INTERNATIONAL STANDARD

ISO 8274

Second edition
2005-10-15

Windows and doors — Resistance to repeated opening and closing — Test method

Fenêtres et portes — Résistance à l'ouverture et fermeture répétée — Méthode d'essai

Reference number
ISO 8274:2005(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 8274 was prepared by Technical Committee CEN/TC 33, *Doors, windows, shutters, building hardware and curtain walling* (as EN 1191:2000) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 162, *Doors and windows* in parallel with its approval by the ISO member bodies.

This second edition cancels and replaces the first edition (ISO 8274:1985) which has been technically revised.

Throughout the text of this document, read “...this European Standard...” to mean “...this International Standard...”.

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 33 "Doors, windows, shutters, building hardware and curtain walling", the secretariat of which is held by AFNOR**.**

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2000, and conflicting national standards shall be withdrawn at the latest by August 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.

This draft standard describes one of the test methods that are called up in the product standards for windows and doors.

No existing European Standard will be superseded.

Introduction

The test method described in this standard provides information on mechanical durability and not on durability related to environmental erosion or corrosion of the materials or their finishes.

1 Scope

This standard specifies the method to be used to determine the mechanical durability of doorsets and the opening parts of windows after a defined number of operating cycles.

It applies, whatever their construction materials and operating systems, to any window or any door in the form of complete assemblies in normal operating conditions.

The parts concerned in the testing are the frame, the opening elements (including any secondary elements) and all essential hardware, including operating devices. It does not include any additional fasteners such as pegstays or cabin hooks, nor any independently installed restrictor.

In this standard, it is assumed that the operating cycle imparts movement to ancillary items such as hinges, stays, balances and other mechanisms.

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.

prEN 12046-1:1996 Operating forces - Test method - Part 1: Windows
prEN 12046-2:1999 Operating forces - Test method - Part 2: Doors

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 cycle: Set of operations involving the opening of a casement, sash or leaf, including the release of any fasteners fitted, moving open to the required extent, returning to the closed position and the re-engaging of any fasteners.
3.2 operating device: Item of hardware enabling user to release and move a casement or leaf.
3.3 operating equipment: Part of test apparatus used to activate the operating device.

3.4 reference velocity: When casements, sashes or leaves are moved by linear movement, the reference velocity is the actual velocity of the moving parts. When leaves or casements are moved by rotation, the reference velocity is that which can be measured on the closing edge of the member to which is attached the operating device used to carry out the test. Reference velocity is measured in metres per second (m/s.)

3.5 rest time: Time in seconds of a stationary period, either between two changes of direction of movement or between two cycles.

3.6 datum points: Measurement reference points located at 50 mm from each corner of any casement, sash or door leaf on any joint between moving elements.

4 Principles of test

4.1 General

The test specimen has its fasteners released, its casement, sash or leaf is opened to the required resting position, is brought to the closed position and its fasteners secured again before a final rest. This cycle is repeated for the specified number of times or until failure occurs. The duration of each cycle depends upon the stroke (itself depending upon the mode of operation of the specimen), upon the reference velocity, and upon the operations carried out during a cycle (see figures 1 and 2).

NOTE If the test specimen can be operated in more than one mode, e.g. tilt and turn, each may be tested completely and separately on the same specimen, the more frequent mode being addressed first, or the two modes may be tested alternately in a continuous cycle.

4.1.1 Stroke

Side hung casements and leaves are operated from the closed position to an open position of 90° ± 10°, or to the stopping position of the restrictor or closing device if this occurs at less than 90°. For other modes of operation, casements, sashes or leaves are operated from the closed position to the full opened position unless specified otherwise. However the stopping position shall not be less than 60% of the fully open position.

Unless otherwise specified, dynamic forces shall be applied at both ends of the stroke.

4.1.2 Reference velocity

If the casement, sash or leaf is manually operated, the reference velocity shall be (0,5 ± 0,05)m/s if the moving part has a mass not exceeding 400 kg, and (0,2 ± 0,02)m/s if the moving part has a mass exceeding 400 kg, unless, for special purposes, the velocity is defined by the relevant standard.

If the casement, sash or leaf is mechanically operated during either a part or the whole of the cycle, and if the velocity is adjustable, the reference velocity shall be set as defined above. If not adjustable, the reference velocity shall be the actual velocity allowed by the system.

