SLOVENSKI STANDARD
oSIST prEN 12453:2005

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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 et portails industriels, commerciaux et de garage - Sécurité a l'utilisation des portes motorisées - Exigences

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

Portes et portails industriels, commerciaux et de garage - Sécurité à l'utilisation des portes motorisées - Exigences

Tore - Nutzungssicherheit kraftbetätigter Tore - Anforderungen

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 12453:2005) 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 12453:2000.

Introduction

This document is a type C document as stated in EN 1070.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

When provisions of this type C document are different from those which are stated in type A or B documents, the provisions of this type C document take precedence over the provisions of the other documents, for machines that have been designed and built according to the provisions of this type C document.

This document has been prepared to meet the needs of manufacturers, users and safety enforcement authorities, with the primary purpose of providing design and performance for safety in use of power operated industrial, commercial and garage doors and gates used by vehicular and pedestrian traffic.

With the aim of clarifying the intention of this document and avoiding doubts when reading it, it was assumed when producing it that negotiation occurred between the manufacturer and the professional installer concerning:

— components to be kept in good repair or working order

— negotiation between the manufacturer and the user concerning the specificity of the use, the intended users and place of use of the door

— all parts of door installations, whether fixed or moving, including the fixing and assembling means, to be in all respects of good construction, suitable material, adequate strength and free from obvious defects for their intended working life

— the design to be in accordance with European technical rules taking into account the most unfavourable static and dynamic forces occurring during the operation and all failure modes.

For the purpose of this document it is assumed that manually operated balanced doors with an out of balance of not more than 150 N are fully manual doors (and out of the scope of the Machinery Directive).

1 Scope

1.1 General

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

This document also covers commercial doors such as rolling shutters and rolling grilles used in retail premises which are mainly provided for the access of persons rather than vehicles or goods.

This document deals with all significant hazards, hazardous situations and events relevant to the power operation of doors, gates and barriers, as identified in Annex C.

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 less than 2,5 m wide and 6,25 m^2 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.

Also this document does not apply to power operated doors, gates and barriers which are manufactured before the date of publication of this document by CEN.

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 document 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 document. If the specifications of a standard on the special characteristics of such doors are in conflict with the requirements of this document, that standard has preference.

2 Normative references

The following referenced documents are indispensable for the application 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 294, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs.*

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body.*

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 — Hydraulic*s.

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

EN 1070, *Safety of machinery — Terminology.*

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*.

prEN 12445:2005, *Industrial, commercial and garage doors and gates — Safety in use of power operated doors — Test methods.*

prEN 12604:2005, *Industrial, commercial and garage doors and gates — Mechanical aspects — Requirements*.

EN 12978:2003, *Industrial, commercial and garage doors and gates — Safety devices — Requirements and test methods.*

EN 13241-1, *Industrial, commercial and garage doors and gates — Product document –Part 1: products without fire resistance or smoke control characteristics.*

EN 60335-2-95:2001, *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 60335-2-103:2003, *Household and similar electrical appliances - Safety - Part 2-103: Particular requirements for drives for gates, doors and windows (IEC 60335-2-103:2002);*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1070, EN 12433-1, EN 12433-2 and EN 12978:2003 and the following apply.

NOTE Whenever the term “door” is used in this document, it shall be deemed to cover the full scope of types and variances of doors, gates and barriers defined in EN 12433-1.

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 List of significant hazards

4.1 General

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this document, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

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 significant hazards which can be generated by a power operated door are listed in the normative annex C and detailed hereinafter.

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 protrude;

— at moving parts of the drive which are capable of causing injury.

— at gaps (the physical configuration of which changes during the movement of the door) which are accessible during the leaf movement.

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:

— any gap between leaves and fixed parts in the vicinity

and

— 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;

— kick-back can occur as a consequence of manual release operation.

4.4 Other hazards

In addition to the hazards described above, the following hazards which may occur due to particular site requirements 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 in door structure as well as in the drive.

4.4.5 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 use and the location of the door and the type of door control may increase the level of risk created by power operated doors.

Such factors increasing the level of risk are when:

— the intended user is public, or infirm, or elderly, or children;

— there is no possibility to instruct, train or supervise the door users;

— access is not restricted to persons who are the only ones allowed to operate the door (authorized persons);

— a high number of persons may come in contact with the door;

— degree of automation is high;

— door opens directly onto a public area.

Vice versa, non automatic operated domestic garage doors used by one household only and which do not protrude directly onto a public area are considered as doors with a reduced level of risk.

5 Safety requirements and/or protective measures

A power operated door shall comply with the safety requirements and/or protective measures of this clause. In addition, the door shall be designed according to EN 13241-1 and to the principles of EN 292 for hazards relevant but not significant, which are not dealt with by this document (e.g. sharp edges).

5.1 General

Hazardous situations as listed in 4 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 (see 5.1.1.1);

— installing guards such as enclosures, covers, enclosing guards, fixed protection leaves (see 5.1.1.2);

— shaping in a proper way any leaf surfaces and parts which protrude (see 5.1.1.3);

— operating the door in the hold to run control mode (see 5.1.1.4);

— limiting the forces generated by the door leaf when meeting a person or an obstacle (see 5.1.1.5);

— installing sensitive protective equipment (PSPE or ESPE) (see 5.1.1.6).

For domestic garage doors, 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 in accordance with EN 294 and EN 349.

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 D.2 contains examples for safety distances with the minimum dimensions.