



BSI Standards Publication

Enhanced security performance requirements for doorsets and windows in the UK

Doorsets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk

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Foreword

Publishing information

This Product Assessment Specification (PAS) is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 September 2022. It was prepared by Subcommittee B/538/1, *Windows and doors*, under the authority of Technical Committee B/538, *Doors, windows, shutters, hardware and curtain walling*. A list of organizations represented on this committee can be obtained on request to the committee manager.

Supersession

PAS 24:2022+A1:2024 supersedes [PAS 24:2022](#), which is withdrawn.

Information about this document

Text introduced or altered by Amendment No. 1 is indicated in the text by tags A1 A1. Minor editorial changes are not tagged.

[PAS 24:2022](#) was a full revision of the PAS, and introduced the following principal changes:

- clarification of test methods;
- introduction of widely available tools in Tool Group B; and
- updating of references to proprietary standards.

This PAS has been produced by BSI to provide a method for testing and assessing the enhanced security performance requirements of doorsets and window types intended to resist the levels and methods of attack experienced in the UK and normally associated with the casual or opportunist burglar. It is believed that these attacks are the result of an opportunity presenting itself with no particular regard to the likely reward that success might bring. Burglary attempts covered by this document are likely to avoid noise and unnecessary risk. As risk is associated with time, the period spent attempting to gain entry is limited.

For both doorsets and windows, it offers two routes to demonstrating suitable security performance.

For doorsets, one route is based on the traditional UK test methods detailed in previous editions of PAS 24 and the other is a European approach based on [BS EN 1627](#). In both cases, cylinders and associated security hardware are subjected to additional assessment against attack methods seen in the UK.

For windows, one method of demonstrating suitable security performance is based on [BS 7950](#) (now withdrawn). The other method is based on [BS EN 1627](#).

For doorsets and windows tested in accordance with [BS EN 1627](#), users of this PAS are advised to consult the Secured by Design document [1].

Product certification/inspection/testing. Users of this PAS are advised to consider the desirability of third-party certification, inspection and testing of product conformity to this PAS. Appropriate conformity attestation arrangements are described in [BS EN ISO/IEC 17065](#). Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

This PAS covers doorsets and windows of all material types. Products are required to meet the material-specific requirements as covered by the product standards for doorsets and windows, such as [BS 7412](#), [BS 4873](#), [BS 6510](#), [BS 8529](#) and [BS 644](#). Other characteristics, such as weathertightness

and operational strength, are covered by the [BS 6375](#) series of standards that also references this document.

The distinction between a doorset and a window is based on the intended use as declared by the manufacturer. Products intended for pedestrian access are declared, tested and classified as doorsets in accordance with [4.4](#) of this PAS.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at knowledge.bsigroup.com, or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Presentational conventions

The provisions of this document are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this document are drafted in accordance with the *Rules for the structure and drafting of UK standards:2022*, subclause **G.1.1**, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this document.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This Product Assessment Specification specifies test methods (given in [Annex A](#) to [Annex C](#)) and acceptance criteria relevant to the enhanced security performance of doorsets and windows intended to resist attack normally associated with the casual or opportunistic burglar.

It is applicable to doorsets and windows listed in a) and b).

Standard loading cases for use with [Annex B](#) and [Annex C](#) have been prepared for the following products.

- a) Windows: singular and multilight:
 - 1) top hung, side hung, bottom hung, butt hinged;
 - 2) top and side hung projected;
 - 3) top hung and side hung fully reversible;
 - 4) tilt and turn and turn and tilt;
 - 5) vertical and horizontal sliding;
 - 6) fixed and fixed casements (dummy vents);
 - 7) parallel opening;
 - 8) double opening (French windows);
 - 9) vertical and horizontal pivot.
- b) Doorsets:
 - 1) single and double leaf;
 - 2) single and double swing;
 - 3) hinged;
 - 4) sliding (single and multi-track);
 - 5) pivot;
 - 6) folding sliding (single and multi-track);
 - 7) stable;
 - 8) with or without integral side panels and fanlights.

The security performance requirements in this PAS are not material specific.

This PAS is applicable to new window and doorsets as manufactured and prior to installation. It is only applicable to complete window and doorsets or a range thereof.

The ability to gain entry by manipulation of a lock cylinder is addressed in this PAS. Entry by deliberate breaking of the glass, lock picking using tools only available to a locksmith, attack on electrical controls, electronic components and electrical supply or by attack on the frame fixing methods is not addressed by this testing. This PAS does include a requirement for the infill medium material.

NOTE The electrical controls, electronic components and electrical supply can be subject to a mechanical or manual attack as a physical component of the door.

This PAS is not a test of component performance or installation requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions, or limits the application, of this document¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

BS 644, *Timber windows and doorsets – Fully finished factory-assembled windows of various types – Specification*

BS 4873, *Aluminium alloy windows and doorsets – Specification*

BS 6262 (all parts), *Glazing for buildings*

BS 6375 (all parts), *Performance of windows and doors*

BS 6510, *Steel-framed windows and glazed doors – Specification*

BS 7412, *Specification for windows and doorsets made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles*

BS 8529, *Composite doorsets – Domestic external doorsets – Specification*

BS EN 356:2000, *Glass in building – Security glazing – Testing and classification of resistance against manual attack*

BS EN 1303:2015, *Building hardware – Cylinders for locks – Requirements and test methods*

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

BS EN 12600:2002, *Glass in building – Pendulum test – Impact test method and classification for flat glass*

BS EN 13724:2013, *Postal services – Apertures of private letter boxes and letter plates – Requirements and test methods*

Other publications

[N1] DOOR AND HARDWARE FEDERATION. TS 008:2022. *Enhanced security and general requirements for letter plate assemblies and slide through boxes*. DHF: 2022.²⁾

3 Terms and definitions

For the purposes of this PAS, the following terms and definitions apply.

3.1 active leaf

leaf of a multi-leafed doorset intended to be moved first to provide opening

NOTE Also referred to as the “master leaf” and normally containing the primary lock.

3.2 channel glazing

glazing system in which the frame overlaps the infill medium on both sides without the use of an independent glazing bead

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

²⁾ Available from www.dhfonline.org.uk/publications/technical-specifications/1.htm.

3.3 component failure

3.3.1 primary component failure

first occasion that a deflection of 50 mm or greater in the opening direction occurs at the loading point under test

3.3.2 secondary component failure

second or subsequent occasion that a deflection of 50 mm or greater in the opening direction occurs at the loading point under test

3.4 continuous hinge

continuous uninterrupted hinge similar to those found on piano lids

3.5 coupled side panel

fixed element with its own outer frame attached to the outer frame of the doorset

3.6 doorset

complete unit, primarily intended for pedestrian access, consisting of the door frame, door leaf or leaves, any integral side panel or fanlight and essential hardware excluding coupled assemblies

NOTE Side panels or windows that are coupled to the doorset are intended to be tested separately.

3.7 dummy vent

vent which is permanently fixed in the closed position

3.8 electromagnetic lock

locking device that consists of an electromagnet and armature plate, such that a current passing through the electromagnet attracts the armature plate holding the door shut

3.9 entry

⟨for all tests except the cutting test in zone 2⟩ creation of an aperture through which a (500 ± 25) mm long cylindroid of diameter (50 ± 0.5) mm can pass freely

3.10 entry

⟨for the cutting test (see [B.4.4.4](#)) in zone 2⟩ creation of an aperture through which a (500 ± 25) mm long cylindroid with an elliptical section of (225 ± 2) mm minor and (380 ± 2) mm major diameters can pass freely

NOTE 1 This simulates the passage of an intruder's body. The aperture might encroach by an unlimited amount into zone 1.

NOTE 2 The above entry definitions are only relevant for the annexes in this PAS. Separate failure criteria are given in [BS EN 1627](#).

3.11 false mullion

section fitted to a leaf within a double leaf doorset or casement stile in a window to provide a rebate for the opposed leaf or casement to close onto and to create the impression of a mullion when in the locked position

3.12 fixed light

infill medium that is permanently retained within the outer framing members of the window

3.13 floor level

underside of the doorset sill or threshold

3.14 folding sliding door

concertina-style folding and sliding door system with or without single or double leaf doorsets capable of providing a large opening area

3.15 horizontal sliding door

fully glazed horizontal sliding door system, usually consisting of a fixed leaf and horizontal sliding leaf(s) that slide in front of each other

NOTE Horizontal sliding doors are often called "sliding patio doors".

3.16 inactive leaf

leaf of a multi-leafed doorset intended to be moved after the active leaf

NOTE Also referred to as the "slave leaf".

3.17 infill medium

single glass, insulating glass units or infill panel

3.18 integral side panel

fixed element within the outer frame of the doorset

3.19 key unlocking hardware

hardware that requires a removable key to effect the unlocking function

NOTE The locking function might be effected with or without the key.

