BS EN 1628:2021



BSI Standards Publication

Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance under static loading

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National foreword

This British Standard is the UK implementation of EN 1628:2021. It supersedes BS EN 1628:2011+A1:2015, which is withdrawn.

BSI, as a member of CEN, is obliged to publish EN 1627:2021, EN 1628:2021, EN 1629:2021, and EN 1630:2021 as British Standards.

However, attention is drawn to the fact that, during the development of these European Standards, the UK committee voted against the approval of EN 1627:2021, EN 1628:2021, EN 1629:2021, and EN 1630:2021, and appealed against the ratification of all four standards.

This is due to the UK committee's belief that the standards do not address all known burglary modus operandi in the UK, specifically lock-related attacks, and are firm in the belief that there is a lack of repeatability and reproducibility of testing.

These concerns remain with the revised version of this European standard. Users are to be drawn, for products meeting EN 1628:2021, to the existence of PAS 24:2022 which provides enhanced security performance requirements for doorsets and windows.

Users should note that PAS 24:2022, and other alternative standards, form the basis of a security requirement for doorsets and windows within The Building Regulations 2010, and The Building (Scotland) Regulations 2004 of England, Wales, and Scotland.

The UK participation in its preparation was entrusted to Technical Committee B/538/1, Windows and doors.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1628

June 2021

ICS 13.310; 91.060.50

Supersedes EN 1628:2011+A1:2015

English Version

Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Test method for the determination of resistance under static loading

Blocs-portes pour piétons, fenêtres, façades rideaux, grilles et fermetures - Résistance à l'effraction - Méthode d'essai pour la détermination de la résistance à la charge statique

Türen, Fenster, Vorhangfassaden, Gitterelemente und Abschlüsse - Einbruchhemmung - Prüfverfahren für die Ermittlung der Widerstandsfähigkeit unter statischer Belastung

This European Standard was approved by CEN on 19 March 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European foreword

This document (EN 1628:2021) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2021, and conflicting national standards shall be withdrawn at the latest by December 2021.

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

This document will supersede EN 1628:2011+A1:2015.

Significant changes in this revision are:

a) Updated editions of Normative References;

b) Gap gauge C in Figure A.14 replaced gauge 3 in Figure A.13.

This European Standard is one of a series of standards for burglar resistant pedestrian doorsets, windows, curtain walling, grilles and shutters. The other standards in the series are:

— EN 1627:2021, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Requirements and classification;*

— EN 1629:2021, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance under dynamic loading;*

— EN 1630:2021, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance to manual burglary attempts.*

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

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1 Scope

This document specifies a test method for the determination of resistance to static loading in order to assess the burglar resistant properties of pedestrian doorsets, windows, curtain walling, grilles and shutters. It is applicable to the following opening functions: Turning, tilting, folding, turn-tilting, top or bottom hung, sliding (horizontally and vertically), pivoted (horizontally and vertically), projecting, and rolling as well as non-openable constructions.

It is acknowledged that there are two aspects to the burglar resistance performance of construction products, their normal resistance to forced operation and their ability to remain fixed to the building. This test method does not evaluate the performance of the fixing to the building.

The manufacturer's installation instructions will give guidance on the fixing of the product.

An example for the contents of the manufacturer's installation instructions is given in EN 1627:2021, Annex A.

This document does not apply to walls and roofs, as well as for doors, 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, as covered by EN 13241:2003+A2:2016.

NOTE It is important that construction products that can be reached or driven through by vehicles are protected by appropriate measures such as barriers, extensible ramps, etc.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 356:1999, *Glass in building — Security glazing — Testing and classification of resistance against manual attack*

EN 1627:2021, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Requirements and classification*

EN 1629:2021, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance under dynamic loading*

EN 1630:2021, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Test method for the determination of resistance to manual burglary attempts*

EN 12195-2:2000, *Load restraint assemblies on road vehicles — Safety — Part 2: Web lashing made from man-made fibres*

EN 12216:2018, *Shutters, external blinds, internal blinds — Terminology, glossary and definitions*

EN 12519:2018, *Windows and pedestrian doors — Terminology*

EN 13119:2016, *Curtain walling — Terminology*

EN 13241:2003+A2:2016, *Industrial, commercial, garage doors and gates — Product standard, performance characteristics*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1627:2021, EN 12519:2018, EN 12216:2018, EN 13119:2016 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
test specimen
complete, fully functioning construction product as detailed in the scope of this document

3.2
sub-frame
standard surrounding frame into which the test specimen is mounted for testing purpose

3.3
test rig
surrounding substantial steel frame with movable steel supports into which the sub-frames containing test specimens of various dimensions can be mounted

3.4
load applicator
hydraulic ram or similar loading device that can apply the test forces required

3.5
pressure pad
pad fitted to the active end of the load applicator to spread the load

3.6
locking points
all connecting points between the opening element and the fixed element including the following:

— main lock;

— bolts of additional locks or multi-point locks;

— hinges;

— hinge bolts or dog bolts;

— fixings of fixed elements;

— roller and slide bearings in guides of sliding elements;

— junction of grille bars.

Note 1 to entry: Locating wedges are not considered to be building hardware or attachment points unless they also act as a security claw/dogbolt.

3.7
passive leaf
leaf of a multi-leafed window or door, intended to be moved after the active leaf

3.8
active leaf
leaf of a multi-leafed window or door intended to be moved first to provide opening

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4 Apparatus

4.1 Test rig

The test rig is consisting of a rigid steel frame with movable steel supports into which test specimens of various dimensions can be mounted, is shown in Annex A - Figure A.5. The stiffness of the rig shall be such that a 15 kN force applied to any of the defined points and normal to the plane of the frame shall not cause a deflection of more than 5 mm. The test rig shall not impede the execution of the test.

4.2 Load applicators

The load applicators consisting of a hydraulic ram or similar loading device shall be capable of applying the required test forces progressively and without shock.

4.3 Hooks

A hook is shown in Figure A.12.

4.4 Straps

Straps shall conform to EN 12195-2:2000 or equivalent and have a minimum tensile strength of 5 kN. These straps may be used to apply some of the loads.

4.5 Pressure pads

Pressure pads and loading equipment are shown in Figures A.6 to A.11.

4.6 Measuring equipment

The measurement equipment is consisting of the following:

a) equipment to display and/or record the forces being applied;

b) a chronometer with seconds display for measuring the loading times;

c) equipment for determining temperature and relative humidity;

d) calliper and/or depth gauge;

e) angle measuring instrument;

f) three gap gauges as shown in Figures A.13 and A.14: gap gauge A shall be 10 mm in diameter, gap gauge B shall be 25 mm in diameter, gap gauge C shall have an elliptical form with a major diameter of 250 mm and a minor diameter of 150 mm.

NOTE The various gap gauges detailed in A.10 are used to evaluate the resistance to an applied load. They represent an acceptable level of deformation of the various products above which vulnerabilities can be exposed. They are not intended to represent any particular attack method but are used as a simple method to establish failure.

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4.7 Sub-frame

The sub-frame shall simulate the support given to the product when installed into a building. It shall typically consist of the following:

a) for group 1 to group 4 products, a rectangular minimum metal tube 120 mm × 120 mm × 5 mm or a rectangular timber frame minimum 100 mm × 70 mm;

NOTE High quality wood, e.g. glue laminated timber.

b) additionally for group 3 and group 4 products, a steel tube minimum 40 mm × 40 mm × 3 mm; and a base plate of 8 mm steel, consisting of several segments which shall be removable for the purposes of loading, if necessary.

