BRITISH STANDARD

BS EN
12605:2000

Industrial, commercial and garage doors and gates — Mechanical aspects — Test methods

The European Standard EN 12605:2000 has the status of a British Standard

ICS 91.060.50

National foreword

This British Standard is the official English language version of EN 12605:2000.

The UK participation in its preparation was entrusted by Technical Committee B/538, Doors, windows, shutters, hardware and curtain walling, to Subcommittee B/538/5, Industrial, commercial and garage doors and gates, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Further information

Users of this standard are informed that the UK submitted a vote of disapproval on final voting stage of the draft EN for the following reasons.

1. For some types of vertically moving doors, compliance with **4.3.4** will require the introduction of safety devices to cover components that do not fail in a dangerous manner. This is beyond the requirements of the following UK regulations.

• Management of Health and Safety at Work Regulations 1999;

• Workplace (Health, Safety and Welfare) Regulations 1992;

• Requirement K5 of Building Regulations, England and Wales and parallel provisions in the Building Standards (Scotland) Regulations and the Building Regulations (Northern Ireland).

2. No consideration is given to the possible results of a failure in secondary safety devices.

3. The durability test permits unlimited expenditure through the ongoing replacement of components. No accurate conclusion of cyclic durability in terms of intended use can be drawn from testing to clause **5** of BS EN 12604:2000.

* *Additional guidance will be given in PD 6666 "Guidance on the interpretation of standards for mechanical aspects for industrial, commercial and garage doors", which is in preparation.*

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 23 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

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EN 12605

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English version

Industrial, commercial and garage doors and gates - Mechanical aspects - Test methods

Portes industrielles, commerciales et de garage - Aspects mécaniques - Méthodes d'essai

Tore - Mechanische Aspekte - Prüfverfahren

This European Standard was approved by CEN on 1 January 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12605:2000 E

Contents

Foreword

This European Standard has been prepared by CEN/TC 33, Windows, doors, 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 October 2000, and conflicting national standards shall be withdrawn at the latest by October 2000.

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.

Parts of this European Standard have been prepared under a mandate given to CEN by the European Commission in the Free Trade Association, and support essential requirements of EU Directives. For relationship with EU Directives, see informative annexes ZA and ZB, which are integral part of this standard.

This standard is part of a series of European Standards for industrial, commercial and garage doors and gates, which are identified in prEN 13241.

No existing European Standard is superseded.

1 Scope

1.1 This European Standard specifies the test methods to verify the mechanical requirements for doors, gates and barriers 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 by persons in industrial, commercial and residential premises.

1.2 It does not apply to:

- lock gates and dock gates;
- doors on lifts;
- doors on vehicles;
- armoured doors in banks;
- doors for animals in zoos;
- theatre curtains;
- revolving doors of any size;
- horizontally moving doors less than 2,5 m wide and 6,25 m^2 area, designed solely for pedestrian use;
- doors outside the reach of people (such as crane gantry fences);
- railway barriers;
- barriers used solely for vehicles.

1.3 This standard applies only to doors which are not part of the load carrying structure of the building.

1.4 Test methods shall include several procedures, e.g. functionality, durability or special tests and inspection. The relationship between the requirements and relevant test methods is listed in Table 1. Calculation can also be used as means in a test method, if it is based on the state of the art.

The relationship between requirements for mechanical aspects and relevant test methods given in this standard is shown in Table 1. A structural overview over test procedures and specimen is given in Table 2.