3.20 location

area described by a circle with a radius of 50 mm from a selected point

3.21 midrail

structure between the opposing horizontal edges of infill panels or glazed apertures in a doorset

3.22 opening face

leading face of a leaf or casement when opened, i.e. the exterior face of an open-out leaf or casement and the interior face of an open-in vent

3.23 parallel opening window

window that does not tilt, turn or slide and that opens outwards where all edges of the sash remain parallel with the outer frame

3.24 plane

surface of the infill medium

3.25 range

group of doorsets or windows with defined limits of size, type, configuration, hardware, glazing system, infill mediums, construction and security features

3.26 technique

combination of tools and locations

NOTE Any change in either the tools or the locations constitutes a new technique.

3.27 vent

moveable individual glazed unit of a window

3.28 window

complete unit, not intended for pedestrian access, consisting of the frame, opening sash(s), casement(s) or fixed light(s) and essential hardware excluding coupled assemblies

NOTE Doorsets, side panels or top lights that are to be coupled to a window are intended to be tested separately.

4 Enhanced security requirements

4.1 General

4.1.1 Classification of use

To claim conformity to this PAS, doorsets and windows shall be classified according to their intended use for all relevant characteristics in accordance with [BS 6375](#) (all parts) and shall meet the requirements of the relevant material specific standard, such as [BS 7412](#), [BS 4873](#), [BS 6510](#), [BS 8529](#) and [BS 644](#).

4.1.2 Doorsets

To claim conformity to this PAS, doorsets shall meet the requirements of [4.2](#), [4.3](#), [4.4](#) and [Annex A](#) of this PAS and either [Annex B](#) of this PAS or [BS EN 1627:2021](#), RC3.

Additionally, where a cylinder accessible from the external face of the doorset and falling within the scope of [BS EN 1303:2015](#) is used within the doorset, the cylinder shall meet the requirements of key-related security (digit 7) grade 5 as detailed in [BS EN 1303:2015](#) and shall also meet the requirements of [BS EN 1303:2015](#), [4.9.2](#), resistance to drilling security, grade 2.

NOTE A cylinder meeting any of the following alternative standards would satisfy the above requirements:

- a) a cylinder meeting the requirements of [TS 007-1:2024](#) [3] with a 3-star rating; or
- b) a mechatronic cylinder meeting the requirements of [TS 007-2:2024](#) [5] with a 3-star rating; or
- c) a cylinder meeting the requirements of [Sold Secure SS312:2024](#) [7] with a Diamond rating; or
- d) a cylinder meeting the requirements of [TS 007-1:2014+A2:2018](#) [2] with a 1-star rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [TS 007-1:2014+A2:2018](#) [2] with a 2-star rating; or
- e) a cylinder meeting the requirements of [TS 007-1:2024](#) [3] with a 1-star rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [TS 007-1:2024](#) [3] with a 2-star rating; or
- f) a cylinder meeting the requirements of [Sold Secure S312:2019](#) [6] with a Gold rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [Sold Secure SS301:2015](#) [8] with a Bronze rating; or
- g) a cylinder meeting the requirements of [Sold Secure SS312:2024](#) [7] with a Gold rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [Sold Secure SS301:2024](#) [9] with a Bronze rating; or
- h) a mechatronic cylinder meeting the requirements of [TS 007-2:2019](#) [4] with a 1-star rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [TS 007-2:2019](#) [4] with a 2-star rating; or
- i) a mechatronic cylinder meeting the requirements of [TS 007-2:2024](#) [5] with a 1-star rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [TS 007-2:2024](#) [5] with a 2-star rating; or
- j) a mechatronic cylinder meeting the requirements of [Sold Secure SS504:2024](#) [10] with a Gold rating, plus a handle or escutcheon protecting the cylinder meeting the requirements of [Sold Secure SS301:2024](#) [9] with a minimum Bronze rating; or

- k) a mechatronic cylinder meeting the requirements of both *Sold Secure SS504:2024* [10] with a Gold rating, and a *Sold Secure SS312:2019* [6] or a *Sold Secure SS312:2024* [7] with a Diamond rating. $\langle A_1 \rangle$

Where doorsets conform to *BS EN 1627:2021*, RC3, a letter plate may be added if the letter plate meets the requirements of 4.3.

4.1.3 Windows

To claim conformity to this PAS, windows shall meet the requirements of 4.2, 4.3 and 4.4 and either Annex C of this PAS or *BS EN 1627:2021*, RC2N.

4.2 Infill medium requirements

Where doorsets, coupled side panels and windows adjacent to doorsets contain glass, each glazed area shall include at least one pane of laminated glass meeting the requirements of *BS EN 356:2000*, Class P1A or higher, and shall be glazed in accordance with the BS 6262 series.

Where windows contain glass and non-key unlocking hardware, each glazed area shall include at least one pane of laminated glass meeting the requirements of *BS EN 356:2000*, Class P1A or higher, and shall be glazed in accordance with the BS 6262 series.

4.3 Letter plates

Where a letter plate is included:

- a) the letter plate shall have a maximum aperture size of (260 × 40) mm; and
- b) the letter plate shall meet the installation height requirements specified in *BS EN 13724:2013*, 5.4.1.2; and
- c) the letter plate shall meet the requirements of TS 008:2022 [N1], Enhanced security grade 2 with all fixing accessible from the external face removed.

NOTE 1 The TS 008:2022 test may be conducted on the letter plate when installed in a doorset or mounted in a test block as detailed in TS 008:2022 [N1].

NOTE 2 TS 008:2022 [N1] details a number of characteristics that might be applicable in particular circumstances, such as fire resistance.

4.4 Classification

All doorsets shall be designated as D.

All windows shall be designated as W.

NOTE See 4.1 regarding product conformity to this PAS.

5 Marking

Each doorset and window shall be permanently marked, in a position that is visible and readily accessible when the product is open and not visible when the product is closed, with the following information:

- a) the number and date of this Product Assessment Specification, i.e. $\langle A_1 \rangle$ PAS 24:2022+A1 $\langle A_1 \rangle$,³⁾
- b) the date of manufacture of the product (at least the year and quarter);
- c) the name or trademark of the manufacturer or other means of identifying the manufacturer; and
- d) the classification in accordance with 4.4.

NOTE 1 In addition to this marking, a digital mark can be used (e.g. a QR code).

NOTE 2 Marking may be covered by easily removable trim or located on the top rail of the door leaf, window sash or casement.

³⁾ Marking $\langle A_1 \rangle$ PAS 24:2022+A1 $\langle A_1 \rangle$ on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the PAS. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

6 Design and general requirements

6.1 Doorsets

Where a doorset includes dummy vents, fixed lights, fixed panels and/or opening lights, these shall meet the requirements for a doorset, as detailed in [4.1.2](#).

6.2 Instructions and installation

Doorsets and windows shall either be supplied to site as fully assembled products; or, where this is not practicable, the manufacturer shall be responsible for ensuring all component parts of the doorset or window are supplied to site (see footnote to [Clause 5](#)).

The manufacturer shall supply full instructions for assembly, installation, glazing, operation and maintenance with each doorset and window.

NOTE The instructions should indicate that installation is to be undertaken by a person, suitably trained and qualified by knowledge and practical experience, and provided with the necessary instructions, to enable the required task(s) to be carried out correctly. 

Annex A (normative)

Security hardware and cylinder test and assessment

A.1 Objective

The objective of this annex is to provide a method of testing the door furniture, hardware, lock and cylinder's resistance to manual attack and to assess the vulnerability of a cylinder to an attack using knowledge, skill and professional ability.

A.2 Test tools

A.2.1 General

Tools listed in this PAS shall not be used to strike one another, nor shall they be connected in any way to increase the leverage (excluding tools [A.2.4.2](#), [A.2.4.3](#) and [A.2.4.4](#) which are to be used together).

If the test engineer identifies an opportunity to manipulate, push or pull (but not strike) with bodily force the test sample during the test to gain entry, this shall be allowed.

A.2.2 Tools group A

A.2.2.1 *Assorted mild steel wire*, not more than 2 mm in diameter and not more than 700 mm in length.

A.2.2.2 *Two credit cards*, of size [(55 ±5) × (85 ±5)] mm and (0.7 ±0.3) mm thick.

A.2.2.3 *Two paint scrapers*, with a blade width of approximately (75 ±15) mm in width.

A.2.2.4 *One craft knife*, with a maximum overall length of 180 mm, a straight blade (0.6 ±0.1) mm thick and an exposed blade of length (28 ±7) mm, e.g. a Stanley®⁴⁾ trimming-type knife.

A.2.2.5 *Two flat blade screwdrivers*, of length (150 ±20) mm overall, a shank length of (75 ±15) mm, a shank diameter of (3 ±0.5) mm and a blade width of (3 ±1) mm. The shank shall be of vanadium or chrome tool grade steel.

A.2.3 Tools group B

A.2.3.1 *One wood chisel*, of length (250 ±20) mm overall and a blade width of (25 ±2) mm.

A.2.3.2 *One wood chisel*, of length (250 ±20) mm overall and a blade width of (6 ±1) mm.

A.2.3.3 *One flat blade screwdriver*, of length (200 ±20) mm overall, a shank diameter of (6 ±1) mm and a blade width of (6 ±1) mm.