4.1.3 Force to operate fasteners

For manually operated fasteners, the force applied by the operating equipment shall be (50 ± 10) % higher than the initial measurement of operating forces necessary to release and secure the fasteners, determined in accordance with prEN 12046-1:1996 or prEN 12046-2:1999.

For motor operated fasteners (either partly or totally) the amplitude of the force shall be that set by the mechanism itself.

4.1.4 Opening phase

The fasteners are released by the operating equipment and the casement, sash or leaf is set into motion as continuously as possible, so as to reach the reference velocity within the range 20° to 60° or 20% to 60% of the stroke of the casement, sash or leaf, and continuing at this velocity to the end of the stroke.

4.1.5 Rest time in open position

The rest time shall not be greater than 4 s for manually operated casements or leaves. For motor operated casements, sashes or leaves, the rest time shall be established with the manufacturer before the test.

4.1.6 Closing phase

The casement, sash or leaf is set in motion from the open to the closed position in the same manner as described in 4.1.4. Manually operated casements, sashes or leaves shall come to a stop on the closing member of the frame at reference velocity.

If allowed by the mechanism, motor operated casements, sashes or leaves are also brought to a stop on the closing member of the frame.

In the closed position the fasteners are secured by the operating device unless the operation is carried out automatically.

4.1.7 Rest time in closed position

The rest time in the closed position shall be as described in **4.1.5**.

4.2 Special cases

4.2.1 Double leaf, single swing doors without panic function

The primary leaf is operated to the open position as described above, followed by the secondary leaf. The closing operation commences with the secondary leaf (see figure 3).

If there is a mechanism for regulating the closing sequence, it shall operate normally throughout the test.

4.2.2 Double leaf, single swing doors with panic function

Where there are anti-panic fittings on both primary and secondary leaves, the operating device on the secondary leaf shall be actuated first and the leaf opened to 90° ± 10°. The primary leaf, which is automatically opened by the action of the secondary leaf, is opened to an angle of at least 30°. The closing operation commences with the secondary leaf (see figure 4).

4.2.3 Double swing doors

The leaves of double swing doors shall be tested in both directions, either by separate and complete tests for each direction or by a continuous cycle in opposite directions.

5 Apparatus

5.1 Test surround

A surround shall be constructed, capable of adjustment for the size of the specimen to be tested. It shall be sufficiently rigid to withstand the test loads involved in the movement of the casements, sashes or leaves without deflecting to an extent likely to impose bending stresses or to impair jointing either of the frame or its casement, sash or leaf.

> NOTE A suitable frame would, for example, be of such stiffness that the mid-span deflection of any member likely to be loaded, would not exceed 2 mm due to the application of a 6 kN load at any point and in either direction in relation to the plane of the test specimen.

5.2 Operating equipment

5.2.1 Motion controlled actuators - hydraulic, pneumatic or electric torque and linear cylinders or any appropriate mechanisms, having features consistent with:

a) the reference velocities to be used
b) the mass of the casement, sash or leaf to be moved and the friction forces involved
c) the loads applied, if relevant, to produce dynamic forces
d) the duration of the test

e) the operating system of the test specimen.

5.2.2 Adjustable stops.
5.2.3 Cycle counter.
5.2.4 Operating element enabling operations similar to those in practice.

5.3 Measuring equipment

5.3.1 Masses and scales accurate to 2 %
5.3.2 Dynamometer and torquemeter accurate to 2 %
5.3.3 Measuring tape, accurate to 0,5 mm
5.3.4 Dial gauges and callipers accurate to 0,1 mm

6 Preparation for test

Unless otherwise specified, specimens shall be tested in their as-received condition. Test specimens shall be stored and tested in a non-destructive environment within the ranges of (15-30) °C and (25-75) % RH.

Specimens which are designed to be glazed, should be supplied for testing with all glazing carried out in accordance with the window/door manufacturer's published recommendations.

The mass of the casement, sash or leaf shall be measured prior to testing.

In respect of the type, number and position of fixing devices, the installation of the specimen in the test surround shall be consistent with its normal installation in buildings. Such fixings shall in no way hinder the operation of casements, sashes or leaves, or any hardware involved in the test.

NOTE 1 Windows or doors designed to be incorporated in, or form part of a proprietary wall or partition system, should be installed in such a system, the composite construction being fitted into the test surround.

