



DRAFT TANZANIA STANDARD

Industrial, commercial, garage doors and gates - Product standard, performance characteristics

Draft for Public Comments

TANZANIA BUREAU OF STANDARDS

BCDC 15 (108) DTZS

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0 National Foreword

The Tanzania Bureau of Standards is the statutory national standards body for Tanzania, established under standards Act No. 3 of 1975, amended by Act No. 2 of 2009.

This draft Tanzania Standard is being prepared by BCDC 15 Doors and Windows technical committee under the supervision of the Building and Construction Divisional Committee (BCDC).

On preparation of this document adaption was made to EN 13241:2003+A2:2016 - *Industrial, commercial, garage doors and gates - Product standard, performance characteristics*.

With the aim of clarifying the intentions of this draft Tanzania Standard and avoiding doubts when reading it, the following assumptions were made when producing it:

- a) components without specific requirements are:
 - designed in accordance with the usual engineering practice and calculation codes, including all failure modes;
 - of sound mechanical and electrical construction;
 - made of materials with adequate strength and of suitable quality;
 - general electrical hazards are dealt with according to relevant national standards and guidelines.
- b) components are kept in good repair and working order, so that the required characteristics remain during the economical working life despite wear;
- c) with the exception of the items listed below, a mechanical device is built according to good practice and the requirements of this this draft Tanzania Standard:
 - negotiations occur between the manufacturer and the purchaser concerning particular conditions for the use and places of use for the door related to health and safety;
 - the place of use/installation to be adequately lit;
 - the place of use/installation to allow safe use of the door.

These assumptions do not restrict the need for adequate information for use in this draft Tanzania Standard.

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

Industrial, commercial, garage doors and gates - Product standard, performance characteristics.

1 Scope

1.1 General

This draft Tanzania Standard specifies the safety and performance requirements, except resistance to fire and smoke control characteristics, for industrial, commercial, garage doors and gates and barriers, intended for installation in areas in the reach of persons, and for which the main intended uses are giving safe access for goods and vehicles accompanied or driven by persons in industrial, commercial or residential premises.

This draft Tanzania Standard 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.

These doors can include pass doors incorporated in the door leaf which are also covered by this Standard.

These devices can be manually or power operated.

1.2 Exclusions

This draft Tanzania Standard does not apply to the following which are intended for a different use:

- 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 power operated doors mainly intended for pedestrian use.
- revolving doors of any size;
- railway barriers;
- barriers used solely for vehicles.

This Standard does not cover the radio part of doors. If a radio operating device is used, the relevant standards should be applied in addition.

This draft Tanzania Standard does not contain any specific requirement for doors which are moving because of energy stored by dedicated means from human power such as manually tensioned springs.

This Standard does not contain any specific requirements for doors on escape routes. The ability to open the door leaf safely and easily cannot normally be achieved by industrial, commercial and garage doors due to size, weight and/or mode of operation

1.3 Specific applications

This draft Tanzania Standard should also apply to power operated doors which have been created by the addition of power operation to an installed manual door in respect of the relevant requirements.

It also identifies requirements and classes of performance for additional characteristics considered to be of importance to the trade.

When a door is part of the load carrying structure of the building the requirements of this draft Tanzania Standard can apply on a voluntary basis in addition to the requirements for the load carrying structure.

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.

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EN 418, Safety of machinery - Emergency stop equipment, functional aspects - Principles for design
EN 1037, Safety of machinery - Prevention of unexpected start-up
ENV 1991-2-4, Eurocode 1: Basis of design and actions on structures - Part 2-4: Actions on structures - Wind actions
EN 12424:2000, Industrial, commercial and garage doors and gates - Resistance to wind load - Classification
EN 12425, Industrial, commercial and garage doors and gates - Resistance to water penetration - Classification
EN 12426, Industrial, commercial and garage doors and gates -Air permeability - Classification
EN 12427, Industrial, commercial and garage doors and gates-Air permeability- Test method
EN 12428, Industrial, commercial and garage doors and gates - Thermal transmittance - Requirements for the calculation
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 12444, Industrial, commercial and garage doors and gates - Resistance to wind load - Testing and calculation
EN 12445:2000, Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Test methods
EN 12453:2000, Industrial, commercial and garage doors and gates - Safety in use of power operated doors – Requirements
EN 12489, Industrial, commercial and garage doors and gates - Resistance to water penetration - Test method
BCDC 15 (109)/ EN 12604 Industrial, commercial and garage doors and gates - Mechanical aspects - Requirements
EN 12605:2000, Industrial, commercial and garage doors and gates - Mechanical aspects- Test methods
EN 12635:2002, Industrial, commercial and garage doors and gates - Installation and use
EN 12978:2003, Industrial, commercial and garage doors and gates - Safety devices for power operated doors and gates - Requirements and test methods
EN 60204-1:1997, Safety of machinery -Electrical equipment of machines - Part 1: General requirements
EN 61000-6-2, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3, Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
ISO 140-3, Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements
ISO 717-1, Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation
ISO 12567-1, Thermal performance of windows and doors- Determination of thermal transmittance by hot box method- Part 1: Complete windows and doors

