



SLOVENSKI STANDARD

SIST EN 12445:2001

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

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

Tore - Nutzungssicherheit kraftbetätigter Tore - Prüfverfahren

iTeh STANDARD PREVIEW

Portes équipant les locaux industriels et commerciaux et les garages - Sécurité a l'utilisation des portes motorisées - Méthodes d'essai

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EUROPEAN STANDARD

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

Portes équipant les locaux industriels et commerciaux et les garages - Sécurité à l'utilisation des portes motorisées - Méthodes d'essai

Tore - Nutzungssicherheit kraftbetätigter Tore - Prüfverfahren

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

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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of an identical text or by endorsement, at the latest by May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.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, which are specified in prEN 13241:1998.

No existing European Standard is superseded.

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1 Scope

This standard specifies the test methods to be applied to a power operated door to demonstrate compliance with the requirements specified in EN 12453 : 2000. In particular it specifies the method of measuring the forces developed by a power operated door.

It applies to any power operated door covered by EN 12453 : 2000.

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 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 12453:2000, *Industrial, commercial and garage doors and gates – Safety in use of power operated doors – Requirements.*

EN 12605, *Industrial, commercial and garage doors and gates – Mechanical aspects – Test methods.*

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

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 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 60335-1:1991, 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).*

IEC 60812, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA).*

3 Terms and definitions

For the purpose of this standard, the following terms and definitions apply in addition as defined in EN 12433-1, EN 12433-2 and EN 12453:2000.

3.1

measuring point

specified point where measurements of force will be made

3.2

direction of measurement

specified direction in which measurements of force will be made

3.3

opening gap

clear distance between the main closing edge and the opposing closing edge or between the leaf and neighbouring hard parts of the surroundings

4 Test method

The level of safeguarding of a power operated door, in respect of the requirements specified in EN 12453:2000, shall be determined by the following tests and/or inspections.

Non automatic one single household vertically moving domestic garage doors, excluding those which open onto public areas, may be excluded if these doors are driven by drives which fulfil the requirements of prEN 60335-2-95:1999.

4.1 General

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4.1.1 Avoiding or safeguarding against crushing, shearing and drawing-in points

Any crushing, shearing or drawing-in location shall be identified from a test specimen. For any identified hazardous location, a check shall be made to establish whether the hazard has been avoided or safeguarded. This check shall be done as follows:

4.1.1.1 Safety distance

When a crushing, shearing or drawing-in point is avoided by the provision of a safety distance, this distance shall be checked by inspection and measuring, taking into consideration the endangered parts of the human body.

4.1.1.2 Force limitation

When a crushing, shearing or drawing-in hazard is avoided by the provision of a force limitation system, this shall be checked

- by measuring the forces as specified in clause 5. The measured values shall be lower or equal to those mentioned in Annex A of EN 12453:2000

and

- by the following tests and inspections.

4.1.1.2.1 Crushing point

For any crushing point where the limitation of forces is achieved through force limiting devices or by devices for limitation of torque, electrical power, or pneumatic/hydraulic pressure, it shall be checked that these devices are properly designed by

- testing them according to prEN 12978:2000

and

- testing them against the single fault failure criteria as specified in clause 6.

4.1.1.2.2 Shearing point

For any shearing point which occurs at secondary closing edges, it shall be checked that

- forces exerted by the door leaf are limited to less than 150 N static and to less than 400 N dynamic, when measured according to clause 5

and

- either a distance of at least 25 mm has been provided between passing edges or the passing edges have been provided with round edges with a radius of at least 2 mm for each edge and a combined value (sum of the 2 radii) of at least 6 mm has not been exceeded.

4.1.1.3 Shaping of leaf surfaces

It shall be checked by inspection that the door leaf has no sharp edges, and that any part which protrudes shall cause no injury.

4.1.1.4 Hold-to-run-control

When a door is operated via "Hold-to-run" control, it shall be checked

- by measurement that the door leaf stops when the manual control device is released, within the specified overrun distance and maximum static force as specified in 5.1.1.4 of EN 12453:2000;
- by inspection that it is specified in the installation and user instructions that no manual controls other than hold to run control are to be installed and/or used;
- by inspection that when installed and operated in accordance with the installation and user instructions, the person controlling the door shall be in full view of the door and in the vicinity of the door during the leaf movement and shall not be in a hazardous position;
- by measurement that the speed of the primary edge is $< 0,5$ m/s. This speed shall be measured at the same points as those specified for force measurement for the type of door concerned (see clause 5).

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4.1.1.5 Guard [https://standards.iteh.ai/catalog/standards/sist/303a6972-10ec-489b-b81c-](https://standards.iteh.ai/catalog/standards/sist/303a6972-10ec-489b-b81c-b2f02#7901d/sist-en-12445-2001)

When guards such as enclosures, covers, enclosing guards or fixed protective leaves (screens) etc. are installed, it shall be checked by inspection that

- the danger points are safeguarded up to a height of 2,5 m above the floor to ensure that unprotected zones of the danger points do not remain,
- they are firm and resilient in respect of their safety-related function,
- they can be loosened only by use of a tool,
- they do not cause additional hazards,
- they cannot easily be defeated, bypassed or made ineffective.