Operating equipment shall act at the position of normal operation and where possible shall be supported by the test surround. It shall be balanced so that the dead load applied on the operating point does not increase, in any position, the weight of the operating casement or leaf by more than 5%.

NOTE 2 Unless the handle of an operating device has a safety function, it may be removed to facilitate the action of the operating equipment.

Adjustment and lubrication, in accordance with the manufacturer's instructions, shall be carried out before the test as specified.

Conducting away of any frictional heat (cooling) shall be carried out as agreed between the testing laboratory and the manufacturer.

NOTE 3 Cooling jets of compressed air, at reduced pressure and from which water droplets have been spun, may be applied to moving parts which would otherwise become overheated as a result of what may be an unusually prolonged test, when compared with the products normal everyday use.

7 Procedure

7.1 Pre-test operation

With the test specimen installed in accordance with clause 6, and before taking initial measurements, the casement, sash or leaf shall be subjected manually, or automatically if motor operated, to 5 operating cycles.

7.2 Initial measurements

The following measurements shall be taken:

a) The dead load in Newtons, accurate to 2%, applied by the operating equipment on the casement, sash or leaf.

b) The stroke of the casement, sash or leaf in degrees or millimetres for angular or linear movement.
c) Dimensions at datum points in order to establish any wear which may take place during the test.
d) The operating forces, measured in accordance with prEN 12046-1:1996 or prEN 12046-2:1999.

7.3 Testing

The stops are adjusted to determine the stroke.

The actuators are adjusted in accordance with the operation of the hardware, the reference velocity and its attainment within the specified limits, the rest times and the stroke.
The cycle counter is set to 0 and the sequence of cycles of opening and closing is started.

After every period, equal to 25% of the specified total number of cycles, or less if required by the manufacturer for lubrication purposes, the test is halted and the specimen is examined. If specified, lubrication and adjustment of the test specimen hardware is carried out, and the test is resumed in the defined conditions until the next pause.

The test is completed either when failure occurs or when the specified number of cycles has been carried out.

7.4 Final measurements

Measurements b), c) and d) of 7.2 shall be repeated.

8 Expression of results

Record:
a) the number of cycles completed
b) the stroke of the casement, sash or leaf
c) the measurements carried out in accordance with 7.2 c)
d) the operating forces measured before and after the test
e) the calculation:

$$V(\%) = 100\left(\frac{P_e}{P_i} - 1\right)$$

where: V is the percentage variation in performance
P_e is the operating force measured after the test
P_i is the operating force measured before the test

9 Test report

The test report shall include:

a) the name and address of testing laboratory and location where the test was carried out when different from the address of the testing laboratory;
b) the number, title and date of issue of this standard;
c) unique identification of the report and of each page, and total number of pages of the report;
d) name and address of client
e) date of receipt of test item and date(s) of test;
f) details of the test method and any deviation from this standard;
g) all necessary details to identify the window or door;
h) all relevant details concerning the type, specified dimensions, materials, form and construction of the window or door, and its conformity with drawings provided by the manufacturer;
i) full details of the test specimen's hardware and their fittings and fixings;
j) the mass of the tested casement, sash or leaf;
k) the dead load applied by the operating device on the casement, sash or leaf;
l) whether or not the fastening system was operated
m) the frequency of lubrication and the extent of any adjustments carried out during the test;
n) laboratory storage and testing conditions;
o) the results expressed as in clause 8;
p) details of wear or failure of the specimen and when observed.