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12433-1 and EN 12433-2 and the following apply.

3.1 operating force of the door

force exerted by the power operated door leaf when coming into contact with a person and/or an obstacle

3.2 vertically moving door

any door where the main closing edge remains parallel to the ground or floor during its movement

3.3 horizontally moving door

any door where the main closing edge remains perpendicular to the ground or floor during its movements

4 Requirements

4.1 General

The choice of the door type and its specification needs to be made after taking into account where the door is to be installed and the operating requirements expected from it. Safety in use, ease of use and the amount and frequency of maintenance, its mode of operation, frequency of operation, degree of automation, provision of pass doors and position of the door within the building, etc. are all linked to the choice of the door type. Such specifications may include requirements for performance features which shall be demonstrated by the standards given in the following clauses.

Unless the manufacturer is supplying to fulfil the particular classes or values of performance characteristics for resistance to water penetration, resistance to wind load, thermal resistance air permeability, resistance to fire or resistance to smoke as notified by the purchaser, the manufacturer shall declare the relevant performance levels of his product.

Doors shall be planned, designed and constructed in accordance with the following requirements to ensure their satisfactory and safe operation in their intended situation and under their expected conditions of use and their safe maintenance, repair and dismantling.

4.2 Mechanical aspects

4.2.1 General

All doors, manual and power operated, shall be planned, designed and constructed in accordance with BCDC 15 (109)/ EN 12604. In particular, all doors shall meet the following requirements.

4.2.2 Force for manual operation

Maximum values for the force for manual operation are specified in BCDC 15 (109)/ EN 12604, 4.4.

Maximum values of the force for emergency manual operation due to power or drive failure are specified in EN 12453:2000, 5.3.5.

Verification of the force for manual operation shall be carried out in accordance with the test method specified in EN 12605:2000, 5.1.5.

4.2.3 Mechanical resistance

Doors shall be designed and constructed in accordance with BCDC 15 (109)/ EN 12604, 4.2 so that in normal operation the imposed forces, impacts and stresses neither damage the door nor impair its mechanical performance.

The mechanical strength shall be verified in accordance with the test methods specified in EN 12605:2000, 5.1.1 and 5.4.1.

4.2.4 Mechanical durability

The mechanical performance of a door shall be ensured, subject to prescribed maintenance, for a number of operational cycles, to be declared by the manufacturer in accordance with BCDC 15 (109)/ EN 12604, Clause 5.

Mechanical durability shall be verified in accordance with the test methods specified in EN 12605:2000, 5.2.

NOTE -The influences of degradation, by chemical and/or biological attack on the components, which may be incorporated in the test specimen for mechanical durability testing, when they are necessary to achieve characteristics such as air permeability, resistance to water penetration, safety in use etc. are not taken into account. The components are e.g., seals, gaskets, guards.

4.2.5 Geometry of glazing/glass components

Where transparent materials are used in doors, they shall not become dangerous, if any breakage should occur.

Door leaves which are primarily made of transparent material shall be easily visible.

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Specific requirements are specified in BCDC 15 (109)/ EN 12604, 4.2.2, which shall be verified by the related test methods specified in EN 12605:2000, 5.3.1

4.2.6 Protection against cutting

Accessible parts of doors shall not create any cutting hazard. Sharp edges shall be eliminated in accordance with BCDC 15 (109)/ EN 12604, 4.6, and EN 12453:2000, 5.1.1.3.