See Figures A.15 to A.32.

4.8 Tolerances

Unless stated otherwise in this document, the following tolerances shall apply to the test equipment:

Load		±5 %
Dimensions	< 20 mm	±0,5 mm
	≥ 20 to 500 mm	±1,0 mm
	≥ 500 to 2 000 mm	±2,0 mm
	≥ 2 000 mm	±3,0 mm
Angle		±2°
Time		±1 %
Temperature		±2 °C
Relative humidity		±5 %

5 Test specimen

5.1 General

Each test specimen shall be a functioning product complete with its frames, building hardware, guide rails, curtain, tube, roller box and accessories, as appropriate. When testing roller shutters at least two test specimens consisting of separate sections of the guide rails shall be supplied for test. These sections shall be 1 m in length (see Figure A.56).

The test specimen shall be fixed square and plumb and without twist or bend into a sub-frame. The manufacturer shall ensure that the method of fixing, packing supports, sealing requirements, etc. of the test specimen into the sub-frame are in accordance with their installation instructions (see Figures A.15 to A.63). The sub-frame shall be supported by the test rig so that there will be no movement of the sub-frame during the test.

NOTE Products that are intended to be installed in orientations other than vertical (e.g. roof lights) can be installed in the vertical orientation for the purpose of this test.

For the purposes of this document, the test specimen shall be glazed according to the relevant glazing resistance class of EN 356:1999, corresponding to the resistance class of the construction product according to EN 1627:2021, as shown in Table 1. The glass pane offering the highest security level, when used in an insulating glass unit, is normally positioned on the non-attack side. For the purpose of this test, the glass pane offering the highest security level shall be positioned on the attack side of the sample. Products shall be glazed in accordance with the manufacturer's specification.

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Table 1 — Glazing requirements for the test specimen

Resistance class	Minimum resistance class of glazing according to EN 356:1999 fitted on the test specimen for testing purpose
RC 1 N	P4 A
RC 1	P4 A [a]
RC 2 N	P4 A
RC 2	P4 A [a]
RC 3	P5 A [a]
RC 4	P6 B [a]
RC 5	P7 B [a]
RC 6	P8 B [a]
[a] The glazing type fitted on the test specimen shall be the type (or one of the types) used for classification purposes.	

If a glass unit with a higher security level is used within the specimen used for the tests, it may not be possible to assess the use of glass units with a lower grade within those products without conducting further tests. This is because higher grades of glass can increase the rigidity of the product.

The test specimen used in this test may also be used for the dynamic test in accordance with EN 1629:2021 and the pre-test in accordance with EN 1630:2021, provided that any damage caused by these tests will not affect the result of the pre-test (see also EN 1627:2021, Clause 11).

5.2 Preparation and examination of the test specimen

The specimen shall be stored for at least 8 hours in a temperature range between 15 °C and 30 °C until the start of the test to ensure that it is fully tempered for the test.

The test specimen and sub-frame mounted in the test rig shall be visually examined for damage, defects or other particular conditions of finish, etc. These shall be recorded.

The top of the sub-frame should be propped local to the locking points, if necessary.

Each test specimen shall be examined and the direction to disengage each locking point shall be noted.

During testing the test specimen shall be closed and locked at the declared secured condition in accordance with the manufacturer's instructions.

All locking hardware that can be disengaged from the attack side without the use of a key or tool shall be disengaged during all tests.

Products in resistance class 1 shall additionally be prepared prior to the static loading test by removing all parts on the attack side that can be unscrewed, dismounted or disassembled using the tools described in EN 1630:2021, Annex A, tool set A1. Parts must not be damaged during this procedure. The total time for this preparation procedure shall not exceed 3 min.

The parts removed during this preparation shall be recorded.

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6 Procedure

6.1 Test room climate

The test room temperature shall be maintained between 15 °C and 30 °C.

The relative humidity in the test room shall be between 30 % and 70 %.

6.2 General

The specified test loads detailed in EN 1627:2021 shall be applied in the order specified in EN 1627:2021, 7.1 at the various loading points using the load applicator. The ability of the products to resist static loading shall be assessed by means of a gap gauge, as shown in Figures A.13 and A.14.

The complete test procedure shall be carried out as shown in Annex B, Figure B.1.

Should the glass break during any tests, the test programme shall proceed with the broken glass *in situ*. Adhesive film may be applied to the glass to protect the tester.

When propping is needed, the restraint shall have a nominal contact area of 100 mm by 50 mm and offer restraint in the opposite direction to the applied load.

Where it is not possible to use the 100 mm by 50 mm prop smaller props may be used. Where a smaller prop is used, it should be as large as possible (up to 100 mm by 50 mm). The test report shall document where smaller props are used and the size of the prop.

The prop shall be located as close to the loading point as is practical, but shall not give additional support to the leaf/infill/beading under test, see Figure A.38. Load F2 is applied without propping the inactive leaf on elements with more than one leaf.

Fixed construction products and side/overpanels, that have no openable element, shall be tested in a similar manner to openable elements for group 1 and group 2 products. That is, the F1 and F3 loads will be applied to the infill and supporting frame in accordance with 6.3.1.1 and 6.3.1.3.

NOTE Side/overpanels are fanlights (EN 12519) with or without glass.

Test method for dislocation of window hardware against the locking direction, see Annex C.

6.3 Testing of group 1 and group 2 construction products

6.3.1 Loading points for group 1 and group 2 products

6.3.1.1 Loading point F1: infilling corner

The specified load shall be applied, in turn, to each corner of the infilling medium at a point as shown in Figure A.1, unless the infilling medium is circular, in which case four points shall be selected at approximately equidistant intervals around the edge. The load shall be applied in a direction to disassemble the infilling medium retention system and perpendicular to the plane of the test specimen. The F1 loads to infills will be applied with the pressure pad located nominally 5 mm from the edge of the infill, as described in Figure A.1. F1 loads on infills will be applied in the direction to disassemble the glazing/infill, i.e. loading from the outside on internally glazed windows and vice versa. Where it is unclear as to which side is the direction to disassemble the glazing/infill, e.g. cassette systems of symmetrical systems, the load will be applied from the attack side. An optional wood or plastic panel to protect the glazing may be used to prevent glass breakage.

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6.3.1.2 Loading point F2: leaf corner

The specified load shall be applied, in turn, to each corner of the leaf if the adjacent locking point has a greater distance A than 350 mm from the corner as shown in Figure A.33. If no corner exists (e.g. circular product) apply the loads half way between locking points. It shall be applied in a direction to open the leaf and perpendicular to the plane of the test specimen. The distance of a hardware loading point from a corner shall be measured from the corner of the frame rebate to the centre of that hardware loading point.

F2 loads will be applied progressively and without shock over a period of 10 s to 20 s within 5° of perpendicular to plane and will be maintained for a period of 8 s to 12 s.

6.3.1.3 Loading point F3: locking points

The specified load shall be applied, in turn, to each locking point as defined in 3.6 and shown in Figures A.2 to A.4. If the distance between two adjacent locking points is less than 200 mm then a single loading point shall be used located at the midpoint between the two locking points. The load shall be applied in a direction to open the leaf. For locking points on adjacent edges the sum on their distance from the corner shall be used. The load shall be applied in a direction to open the leaf. Where the locking point has a contact length of greater than 200 mm (e.g. piano hinge or locking bar) then a load shall be applied at each end. Once two loading points have been combined, they cannot be further combined with other loading points.

For fixed construction products and side/overpanels the specified load shall be applied, in turn, to any fixing securing the infill frame into the main frame as shown in Figure A.37 a) to A.37 b) 2).

