



SLOVENSKI STANDARD
SIST EN 12453:2017+A1:2022

01-februar-2022

Nadomešča:
SIST EN 12453:2017

Vrata v industrijske in javne prostore ter garažna vrata - Varnost pri uporabi pogonskega mehanizma - Zahteve in preskusne metode (vključuje dopolnilo A1)

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

Tore - Nutzungssicherheit kraftbetätigter Tore - Anforderungen und Prüfverfahren

Portes et portails industriels, commerciaux et résidentiels - Sécurité d'utilisation des portes et portails motorisés - Exigences et méthodes d'essai

[SIST EN 12453:2017+A1:2022](https://standards.iteh.ai/catalog/standards/sist/en-12453-2017/a1-2022)

Ta slovenski standard je istoveten z: EN 12453:2017+A1:2021

<https://standards.iteh.ai/catalog/standards/sist/en-12453-2017/a1-2022>

ICS:

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

SIST EN 12453:2017+A1:2022 **en,fr,de**

**iTeh STANDARD
PREVIEW
(standards.iteh.ai)**

SIST EN 12453:2017+A1:2022

<https://standards.iteh.ai/catalog/standards/sist/a0fc2650-c1bd-42d9-a4bc-1efa41cc0536/sist-en-12453-2017a1-2022>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12453:2017+A1

December 2021

ICS 91.060.50

Supersedes EN 12453:2017

English Version

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

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

Tore - Nutzungssicherheit kraftbetätigter Tore -
Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 12 June 2017 and includes Amendment 1 approved by CEN on 16 December 2021.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	5
Introduction	7
1 Scope.....	8
2 Normative references.....	9
3 Terms and definitions	10
4 List of significant hazards	12
4.1 General.....	12
4.2 Hazards caused by crushing, shearing and drawing-in.....	13
4.2.1 General.....	13
4.2.2 A1 Hazards caused when persons can travel with the door A1	13
4.2.3 Hazards caused by impact.....	13
4.3 Hazards caused by source of energy and power controls	13
4.4 Manual operation.....	14
4.5 Other hazards.....	14
4.5.1 General.....	14
4.5.2 Hazards caused by pass doors.....	14
4.5.3 Hazards caused by imprisonment.....	14
4.5.4 Hazards caused by trapping.....	14
4.5.5 Hazards caused by falling or ejected parts or uncontrolled movement	14
4.5.6 Hazards caused by the locking devices	14
4.5.7 Hazards caused due to a loss of stability	14
4.5.8 Hazards caused by glazing material.....	15
4.5.9 Hazards caused by modification of settings.....	15
5 Safety requirements and/or protective measures	15
5.1 General.....	15
5.1.1 General requirements	15
5.1.2 Safety Function performed by control system.....	15
5.1.3 Minimum level of safeguarding at the main closing edge	16
5.2 Crushing, shearing and drawing-in	17
5.2.1 General.....	17
5.2.2 Safeguarding against hazards caused when persons can travel with the door	21
5.2.3 Safeguarding against impact hazard.....	21
5.3 Source of energy and power controls	22
5.3.1 General.....	22
5.3.2 Electrical drive units.....	22
5.3.3 Hydraulic drive units	25
5.3.4 Pneumatic drive units	25
5.3.5 Restart after unintended interruption.....	26
5.3.6 Supply disconnection.....	26
5.4 Manual operation.....	26
5.4.1 General.....	26
5.4.2 Manual operation by direct movement of the door leaf	26
5.4.3 Manual operation directly applied to the drive unit.....	26
5.4.4 Balancing failure at manual operation.....	26
5.4.5 Human physical strength for manual operation of the door leaf	27