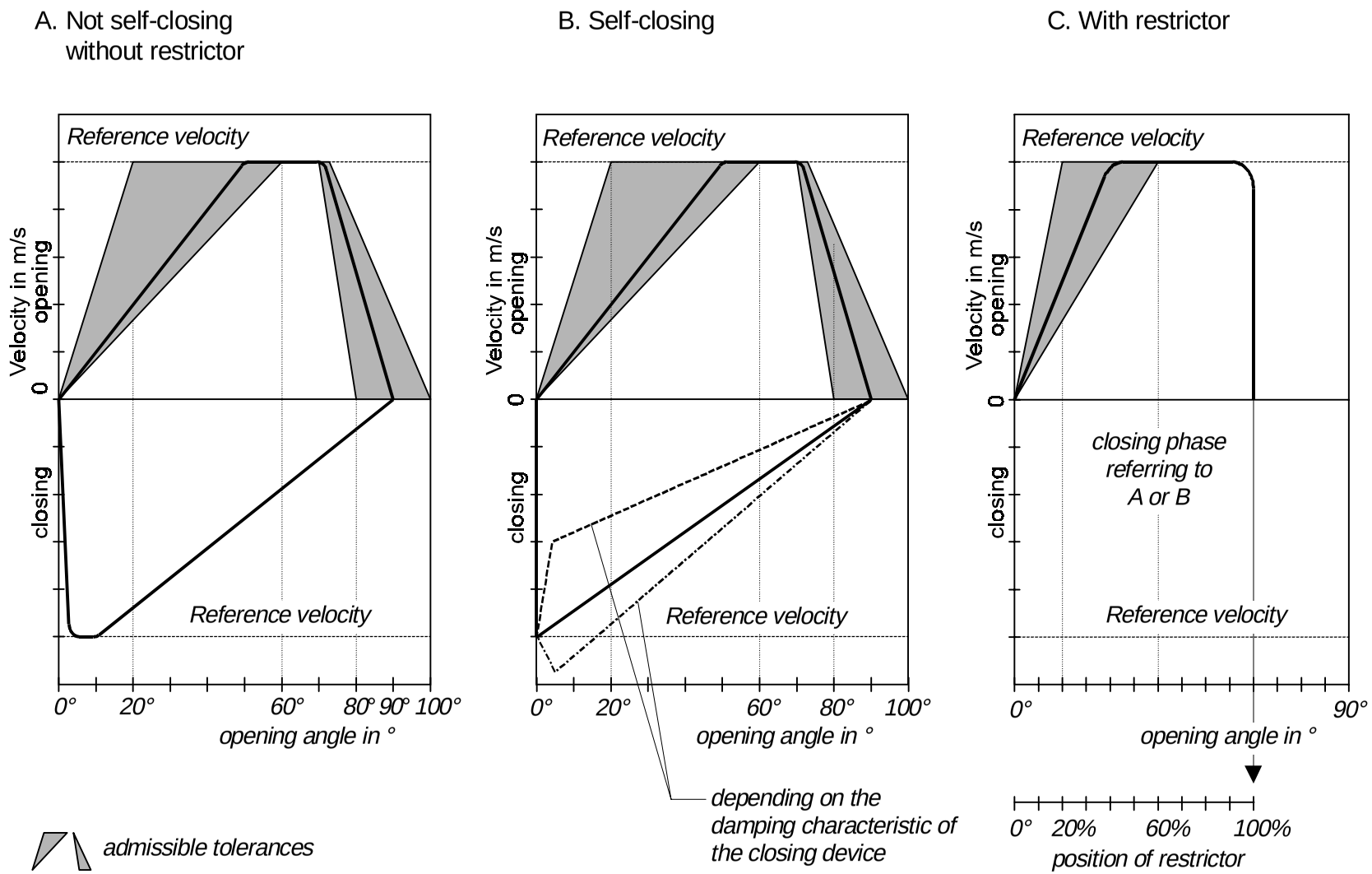

Figure 1- Testing cycle for side hung leaves or casements

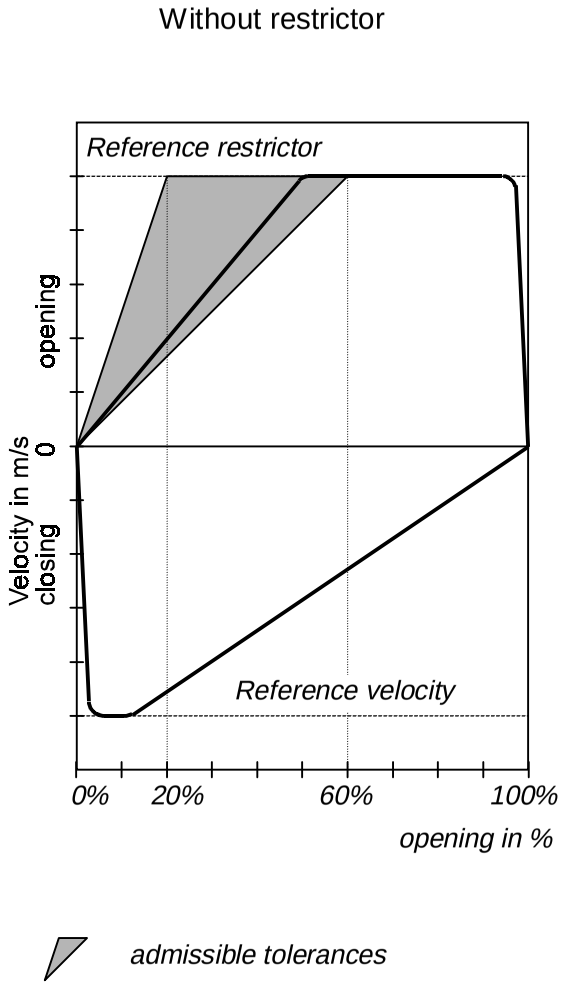

Figure 2 - Testing cycle for