4.2.7 Protection against tripping

Parts of doors shall not cause any tripping hazard. Height differences up to 5 mm which occur in the traffic area are not considered dangerous.

When height differences greater than 5 mm are needed due to technical reasons, e.g., thresholds of pass doors, the raised parts shall be clearly visible themselves or shall be made so by warning signs, e.g., yellow- black strips.

Pressure sensitive mats and floors which may create a tripping hazard shall comply with EN 12978:2003, 4.2.4.2.

4.2.8 Safe openings

Vertically moving doors shall be safeguarded in the event of failure of a single component in their suspension (including gear drives) or balancing system against dropping or uncontrolled out-of-balance movement.

Requirements are specified in BCDC 15 (109)/ EN 12604, 4.3.4. These requirements shall be verified in accordance with EN 12605:2000, 5.3.2 and 5.4.3.

Horizontally moving doors shall be safeguarded against derailment.

Requirements are specified in BCDC 15 (109)/ EN 12604, 4.3.1. These requirements shall be verified in accordance with EN 12605:2000, 5.1.2 and 5.4.2.

4.2.9 Release of dangerous substances

Products shall not release any dangerous substances in excess of the maximum permitted levels specified in the relevant Tanzania Standard or other specifications.

4.3 Power operation

4.3.1 General

All power operated doors shall fulfil (in addition to meeting the requirements of 4.2) the requirements of EN 12453. In particular, power operated doors shall fulfil the following requirements:

4.3.2 Protection against crushing, shearing and drawing-in

Crushing, shearing and drawing-in points generated by the door leaf during normal use shall be eliminated or safeguarded.

Requirements for safety measures are specified in EN 12453:2000, 5.1.1.

The effectiveness of these measures shall be assessed in accordance with EN 12445:2000, 4.1.1.

Safety devices, e.g., pressure-sensitive or electro-sensitive protective devices, which are involved in compliance with the requirements listed above shall be designed and tested in accordance with EN 12453:2000, 5.1.1.6 and EN 12978

4.3.3 Operating forces

Operating forces exerted by the door leaf of power operated doors, including power operated pass doors, where crushing, shearing or impact hazards are safeguarded by limitation of forces, shall be kept to a safe level for users, as specified in EN 12453:2000, 5.1.1.5 and 5.1.3. Compliance shall be verified by tests specified in EN 12445:2000, Clause 5 and 7.3.

For power operated doors which are operated in the hold to run mode of operation, the stopping distance after release of the actuator shall be kept under control.

Specific requirements are given in EN 12453:2000, 5.1.1.4. Compliance shall be verified by tests specified in EN 12445:2000, 4.1.1.4.

Safety devices, e.g., pressure-sensitive or electro-sensitive protective devices, which are involved in compliance with the requirements listed above shall be designed and tested in accordance with EN

12453:2000, 5.1.1.6 and EN 12978.

4.3.4 Electrical safety

Electrical drive systems, control units and their components shall be designed and constructed so that when installed, electrical hazards in normal use and foreseeable misuse are avoided or safeguarded.

EN 12453:2000, 5.2.1 and 5.2.2 as well as EN 12978:2003, 4.1.2, 4.1.3 and 4.1.4 define specific requirements and identify the relevant test methods to be used for verification.

4.3.5 Electromagnetic compatibility (EMC)

4.3.5.1 Electromagnetic compatibility related to EMC Directive

The electromagnetic disturbances generated by the power operated door shall not exceed the levels specified in EN 61000-6-3. The power operated door shall have sufficient immunity to electromagnetic disturbances to enable it to operate as intended when exposed to the levels and types of disturbance as specified in EN 61000-6-2. The manufacturer of the power operated door shall design, install and wire the equipment and sub-assemblies taking into account the recommendations of the supplier(s) of the sub-assemblies, to ensure that the effects of electromagnetic disturbances thereon shall not lead to unintended operation and/or failure to danger.

In particular, the following loss of performance or degradation of performance shall not occur:

- speed in excess of 20 % of the designed performance;
- inhibition of operation of interlocking devices;
- reduction in fault detection capability.

NOTE - Information on measures to reduce generated disturbances and measures to reduce the effects of disturbances on the power operated door is given in EN 60204-1:1997, 4.4.2.