5.5	Other hazards.....	27
5.5.1	Pass doors.....	27
5.5.2	Imprisonment.....	27
5.5.3	Trapping.....	27
5.5.4	Falling or ejected parts or uncontrolled movement.....	27
5.5.5	Locking devices.....	28
5.5.6	Loss of stability.....	28
5.5.7	Glazing material.....	29
5.5.8	Modification of setting.....	29
6	Verification of the safety requirements and/or protective measures.....	29
6.1	General.....	29
6.2	Crushing, shearing and drawing-in points.....	29
6.2.1	General.....	29
6.2.2	A_1 Hazards caused when persons can travel with the door A_1	31
6.2.3	Impact hazard.....	31
6.3	Source of energy.....	31
6.3.1	Electrical drive units.....	31
6.3.2	Hydraulic drive units.....	32
6.3.3	Pneumatic drive units.....	32
6.3.4	Restart after unintended interruption.....	32
6.3.5	Supply disconnection.....	32
6.4	Manual operation.....	32
6.4.1	Manual operation by direct movement of the door leaf.....	32
6.4.2	Manual operation directly applied to the drive unit.....	32
6.4.3	Balancing failure at manual operation.....	32
6.4.4	Human physical strength for manual operation of the door leaf.....	33
6.5	Other hazards.....	33
6.5.1	Pass doors.....	33
6.5.2	Imprisonment.....	33
6.5.3	Trapping.....	33
6.5.4	Falling or ejected parts or uncontrolled movement.....	33
6.5.5	Locking devices.....	34
6.5.6	Loss of stability.....	34
6.5.7	Glazing material.....	34
6.5.8	Modification of settings.....	34
7	Information for use.....	34
7.1	General.....	34
7.2	Marking.....	37
	Annex A (normative) Limitation of forces.....	38
A.1	Specifications.....	38
A.2	Admissible forces.....	38
	Annex B (informative) Examples of mechanical protection and safety distances.....	40
B.1	Examples of mechanical protection.....	40
B.2	Examples of appropriate safety clearances and safety distances.....	41
	Annex C (normative) Force measuring method.....	43
C.1	General.....	43
C.2	Measuring equipment.....	43

EN 12453:2017+A1:2021 (E)

C.3	Points of measuring.....	43
	Annex D (normative) Testing method for presence detection	53
D.1	General.....	53
D.2	Test pieces	53
D.3	Testing of supplementary device to be used with force limitation.....	54
D.4	Testing of presence detection system to be used without force limitation	57
	Annex E (informative) Safeguarding against dropping by other design features incorporated in the suspension system of vertically moving power operated door leaves	61
	Annex F (informative) Relationship between Hazards, Requirements and Test clauses	62
	Annex G (informative) Logbook.....	64
	Annex ZA (informative) Relationship between this European standard and the Essential Requirements of Directive 2006/42/EC aimed to be covered	65
	Bibliography.....	68

**iTeh STANDARD
PREVIEW
(standards.iteh.ai)**

SIST EN 12453:2017+A1:2022

<https://standards.iteh.ai/catalog/standards/sist/a0fc2650-c1bd-42d9-a4bc-1efa41cc0536/sist-en-12453-2017a1-2022>

European foreword

This document (EN 12453:2017+A1:2021) 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 June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document will supersede A1 EN 12453:2017 A1.

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

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

This document includes Amendment 1 approved by CEN on 4 January 2021.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

Compared with EN 12453:2000 and EN 12445:2000, the following changes have been made:

- a) EN 12453 has been revised to be harmonized under Machinery Directive 2006/42/EC;
- b) EN 12453 has been merged with EN 12445; as EN 12445:2000 will be withdrawn;
- c) aligning structure of EN 12453 according to MD templates;
- d) revision of the list of significant hazards (Clause 4);
- e) revision of safety and/or protective measures (Clause 5);
- f) revision of the verification of the safety requirements (Clause 6);
- g) editorial revision of Annex A (limitation of forces);
- h) introducing Annex B (Examples of mechanical protection and safety distances);
- i) introducing Annex C (Force measuring method);
- j) introducing Annex D (Testing method for presence detection);
- k) introducing Annex E (Safeguarding against dropping by other design features incorporated in the suspension system of vertically moving power operated door leaves);
- l) introducing Annex ZA for harmonization of EN 12453 under MD.

EN 12453:2017+A1:2021 (E)

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**iTeh STANDARD
PREVIEW
(standards.iteh.ai)**

SIST EN 12453:2017+A1:2022

<https://standards.iteh.ai/catalog/standards/sist/a0fc2650-c1bd-42d9-a4bc-1efa41cc0536/sist-en-12453-2017a1-2022>

Introduction

This document is a type C document as stated in EN ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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

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

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 traffic.

Mechanical aspects of the doors are covered by normative references to [EN 12604:2017+A1:2020](#).