A.2.3.4 *One brick bolster*, of length (250 ±25) mm and a blade width of (60 ±15) mm.

A.2.3.5 *One crosspoint screwdriver*, of length (200 ±20) mm overall, a shank diameter of (6 ±1) mm and point size 2.

A.2.3.6 *One cross head screwdriver*, of length (200 ±20) mm overall, a shank diameter of (6 ±1) mm and point size P(Z)2, e.g. a Pozidriv®⁵⁾ screwdriver.

⁴⁾ Stanley® is a trademark owned by Stanley Black and Decker and is an example of a suitable product available commercially. This information is given for the convenience of the users of this PAS and does not constitute an endorsement by BSI of this product.

⁵⁾ Pozidriv® is a trademark owned by the Phillips Screw Company and the American Screw Company and is an example of a suitable product available commercially. This information is given for the convenience of the users of this PAS and does not constitute an endorsement by BSI of this product.

- A.2.3.7** *One interchangeable bit screwdriver, of length (200 ± 20) mm long overall with PH1 to PH3, PZ1 to PZ3, T5 to T30, H2 to H6, hexagon heads range 4 mm to 10 mm and slotted 3.5 mm to 6.5 mm bits. This screwdriver is only to be used for removal of exposed fixings.*

A.2.4 Tools group C

A1 NOTE Guidance on the use of the tools is given in the Secured by Design document [1]. **A1**

A.2.4.1 Self-gripping pliers

- a) *Straight jaw self-gripping pliers, with a nominal length between the end of the fixed jaw and the non-adjustable section of the handle of (210 ± 10) mm. Each serrated gripping surface shall be (13 ± 3) mm wide at the end, (16 ± 3) mm at the throat and (36 ± 7) mm in length. When the ends are closed on a (12 ± 0.5) mm block, the distance between the serrated gripping surfaces shall be (12 ± 2) mm (see Figure A.1 and Figure A.2).*
- b) *Curved jaw self-gripping pliers, with a nominal length between the end of the fixed jaw and the non-adjustable section of the handle of (210 ± 10) mm. Each serrated gripping surface shall be (11 ± 3) mm wide at the end, (13 ± 3) mm at the throat and (30 ± 5) mm in length. When the ends are closed on a (12 ± 0.5) mm block, it shall be possible to insert a (15 ± 0.1) mm diameter bar between the serrated gripping surfaces at the widest point (see Figure A.3 and Figure A.4).*

NOTE Irwin Vise-grip®⁶⁾ straight and curved jaw locking pliers model 10WRC and model 10R have been used successfully.

- A.2.4.2** *Torque gauge, with a 16 mm spigot end, calibrated with a location pin to centre of nut (extension length) of (31.8 ± 1) mm and capable of applying a (180 ± 10) Nm torque. The overall length of the tools shall be (420 ± 40) mm.*

NOTE A Norbar®⁷⁾ model 200TH has been used successfully.

- A.2.4.3** *Shallow curve head attachment, suitable for use with the torque gauge detailed in A.2.4.2 manufactured from a nail bar with dimensions as shown in Figure A.5 and Figure A.6.*

NOTE A modified Stanley Wonder Bar®⁸⁾ has been used successfully.

- A.2.4.4** *Hooked head attachment, suitable for use with the torque gauge detailed in A.2.4.2 manufactured from a nail bar with dimensions as shown in Figure A.7 and Figure A.8.*

NOTE A modified Stanley Wonder Bar®⁸⁾ has been used successfully.

- A.2.4.5** *Selection of steel self-cutting traction screws with deep thread and gimlet point, self-tapping thread with drill point, single and twin start. Screws shall be up to a maximum nominal diameter of 5.5 mm and maximum nominal length of 60 mm.*

- A1** **A.2.4.6** *Water, up to 500 ml, with an ambient water temperature between 10 °C and 30 °C.*

- A.2.4.7** *Syringe applicator for water, 20 ml.*

- A.2.4.8** *Freeze spray, -45 °C, 2 × 150 ml aerosols with applicator tube.*

- A.2.4.9** *Cyanoacrylate adhesive (high strength bonding adhesive), 100 g with 400 ml spray activator.*

- A.2.4.10** *Syringe applicator for adhesive, 10 ml, with 18G blunt needle. **A1***

⁶⁾ Irwin Vise-grip® is a trademark owned by Irwin Industrial Tool Company and is an example of a suitable product available commercially. This information is given for the convenience of the users of this PAS and does not constitute an endorsement by BSI of this product.

⁷⁾ Norbar® is a trademark owned by Norbar Limited and is an example of a suitable product available commercially. This information is given for the convenience of the users of this PAS and does not constitute an endorsement by BSI of this product.

⁸⁾ Stanley Wonder Bar® is a trademark owned by Stanley Black and Decker and is an example of a suitable product available commercially. This information is given for the convenience of the users of this PAS and does not constitute an endorsement by BSI of this product.

A.3 Procedure

A.3.1 General

A locking mechanism is deemed to have failed if, during the test, entry is gained, as defined in 3.9.

Conduct the test on all doorset locking mechanisms.

Carry out the test from the exterior face of the doorset with full knowledge of the sample's construction and hardware details.

Before testing, samples shall be closed and locked, as detailed in B.4.2.

Conduct A.3.2, Part 1, of this test on all doorset locking mechanisms using any of the following: sample 1 (see Annex B), a complete new sample or new hardware fixed to sample 1, using the tools specified in A.2.2 (Tools group A), A.2.3 (Tools group B) and A.2.4 (Tools group C), excluding A.2.4.5.

Conduct A.3.3, Part 2, of this test on all doorsets that contain a cylinder as a component of the locking mechanism, using any of the following: sample 1 (see Annex B), a complete new sample or new hardware fixed to sample 1, using the tools specified in A.2.2 (Tools group A), A.2.3 (Tools group B) and A.2.4 (Tools group C).

Conduct A.3.4, Part 3, of this test on all doorset locking mechanisms using any of the following: sample 3 (see Annex B), a complete new sample or new hardware fixed to sample 1, using the tools specified in A.2.2 (Tools group A), A.2.3 (Tools group B) and A.2.4 (Tools group C) excluding A.2.4.5. Group C tools shall only be used for attacking handles and escutcheons or similar protective hardware, excluding the door leaf.

NOTE 1 The tests in Part 1, Part 2 and Part 3 (A.3.2, A.3.3 and A.3.4) are not intended to be accumulative and a focus of attack should not be repeated, e.g. after attempting to snap the cylinder in Part 1, it is not permitted to snap the cylinder again using the same methodology in Part 2 or Part 3.

When using the tools listed in A.2.4.2, A.2.4.3 and A.2.4.4, the torque applied shall not exceed 180 Nm measured by the torque gauge.

When using any tool specified in A.2.2, A.2.3 and A.2.4 to strike the assembly, the impact point of the tool shall not travel more than 100 mm.

A maximum of two self-cutting traction screws, as described in A.2.4.5, shall be used during the Part 2 test (see A.3.3). Those traction screws selected shall be of a type, length and diameter that are most likely to enable entry to be gained to the cylinder.

The second screw shall be used only if the first breaks during insertion or due to the application of forces other than nominally axial. If, however, the thread of the screw is damaged due to protection within the cylinder, or the cylinder part breaks or fractures, the use of a second screw is not permissible.

NOTE 2 The test organization may request up to six additional cylinder sets in order to establish the location on the cylinder face and type, diameter and length of traction screw most likely to result in a successful attempt of activities ii) and iii) in A.3.3.

NOTE 3 The operation of the lever or knob furniture is permitted without the aid of tools.

A.3.2 Part 1

[A₁] Part 1 of the test consists of four activities. Where applicable, conduct each activity as detailed in i), ii), iii) and iv). The total test time shall consist of attack time and rest time. During the attack time, the activities described in i), ii), iii) and iv) shall be performed. Changing the attachments detailed in A.2.4.3 and A.2.4.4 shall form part of the rest time. Time taken to consider the vulnerability of the assembly during the test shall also form part of the rest time.

The total attack time shall not exceed 3 min. The total rest time shall not exceed 7 min.

Activities are as follows (where necessary):

- i) attempt to remove, dislodge or otherwise gain access to the cylinder and/or lock workings by attacking any protective item, including the fabric of the door leaf;
- ii) using available tools, prepare the cylinder for a subsequent attack;
- iii) attempt to break and defeat any cylinder by applying a twisting and/or bend force;
- iv) if access to the internal workings of the hardware, cylinder or lock is gained, then attempt to defeat the lock and gain entry by operating any accessible mechanism.

NOTE Access to the internal workings such as lever lock mechanisms or pin tumblers may be gained via the key hole. ^(A1)

A.3.3 Part 2

^(A1) Part 2 of the test consists of five activities. Where applicable, conduct each activity as detailed in i), ii), iii), iv) and v). The total test time shall consist of attack time and rest time. During the attack time, the activities described in i), ii), iii), iv) and v) shall be performed. Changing the attachments detailed in [A.2.4.3](#) and [A.2.4.4](#) shall form part of the rest time. Time taken to consider the vulnerability of the assembly during the test shall also form part of the rest time.