On fixed construction products that consist of a single element secured directly to the substrate then the specified load shall be applied at:

— 200 mm intervals around the edge of the product, where a fixed product is secured using a continuous fixing system (e.g. structural sealant) as shown in Figure A.37 c) 2).

— Each fixing point to the substrate as shown in Figure A.37 c) 1).

On elements with openable parts, the fixing of the mainframe adjacent to the openable sash is indirectly tested by loading the locking points with F3.

6.3.1.4 Loading point: F3.a: locking points

The specified load shall be applied to the leaf and, where necessary, to the frame, in a direction to disengage the associated locking point as shown in Figure A.41 to A.50. The load F3.a shall be applied in the plane of the specimen and only in association with the load applied to loading point F3 and to products in burglar resistance class 1N, as defined in EN 1627:2021.

Where a separating force is required, a load shall also be applied to other parts of the product. The load F3.a shall be applied and maintained until the load applied to loading point F3 has been applied and removed.

There is no fixed correlation between the attack side and the loading direction, because in a realistic attack with tools, forces are applied in the direction of opening or contrary to the direction of assembly. The loading direction is therefore dependent on the construction and function of the test specimen. For products where both sides are considered to be the attack side then no additional static tests are necessary.

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6.3.2 Test procedure for the infill medium retention system (product groups 1 and 2)

For the purpose of this test, the leaf of the test specimen shall be restrained to resist any deflection between leaf and frame due to the loads applied to the infilling medium. The restraint shall have a nominal contact area of 100 mm × 50 mm and offer restraint in the opposite directions to the applied load.

The load F1 shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of perpendicular to plane to each corner of the infill medium. The load shall be maintained for a period of 8 s to 12 s. If the retention system exhibits any sign of disengagement at a corner, the loading test shall be continued along each section of the retention system in an attempt to defeat the system. Subsequent loads shall be applied at intervals of a minimum of 50 mm.

When propping is needed, see 6.2.

6.3.3 Test procedure for the leaf (product group 1, burglar resistance class 1)

The loads shall be applied to the points in the order shown in Figures A.33 to A.38, A.42 to A.45, A.47, A.50 and A.52. For side hung products the first point to be loaded shall be the uppermost point on the hinged side. Each subsequent point down the hinged side then along the bottom, up the locking side and across the top shall be tested in turn. The load shall be applied in a direction to open the leaf and perpendicular to the plane of the test specimen.

For products that contain two or more leaves, propping of the passive leaf shall be provided as shown in Figure A.38. The passive leaf shall be tested first.

In the case of a loading point at the corner of the leaf and without an adjacent locking point within 350 mm, the load F2 shall be applied.

In the case of a loading point requiring an inplane load F3a, this load shall be applied first. With this load maintained, the corresponding load F3 shall be applied. In the case of a loading point that requires two or more inplane loads, all these loads shall be applied and maintained before the application of the relevant F3 load.

F3.a loads shall each be applied progressively and without shock over a period not exceeding 30 s. They shall be maintained until the F3 load has been applied and maintained for the required period.

Each F3 load shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of perpendicular to the plane of the test specimen. These loads shall be maintained for a period of 8 s to 12 s.

All loads shall be removed without shock.

All loading points shall be tested unless a product failure occurs.

When propping is needed, see 6.2.

6.3.4 Test procedure for the leaf (product group 1, burglar resistance classes 2 and higher)

The test procedure for construction products in burglar resistance classes 2 and higher (product group 1) shall be as detailed in 6.3.3 except that the inplane load F3.a shall be omitted.

6.3.5 Test procedure for the leaf (product group 2, burglar resistance class 1)

6.3.5.1 Sliding door/window

The loads shall be applied as shown in Figures A.11, A.39 and A.51.

The first test shall assess the locking mechanism ability to resist a load applied at the locking points in the direction to open the sliding leaf (force axis is in plane of the leaf).

At first, the load F3.a shall be applied in a direction to disengage the locking hardware. It shall be applied progressively and without shock over a period not exceeding 30 s. With this load F3.a maintained, a second load F3 shall be applied in the direction to open the sliding leaf.

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The second load shall be applied progressively and without shock over a period not exceeding 30 s. This load shall be maintained for a period of 8 s to 12 s. After that the load F3 and subsequently also the load F3.a is removed without shock.

The second test shall assess the retention of the sliding leaf in its frame. The load F3 applied to the locking points shall be applied perpendicular to the plane of the sliding leaf at the points as shown in Figure A.39 (rectangles in the leaf corners).

In all cases, the F3 load shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of the desired direction. These loads shall be maintained for a period of 8 s to 12 s.

After that the load shall be removed without shock.

All loading points shall be tested unless a product failure occurs.

As a rule Tilt and Slide windows and Folding Sliding windows should be tested as product group 1 in the case that the design of the hardware and its initial movement to open the window is like Tilt and Turn or a Turn window (to disengage the locking mechanism).

6.3.5.2 Lift and slide door/window

The loads shall be applied as shown in Figures A.11 and A.40.

The first test shall assess the locking mechanism ability to resist a load applied at the locking points in the direction to open the lift and slide leaf (force axis is in plane of the leaf).

At first, the load F3.a (e.g. in Figure A.40 - bottom corner of the leaf to lift up) shall be applied in a direction to disengage the locking hardware and/or to lift up the leaf. It shall be applied progressively and without shock over a period not exceeding 30 s. With this load F3.a maintained, a second load F3 shall be applied in the direction to open the lift and slide leaf. The second load shall be applied progressively and without shock over a period not exceeding 30 s. This load shall be maintained for a period of 8 s to 12 s. After that the load F3 and subsequently also the load F3.a is removed without shock.

The second test shall assess the retention of the lift and slide leaf in its frame. The load F3 applied to the locking points shall be applied perpendicular to the plane of the lift and slide leaf at the point as shown in Figure A.40 (rectangles in the leaf corners).

In all cases, the F3 load shall be applied progressively and without shock over a period of 10 s to 20 s and within 5° of the desired direction. These loads shall be maintained for a period of 8 s to 12 s.

After that the load shall be removed without shock.

All loading points shall be tested unless a product failure occurs.

6.3.6 Test procedure for the leaf (product group 2, burglar resistance classes 2 and higher)

The test procedure for construction products in class 2 is as detailed in 6.3.5.1 or 6.3.5.2 except that the level of load F3.a is increased to equal the F3 load.

The test procedure for construction products in classes 3 and higher shall be as detailed in 6.3.5.1 or 6.3.5.2 except that the inplane load F3.a shall be omitted.

6.4 Failure criteria for product groups 1 and 2

The ability of the product to resist the static load shall be assessed with the use of the gap gauges. Failure shall be deemed to have occurred if the appropriate gap gauge can pass through any aperture in the test specimen either with or without the application of the test loads. Where loads are applied to loading points F1 and F2, gap gauge B shall be used to assess the deflection of the leaf. Where loads are applied to loading point F3, gap gauge A shall be used. Use of the gap gauge shall not apply additional loads to the test specimen. The gap gauge may be passed through the aperture at any angle.

Passage of the gap gauge through letter plates does not constitute a failure.

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6.5 Testing of group 3 construction products

6.5.1 Loading points

6.5.1.1 General

Loads shall be applied to the weakest points of the test specimen at the loading points F1, F1.1, F2 and F3 for the static testing of roller shutters, as described in 6.5.1.2 to 6.5.1.5 and as shown in Figures A.56 to A.59.

