting and sliding doors and opposing edges (e.g. see type a in Annex B);
- between closing edges and obstacles within the closing area of the leaf (e.g. see type b in Annex B);
- between leaves passing each other (e.g. see type c in Annex B);
- between leaves and the perimeter of openings in leaves and fixed parts in the vicinity (e.g. see type d in Annex B);
- between gaps and openings of the leaf which change in their size during the leaf movement (e.g. see type e in Annex B);
- at parts of the leaf which project;
- at moving parts of the drive which are capable of causing injury.

4.1.2 Hazards caused when the door can lift persons

If a power operated door, which opens upwards, can lift an adult or a child, this can lead to a foreseeable misuse which may create a dangerous situation, especially when the door is located in a public area. Therefore, each time a door can give a person a lift, a danger point is considered to exist, irrespective of its height above the floor, in the following locations:

- between leaves and fixed parts in the vicinity;
- in the neighbourhood of shafts or rising spindles of rolling doors.

4.1.3 Hazards caused by impact

Impacts between the moving door and a person may be dangerous because of the impact force from the door leaf.

4.2 Hazards caused by the drive or the source of energy

The drive or the source of energy used for power operation may create hazards such as:

- electric shock;
- fire from overheating;
- bursting, due to hydraulic or pneumatic over pressure;
- failure of electrical, pneumatic and hydraulic equipment;
- over travel of the door leaf after the drive is switched off;
- safety device failure.

4.3 Manual operation

When a power operated door has to be moved manually (e.g. in case of power supply failure), hazardous situations may exist when

- power operation can occur during manual operation;
- the manual operation handle or device is not properly shaped and/or located;
- the necessary manual effort is not related to the capability of the human body.

4.4 Other hazards

In addition to the hazards described above, the following hazards are likely to create dangerous situations:

4.4.1 Pass doors

When a pass door is fitted in the main door leaf, the power operation of the main door leaf whilst the pass door is not in the closed position may lead to a dangerous situation.

4.4.2 Trapping

The hazard of being trapped in areas between power operated doors or in rooms where a power operated door is the only means of escape, may exist.

NOTE The provision of safety distances to avoid crushing may have the effect of creating a room where trapping may then occur.

4.4.3 Overrunning of leaf

When the door leaf of a power operated door can overrun its final positions, the leaf may then fall down, thus creating a dangerous situation.

4.4.4 Hazards caused when the door is not in working order but used correctly

An abnormal state of the door may lead to an unintended movement of the door leaf which can create a hazardous situation. In particular such a dangerous situation exists when

– leaves can jump out of the guides (e.g. guide-rails, slide-channel, hinges);

– a raised leaf can fall down unintentionally, even due to mechanical failure.

4.4.5 Hazards caused when the door is not in working order and not used correctly

Hazards arising from the misuse of a power operated door which is not in working order are unforeseeable and therefore not considered.

4.4.6 Hazards caused by the locking devices

Interaction of locking device and drive may result in a hazardous situation, e.g. mechanical damages, derailment.

4.5 Influence of the type of use on the level of risk

The location of the door and the type of door control can have an influence on the level of risk created by a power operated door.

This level of risk increases when

– children, infirm or elderly persons are able to use the door;

– it is not possible to instruct, train or supervise the door users;

– it is not possible to select the persons who are the only ones allowed to operate the door (authorised persons);

– the number of persons who may come in contact with the power operated door is high;

– the number of users, and/or the frequency of use is high;

– the degree of automation is high.

Conversely, the level of risk is reduced when doors are used by a limited number of users, are not equipped with any automatic function and are not opening directly onto a public area, i.e. non automatic domestic garage doors used by one household only and which do not protrude directly onto a public area.

5 Requirements

5.1 General

Hazardous situations as listed in 4.1 shall be avoided or safeguarded.

Safety measures specified in 5.1.1 to 5.1.3 to protect persons shall be considered sufficient to also protect goods and vehicles.

5.1.1 Avoiding or safeguarding hazards caused by crushing, shearing and drawing-in points

All danger points as listed in 4.1.1 shall be avoided or safeguarded.

This can be achieved by one or a combination of the following measures:

– creating safety distances;

– installing guards such as enclosures, covers, enclosing guards, fixed protection leaves;

– shaping in a proper way any leaf surfaces and parts which protrude;

– operating the door in the hold to run control mode;

– limiting the forces generated by the door leaf when meeting a person or an obstacle;

– installing sensitive protective equipment (PSPE or ESPE).

For doors with a reduced level of risk according to 4.5, it may be acceptable to safeguard only the main edge movement (see 5.5.2).

NOTE 5.5 specifies some combinations.

5.1.1.1 Safety distances

Crushing, shearing and drawing-in points are avoided if safety distances, which are related to the endangered parts of the human body, are provided.

When safety distances are dependant on the installation and the site conditions, the installation instructions shall precisely describe the method of ensuring that the safety distances are effective after the installation is completed. Safety distances cannot be applied to the safeguarding of main closing edges.

NOTE Annex C in EN 12604 contains examples for safety distances with the minimum dimensions.

5.1.1.2 Guards

Guards such as enclosures, covers, enclosing guards, fixed protective leaves (screens), shall be designed to fulfil the following requirements:

– the danger points are safeguarded up to a height of 2,5 m above the floor or any other permanent access level;

– they are firm and resilient in respect of their safety-related function;

– they can be loosened only by a tool;