Table 1 – Table of reference

Requirements EN 12604		Test method EN 12605 or defined otherwise	
Object/clause	**Headword**	**Type**	**Clause**
Door 4.2.2 4.2.3 5	 Strength Operability Durability	 Inspection (calculation or test) Functionality test Durability test	 5.4.1 5.1.1 5.2
Differential pressure 4.2.4	Deformation	Calculation or test	prEN 12444
Transparent surfaces 4.2.5	Performance	Special test	5.3.1
Guides and stoppers 4.3.1	Disengagement or derailment - during use and operation	Inspection Functionality test	5.4.2 5.1.2
	- by obstacles	Functionality test	5.1.2
Arresting devices 4.3.2	Movement by wind	Functionality test	5.1.3
Vertically operating doors 4.3.3	Uncontrolled movements	Functionality test	5.1.4
4.3.4	Safeguarding against dropping - by anti-drop device	 Special test	 5.3.2
	- by other design features	Inspection	5.4.3
Manual operation 4.4.1	Required force	Functionality test	5.1.5
4.4.2	Devices	Inspection	5.4.4
Crushing, cutting, shearing, entanglement, drawing-in and trapping 4.5.1, 4.5.2	Hazard of crushing, cutting, shearing	Inspection	5.4.5
Doors to traffic areas 4.6	Observation window	Inspection	5.4.6
Springs 4.7.1	Ejection	Inspection	5.4.7
Counterweights 4.7.2	Guidance, protection	Inspection	5.4.8
Steel wire rope 4.7.3, 4.7.3.1	Design of steel wire rope, pulleys or drums	Inspection	5.4.9
Straps 4.7.3, 4.7.3.2	Design of straps	Inspection	5.4.10
Chains 4.7.3, 4.7.3.3	Design of chains	Inspection	5.4.11
Pass doors 4.8	Interlocking, threshold	Inspection	5.4.12
Rolling doors 4.9	Door leaf attachment	Inspection Durability	5.4.13 5.2
Self closing doors 4.10	Operating speed and force	Functionality test	5.1.6
Remaining hazards 4.1.1, 4.5.1	Warning signs	Inspection	5.4.14

Table 2 – Test methods – Structural overview

Object	Procedure	Specimen
FUNCTIONALITY TEST	5.1	
• Verification of the operability of the door	5.1.1	4.1
• Verification of the provisions against disengagement and derailment	5.1.2	4.1
• Verification of the provisions against unintentional movements due to wind	5.1.3	4.1
• Verification of the provisions against uncontrolled movements of vertically operating door leaves	5.1.4	4.1
• Verification of forces required for manual operation	5.1.5	4.1
• Verification of speed and forces for self-closing doors	5.1.6	4.1
DURABILITY TEST	5.2	4.1
SPECIAL TESTS	5.3	
• Transparent surfaces	5.3.1	See prEN 12600
• Verification of safeguarding against dropping of vertically operating door leaves by anti-drop devices	5.3.2	4.2
INSPECTION	5.4	
• Strength	5.4.1	4.3
• Disengagement or derailment during use and operation	5.4.2	4.3
• Verification of safeguarding against dropping	5.4.3	4.3
• Devices for manual operation	5.4.4	4.3
• Mechanical protection and safety clearances against crushing, cutting, shearing, entanglement and drawing-in	5.4.5	4.3
• Observation window	5.4.6	4.3
• Springs	5.4.7	4.3
• Counterweights	5.4.8	4.3
• Steel wire rope, pulleys or drums	5.4.9	4.3
• Straps	5.4.10	4.3
• Chains and chain wheels	5.4.11	4.3
• Passdoors	5.4.12	4.3
• Rolling door leaf attachment	5.4.13	4.3
• Warning signs	5.4.14	4.3

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.

EN 349	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body.
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 12444	Industrial, commercial and garage doors and gates - Resistance to wind load – Testing and calculation.
prEN 12600	Glass in buildings - Pendulum test – Impact test method for flat glass and performance requirements.
EN 12604	Industrial, commercial and garage doors and gates - Mechanical aspects – Requirements.
prEN 13241	Industrial, commercial and garage doors and gates - Product standard.

3 Definitions

For the purpose of this standard the definitions in EN 12433-1 and EN 12433-2 apply.

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

4 Test specimen

For practical reasons more than one test specimen may be used. Each test specimen shall consist of parts which conform to the level of quality of the production run to be tested. 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 production run.