6.5.1.2 Loading point F1: connection between guide rail and roller curtain

Loading point F1 for roller shutters shall correspond to loading point F1 for infilling corners of doorsets and windows, as shown in Figure A.59.

6.5.1.3 Loading point F1.1: Guide rails as separate components

Loading point F1.1 is a point located on the guide rail of group 3 products. The load is applied to the guide rail as a separate component, as shown in Figure A.56.

6.5.1.4 Loading point F2: extraction of bottom lath and roller curtain

Loading point F2 for the roller curtain and the bottom lath in the middle between the guide rails, as shown in Figures A.58, shall correspond with the loading point F2 for, doorsets and windows.

6.5.1.5 Loading point F3: Lift up of roller curtain

Loading points F3 shall correspond with those at the locking points of doorsets and windows, as shown in Figure A.57. Any additional locks shall also be loaded by this method.

6.5.2 Loading direction

The loading direction for the loading points F1, F1.1 and F2, as shown in Figures A.58 and A.59 shall be dependent on the attack side (levering out of the curtain ends). Test specimens with two defined attack sides shall undergo two tests.

The loading on the loading points F3, as shown in Figure A.57, shall be applied in the direction of opening (e.g. sliding up of a roller shutter with an overhead roller tube).

6.5.3 Loading and measurement procedure

6.5.3.1 Guide rail deflection test

The guide rail deflection test shall be carried out on each guide rail submitted for test. The rail exhibiting the highest angular measurement shall be selected for the tests described in 6.5.3.2 and 6.5.3.3.

The test shall be carried out on guide rails as separate components. The installation of the guide rails shall be in accordance with the manufacturer's published mounting instructions, e.g. the cavity fills and the distance A between the fixing points of the guide rails. The leg of the guide rail on the attack side shall be loaded, as shown in Figure A.56. The load F1.1 shall be applied progressively and without shock over a period of 10 s to 20 s. It shall be maintained for 8 s to 12 s. The angular displacement shall be measured with the load F1.1 applied as shown in Figure A.56.

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6.5.3.2 Curtain lift test

The curtain lift test shall be carried out on a complete roller shutter or roller grille assembly. In order that the load can be applied the corresponding segment of the test frame base plate may be removed. The following sequence of the loading procedure shall be maintained: left - right - middle. The load F3 for roller shutters as shown in Figure A.57 and for roller grilles as shown in Figure A.62 shall be applied to the bottom section of the roller shutter or roller grille in an upward direction at the points and in the order shown in Figure A.57 or A.62. This load is not related to the attack side.

Any additional locking points – e.g. a lock in the bottom lath – shall also be loaded by this method. Under the loading F3 all parts of the lock shall remain in the locked condition.

The load should be applied in a vertical direction. This could be achieved by use of an appropriate pressure pad or by a webbing sling passed under the curtain.

6.5.3.3 Lath engagement

The minimum depth of engagement of the shutter laths into the guide rails shall be established by moving the shutter laths away from the loading point until the ends make contact with the other guide rail. The engagement shall either be measured and recorded or a reference mark shall be made on the laths.

6.5.3.4 Static test on guide rail and curtain

The required load F1 shall be applied progressively and without shock over a period of 10 s to 20 s to the side of the roller shutter laths as shown in Figure A.59. This load shall be maintained for 8 s to 12 s and the engagement under load of the shutter laths shall be measured and recorded or a second reference mark shall be used. The load shall be removed without shock. This procedure shall be repeated at the same points as shown in Figure A.59. This procedure is repeated using load F2 as shown in Figure A.58.

6.5.4 Failure criteria for product group 3

6.5.4.1 Guide rail deflection

Failure shall be deemed to have occurred if the deflection of the guide rail is more than 30° whilst the test load is applied.

6.5.4.2 Curtain lift

The deflection of the bottom section of the roller shutter shall be assessed with the use of gap gauge C. If the gauge can pass through any aperture whilst the test loads are applied, then failure has occurred.

6.5.4.3 Lath engagement

Failure shall be deemed to have occurred if the minimum engagement and the engagement under load is less than 10 mm.

6.5.4.4 Static test on guide rail and curtain

Failure shall be deemed to have occurred if the minimum engagement and the engagement under load is less than 10 mm.

6.6 Testing of group 4 construction products

6.6.1 General

Two test sequences shall be carried out on group 4 construction products. The first shall assess the ability of the product to resist forced operation of its normal opening method. The second shall assess the ability of other loading points to resist the applied loads (e.g. loading F2.2 between two junction points).

In order to define the direction and location of the test loads, the products are further grouped according to their normal operating mode.

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6.6.2 Resistance of moving elements

Products with a rigid element that requires a turning movement to open shall be tested using the methods described in 6.3.3 and 6.3.4 depending upon the burglar resistance class.

Products with a rigid element that requires a sliding movement to open shall be tested using the methods described in 6.3.5 and 6.3.6 depending upon the burglar resistance class.

Products such as roller grilles shall be tested using the methods described in 6.5.

For the loading on roller grilles, as shown in Figure A.62, the corresponding segment of the base plate has to be removed. The following sequence of the loading procedure shall be maintained: left - right - middle.

This load is not related to the attack side.

Any additional locking points – e.g. a lock in the bottom lath – shall also be loaded by this method.

For such additional locking points the pressure pad 2 can be used. Under the loading F3.2 all parts of the lock shall remain in the locked condition.

6.6.3 Resistance of other loading points

The loading points detailed in EN 1627:2021, Table 12 shall be tested. The loads also detailed in the table shall be applied in a direction to defeat the product.

If the distance between adjacent fixing points to the building is more than 1000 mm, the product shall be loaded at the midpoint of the fixing points with loading point F2.1 and F2.2 as shown in Figures A.60 to A.62.

When the distance between a junction and the nearest adjacent junction is greater than 50 mm, the junction shall be tested using the direction and points of application shown in Figures A.60 to A.62. When a product has more than 4 junctions that require testing, only 4 junctions shall be tested.

6.6.4 Failure criteria for product group 4

The product shall be assessed using gap gauge C (see Figure A.14). The product shall be deemed to have failed if gap gauge C can pass through any aperture in the test specimen either with or without the application of the test loads. Use of the gap gauge shall not apply additional loads to the test specimen. Failure shall also be deemed to have occurred if the angular deflection criteria specified in the relevant clauses is exceeded.

7 Test report

Each test specimen shall be visually inspected before and after each test and any relevant damage shall be recorded, together with all relevant assessment details and observations.

Forces shall be expressed in kilo Newton and deflections in millimetres. The assessment of the test specimen with the use of the gap gauges shall be noted and recorded.

The test report shall include at least the following details:

a) name and address of the person or body carrying out the testing;

b) name of the applicant, plus the name of the manufacturer of the test specimen, if different;

c) details of the test specimen, to include:

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1) types of construction;

2) profile references (codes, names, dimensions etc.);

3) types of materials used;

4) thickness of infilling and glazing;

5) used building hardware and its fixing.

d) designation of materials;

e) date of manufacture;

f) declared classification of glazing used in the test specimen according to Table 1 of this document;

g) declared classification of applicable hardware standards or the result of additional tests if relevant (see EN 1627:2021, Clause 6);

h) attack side(s) of the test specimen;

i) secured condition(s) during the test and the method of power supply during the testing of electromechanical hardware;

j) if the classification is RC 1 or RC 1 N, then it shall be mentioned that Toolset A1 was used to remove some parts (see 5.2);

k) dimensioned drawings of the specimen, to include the following, which shall be inspected and stamped by the testing laboratory and retained by the applicant:

1) dimensions and tolerances;

2) list of the various parts of the construction products, including precise manufacturer's designation.

l) installation instructions of the product (see EN 1627:2021, Annex A);

m) all relevant test results;

n) range of sizes covered by the test;

o) report of the condition of the specimen before the test including detailed description of any damage caused during the test (see 5.1, NOTE);

p) date of report;

q) signature of responsible person.

