International Standard 8272

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Doorsets — Air permeability test

Blocs-portes — Essai de perméabilité à l'air

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8272 was prepared by Technical Committee ISO/TC 162, *Doors and windows.*

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Doorsets — Air permeability test

0 Introduction

The procedure specified in this International Standard corresponds as closely as possible to that in ISO 6613, *Windows and door height windows — Air permeability test.*

1 Scope and field of application

This International Standard specifies a method for the determination of the air permeability of doorsets to be fitted in exterior walls and supplied in the form of completely assembled and finished units.

It applies to all doorsets, made of any material, in the normal operating condition for which they are designed and installed according to the manufacturer's recommendations as in a finished building, bearing in mind the conditions of test as defined below. It does not apply to the joints between the doorsets and surrounding components and material.

2 Reference

ISO 1804, *Doors — Terminology.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 1804, together with the following, apply.

3.1 pressure differential: Difference between the absolute air pressure on the external surface of a doorset and the absolute air pressure on the internal surface of the same doorset.

The difference is positive when the external pressure is higher than the internal pressure. In the opposite case, it is negative. The pressure differential is expressed in pascals [1].

3.2 air permeability: The property of a closed doorset to let air pass when it is subjected to a differential pressure.

The air permeability is characterized by a flow of air, in standard conditions expressed in cubic metres per hour as a function of the pressure. This flow may be related to the opening surface area of the doorset (flow per unit of surface area in cubic metres per hour per square metre), or to the length of opening joints (flow per unit of length in cubic metres per hour per metre), or to the total surface area of the doorset (flow per unit of surface area in cubic metres per hour per square metre).

3.3 door leaf area: Any part of a door that can be moved within the main frame.

By convention, the door leaf area is equal to the apparent surface, seen from inside, and is calculated from the dimensions used for determining the length of joints.

3.4 length of joints: The sum of all perimeters of all opening leaves contained in the test specimen, based on overall dimensions of the apparent surface of such parts, seen from inside.

Where two such movable parts meet, the two adjacent lengths of perimeter are counted as only one length.

3.5 specimen area: The area calculated from the overall dimensions of the test specimen.

3.6 standard conditions: For the purpose of this test the following are considered to be the standard conditions for determining air flow:

temperature: 20 °C

pressure: 101,3 kPa

air density: 1,202 kg/m^3

NOTE — Some materials require an additional test of the doorset. Such tests are carried out with different outside and inside temperatures.

4 Principle

Mounting the doorset in a chamber and subjecting one face to increasing pressure. Determination of the rate of flow of air through the chamber at the various pressures.

1) 1 Pa = 1 N/m^2

5 Apparatus

The basic test apparatus consists of the following.

5.1 Chamber, with an opening in which the doorset can be fitted by means of its frame.

5.2 Means for producing a controlled differential air pressure across the doorset.

5.3 Device for rapid controlled changes of the differential air pressure, operating between defined limits.

5.4 Means for measuring the flow of air into or out of the chamber.

5.5 Means for measuring the difference in pressure between the two faces of the doorset.

6 Test specimens and preparation for testing

6.1 When a doorset contains a glazed area, the thickness, type of glass and method of glazing shall comply with the requirements of the manufacturer.

6.2 Prepare a surround for the specimen to be tested. This shall be sufficiently rigid to withstand the test pressures without deflecting to an extent likely to impair jointing or to impose bending stresses on the test specimen. When the installation conditions are known, the specimen shall, whenever practical, be installed to simulate these.

6.3 Fix the doorset vertically, square, and without twists or bends.

6.4 Clean and dry the doorset (free of surface water) entirely.

7 Preparation for test

7.1 Measure the air temperature of the laboratory and the test chamber and record it in the test report.

7.2 Apply three air pressure pulses, the rate of application being over a period of not less than 1 s. Maintain each pulse for at least 3 s.

These pulses shall be at a pressure 10 % higher than P_{max} required for the test, without however being less than 500 Pa.

7.3 Reduce the pressure to zero, open and close all the operating parts of the doorset five times and finally secure them in the closed position. The closed position shall be defined in the test report.

7.4 Extraneous permeability of the apparatus shall be accounted for and preferably eliminated. Extraneous chamber permeability, when measured, shall be determined with the test specimen sealed, at the air pressure differences to be exerted during the test itself.

7.5 The metering equipment used for measuring the air permeability of the doorset may be used for measuring the extraneous permeability, or it may be necessary to provide additional air metering equipment.

7.6 The method adopted to measure specimen permeability and extraneous permeability shall be clearly stated in the test report.

8 Procedure

8.1 Subject the doorset to a positive pressure increasing in stages for a minimum period of 10 s at each stage up to the maximum pressure required for the test.

The pressures at these stages shall be 50, 100, 150, 200, 300, 400, 500 and 600 Pa and may then be increased in steps of not more than 100 Pa if the pressure required for the test is, exceptionally, greater than 600 Pa.