4.1 Test specimen - Functionality and durability test

4.1.1 Test specimen

Test specimen for the functionality tests may be either doors installed in the factory or on site or a test door installed in a dummy wall or a test frame, both representative of the door to be tested.

Simulation of doors with other dimensions are permitted if the tests on the test specimen are representative.

4.1.2 Dimension and weight

The test specimen shall represent the maximum size in dimensions and weight respectively for the door type specified.

Exceptions see 4.1.3 (simulation of a bigger door).

4.1.3 Simulation of a bigger door

The door shall represent the maximum size in dimensions and weight for the specified door type. For practical reasons it is permitted to simulate bigger dimensions. This can be done by adding mass, distributed in a way equal to the distribution of weight of the door leaf to be simulated.

4.1.4 Documentation to be supplied

Together with the test specimen the following documents shall be supplied:

- design specifications (mechanical as well as electrical);
- installation manual;
- operation manual;
- maintenance manual.

4.1.5 Conditioning

The tests shall be performed under normal, ambient conditions. Specific values of temperature or humidity shall be considered if they are specified between manufacturer and customer.

When the function of certain elements depends on temperature and/or humidity, the elements have to be tested at all limits of temperature and humidity.

These elements can be tested individually without full door construction.

4.1.6 Installation of the test specimen

When the test specimen is not tested on site, it shall be installed in a dummy wall or test frame of sufficient stability according to the instructions specified by the door manufacturer.

The test frame shall be capable of withstanding the static and dynamic forces which occur during the test procedure, without any effect on the test results from the elasticity of the frame.

The test specimen shall be installed in such a way that it can be opened and closed to its terminal positions without difficulty.

Any adjustment or calibration operations which are prescribed to be carried out as a part of the installation procedure shall be recorded.

4.1.7 Operating mechanism

For power-operated doors the type of operating mechanism designed for the door shall be used.

For manually operated doors a suitable mechanism shall be applied to open and close the specimen. The mechanism shall simulate the normal manual operation by acting upon the handles or devices used for manual opening and closing. If not otherwise specified the opening and closing speed shall be 0,3 m/s measured at the main closing edge of the leaf.

4.2 Test specimen - Special tests for anti-drop devices

4.2.1 Test specimen

One or more operational samples of anti-drop devices shall be provided for the tests depending on what is necessary to carry out the test (see 5.3.2).

4.2.2 Documentation to be supplied

Together with the test specimen the following documents relating to the anti-drop devices shall be delivered:

- design specification;
- description of its design and function;
- operating instructions which contain data relating to the determined application, installation, conditioning, starting-up, procedures after activation of the anti-drop device, repeated testing and maintenance.

4.2.3 Installation of the test specimen

The test specimen may be installed on a rigid test frame of a testing institution, on a test frame at the manufacturer's premises or on site or at a testing door.

The anti-drop device shall be installed and loaded as prescribed by the manufacturer of the door and/or the device.

4.3 Test specimen - Inspection

4.3.1 Test specimen

Test specimen for the inspection procedures may be either doors installed in the factory or on site or a test door installed in a dummy wall or in a test frame, both representative of the door to be examined.

Inspection results from other representative test specimens can also be taken into account.

4.3.2 Documentation to be supplied

Together with the specimen the following documents shall be supplied:

- design basis (mechanical as well as electrical);
- installation manual;
- operation manual;
- maintenance manual.

4.3.3 Conditioning

The inspection shall be performed under normal, ambient conditions. Other values of temperature or humidity shall be considered if they are specified between manufacturer and customer.

When the function of certain elements depends on temperature and/or humidity, the element has to be examined at all limits of temperature and humidity. These elements can be examined individually.

4.3.4 Installation of the specimen

When the door is not tested on site, it shall be installed according to the instructions specified by the door manufacturer in a dummy wall or test frame of sufficient stability.

The test frame shall be capable of withstanding the static and dynamic forces which occur during the inspection procedure, without any effect on the results from the elasticity of the frame.

The door shall be installed in such a way that it can be opened and closed to its terminal positions without difficulty.