The total attack time shall not exceed 3 min. The total rest time shall not exceed 7 min.

Activities are as follows:

- i) attempt to remove, dislodge or otherwise gain access to the cylinder by attacking any item protecting the cylinder;

NOTE 1 This activity may be omitted based on the knowledge gained in [A.3.2](#), or if it is unlikely to improve the chances of defeating the vulnerability in question. Attempts to break or defeat the cylinder by applying a twisting and/or bending force are permitted. This may include removal of part of the cylinder itself.

- ii) using available tools, prepare the cylinder for a subsequent attack;

NOTE 2 This activity may also be performed after activity iii).

- iii) attempt to screw the self-cutting traction screw into any exposed part of the cylinder so that it provides suitable fixing force for activity iv);

- iv) attempt to break and defeat the cylinder by applying a nominally axial force to the screw using the hooked head attachment and torque gauge;

NOTE 3 A hardwood block may be used to raise the heel of the attachment to increase the likelihood of cylinder breakage and decrease the likelihood of screw failure.

- v) if access to the internal workings of the hardware, cylinder or lock is gained during the stage above, then attempt to defeat the lock and gain entry by operating any accessible mechanism. ^(A1)

A.3.4 Part 3: Door assembly integrity test

Part 3 of the test consists of three activities. Where applicable, each activity shall be conducted as detailed in i), ii), and iii). The total test time shall consist of attack time and rest time. During the attack time, the activities described in i), ii), and iii) shall be performed. Changing the attachments detailed in [A.2.4.3](#) and [A.2.4.4](#) shall form part of the rest time. Time taken to consider the vulnerability of the assembly during the test shall also form part of the rest time.

The total attack time shall not exceed 3 min. The total rest time shall not exceed 7 min.

Activities are as follows (where necessary):

- i) attempt to remove, dislodge or otherwise gain access to the lock mechanism by attacking any item protecting the lock mechanism;
- ii) attempt to defeat the lock and expose mechanisms within the lock case;
- iii) if access to the internal workings of the hardware, cylinder or lock is gained, then attempt to defeat the lock and gain entry by operating any accessible mechanism.

NOTE 1 The purpose of this test is to assess the ability of the doorset to protect the lock hardware from attack.

NOTE 2 The security of the door leaf–lock combination can be enhanced by the lock and cylinder apertures being formed in such a way that there are no unnecessary voids within the door leaf or excessive clearance around the cylinder (if installed).

NOTE 3 Handles or escutcheons, meeting the following standards, have been proven to provide additional support and protection to the lock area of the door leaf:

- TS 007-1:2014+A2:2018 [2] with a 2-star rating; or
- TS 007-1:2024 [3] with a 2-star rating; or
- TS 007-2:2019 [4] with a 2-star rating; or
- TS 007-2:2024 [5] with a 2-star rating; or
- Sold Secure SS301:2015 [8] with a minimum Bronze rating; or
- Sold Secure SS301:2024 [9] with a minimum Bronze rating. **AA**

A.4 Cylinder vulnerability assessment

A.4.1 Principles of assessment

The assessment shall be undertaken by a panel of three expert assessors qualified in accordance with [A.4.6](#). Each expert shall undertake an individual assessment and report back independently. In order for conformity to [Annex A](#) to be claimed, each member of the panel shall report the test sample as having satisfactorily withstood the test, or where a suitable test key cannot be manufactured due to the design of the product, each expert shall confirm that the product is not vulnerable to the attack method described in this annex.

NOTE The test is intended to assess the vulnerability of a cylinder to an attack using knowledge, skill and professional ability. It is not intended to assess the cylinder's ability to resist attack involving significant force or by the use of tools only available to locksmiths.

A.4.2 Submission of assessment samples

A total of 12 complete cylinder assemblies shall be submitted. These shall be representative of normal production and shall contain the most vulnerable combination of variations as determined by the panel. Four samples shall be supplied to each assessor, one for examination and three for assessment purposes. Where a range of products is assessed, the panel shall agree with the manufacturer which samples are required for assessment, and the decision shall be based on the examination of detailed drawings, specimens and discussions with the interested parties. If, during the assessment process, an assessor identifies a particular vulnerability and believes that further tests are required, a maximum of two further samples shall be requested.

A.4.3 Preparation of the assessment sample

The test sample and a typical lock shall be mounted in accordance with the manufacturer's instructions in a wooden block or similar, with a thickness that equates to the minimum door

thickness for which the cylinder is intended to be used. The sample shall be verified as being fully functional. During the test the cylinder and lock shall be mounted in a rigid fixture at a working height similar to the intended location when installed in a door; nominally 1 000 mm from floor level.

Any protective furniture incorporated into the lock assembly shall be included as part of the test sample. The side on which any protective furniture is fitted shall be treated as the attack face.

A.4.4 Assessment procedure

Each assessor shall dismantle and examine the first sample prior to testing and assessing the second sample. There is no overall limit for the time required to dismantle and examine the first sample.

A cylinder is deemed to have failed if, during the test, it is possible from the attack side for any of the locksmith experts to rotate the cylinder cam by more than 90°.

Cylinders used in a lock design shall be assessed in accordance with the following procedure.

The maximum duration of the assessment shall be 3 min, with a further 4 min allowed to conduct any modification deemed necessary in accordance with iv).

- i) Sample cylinders shall have combinations in which all step heights are in the mid-range, and are as close together as possible, but which also conform to the manufacturer's specification and the requirements of [BS EN 1303:2015](#).
- ii) During assessment, cylinders shall be installed in a lock, which in turn shall be mounted as detailed in [A.4.3](#).
- iii) Two test keys are required for this assessment. One key shall be cut on bottom steps (as defined in the manufacturer's production issue effective differ chart) consistently in all positions. The second key shall be cut on the next step up from the bottom step (again as defined by the manufacturer's production issue effective differ chart) consistently in all positions. A test key shall be rejected if it does not conform to the manufacturer's drawing in terms of step height and tolerance on step height. A rejection under these circumstances shall constitute a "fail". Where, due to the complexity of the mechanism, it is not practicable for the tester to measure the step heights, a manufacturer's declaration (that the test keys conform to drawing) shall suffice. The length of the test key and its shoulder shall not be modified by the manufacturer; this shall be done by the assessor only.
- iv) Where a cylinder has a non-random feature as part of the combination (e.g. in a combination supplied to a specific distributor and/or region), the test key shall exhibit that non-random feature.
- v) The length of the test key and its shoulder shall not be modified by the manufacturer; this may be done by the assessor.
- vi) Where cylinders using a side bar code are supplied, the test key shall exhibit that side bar code.
- vii) In the case of double-sided cylinders, where one side only is intended for use on the outside of the door, only this side shall be subjected to the test and the higher security side shall be clearly marked accordingly.
- viii) Using the permissible tools (see [A.4.5](#)), each assessor shall attempt to defeat the cylinder within the defined times, using manipulation techniques.

A.4.5 Permissible assessment tools

Only the tools listed in Table A.1 shall be used in undertaking the cylinder vulnerability assessment.

NOTE The list is intended to give a general description of the tools allowed. It is not intended to give precise dimensions, or to fully detail the type of tool.

Table A.1 — List of tools permitted for use in the assessment of the cylinder

Item	Additional details
Picking tools – cylinders	Rake pick – HPC novice pick set Tensioner
Test key	See A.4.4
Impactor	Any proprietary impactor appropriate to the manipulation techniques considered in A.4.4.
Resilient device for attaching to the test key	—
Petroleum-based water displacement lubricant spray	—

NOTE Other tools might be used as impactors, e.g. the handle of a screwdriver.

A.4.6 Assessment panel

The assessment shall in all cases be undertaken by a panel of three locksmiths; each of whom shall be able to demonstrate expertise and experience, such as to be able to form a reliable and disinterested judgement as to the probability of a lock being able to withstand the types of attack simulated by the procedures specified in A.4.4.

NOTE 1 Such expertise and experience could be demonstrated by a recognized qualification in locksmithing, achieved by examination (e.g. BLI, ALOA) and supplemented by:

- ten years’ experience as a practising locksmith; and
- current full membership in good standing, of not less than five years’ continuous duration, of a professional locksmithing body.

NOTE 2 For assessments undertaken by a lock manufacturer, the experts may be directly employed or may be contracted for the purpose. A register containing details of some of those known to be appropriately qualified within the UK can be accessed by application to the BSI Knowledge Centre.