EN 12453:2017+A1:2021 (E)

1 Scope

A1 This document specifies requirements and test methods for the safety in use of power operated industrial, commercial and garage doors, gates and barriers intended for installation in areas in the reach of persons, and for which the main intended use is giving safe access for goods and vehicles accompanied or driven by persons in industrial, commercial or residential premises. **A1**

This European Standard also covers power operated vertically moving commercial doors such as rolling shutters and rolling grilles, used in retail premises which are mainly provided for goods protection.

This European Standard deals with all significant hazards, hazardous situations and events relevant to the power operation of industrial, commercial and garage doors, and gates when they are used as intended and under conditions of misuse which are reasonably foreseeable as identified in Clause 4.

All lifetime phases of the machinery including transportation, assembly, dismantling, disabling and scrapping are considered by this standard.

This European Standard does not apply to:

- lock gates and dock gates;
- doors on lifts;
- doors on vehicles;
- armoured doors;
- doors mainly for the retention of animals, unless they are at the site perimeter;
- theatre textile curtains;
- horizontally moving power operated doors mainly intended for pedestrian use;
- doors outside the reach of people (such as crane gantry fences);
- railway barriers;
- barriers intended solely for use by pedestrians;
- barriers used solely for vehicles on motorways.

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 in the scope of this Standard.

This European Standard does not deal with any specific requirements on noise emitted from power operated door, gate and barrier, intended for installation in areas in the reach of persons, and for which the main intended use is giving safe access for goods and vehicles accompanied or driven by persons in industrial, commercial or residential premises as their noise emission is not considered to be a relevant hazard.

NOTE Noise emission of power-operated doors is not a significant hazard for the users of these products. It is a comfort aspect.

This European Standard is not applicable to machinery which are manufactured before the date of publication of the standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 349:1993+A1:2008, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 12433-1:1999, *Industrial, commercial and garage doors and gates - Terminology - Part 1: Types of doors*

EN 12433-2:1999, *Industrial, commercial and garage doors and gates - Terminology - Part 2: Parts of doors*

Ⓐ₁ EN 12604:2017+A1:2020, *Industrial, commercial and garage doors and gates — Mechanical aspects — Requirements and test methods* Ⓐ₁

Ⓐ₁ *deleted text* Ⓐ₁

EN 12978:2003+A1:2009, *Industrial, commercial and garage doors and gates - Safety devices for power operated doors and gates - Requirements and test methods*

EN 60335-1:2012, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2012)*

EN 60335-2-95:2015, *Safety of household and similar electrical appliances — Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use (IEC 60335-2-95:2015)*

EN 60335-2-103:2015, *Household and similar electrical appliances — Safety — Part 2-103: Particular requirements for drives for gates, doors and windows (IEC 60335-2-103:2015)*

Ⓐ₁ EN 60529:1991,¹ Ⓐ₁ *Degrees of protection provided by enclosures (IP Code)*

EN 60204-1:2006,² *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

EN 61000-6-1:2007, *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments*

EN 61000-6-2:2005, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments*

EN 61000-6-3:2007, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments*

EN 61000-6-4:2007, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

¹ As impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/corrigendum May 1993, EN 60529:1991/A2:2013/AC:2019-02 and EN 60529:1991/AC:2016-12.

² As impacted by EN 60204-1:2006/A1:2009 and EN 60204-1:2006/AC:2010.

EN 12453:2017+A1:2021 (E)

EN 61032:1998, *Protection of persons and equipment by enclosures - Probes for verification*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power - General rules and safety requirements for systems and their components (ISO 4414:2010)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

IEC 60417:2002, *Graphical symbols for use on equipment*

ISO 7000:2014, *Graphical symbols for use on equipment — Registered symbols*

3 Terms and definitions iTeh STANDARD

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 12433-1:1999, EN 12433-2:1999, EN 12978:2003+A1:2009 and the following apply.

A1 3.1

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 an area in reach of general public (A1)

3.2

drive unit

power operated mechanism, including controls, for moving, positioning and retaining the door leaf

Note 1 to entry: Drive units include controls to move the door leaf, except entrapment protection systems.

[SOURCE: EN 12433-2:1999, 6.1]

3.3

drive

motor and other components that control the movement of the driven part

Note 1 to entry: Examples of components are gears, controls, brakes, components for power transmission from the drive to the driven part (e.g. trolleys, rails, levers, etc.) and entrapment protection systems.