Any adjustment or calibration operations prescribed to be carried out as a part of the installation procedure shall be recorded.

5 Test procedures

In the following clauses procedures are listed which verify the requirements. The procedures are subdivided in functionality tests, durability tests and special tests as well as inspections.

For practical reasons more than one test procedure may be carried out on one test specimen.

5.1 Test procedure - Functionality test

The functionality tests shall verify that the door fulfils the relevant functional requirements and criteria specified in document EN 12604.

The subjects of the tests are:

- operability of the door (see 4.2.3);
- provisions against disengagement or derailment (see 4.3.1);
- provisions against unintended movements due to wind (see 4.3.2);
- provisions against uncontrolled movements of vertically operating doors (see 4.3.3);
- level of manual operating forces (see 4.4.1);
- operating speed and forces (see 4.10).

5.1.1 Verification of the operability of the door

5.1.1.1 Objective

The test shall show whether the door withstands the opening and closing movements without permanent deformations affecting its operation.

5.1.1.2 Procedure

The door shall be fully opened and closed 10 times at the defined operational speed and applying the maximum force according to EN 12604:1999.

The door movements shall be observed, and any abnormalities recorded.

5.1.1.3 Test results

After the test cycles are finished, any alterations in the dimensions or in the shape (form), deformations or wear shall be checked by measuring or observation.

5.1.1.4 Test reports

The test reports shall contain:

a) all necessary details to identify the door, the door leaf or component;

b) all relevant details concerning the type, specified dimensions, materials, form and construction of the door, the door leaf or component;

c) test results;

d) details of temperature and humidity if not in the range specified in 4.1.5.

5.1.2 Verification of the provisions against disengagement and derailment

5.1.2.1 Objective

The objective of the following tests is to verify that disengagement or derailment of the door leaf or such movable parts due to contact with a stationary obstacle or failure of a suspension element is prevented. It is also to verify that the door leaf is stopped in its terminal positions in a safe and suitable way.

5.1.2.2 Apparatus

The obstacle shall consist of a solid cube with a edge length of 400 mm, resting on the floor in the running direction of the main closing edge.

For vertically operating doors the obstacle shall be positioned in the middle and offset at both sides (3 steps total):

a) in the middle of the opening;

b) at the left hand side of the opening;

c) at the right hand side of the opening.

5.1.2.3 Procedure

a) The door leaf shall travel once with the defined speed against the obstacles (see 4.1.7 concerning speed and force applications).

b) Door leaves with mechanical stoppers which are manually operated shall travel twice to their terminal positions with a force of 300 N and a speed of 0,3 m/s.

c) Simulation of a failure of a non rigid suspension element, such as rope, chain or strap.

5.1.2.4 Test results

Examine whether the door leaf did remain in the tracks or guiding elements and whether these show any permanent deformation which affects its function, or whether there are other negative effects.

5.1.2.5 Test reports

The test reports shall contain:

a) all necessary details to identify the door and the door leaf;

b) all relevant details concerning the type, specified dimensions, materials, form and construction of the door and the door leaf;

c) test results.

5.1.3 Verification of the provisions against unintentional movements due to wind

5.1.3.1 Objective

The objective of the test is to verify that door leaves which are capable of being moved by wind or can be unintentionally pushed are safeguarded against unintentional movements in the terminal positions.

5.1.3.2 Procedure

The door leaf shall be located in each of the terminal positions in which the arresting devices are effective.

The door leaf shall be charged with a force in accordance with EN 12604:1999, 4.2.4, for the area exposed to wind in the terminal positions, which may be either uniformly distributed on the door leaf or distributed at certain points, in order to represent the resulting forces on the door leaf.

The force shall act perpendicular to the plane of the door leaf in the direction(s) in which the wind may have an effect.

5.1.3.3 Test result

Examine whether the arresting device is effective and does not show any damage or permanent deformation affecting its function.