For those tests specified in EN 61000-6-2, any degradation of performances or loss of function allowed with regard to performances criteria "A and B" shall be declared by the manufacturer. Any temporary loss of function allowed with regard to performance criteria "C" shall be declared by the manufacturer.

4.3.5.2 Electromagnetic compatibility related to MD Directive

The power operated door shall have sufficient immunity to electromagnetic disturbances to enable it to operate safely as intended and shall not fail to danger when exposed to the levels and types of disturbances as specified in EN 61000-6-2. The manufacturer of the power operated door shall design, install and wire the equipment and sub-assemblies taking into account the recommendations of the supplier(s) of the sub-assemblies, to ensure that the effects of electromagnetic disturbances thereon shall not lead to unsafe operation and/or failure.

The following performance criteria shall be used to determine the result (pass/fail) of EMC immunity testing:

- a) For those tests specified in EN 61000-6-2 the performance criteria as specified in EN 61000-6-2 shall apply.
- b) With regard to all the performance criteria specified in EN 61000-6-2 (A, B etc.), there shall be no loss of performance or degradation of performance which could lead to danger. In particular, the following loss of performance or degradation of performance shall not occur:
 - unexpected start-up (see EN 1037);
 - blocking of an emergency stop command or resetting of the emergency stop function (see EN 418 and EN 60204-1);
 - inhibition of the operation of any safety/interlocking device;
 - any reduction in fault detection capability.

NOTE - Information on measures to reduce the effects of electromagnetic disturbances on the power operated door is given in EN 60204-1:1997, 4.4.2.

4.3.5.3 Verification

4.3.5.3.1 Verification of EMC related to the EMC Directive

Compliance with the EMC requirements in 4.3.5.1 shall be checked in accordance with EN 61000-6-3

and EN 61000-6-2. If testing of the completed power operated door is not reasonably practicable due to the size of the machinery, the manufacturer shall verify that all appropriate equipment sub-assemblies comply with 4.3.5.1 and are suitably installed and wired to minimize disturbances and/or their effects in accordance with any recommendation of the supplier(s) of the sub-assemblies.

4.3.5.3.2 Verification of EMC related to the Machinery Directive

Compliance with the EMC requirements in 4.3.5.2 shall be checked by carrying out preliminary testing and function testing. If testing of the completed power operated door is not reasonably practicable due to the size of the machinery, the manufacturer shall verify that all appropriate equipment sub-assemblies comply with 4.3.5.2. The manufacturer shall also verify that these sub-assemblies are suitably installed and wired to minimize the effects of disturbances on the equipment and are in accordance with any recommendation of the supplier(s) of the sub-assemblies.

4.3.6 Alternative requirements

For power operated garage doors for one household only which are vertically operating, non-automatic, which do not open onto public access areas, 4.3.1 to 4.3.5 may be superseded by the requirements of EN 12453:2000, 5.5.2.

4.3.7 Upgrading of manually operated doors

Power operated doors which are produced by the subsequent addition of a drive unit can deviate from 4.2 with the exception of 4.2.3 and 4.2.8.

4.4 Additional requirements for specific performance characteristics

4.4.1 General

In addition to complying with the requirements in 4.2 and 4.3, performance of the following environmental characteristics, where required, shall be determined and specified in accordance with the following requirements.

NOTE - Table A.1 can be used for this specification.

4.4.2 Water tightness

Resistance to water penetration shall be based upon test measurements carried out on completely assembled doors or individual representative parts in accordance with EN 12489.

The classified test results may be derived from a test specimen with the maximum dimensions of the product, or from a test specimen which is representative of the leaf assembly with the minimum dimensions specified in EN 12489 whichever is more onerous.

The test results shall show, that there is no water leakage through the door at the applied test pressure during the time, specified in the relevant class in EN 12425.

4.4.3 Resistance to wind load

The resistance to wind load of a door is its capacity to withstand a specified differential wind pressure.

Doors shall be designed in order to resist a specified differential wind pressure, and shall be classified in accordance with the wind load classes specified in EN 12424.

The requirements of this clause apply to the ability of the closed doors and not to their ability to be opened or closed under wind load. It is not a requirement that doors are able to operate under wind load.