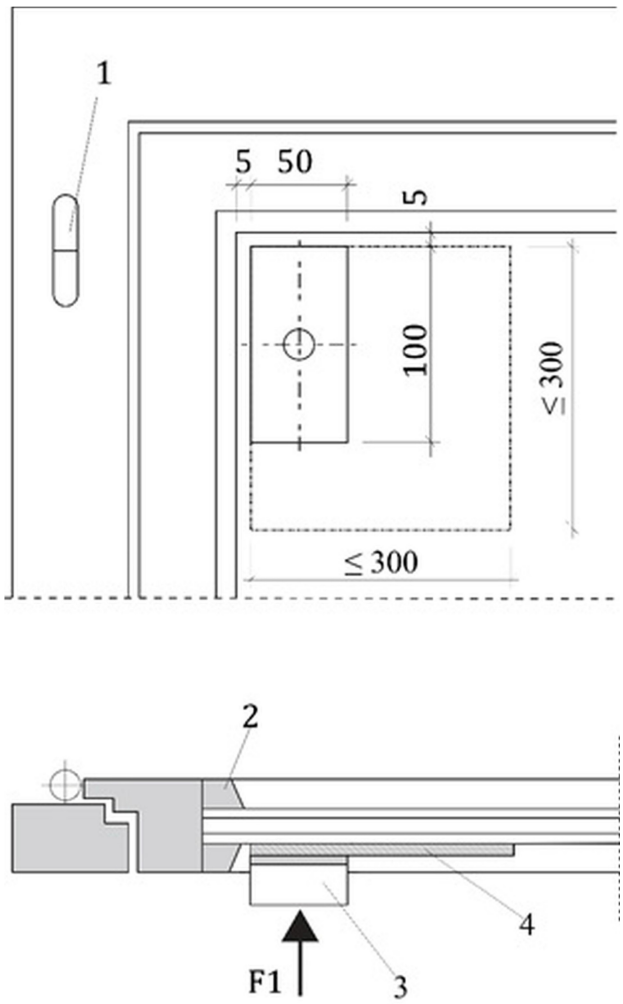
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Annex A
(normative)

Test equipment

A.1 Examples for loading points F1 and F3

Dimensions in millimetres



Key

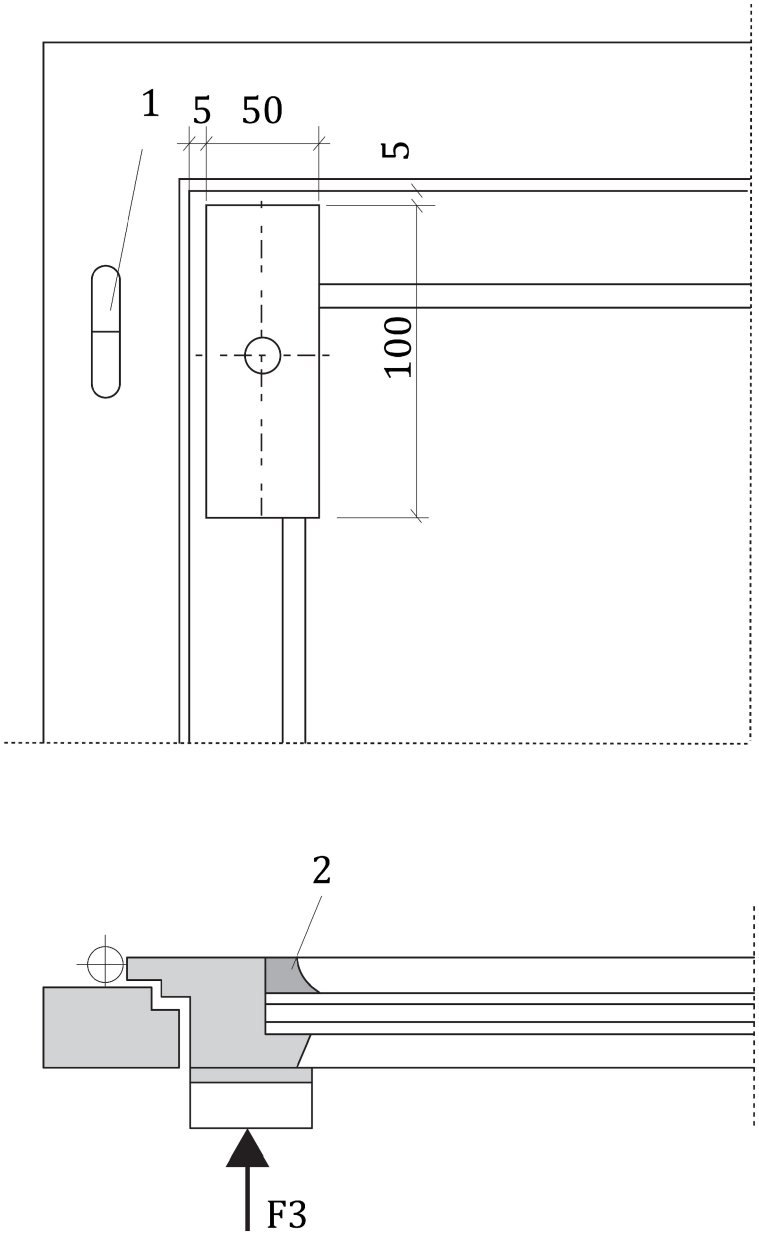
1 hinge
2 glazing bead
3 pressure pad type 1
4 glazing protection panel (optional)

Figure A.1 — Corner of infilling (F1)

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Dimensions in millimetres



Key

1 hinge

2 glazing bead

Figure A.2 — Locking point (F3)