Note 2 to entry: The driven part is the part of a gate, door or barrier that is intended to be moved by the drive.

3.4

opening gap

distance between the main closing edge and the opposing closing edge

3.5**non-automatic operated door**

door that operates only after intentional activation (hold-to-run control mode or impulse activation) by the user in both directions

3.6**pressure sensitive protective equipment****PSPE**

mechanically actuated assembly of devices and/or components working together for protective tripping or presence-sensing purposes comprising as a minimum:

- one or more sensing elements;
- a control unit;
- one or more output signal switching device(s).

Note 1 to entry: Examples are pressure sensitive edges, pressure sensitive floors, pressure sensitive mats and pressure sensitive bars.

[SOURCE: EN 12978:2003+A1:2009, 3.2 modified]

3.7**electro-sensitive protective equipment****ESPE**

non-mechanically actuated assembly of devices and/or components working together for protective tripping or presence-sensing purposes comprising as a minimum:

- a sensing function;
- a control / monitoring function;
- one or more output signal switching device(s).

Note 1 to entry: Examples are light beam, capacitive, active infrared, ultra-sonic and image monitoring equipment.

[SOURCE: EN 12978:2003+A1:2009, 3.1 modified]

3.8**safety-related part of a control system****SRP/CS**

part of a control system that responds to safety-related input signals and generates safety-related output signals

Note 1 to entry: The combined safety-related parts of a control system start at the point where the safety-related input signals are initiated (including, for example, the actuating cam and the roller of the position switch) and end at the output of the power control elements (including, for example, the main contacts of a contactor).

Note 2 to entry: If monitoring systems are used for diagnostics, they are also considered as SRP/CS.

[SOURCE: EN ISO 13849-1:2015, 3.1.1]

EN 12453:2017+A1:2021 (E)

3.9

reversible drive

drive that can be manually operated with or without power in both directions by manual action on the driven part

[SOURCE: EN 60335-2-103:2015, 3.111]

4 List of significant hazards

4.1 General

This Clause contains all the significant hazards, hazardous situations and events identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

A1 *deleted text* **A1** A hazardous point is considered to exist up to a height of 2,5 m above the floor or any other permanent access level.

A1

NOTE **A1** 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.

Annex F is giving the relationship between the hazards listed in this clause, the requirements given in Clause 5 and the test methods described in Clause 6.

The use and the location of the door and the type of door control may influence the severity and probability of risk created by power operated doors.

The severity and probability of risk increases when:

- general public, or infirm, or elderly, or children might come in contact with the moving door;
- 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 **A1** areas accessible by general public; **A1** **A1**
- non-automatic operated domestic garage doors are used for one household only and protrude onto a public area. **A1**

A1 Conversely, non-automatic operated domestic garage doors which do not protrude onto public area are considered as doors with a reduced severity and probability of risk. **A1**

4.2 Hazards caused by crushing, shearing and drawing-in

4.2.1 General

Ⓐ A hazard exists:

- 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;
- between closing edges and obstacles within the closing area of the leaf;
- between leaves passing each other;
- between leaves (and the perimeter of openings in leaves) and fixed parts in the vicinity;
- at parts of the leaf which protrude;
- at moving parts of the drive or drive unit which are capable of causing injury;
- at gaps other than main closing gaps which vary in size and are accessible during the leaf movement.

The hazard can be present during the initial impact, the period after the impact and persist because a person can be held between the leaf and the surrounding fixed parts.

Hazards caused by reversed movement should also be taken into consideration. Ⓐ

4.2.2 Ⓐ Hazards caused when persons can travel with the door Ⓐ

If a person can travel with a power operated door, this can lead to foreseeable misuse which can create a hazardous situation.

A person can travel on a door where a finger, hand or foot can gain hold on a door.

If vertically moving doors which can lift a person can lead to a dangerous situation, then a danger point is considered to exist in the following locations:

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

4.2.3 Hazards caused by impact

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

4.3 Hazards caused by source of energy and power controls

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

- electric shock;
- fire from overheating;
- bursting, due to hydraulic or pneumatic over pressure;
- failure of electrical, pneumatic and hydraulic equipment, including safety devices such as protective equipment, entrapment protection systems and control systems;