NOTE

1. The construction of the door depends with regard to pressure on a number of factors including e. g. the maximum wind speed anticipated in the area, the location, height, size and shape of the building, and the position of the door in the building.

Methods for determining the wind pressure that a building element such as a door has to withstand, from wind speed and other data, are not covered by this Standard. These methods are given e.g., in ENV 1991-2-4 or other relevant national application documents.

2. In most of these documents, the base wind speed is often stated as an average speed over a period of time, and this average speed should not be confused with the peak wind speeds that need to be considered for the design of doors.

When definite wind load classes or pressures are not stated by the specifier, doors shall be designed to

withstand positive and negative differential pressures. In deviation from this requirement, doors to be installed in a facade shall at least comply with class 2 of EN 12424.

When a door has to resist different wind loads at different heights, it may be designed to achieve different wind load classes at different levels.

Resistance of a door to differential pressure shall be determined in accordance with the methods specified in EN 12444, by a full-scale test, or by a model test, or by a component part test and extrapolation, or by calculation.

Different safety factors shall be used depending on whether test or calculation is the basis of the design. These factors, specified in EN 12604, EN 12444 and EN 12424, are correlated in Annex C.

3. It is recommended that user instructions should contain a warning stating that the operation of the door can be dangerous under windy conditions.

4.4.4 Noise

Direct airborne sound insulation performance capabilities, when required, shall be determined in accordance with ISO 140-3.

The test results shall be evaluated in accordance with ISO 717-1.

4.4.5 Thermal resistance

Thermal resistance for a completely assembled door shall be tested or calculated in accordance with EN 12428 and annex B.

Thermal resistance is expressed by the U-value [$\text{W/m}^2\text{K}$] as result of the test or the calculation.

NOTE - The calculation rules do not take into account any effects of solar radiation or heat transfer caused by air permeability.

4.4.6 Air permeability

Air permeability for completely assembled doors related to the overall area and considering the opening joints shall be tested or calculated in accordance with EN 12427.

The results of tests or calculations shall be expressed in terms of the technical classes specified in EN 12426.

4.4.7 Durability of the performance characteristics

Where specific product characteristics of thermal insulation, air permeability and resistance to water penetration shall be declared, the design features (including seals, hardware and insulation material, where applicable) shall be included into the durability test in accordance with EN 12605:2000, 5.2. Where necessary, the particular elements shall be replaced during the test at the frequency defined in the manufacturer's maintenance instructions. Wear and tear of these design features shall be visually checked during the test at intervals not less than those at least as specified in EN 12605:2000, 5.2.4.1.

NOTE - Endurance against chemical or biological attack is not specified unless given in the particular material standards.

4.5 Instructions for installation, operation and maintenance

Suitable instructions shall be provided by the manufacturer to ensure that doors can be properly assembled, installed, operated, maintained and dismantled in a safe manner, in accordance with the requirements of EN 12635:2002, 4.1.1.1.

The manufacturer shall specify the main wearing parts of the product, their discard criteria, the requisite actions and maintenance intervals in the maintenance instructions.

Components such as seals, hardware and insulating material that can be impaired by wear or ageing shall be designed to be replaceable.

5 Marking and labelling

Each door shall be provided with a permanently attached and easily readable label giving at least the following information:

- a) manufacturer or importer (name/ contact details i.e., code or address);
- b) door type;

- c) series number/ unique door reference number;
- d) year of manufacture;
- e) any legal marking.

NOTE

1. Legal marking includes marking with “tbs” mark.

These details shall also be given in the accompanying handover documentation together with additional performance characteristic details in accordance with EN 12635.

2. A form for designation and classification of performances is shown in Annex A which contains the specific data.

6 Evaluation of conformity

6.1 General

The evaluation of conformity shall be based on initial type testing according to 6.2 or on-site testing according to 6.3, and on factory production control to ensure that variability of production is kept within controlled limits.

Where a door is the result of an in-situ assembly of products provided by several manufacturers or suppliers the installer is assumed to be the manufacturer in accordance with this Standard.

Replacement components which are identical to the original ones used for the type testing may be exchanged without affecting the evaluation of conformity. Where alternative and/or additional components are put in which may affect the declared characteristics, the evaluation of conformity shall be reviewed for applicability.