Figure A.1 — Typical straight jaw self-gripping pliers

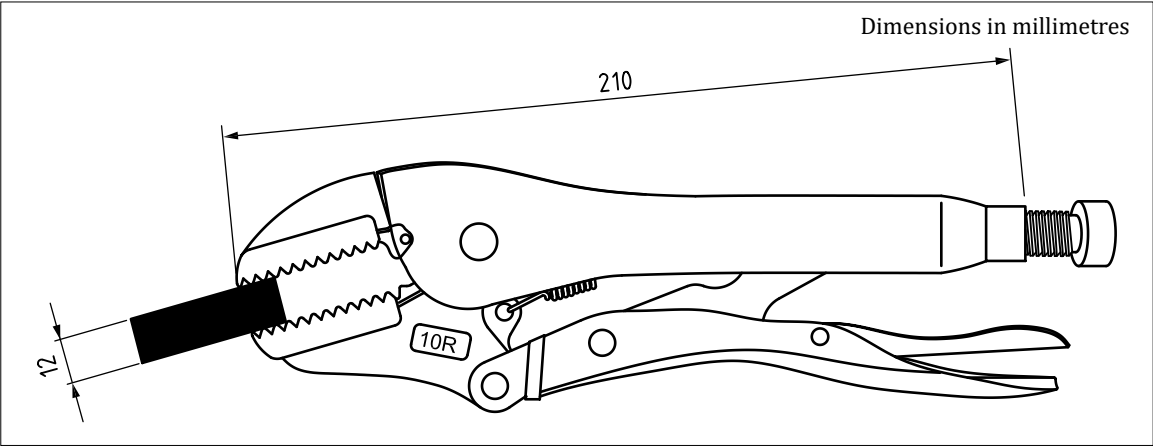


Figure A.2 — Typical straight jaw detail

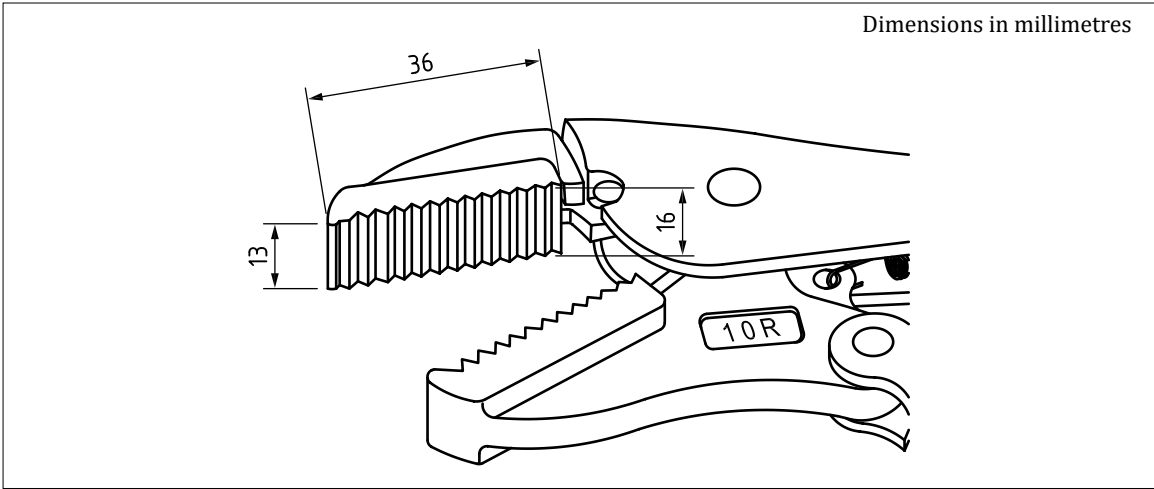


Figure A.3 — Typical curved jaw self-gripping pliers

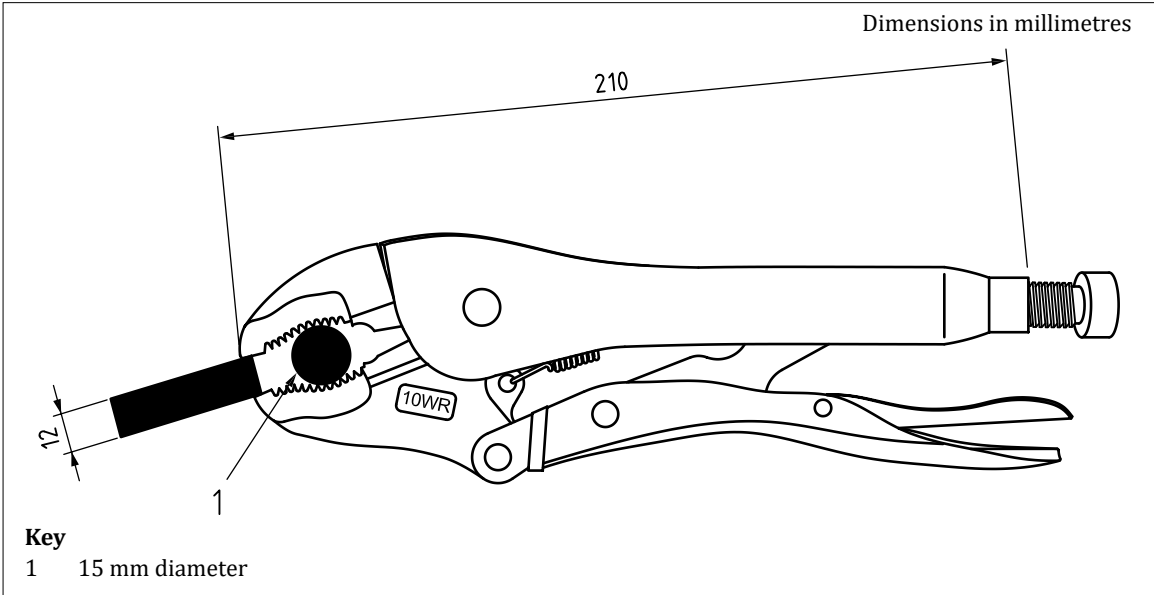


Figure A.4 — Typical curved jaw detail

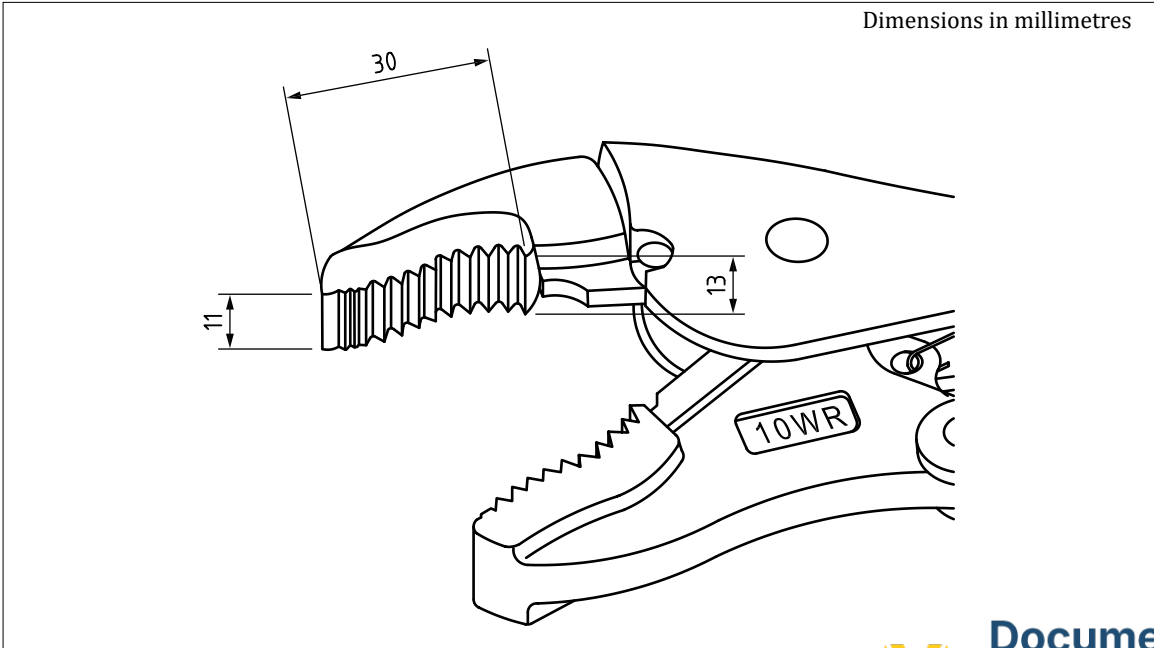


Figure A.5 — Typical shallow curve head

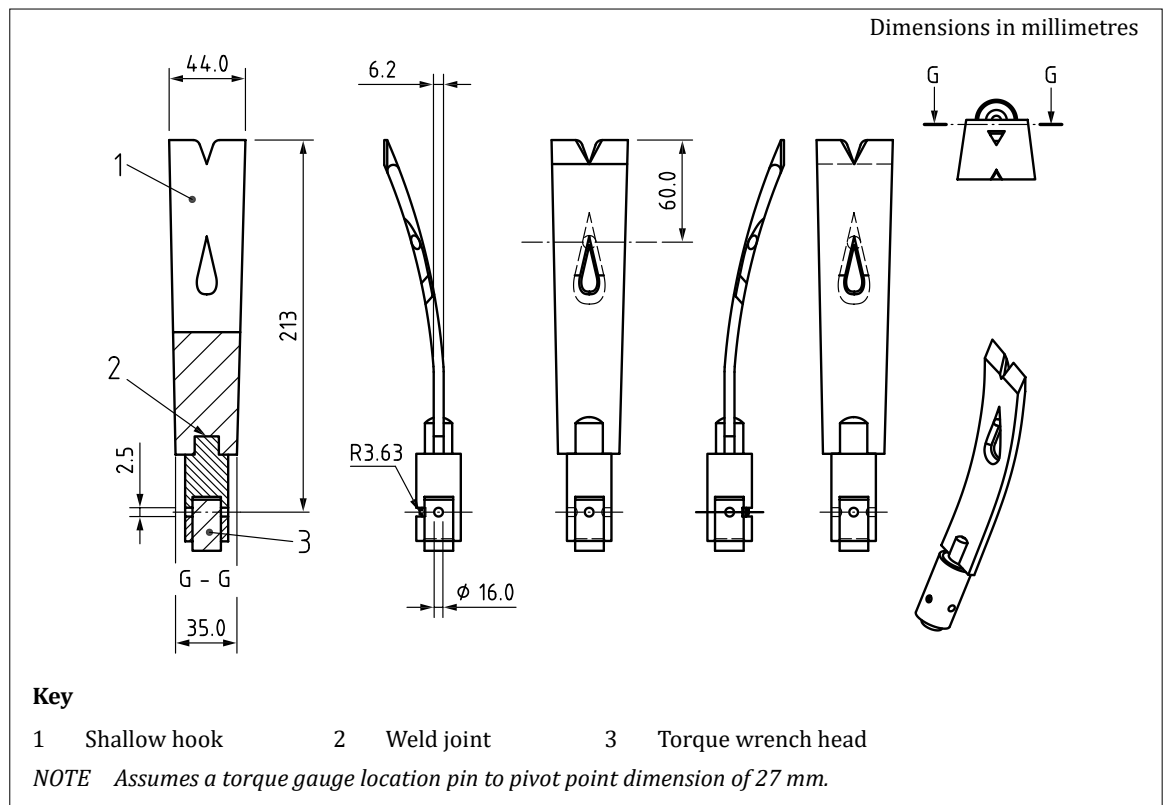


Figure A.6 — *Typical shallow curve head detail*

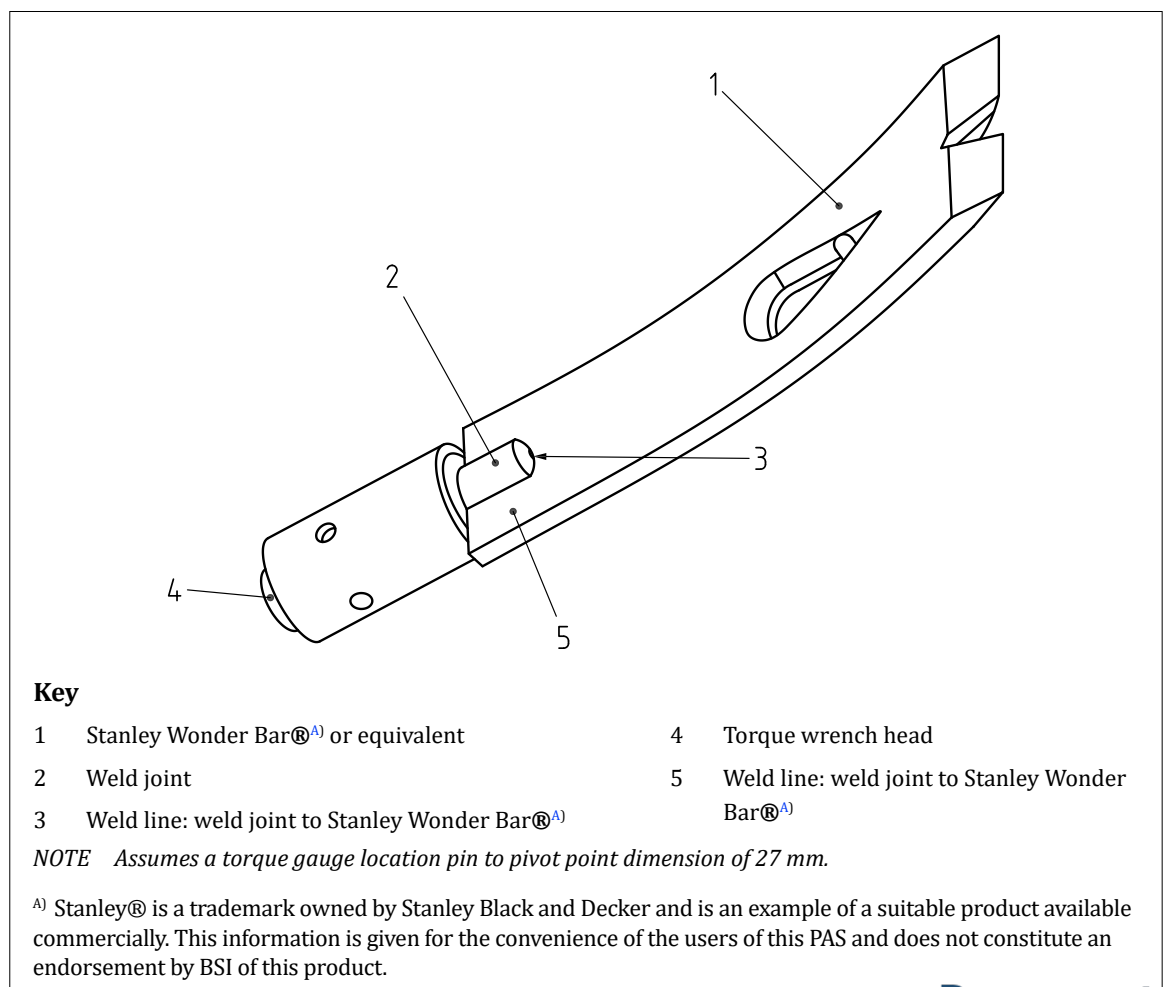


Figure A.7 — Typical hook attachment

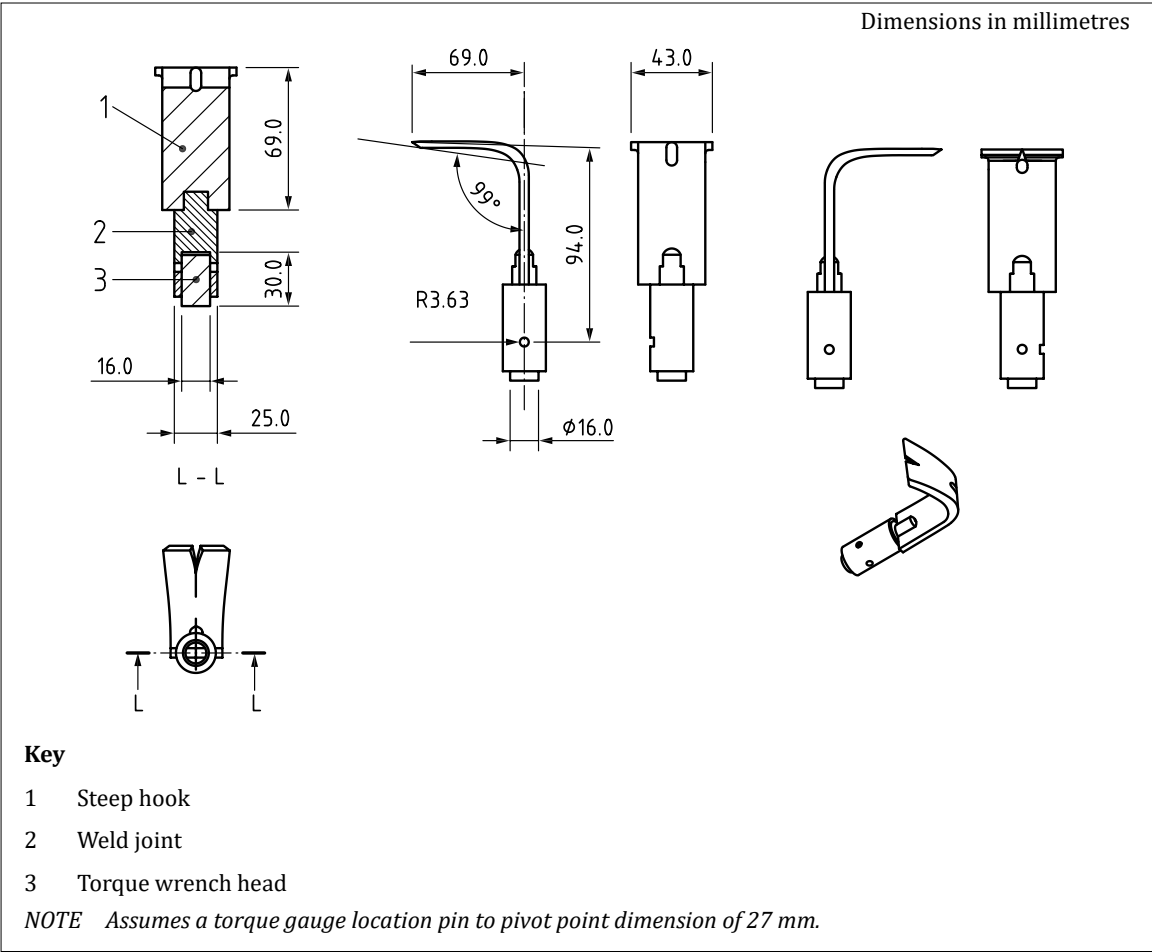
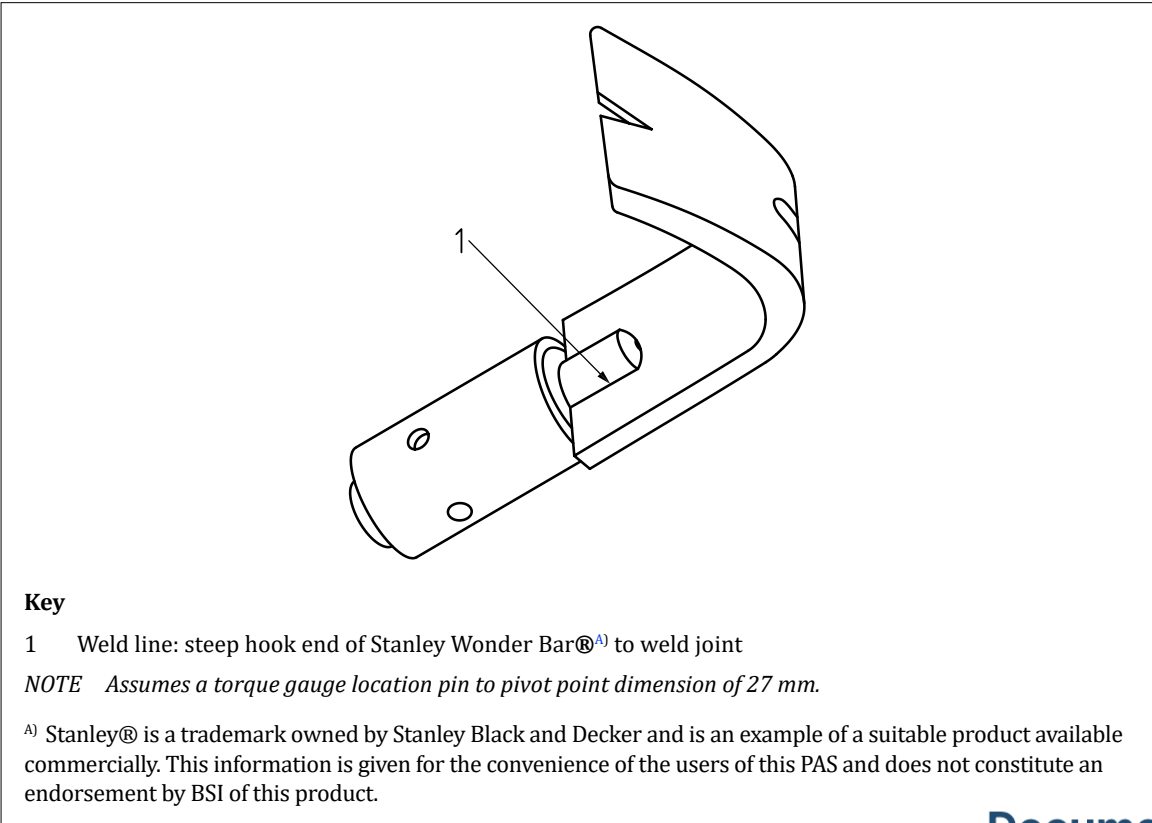


Figure A.8 — Typical hook attachment detail



Annex B (normative)

Enhanced security performance requirements for doorsets

B.1 General

The objective of this annex is to assess the ability of a doorset to resist mechanical loading. A doorset is deemed to have failed if, during the test, entry is gained as defined in 3.9 and 3.10, as appropriate.