8.2 Apply the pressures in the reverse order.

NOTES

1 If it is required to test a doorset for air permeability in the reverse direction, i.e. under negative pressure, the same method should be used. This is a general test method and, as far as doorsets are concerned, the actual test pressures will be established in performance standards.

2 The diagrams in figures 1 and 2 show the sequence of operation for

a) a required pressure P_{max} less than 600 Pa, for example of 300 Pa (see figure 1);

b) a required pressure P_{max} greater than 600 Pa, for example of 700 Pa (see figure 2).

9 Expression of results

For each doorset tested, the recorded volume of air passing through the specimen shall be adjusted to the volume of air passed under standard conditions using the formula

$$V_{293} = \frac{293}{101,3} \times \frac{pV}{T}$$

where

p is the barometric air pressure, in kilopascals;

V is the measured volume of air passed in cubic metres per hour;

T is the temperature in kelvins, of the air.

The air permeability shall be expressed in cubic metres of air per hour, relative to at least in one of the following:

- per square metre of specimen area of the doorset;
- per square metre of door leaf area;
- per metre of length of joints.

Any other relevant information (for example letter-box and keyhole) shall be recorded in the test report.

One or more graphs shall be plotted representing this data and shall be included in the test report.

10 Test report

The test report shall include the following information:

a) detailed information concerning the type, the dimensions, shape, construction and finish of the door and of its frame, including details of glazed parts and a description of the hardware used;

b) manner of closing the door;

c) air flow reading at each pressure, both while increasing and decreasing the pressure, and the higher of the two readings at each pressure.

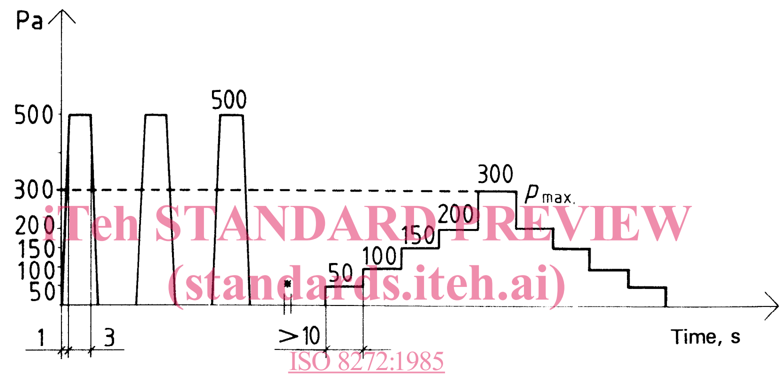

Figure 1 — Example of P_{max} lower than 600 Pa

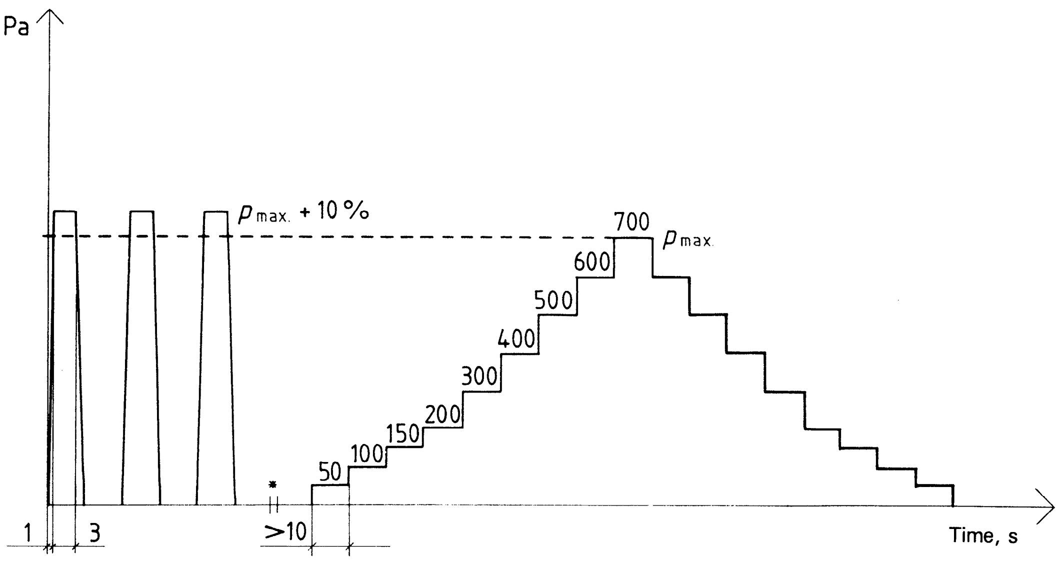

Figure 2 — Example of P_{max} higher than 600 Pa

* Indicates opening and closing

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