6.2 Initial type test

An initial type test shall demonstrate conformity of the test specimen with all the requirements stated in 4.2, and for power operated doors with those stated in 4.3, and for additional characteristics with the relevant parts of 4.4.

Initial type tests of a specimen or specimens representative of the product or the product type shall demonstrate that the required values and properties are achieved.

Specimens to be tested shall be selected in such a way that the test results are valid for the product type.

When test results derive from tests carried out on products of dimensions different from those of the test specimen(s), the relevant test method shall be observed, otherwise the following shall apply:

- a) General: Test the most unfavourable size in the most unfavourable arrangement (with windows and pass-doors incorporated in the moving door leaf, etc.) for each product type. The test results obtained can then be applied to all more favourable arrangements and to all smaller sizes in the particular product design.
- b) Resistance to water penetration and air permeability: Test results deriving from the most unfavourable arrangement with at least the minimum size specified in this Standard shall be applicable to doors with more favourable arrangements and to all smaller and larger doors for the particular design criteria and product type.
- c) Thermal resistance: Specific information are given in Annex B.

6.3 Test on site

The test on site is only applicable to power operated doors which are produced by the subsequent addition of a drive unit in order to declare conformity of the installed product with the requirements specified in 4.2.3, 4.2.8 and 4.3.

6.4 Production control

A permanent internal control of production shall be exercised by the manufacturer.

All elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies, procedures and instructions.

The adopted production control system shall ensure a common understanding of quality assurance. It

shall also enable the repeated achievement of the required characteristics.

All results of Factory Production Control (FPC) tests and inspections, carried out according to a test plan shall be recorded. These records shall show clearly whether the product has fulfilled the defined acceptance criteria. Where the product fails to fulfil the acceptance measures, the provisions for non-conforming products apply.

The adopted production control system shall furthermore ensure the effective operation of the production control system to be checked.

The FPC system documentation shall at least address the following:

- a) specification of tasks and authorities;
- b) specification of the structure of the system documentation;
- c) specification and verification of raw material and components;
- d) identification and traceability of products;
- e) documented procedures and instructions related to FPC;
- f) control of FPC related records;
- g) design control;
- h) identification of inspections and tests to be carried out;
- i) identification of necessary equipment for inspections and tests;
- j) treatment of non-conforming products;
- k) carrying out corrective actions.

All records of the system shall be stored in a safe and proper way for a minimum period of 10 years.

The installation control system shall be part of the factory production control, when manufacturers complete their own installation.

NOTE - When installation with the need of trained installers is carried out by a separate organisation and where installation has influence on the final performance of the product, installation should be covered by a separate control system.

Annex A
(informative)

Form for designation and classification of performances

Table A.1 Designation and classification of performances

Clause in this TZS	Characteristics	Units	Performance value / designation							
4.4.1	Resistance to water penetration	-	Class ^a	0	1	2	3			
4.2.9	Release of dangerous substances	-								
4.4.3	Resistance to wind load	Pa	Class ^a	0	300 1	450 2	700 3	1000 4	>1000 5	
4.4.4	Direct airborne sound insulation	dB (A)	value:							
4.4.5	Thermal resistance	W /m ² K	value:							
4.4.6	Air permeability	m ³ / m ² h	Class ^a	0	24 1	12 2	6 3	3 4	1.5 5	<1.5 6
4.2.4 and 4.4.7	Durability of mechanical and performance characteristics	-	Number of cycles:							
^a The classes are technical classes.										

Annex B (normative)

Procedure for the determination of values for thermal resistance

B.1 Introduction

The test method and/or calculation of the thermal resistance of doors covered by Clause 1 of this European Standard is specified in 4.4.5 with a reference to EN 12428.

The particular test method and calculation specified in EN 12428 may not lead to an equivalence of declared value evaluation as the referenced methods are more applicable to windows and pedestrian doorsets where a casement frame is rigidly fixed into the frame or door aperture. For this reason, the following procedure of evaluation, based on EN 12428, shall be followed to enable comparable declared values to be achieved.