NOTE An example of the steps which may be undertaken in an assessment have been summarized as a flow chart in Figure B.1.

B.2 Sample selection

COMMENTARY ON B.2

The following list, which is not exhaustive, identifies some of the features that can influence the security of a doorset:

- a) maximum distance between points that secure the leaf to the outer frame;
- b) hardware: locking and hinge options, fixings and changes with respect to leaf size;
- c) directions of opening;
- d) infill medium options;
- e) infill medium installation methods;
- f) reinforcement used in any system;
- g) flexing of transoms and mullions;
- h) size;
- i) openings, e.g. letterplate, cat flap;
- j) false mullion configuration on double doors; and
- k) location of hardware in inactive leaf in double doors.

The number of samples selected for testing shall be agreed between the testing organization and the manufacturer. All samples shall be representative of production. The effect of cumulative testing shall be avoided, with the exception that for any one configuration:

- a) the mechanical loading test in B.4.5 and the additional mechanical loading test in B.4.7 and the repeat manipulation test in B.4.3.2 shall be conducted on a single sample; and
- b) the manual test (infill medium removal) in B.4.4.2, the soft body impact test in B.4.8 and the hard body impact test aimed at the door leaf in B.4.9.2.2 shall be conducted on another single sample.

NOTE 1 The configuration of a product consists of its key components, its number, the size and shape of any glazing and its operation.

All remaining tests shall be carried out on either these two samples or on any number of other samples.

NOTE 2 If the manufacturer wishes, all tests may be carried out on a single sample.

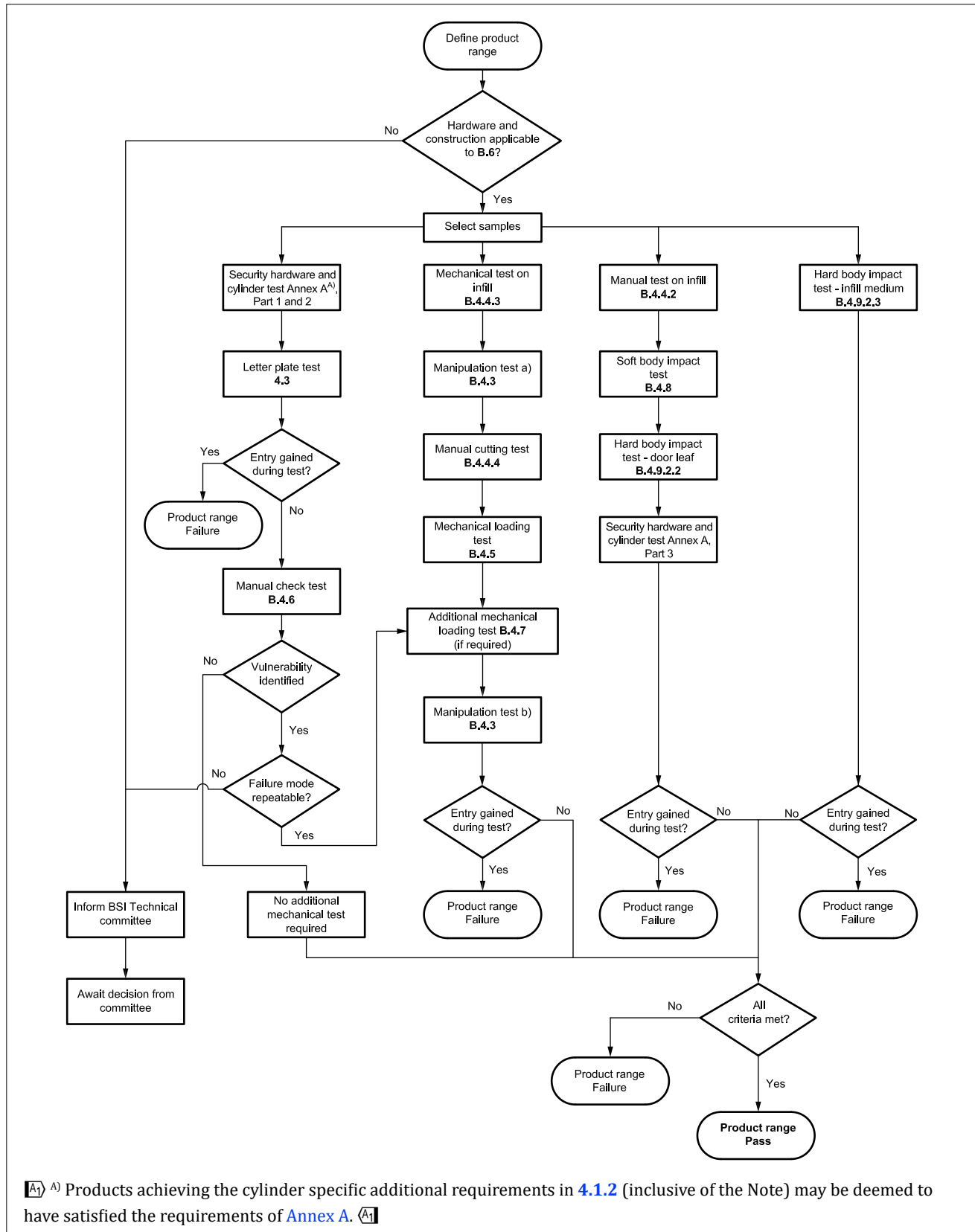
NOTE 3 The sample numbers quoted in the test clauses are relevant to the tests conducted on a typical sample selection of three doors without non-glass infill medium and four where at least one non-glass infill medium is included in the design.