5.1.3.4 Test reports

The test reports shall contain:

a) all necessary details to identify the door and the door leaf;

b) all relevant details concerning the type, specified dimensions, materials, form and construction of the door and the door leaf;

c) test results.

5.1.4 Verification of the provisions against uncontrolled movements of vertically operating door leaves

5.1.4.1 Objective

The objective of the test is to verify that in normal use the door movement can be stopped in any position, thereby excluding uncontrolled dangerous movements.

5.1.4.2 Procedure

The door leaf shall be stopped during 5 opening and 5 closing movements, each time at different positions:

- for power-operated doors, switch off the drive unit, and ensure that the door leaf comes to rest;
- for manually operated doors, stop the movement, release the grip of the handles, and measure the maximum static force at the main closing edge acting in a dangerous direction.

5.1.4.3 Test results

For power-operated doors examine that the door leaf comes to rest after switching off the drive unit. For manually operated doors record the resulting out-of-balance static force in each position.

5.1.4.4 Test reports

As 5.1.2.5.

5.1.5 Verification of forces required for manual operation

5.1.5.1 Objective

The objective of the test is to measure the forces required to open (or close) the door in normal use.

5.1.5.2 Procedure

Locate the door leaf in each of the closed, middle and open positions.

Measure the forces required to move the door leaf from any of the above positions.

5.1.5.3 Test results

Record the maximum static forces, required for the manual operation, in each position.

5.1.5.4 Test reports

As 5.1.2.5.

5.1.6 Verification of speed and forces for self closing doors

5.1.6.1 Objective

The objective of the test is to measure the operating speed and the operating forces.

5.1.6.2 Procedure

Establish the position of the door leaf where the maximum speed occurs due to the effect of gravity or other self operating mechanism. Determine the speed and the forces at the main closing edge at this position.

5.1.6.3 Test results

Record the maximum speed and the maximum forces.

5.1.6.4 Test reports

As 5.1.2.5.

5.2 Test procedure - Durability test

5.2.1 Objective

The objective of the durability test is to verify the economical working life of the door expressed in operating cycles. Criteria for construction and design are provided according to EN 12604.

5.2.2 Determination of testing parameters

The test specimen shall be subjected to the number of test cycles corresponding to the economical working life of the door, which it has been designed for, multiplied by the test factor of 1,1.

> Note Factor 1,1 is be used to compensate for the ideal environment in a test facility and the short time during which the test is carried out.

5.2.3 Initial verification

The compliance with design and construction guidelines as presented in the document EN 12604 shall be checked according to the functionality test in 5.1 and the findings recorded.

5.2.4 Procedure

The test specimen shall be opened and closed using an operation mechanism as indicated in 4.1.7 above.

5.2.4.1 Visual inspections

Inspect for visual deformation or visual wear, etc. at regular intervals at least for each completed 10 % of the total number of cycles.

5.2.4.2 Checking of safety functions (fail-safe)

Check the safety functions at regular intervals during testing, after the completion of at least each 20 % of the total number of cycles.

5.2.4.3 Verification of the functionality after the test of the economical working life has been carried out

At the end of the test after completion of the operating cycles, repeat the functionality tests in accordance with the applicable subjects of 5.1.

5.2.4.4 Checking of defects and wear

At the end of the test, inspect the test specimen for fractures or faults and the wear of components.

5.2.5 Maintenance

During the test any maintenance prescribed by the manufacturer (maintenance manual) shall be observed and carried out.

Parts specified for replacement after a certain number of cycles, before completion of the full operating cycles, shall be replaced during the test according to such instructions.

5.2.6 Test reports

Test reports shall contain details of:

- number of cycles performed;
- visual inspections;
- control of safety functions;
- verification of functionality after the economical lifetime;
- records of failures;
- result from measurement of wear;
- maintenance performed including replacement parts.

5.3 Test procedure - Special tests

5.3.1 Transparent surfaces

Test transparent surfaces in accordance with prEN 12600 (min. class 1) or establish that provisions to prevent breaking have been incorporated.

Also check if door leaves made of transparent material are easily visible.