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Dimensions in millimetres

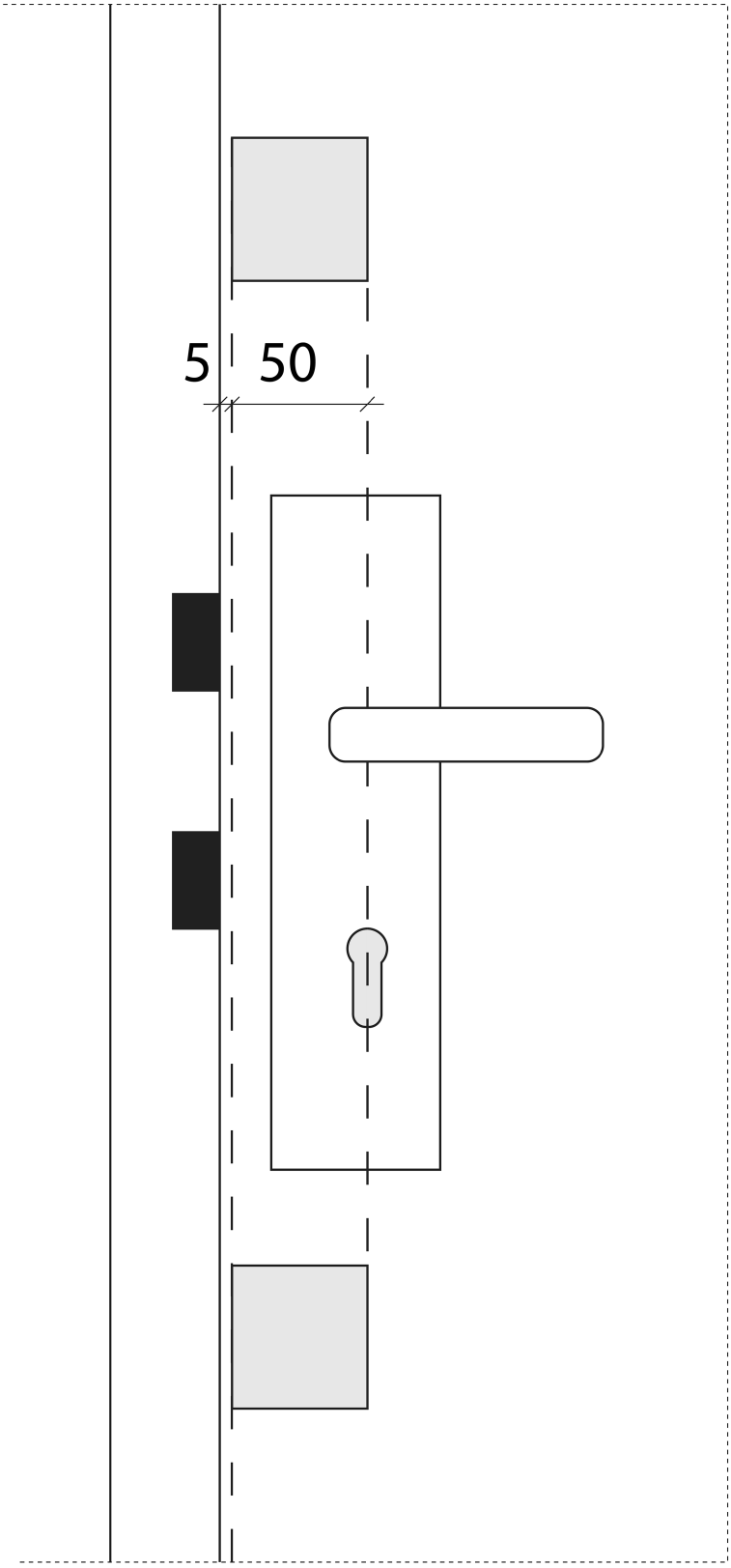


Figure A.3 — Locking point (F3)

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Dimensions in millimetres

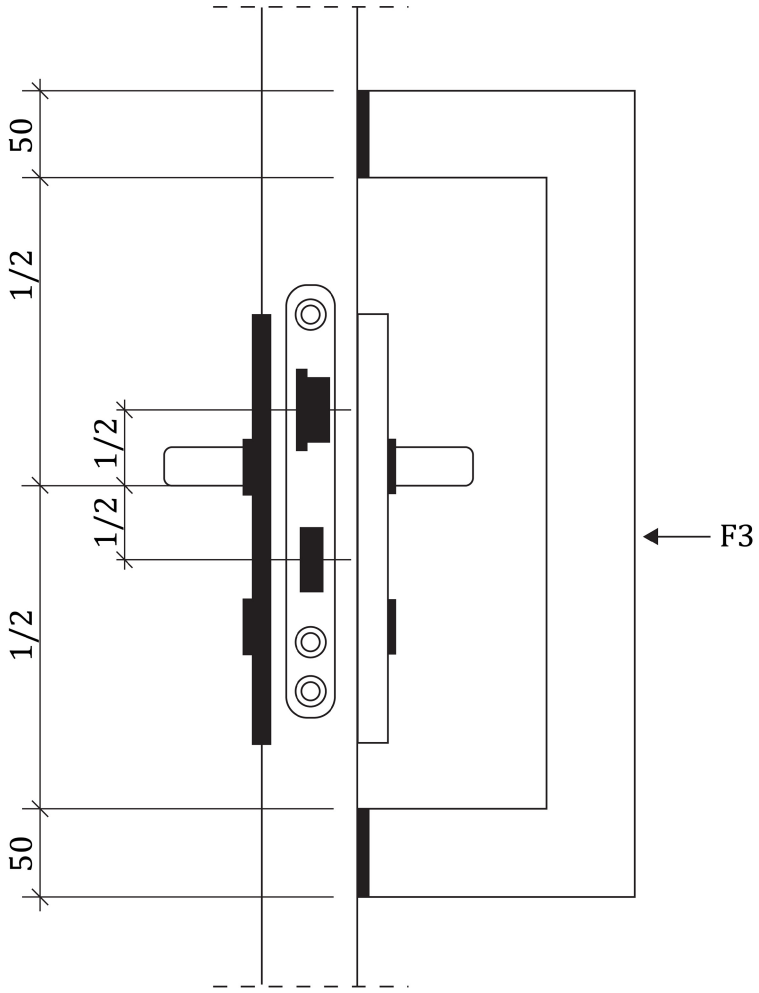
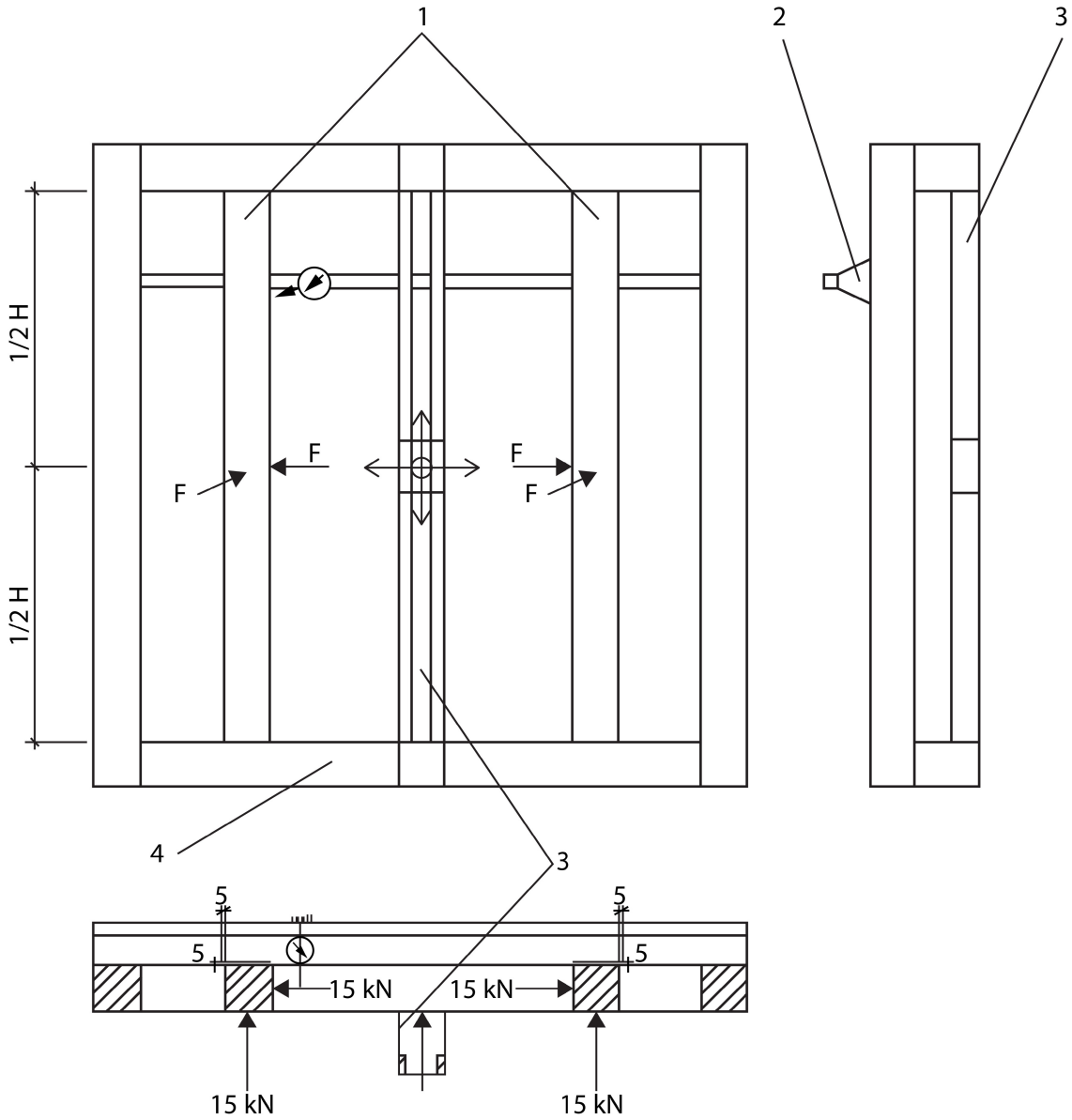