For the purpose of these tests, all glass supplied in the test samples shall be toughened to conform to class 1 (C) ϕ of BS EN 12600:2002, where ϕ might be 1, 2 or 3.

NOTE 4 This requirement is for test samples only, infill medium requirements for doorsets are given in 4.2.

Where a range of doorsets is to be tested, the number and type of samples chosen shall be representative of the product range. The samples selected shall include the most adverse and vulnerable aspects of the design, size and configuration.

Figure B.1 — Flow chart for doorsets



B.3 Requirements for test apparatus

B.3.1 General

The test apparatus shall support the sample rigidly. For all tests the sample shall be installed vertically and square, in accordance with the manufacturer's instructions so that the door opens and closes smoothly and is secured to prevent movement in the test apparatus.

When conducting the manual tests, the test apparatus shall allow for free unrestricted access to the exterior face of the door. The sample shall be mounted at ground level with the outer frame flush with the outer face of the test apparatus such that the test apparatus does not impede the manual test.

When carrying out the mechanical test, the test apparatus shall be provided with the means of applying the loads, parallel and perpendicular to the plane of the test sample, to within a measured accuracy of $\pm 2\%$ and controlled to an accuracy of $\pm 5\%$.

NOTE 1 Typical loading configurations are shown in [Figure B.3](#) to [Figure B.6](#).

The test apparatus shall provide sufficient support so that the in-plane movement and perpendicular-to-plane movement of the sample's sub-frame or propped area is not more than 2 mm or 1/800 of the length of the support edge, whichever is the greater, measured at the centre of the supported edge, when subjected to a 4.5 kN load.

A suitable bracket shall be used to apply the loads (an example is shown in [Figure B.7](#)).

The apparatus shall provide frame support for all tests to prevent perpendicular-to-plane movement of the sample's outer frame with respect to the sub-frame. The supported area shall be a minimum of 200 mm in length and (7.5 ± 2.5) mm wide when measured from the outer edge of the profile, as shown in [Figure B.8](#).

The upper member of the doorset sub-frame shall be supported to prevent vertical movement when applying vertical loads to the test sample. The apparatus shall also provide support, in the form of a prop, to prevent movement of transoms and mullions when the perpendicular-to-plane load is applied to locking points adjacent to the transom or mullion. The supported area shall be sufficient to prevent significant indentation of the frame material.

NOTE 2 A supported area of 1 000 mm² has been proven to avoid significant indentation.

B.3.2 Mechanical load test

For the mechanical load test, the perpendicular-to-plane load shall be applied via a loading pad having a nominal area of 1 000 mm², as shown in [Figure B.9](#).

NOTE 1 Where this size of loading pad is impracticable, a pad with a minor dimension of not less than 15 mm and a nominal area of 1 000 mm² may be used.

In all cases, the line of action of the applied load shall be applied to the geometric centre of the loading pad. When hardware is mounted on the face of the leaf in a position to prevent the use of the loading pad within the radial tolerance, a loading bridge shall be used. This bridge shall apply the load simultaneously at two points to the leaf with the force line as close as possible to the contact area of the locking point within a radial tolerance of 50 mm. The two loading points of the bridge shall be equally spaced about the force line with a maximum span of 300 mm. The total loading area shall be nominally 1 000 mm², having a minor dimension of not less than 20 mm.

NOTE 2 A suitable bridge is shown in [Figure B.10](#).

The method of attaching the loading pad(s) shall not detrimentally affect the sample under test.

NOTE 3 (4 × 25) mm self-tapping screws have been used successfully.

B.3.3 Infill medium removal test

For the infill medium removal test, the perpendicular-to-plane load shall be applied via an articulated pad secured to a nominal $(150 \times 150) \pm 5$ mm plywood block of not less than 25 mm thickness.

B.3.4 Soft body impact test

The soft body impact energy shall be applied by the pendulum fall of a leather sphericoconical bag of approximately $(1\,100 \pm 80)$ mm circumference filled with fine dry sand to a total mass of (30 ± 0.05) kg (this corresponds to a sand density of $1\,500 \text{ kg/m}^3$ and a grain size of < 2 mm). The impactor shall be suspended by a cable of at least 1.5 m in length, such that the movement of the impactor is in a vertical plane perpendicular, $\pm 5^\circ$, to the impacted face of the component.

NOTE A typical impact apparatus is illustrated in [Figure B.11](#).

B.3.5 Hard body impact test

The hard body impact energy shall be applied by the pendulum fall of a cylindrical steel block having a mass of (50 ± 0.05) kg. The nose of the impactor shall be (50 ± 0.5) mm in diameter and (175 ± 35) mm in length. The overall length of the impactor shall be (820 ± 10) mm.

The impactor shall be arranged to swing in an arc normal to the plane of the door and its longitudinal axis shall be horizontal at the moment of impact. The impactor shall be suspended by a cable or cables of at least 1.5 m.

NOTE A typical impact apparatus is illustrated in [Figure B.12](#).

B.4 Test methods

B.4.1 General

Check that all glass fitted to the test samples is toughened (see [B.2](#)).

B.4.2 Sample preparation

When conducting any of the tests specified in this annex, the doorset shall be fixed in a timber, steel or aluminium sub-frame of rectangular section [typical (75×100) mm]; to fully support the frame the sub-frame shall be at least the full depth of frame profile. Unless otherwise stated, the test sample shall be stored and tested in an environment with the range of 15°C to 30°C and 25% RH (relative humidity) to 75% RH, for a minimum of 12 h.

The doorset shall be fixed to the sub-frame using suitable fixings at centres, in accordance with the system supplier's instructions. The fixings shall enter the sub-frame through the door frame.

All protective packaging shall be removed before testing.

NOTE 1 The test organization may cover infill medium with a safety film, applied on the attack side prior to impact tests.

The hardware shall be checked for correct operation.

Before testing, samples shall be closed and locked in their most onerous condition based on the intended use, as detailed below.

- Inactive (secondary) door leaves shall be fully locked before locking the active leaves.
- Active (primary) door leaves only lockable from the internal face of the doorset shall be locked before the test is conducted.
- Active (primary) door leaves only lockable from the external face of the doorset shall be locked before the test is conducted.

- d) Where there are locking points that are operable from either side of the active (primary) door leaf, only the locks that can be operated from both sides of the doorset shall be engaged before testing commences.

NOTE 2 Where the doorset locks from both faces but there is no common locking points shared between both faces, then the testing would be required to be conducted fully for both locking conditions.

All keys shall be removed before testing.

B.4.3 Manipulation test

B.4.3.1 Objective

The objective of this test is to establish that there is no inherent vulnerability in the design which, from the outside, would permit entry by the hardware being operated, released or disengaged. The test engineer shall have detailed knowledge of the sample and the hardware installed (for example, the location and direction of travel of all locking points).

B.4.3.2 Procedure

The manipulation test shall be conducted prior to the manual cutting test (B.4.4.4).

The maximum overall attack time shall be 15 min; although no single test technique shall be used for more than 3 min. The total rest time which is taken between techniques is unlimited for this test.

If fixings are exposed, repeat the manipulation test after the additional mechanical loading test (B.4.7); if the additional mechanical loading test is not required and the fixings are exposed, repeat the manipulation test after the mechanical loading test (B.4.5). The overall attack time shall be 3 min with the primary intention of releasing fasteners exposed as a result of the mechanical load tests.

Conduct this test on sample 2 using the limitations in A.2 and the tools listed in A.2.2 (Tools group A) and, where applicable, tools listed in A.2.3.3, A.2.3.5, A.2.3.6 and A.2.3.7 (Tools group B).

Attempt various methods of manipulation, such as:

- a) removal of trim sections;
- b) removal of any hinge pin;
- c) insertion of a tool to disengage locking devices;
- d) undoing/manipulation of fasteners in accessible hardware; and
- e) applying a physical force by hand to dislodge locking devices.

If the test engineer applies a force sufficient to explore any potential vulnerability, this force shall not result in permanent set or plastic deformation of any tool.

If access to the head of any threaded fastener becomes available, attempts to unscrew the fastener shall be made using the tools given in A.2.3.3, A.2.3.5, A.2.3.6 and A.2.3.7. Tools described in A.2.3.3, A.2.3.5, A.2.3.6 and A.2.3.7 shall not be used for any other purpose, such as levering, during this test.

Manipulation at any location shall be terminated if permanent set, plastic deformation or breakage of a tool occurs. Damaged tools shall be replaced and the test continued at other locations.

The aperture within any letter plate shall not be used to gain entry during this test.