5.3.2 Verification of safeguarding against dropping of vertically operating door leaves by anti-drop devices

5.3.2.1 Objective

The objective of the test is to verify that the door leaf is stopped automatically within the distance of 300 mm and cannot be moved further downwards. The anti-drop device shall be able to immobilize the falling door leaf within the permissible distance. The engaged blocking elements shall not unintentionally leave the locking position.

5.3.2.2 Determination of testing parameters

The tests shall be carried out in the way of an individual test or a type test.

The individual test shall prove that the anti-drop device is able to catch (to immobilize) the door leaf of a definite door construction and that the strength of the anti-drop device and of the stressed components of the door are satisfactory.

The type test shall show in which working range the anti-drop device is permissible. Parts of this test are the determination of the maximum and minimum permissible door leaf weight, the maximum and minimum permissible speed of the door leaf or number of revolutions of the shaft as well as the maximum forces and torque acting on the door components.

5.3.2.3 Procedure

All tests may be carried out in principle either with a test load or with a door leaf, which are representative of the operational conditions. The expression “test load” also includes the door leaf.

Examine the test specimen to ensure that it complies with the documents presented, the principle of the construction is reliable and the stated materials have been used, e.g. by a hardness test.

Locate the anti-drop device in a position where the blocking elements have the longest distance to reach the blocking position (most onerous situation). Release the static test load to drop.

Check that the anti-drop device is able to immobilize the test load.

Measure the distance that the test load moves from the starting to the standstill position. Repeat the test two more times in order to check the continuity of the function.

To verify that the strength of the anti-drop device and the stressed components of the door are satisfactory measure:

- the deceleration of the test load by the anti-drop device;
- the forces and the torque which are acting on the door and its fixation elements.

Use the resulting values to check that the loaded components of the anti-drop device, the door and the fixation elements are adequately dimensioned.

In order to evaluate the criteria of an anti-drop device, determine:

1) The maximum permissible door leaf weight;
2) The resulting forces and torque;
3) Releasing revolution or speed;
4) Catching revolution or speed.

For anti-drop devices, which are not required to be replaced after one catching test, complete seven further drop tests. This is to examine whether the function and strength of the anti-drop device is ensured during several tests and that the falling distance does not exceed 300 mm.

For power-operated doors check that after the actuation of the anti-drop device/devices hazardous movements of the door are not possible.

5.3.2.4 Test reports

As 5.1.2.5 plus details of the anti-drop device.

5.4 Test procedure - Inspections

The requirements of document EN 12604 listed in the following are the subject of inspections:

- Strength (calculation or test) (Req. 4.2.2);
- Disengagement or derailment during use and operation (Req. 4.3.1);
- Safeguarding against dropping by other design features (Req. 4.3.4);
- Manual operation device (Req. 4.4.2);

- Protection against crushing, cutting, shearing, entanglement and drawing-in (Req. 4.5);
- Doors adjacent to traffic areas (4.6);
- Springs (Req. 4.7.1);
- Counterweights (Req. 4.7.2);
- Steel wire ropes, pulleys or drums (Req. 4.7.3 and 4.7.3.1);
- Straps (Req. 4.7.3 and 4.7.3.2);
- Chains and chain wheels (Req. 4.7.3. and 4.7.3.3);
- Pass doors (Req. 4.8);
- Rolling door leaf attachment (Req. 4.9);
- Warning signs (Req. 4.1.1 and 4.5.1).

Record the test results and the behaviour of the door after completing the inspection.

5.4.1 Strength

Check that calculation and/or testing has been completed to ensure that no permanent deformation of the door, its components or its fixing occur during normal operation.

Check that any proof testing for permanent deformation has been based on an applied test load equal to 1,10 times the maximum load anticipated during normal operation.

5.4.2 Disengagement or derailment during use and operation

Check that the door leaf or any other moveable parts are safeguarded against disengagement or derailment during normal use and operation.