Figure A.4 — Locking point (F3)

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A.2 Example of test rig



Key

1 adjustable support to fix the test specimen
2 adjustable support to fix the measuring equipment
3 adjustable support to fix the load applicator
4 main frame

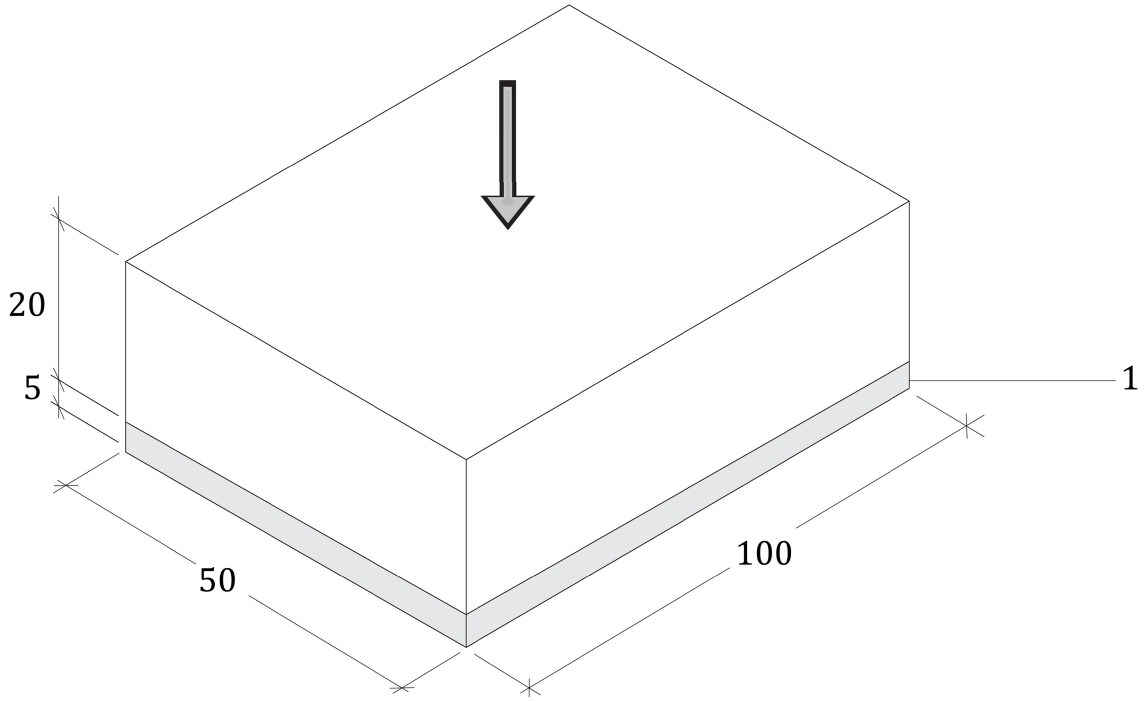
Figure A.5 — Example of a test rig

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A.3 Examples for pressure pads for doorsets, windows and shutters

Dimensions in millimetres



Key

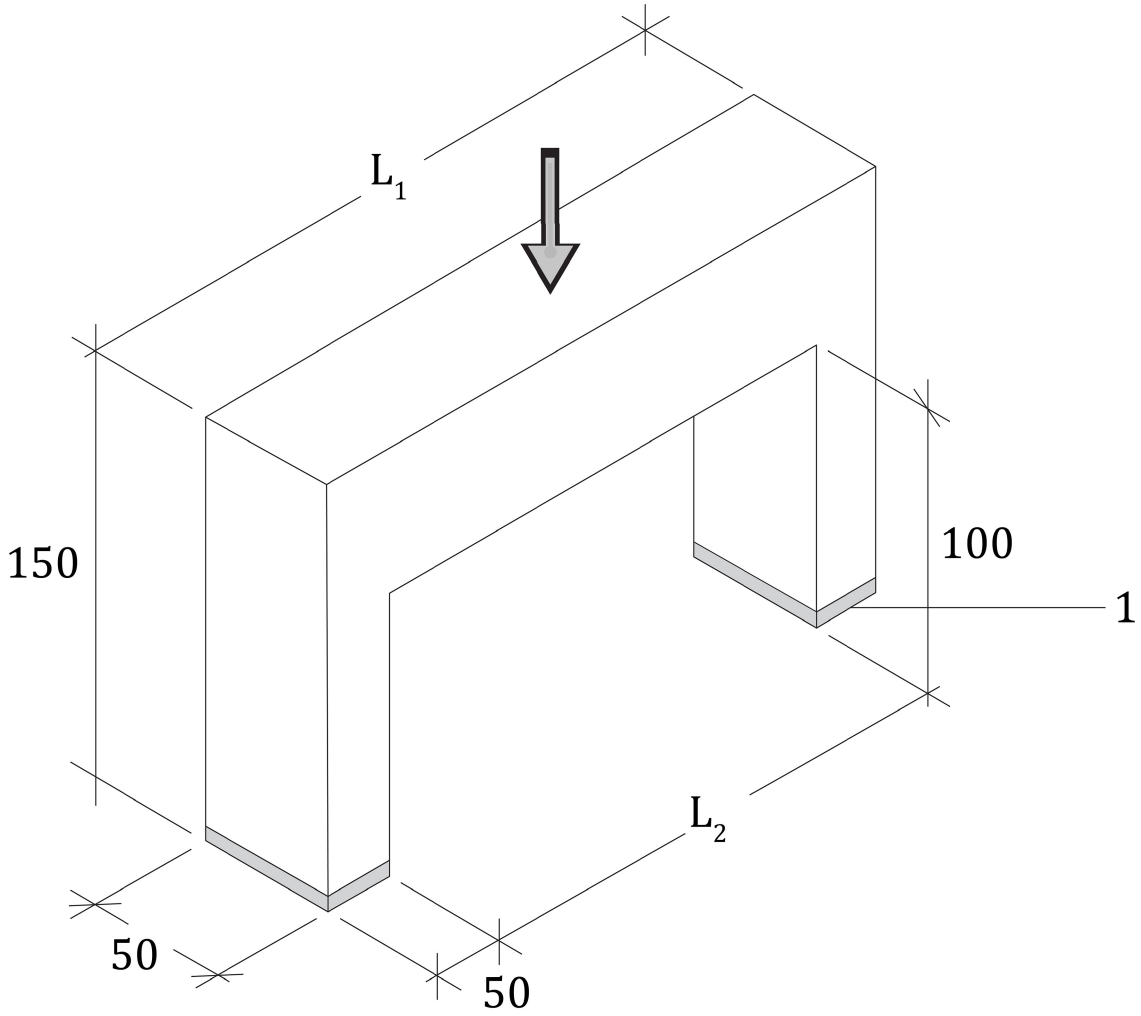
1 Nitrile rubber approximately 70° Shore