4.1.1.6 Protective equipment

For any pressure sensitive (PSPE), electro sensitive (ESPE) or inherent protective equipment, it shall be checked by testing

- that when part of a person is in the detection zone of the ESPE or a person applies the activating force at any point within the active area of the PSPE sensing element or when the signal from the sensing unit is within a specified signal range, an appropriate output signal(s) is given in accordance with prEN 12978:2000. It shall be also checked that the control command for stopping the hazardous leaf movement (off state of the output signal switching device) is maintained as long as the protective device is actuated, or until a signal for reversing the direction of movement of the door leaf is given,
- that the safeguarding function of the protective equipment is effective up to a height of 2,5 m above the floor in a way that unprotected zones of the danger points are eliminated,
- or by failure mode analysis that, in case a single fault occurs, the protective equipment behaves as specified in 5.1.1.6 of EN 12453:2000.

It shall be also checked by measurement or test, that, in any case

- forces exerted by the door leaf are kept at acceptable values when measured according to clause 5
- or
- the moving door is, in no circumstances, able to touch a person, as described in 7.3.2.

4.1.2 Safeguarding against hazard of being lifted

When a door is designed in a way that it opens upwards and is not operated in the “hold-to-run” mode of operation, it shall be checked that it cannot give an adult or a child a lift, in a dangerous way, by

- checking that the door leaf is without apertures or protruding parts which could give the possibility to travel with or to be lifted.

If there are possibilities to be lifted, it shall be checked

- that the door is not able to lift a mass of 20 kg (or 40 kg for doors installed in areas out of public access), from the closed position. The mass shall be attached onto the door leaf, in its most unfavourable position. The maximum dimension of the mass shall be 300 mm in any direction,

or

- that, when the door is able to lift a mass of 20 kg (alternatively 40 kg), the door shall stop before the lifted body reaches the lintel or other fixed parts of the building (see 7.4).

4.1.3 Safeguarding against impact hazards

Forces shall be measured on the main closing edges and at secondary edges, where persons can be pushed, as specified in clause 5. The measured values shall be less than the maximum values specified in Annex A of EN 12453:2000.

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4.2 Drive unit and power supply

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4.2.1 Electrical drive unit

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The electric drive unit of the door to be tested, whatever is its type, shall be tested in accordance with EN 60335-1:1994, taking into account the modifications specified in 5.2.1 of EN 12453:2000.

4.2.2 Electrical equipment

Either by site inspection or by analysis of the installation instructions, it shall be checked that the electrical equipment of the door (outside the drive unit) is designed and constructed according to EN 60204-1:1997, with the exceptions and additions specified in 5.2.2 of EN 12453 : 2000.

4.2.3 Additional requirements for hydraulic drive systems

It shall be checked that hydraulic drive systems are

- in accordance with EN 982,
- equipped with a means to protect them against over pressure and a means which makes it possible to connect a measuring gauge,
- able to resist three times the working pressure,
- constructed in a way that, when a total loss of pressure occurs in the system, the door leaf immediately stops in accordance with 5.2.7 of EN 12453:2000 or continues to operate at normal speed until it reaches a final end position where the fault is detected and further movement is prevented,
- designed in a way that entrapment of air is discouraged,
- not creating any hazardous situation, in particular an unexpected movement, when interruption of the power supply occurs.

4.2.4 Additional requirements for pneumatic drive systems

It shall be checked that pneumatic drive systems are

- constructed in accordance with EN 983;
- not allowed to work with a working pressure higher than 1,2 MPa;
- equipped with means to adjust the working pressure, to protect them against over pressure, and a means which makes it possible to connect a measuring gauge;
- able to stand three times the working pressure;
- constructed so that uncontrolled hazardous movements are not created by variations of air compressibility.

4.2.5 Controls

The parts of door controls which are also part of safety devices, such as

- control units and output signal switching devices of safety devices,
- control devices for limitation of forces,
- control devices for limiting the leaf travel

shall be tested according to the relevant clauses 5, 6 and 7.

4.2.6 Switching on of the drive

If the drive may be switched on by manual activation devices which are designed for impulse and/or automatic and/or remote-controlled and/or programmed control operation, it shall be checked by inspection and/or test that the danger points of the door are avoided or safeguarded.

When danger points have to be avoided by safety distances and/or fixed guards and/or proper shaping of leaf surfaces, during the installation process, it shall be checked that all are properly addressed in the installation instructions.

It shall be accepted that, in automatic mode of operation, the door leaf may move to the fully open position and stop, or the door leaf may automatically move to the closed position after a period of time at the fully open position.

4.2.7 Switching off of the drive

4.2.7.1 Switching off of the drive by stop-command

It shall be checked by test, that the leaf movement stops and the drive is switched off, as soon as a stop-command, as specified in 5.2.7.1 of EN 12453:2000.

4.2.7.2 Switching-off of the drive in case of power supply interruption

It shall be checked by test or inspection that, in case of interruption of the power supply during movement of the door leaf, the subsequent restart when the supply is restored does not lead to a dangerous situation.

4.2.8 Manual actuators

It shall be checked that any manual actuators are provided in such a manner that

- when permanently installed, the person operating the controls is not in a hazardous position. Check to be carried out either on site or by checking that this item is correctly specified in the installation instructions,
- unintended operation of the manual controls is prevented (by inspection).