B.2 Procedure

The following steps shall be taken:

- Step 1: Test, in accordance with ISO 12567-1, a complete test specimen of a door and associated tracks, fixings and seals using full size components but constructed to the nearest size to fit into or behind a prepared opening between the size of 2.0 m wide x 2.0 m high and 2.5 m wide x 2.5 m high. This test specimen shall be mounted within or behind the prepared opening in a manner in which it would normally be installed.
- Step 2: Test, in accordance with ISO 12567-1, the door leaf section only as specified in step 1. For this test, the door leaf shall be mounted within the structural aperture and completely sealed to the opening in order to prevent any edge leakage. This can be evaluated to a heat loss of A [W/m²K] for the area tested.
- Step 3: Deduct the total loss as a result of test 2 from that of test 1. This will give the effective heat loss through the perimeter detail of the actual installed door in test 1. The resultant heat loss can then be evaluated to a heat loss B [W /m²K] for the perimeter.
- Step 4: Some door types are likely to require the supply of windows as part of the door leaf. The different heat loss through the window and its supporting frame structure shall be evaluated by testing, in accordance with ISO 12567-1, a piece of a door leaf X [m²] which incorporates a window of normal size, fixed and sealed in a normal manner. The section of the door leaf shall be completely sealed into an aperture in the same manner as for test 2. The resultant heat loss can be evaluated to C [W/m²K] for the X [m²].
- Step 5: Some door types are likely to require the supply of a pass door built into the main door leaf. The different heat loss through the pass door and its surrounding frame structure shall be evaluated by testing, in accordance with ISO 12567-1, a piece of door leaf Y [m²] which incorporates a pass door of normal size, fitted and sealed in a normal manner. The section of door leaf shall be completely sealed into an aperture in the same manner as for test 2. The resultant heat loss can be evaluated to D [W/m²K] for the Y piece.

From the results of the above five steps the thermal resistance of any size of product, with any number of windows, of the size tested, with or without a pass door, of the size tested, can be evaluated.

EXAMPLE A door 5 m wide x 4 m high door with two windows and one pass door:

where

- thermal transmission of door leaf is $5 \times 4 \times A = 20A$
- thermal transmission of perimeter is $(5 + 5 + 4 + 4) \times B = 18B$
- thermal transmission of two window sections is $2 \times C \times X = 2CX$
- thermal transmission of X m² replaced door leaf is $2 \times A \times X = 2AX$
- thermal transmission of one pass door section is $1 \times D \times Y = DY$
- thermal transmission of Y m² replaced door leaf is $1 \times A \times Y = AY$

Hence, for the complete door where thermal transmission is thermal transmission of the door leaf

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- + thermal transmission through perimeter
- thermal transmission of door leaf area to be replaced by window sections
- + thermal transmission of two window sections
- thermal transmission of door leaf area to be replaced by pass door sections
- + thermal transmission of pass door section which results in the following formula:

$$20A + 18B - 2AX + 2CX - AY + DY \quad (1)$$

This total heat loss W shall be evaluated against the size of the structural aperture to give a declared value in W/m²K, i.e.

$$\frac{20A + 18B - 2AX + 2CX - AY + DY}{5 \times 4} [W/m^2K] \quad (2)$$

If alternative sizes of windows or pass doors or other inclusions are offered, then each shall be tested in accordance with the principles of steps 4 and 5.

Annex C (informative)

Safety factors to be considered in door design in respect of their resistance to wind load

Table C.1 shows the related test loads, the ultimate failure loads (applicable to tests only) and the calculation loads for each design class given in EN 12424:

Table C.1 Safety factors for wind load

Class	Design load (Pa)	Test load (Pa)	Ultimate failure load (Pa)	Calculation load (Pa)
1	300	330	415	450
2	450	495	620	675
3	700	770	965	1050
4	1000	1100	1375	1500
5	> 1000	design load X 1.1	test load X 1.25	design load X 1.5

The terms are understood as follows:

- design load: reference wind load classification values as stated in Table 1 of EN 12424:2000;
- test load: load to be applied when testing without permanent deformation which results in a classification load x factor 1.1 (see BCDC 15 (109)/ EN 12604);
- ultimate failure load: load to be applied when testing with permanent deformation, but the door stays in place which results in a classification load x factor 1.1 x 1.25 (see BCDC 15 (109)/ EN 12604 and EN 12424);
- calculation load: load to be considered for calculation based on yield stress which results in a classification load x factor 1,5 (see BCDC 15 (109)/ EN 12604).