5.4.3 Verification of safeguarding against dropping by other design features

Check that failure of any one of the suspension elements will not result in the door leaves dropping by more than 300 mm. For this procedure it may be necessary to take the suspension elements out of function one by one.

5.4.4 Devices for manual operation

Check that the devices provided for manual operation are suitable and conveniently located to enable the door leaf movement and that they can be grasped without risk of crushing, trapping or cutting the hands.

5.4.5 Mechanical protection and safety clearances against crushing, cutting, shearing, entanglement and drawing-in

Inspect that the door leaves or their components do not give rise to the hazard of catching persons (e.g. limbs, hair or clothes) during the opening and closing movement of the door.

Check that any protruding elements which exist will not give rise to the risk of entanglement when passing through.

Inspect all surfaces and edges up to a height of 2,5 m to ensure that there are no sharp edges which may cause cutting to persons who come into contact with the door.

Measure any variable gaps which arise when the door leaf is operated which are accessible to persons. By comparison with the permissible values given in annex C of documents EN 12604 and EN 349 determine whether any measured gap is dangerous or not.

Gaps between moving parts which are safeguarded by other mechanical and/or electrical means, e.g. sensitive edges, are not required to be considered.

5.4.6 Observation window

Check that when a door is intended to open onto a traffic area, observation windows or other provisions are incorporated.

5.4.7 Springs

Check that in the event of a spring breakage measures have been provided to ensure that the spring remains in its position and that a spring coil cannot be ejected dangerously. Check that operation of or damage to one spring cannot cause faulty operation of another spring in the system.

5.4.8 Counterweights

Inspect any counterweight system to ensure that:

- their guides or runways are covered by suitable guards up to 2,5 m height above floor level or other permanent access level;
- weights enter safely into their covers;
- there is no unintentional dangerous movement of the door leaf if one suspension element of the counterweight fails;
- in consequence of a falling counterweight there will be no danger to the building or persons in the vicinity;
- there is secure attachment to the suspension components;
- accidental counterweight displacement is not possible;
- concrete counterweights are of reinforced construction.

5.4.9 Steel wire ropes, pulleys and drums

For suspension systems which incorporate wire ropes check that:

- at least 2 independent steel wire ropes are used and that loads are shared in a pre-determined way;
- a test certificate is available from the supplier/manufacturer of the steel wire stating the guaranteed minimum breaking strength;
- the steel wire ropes are accessible for inspection and maintenance over their entire length;
- where more than one steel wire rope is connected at one suspension point, means have been provided to equalize the load;
- a traction test result or a certificate exists to confirm that terminations have a breaking strength of not less than 90 % of that of the steel wire rope, or inspect to establish that there are at least two full turns on the drum at the terminal position;

- means have been provided to prevent the steel wire rope from becoming accidentally disengaged from sheaves, drums or pulleys;
- proper orientation exists on entry to grooves, e.g. at least half a turn remains on the drum in the terminal position;
- the safety factor of the wire rope is not smaller than 6;
- rope pulleys and rope drums have a diameter at least 20 times the rope diameter or that there is a certificate from the manufacturer of the rope for smaller diameters;
- the rope drum is grooved and the rope coils in one layer.

5.4.10 Straps

For suspension systems which incorporate straps check that:

- at least 2 independent straps are used and that loads are shared in a pre-determined way;
- a test certificate is available from the supplier/manufacturer of the straps stating the guaranteed minimum breaking strength;
- the straps are inspectable and accessible for replacement;
- where more than one strap exists at one suspension point, means are provided to equalize the load;
- a traction test result or a certificate exists to confirm that terminations have a breaking strength of not less than 90 % of that of the strap;
- means have been provided to prevent straps from becoming accidentally disengaged;
- the safety factor of the strap is not smaller than 6.