window/door elements other than side hung

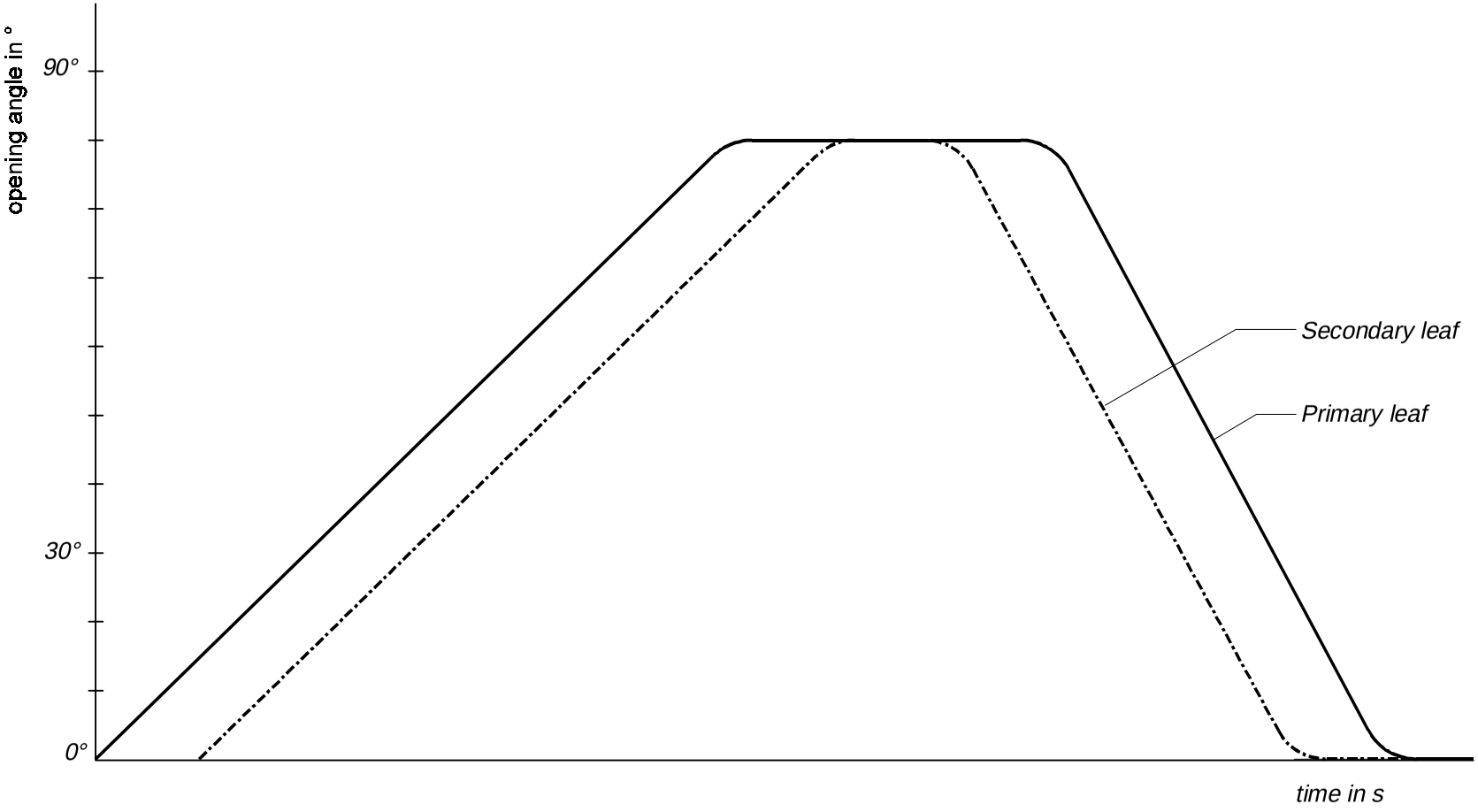

Figure 3 - Operating sequence for double leaf single swing doors without panic function