Figure A.6 — Pressure pad Type 1

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A.4 Examples for pressure pads for doorsets, windows and shutters in places where it is necessary to bridge any item of furniture or a lock

Dimensions in millimetres



Key

1	Nitrile rubber approximately 70° Shore		Pressure pad Type 1	Pressure pad Type 2
		L1	200	450
		L2	100	350

Figure A.7 — Pressure pad Type 2

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A.5 Examples for pressure pads for roller shutters

Dimensions in millimetres

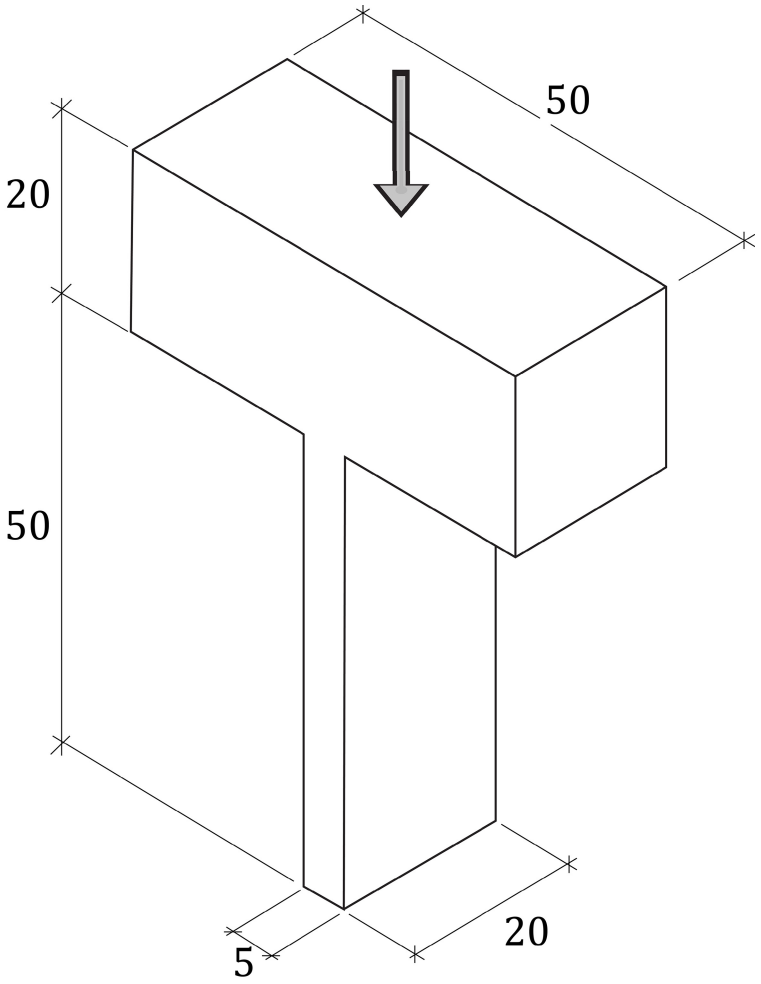
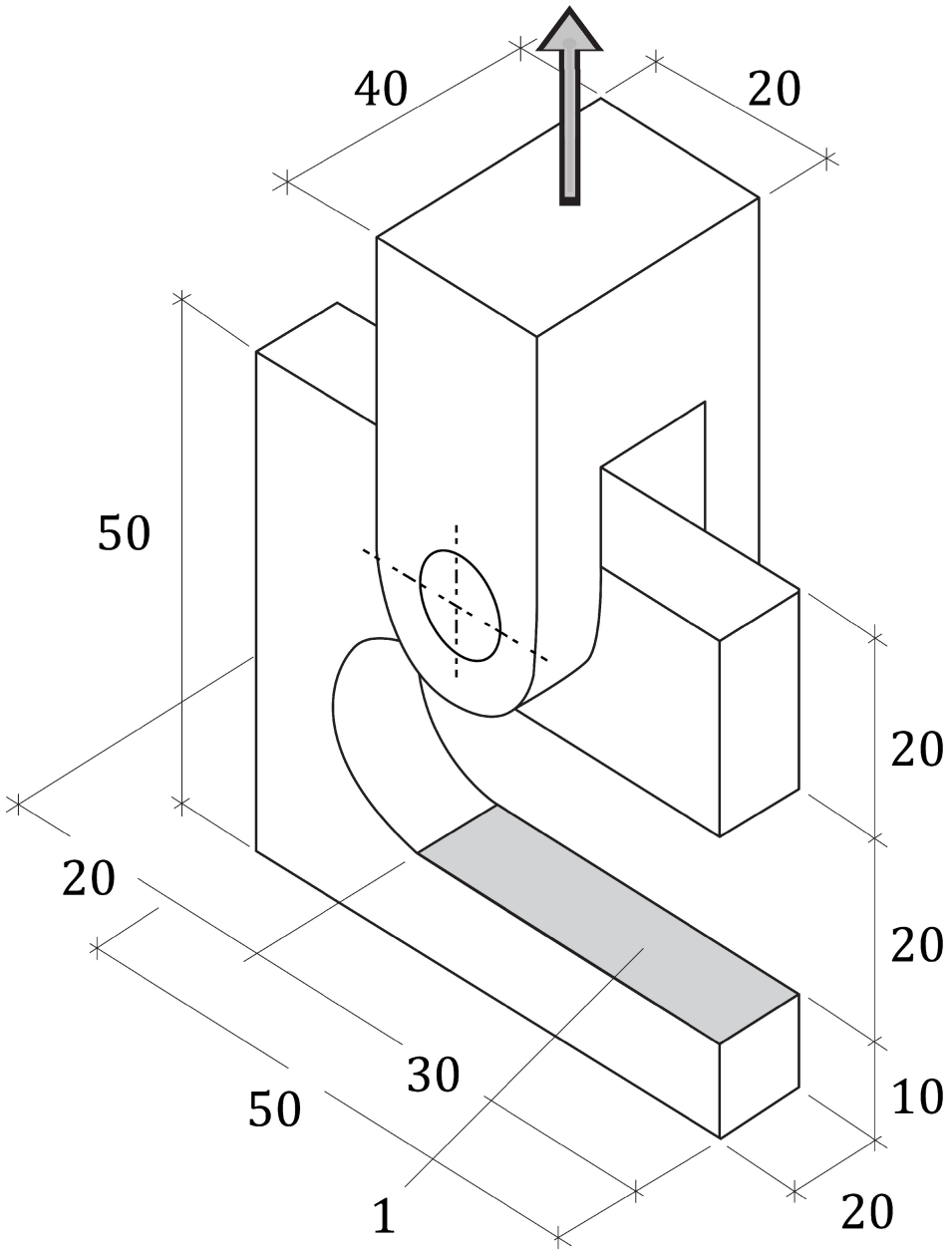


Figure A.8 — Pressure pad Type 3

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A.6 Examples for pressure pads for roller shutters – separate test for guide rails

Dimensions in millimetres



Key

1 serrated surface

Figure A.9 — Pressure pad Type 4

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