5.4.11 Chains and chain wheels

For suspension systems incorporating chains check that:

- at least 2 independent chains are used as suspension elements, and that loads are shared in a pre-determined way;
- a test certificate is available from the supplier/manufacturer of the chains stating the guaranteed minimum breaking strength;
- the chains are accessible for inspection and maintenance over their entire length;
- where more than one chain is connected at one suspension point, means have been provided to equalize the load;
- a traction test result or a certificate exists to confirm that terminations have a breaking strength of not less than 90 % of that of the chain;
- means have been provided to prevent the chain from disengaging from chain wheels;
- the safety factor of the chain is not smaller than 6;
- suspension chains are either roller chains, leaf chains or calibrated round link chains;
- only roller chains are used as transmission chains;
- single transmission chains are only used with fully balanced door systems or in combination with anti-drop-devices;

- chain wheels do not have teeth with undercut flanks;
- covering of the chain wheels or their engagement points has been provided below 2,5 m above floor level.

5.4.12 Pass doors

Ensure that the pass door may not open unintentionally, e.g. by gravity, when the main door is not in the closed position.

Ensure that, for power-operated doors, the main power to the drive unit is switched off if the pass door is not in the closed position.

5.4.13 Rolling door leaf attachment

Check that at least 10 % of the door leaf remains on the door roller or that at least half of the door roller is covered when the door is in the closed position.

Check that lateral movement of laths in relation to one another is not possible or that it cannot lead to a dangerous occurrence.

5.4.14 Warning signs

Check, if mechanical hazards cannot be avoided within the basic design of the door or eliminated by use of suitable guards, that the hazard locations or remaining risks are identified by suitable warning signs.

6 Contents of the test report

The test report shall as a minimum include the following information:

a) name of the testing institute, if involved;
b) name of the manufacturer;
c) manufacturer’s identification of the door;
d) data supplied regarding intended use, economical lifetime, etc.;
e) test principle;
f) date of test;
g) test method;
h) test conditions (temperature, humidity, etc.);
i) operating force, torque and other relevant parameters;
j) test result;
k) special remarks (deviation from the usual test method, etc.);
l) special observations regarding the test specimen and the test result;
m) graphical representation of the test specimen including design and construction details, dimensions, etc.;
n) name of test officials and signatures.

Documentation consists of:

o) design (electrical and mechanical);

p) installation manual;

q) operational manual;

r) maintenance manual.

Annex ZA (informative) - Clauses of this European Standard addressing the provisions of EU Construction Product Directive

This European Standard has been prepared under a Mandate given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard, shown in the table below, meet the requirements of the Mandate given under the EU Construction Products Directive (89/106).

Compliance with these clauses confers a presumption of fitness of the construction product covered by this European Standard for its intended use(s).

WARNING Other requirements and other EU Directives, not affecting the fitness of intended use(s), can be applicable to the construction product falling within the scope of this European Standard.

Construction Product(s): Industrial, commercial and garage doors and gates
Intended use(s): Access for goods and vehicles accompanied by persons

Relevant characteristics	**CPD**	**Clause in this European Standard**
Operating forces	ID 4 No. 3.3.2.3	5.1.5
Break-down of doors or components	ID 4 No. 3.3.2.3	5.2
Falling of parts/components	ID 4 No. 3.3.1.1.	5.3.2
Cutting at sharp edges	ID 4 No. 3.3.2.3	5.3.1
Push and running against not visible parts	ID 4 No. 3.3.2.3	5.3.1

NOTE Limiting values or classes, if any are referred to under these clauses in the standard, are not to be taken into account except if they are recognized as classes and levels according to Article 3.2 of CPD, as specified in the mandate, or later agreed by the Standing Committee according to Article 20.2 of the CPD, following a CEN proposal.

Annex ZB (informative) - Relationship of this European Standard with other EU Directives

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 following EU Directives:

Machinery Directive 98/37/EG

in the clauses 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6, 5.2, 5.3.1, 5.3.2, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.4.7, 5.4.8, 5.4.9, 5.4.10, 5.4.11, 5.4.12, 5.4.13, 5.4.14.

Compliance with this standard provides one means of conforming with the specific essential requirements of the Directives concerned and associated EFTA regulations.

WARNING Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

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