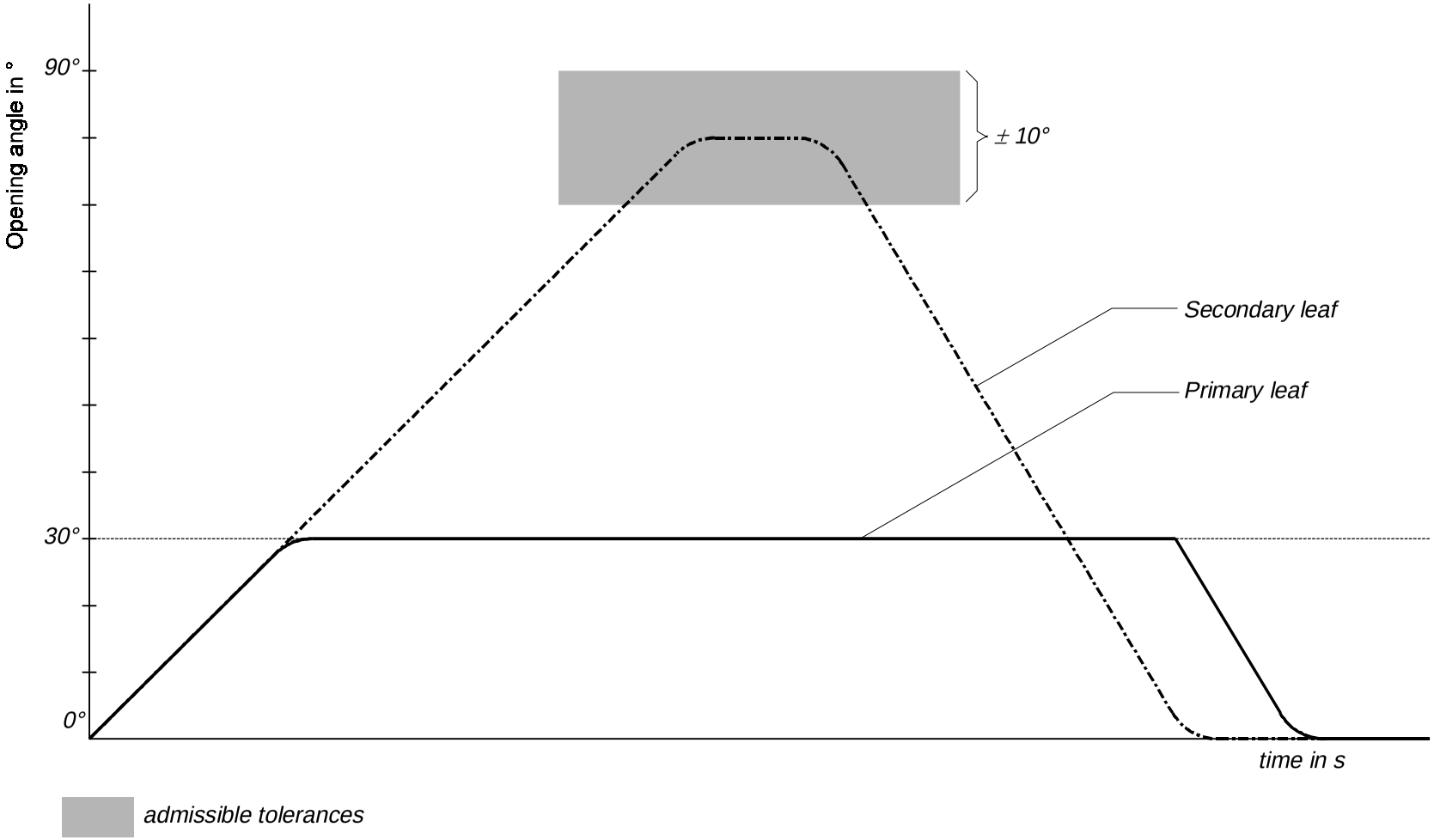

Figure 4 - Operating sequence for double leaf single swing doors with panic function

ICS 91.060.50

Price based on 9 pages