



MANUAL FORCED ENTRY STANDARD (MFES)

Part 1: Requirements

Foreword

This Manual Forced Entry Standard (MFES) was developed by the National Protective Security Authority (NPSA).

This version (Version 2.0 December 2023) has been amended to combine one common series of delay times to products and systems as described in [Chapter 2: Scope](#). The common delay times to all generic product and systems are 0.5, 1, 2, 3, 5, 10, 15 and 20 minutes.

This standard replaced the Physical Barriers Attack Standard (PBAS), which was withdrawn by NPSA in 2015. NPSA has made every effort to ensure that the content and provisions made in this standard are accurate. However, NPSA do not accept any responsibility for any loss arising from decisions based upon it.

It is the intention that this standard be used in conjunction with any British, European or International Standards that are applicable to the installation of the product under test.

This standard will be updated from time to time to take into account changes in threat. It is imperative the latest version be used and that reference to it include the version number and date (e.g. version 2.0 December 2023)

This standard should be read in conjunction with other NPSA guidance documents.

NPSA is not an accredited test laboratory or certification body. It therefore does not offer certification of compliance to any standards or regulations. Successful products will be approved only as meeting a specific government protection level. It is the responsibility of the equipment supplier and equipment purchaser to ensure that any system is suitable to its particular application and that it complies with all legislation, standards, codes of practice and/or any other requirement.

Contents

Foreword	1
1 Introduction	3
2 Scope	4
3 Performance Classifications	5
4 Forced entry attack tests	9
5 References	18
Appendix A High Street Toolkit (<i>Normative</i>)	19
Appendix B Resistance Times (<i>Informative</i>)	26

1 Introduction

NPSA commissions independent forced entry testing of physical barriers to classify their performance and approve their use for protecting UK government and national infrastructure.

NPSA have a long history of commissioning forced entry testing. This standard is intended to improve on the previous methods of testing by reflecting changes to the range of threats faced by UK government and national infrastructure. In particular, this standard reflects:

- Generic levels of knowledge and experience of those actors' intelligence has shown are likely to attempt to attack and disrupt UK government and national infrastructure.
- Availability of tools to those likely to conduct such attacks.
- Methodology likely to be employed.

The forced entry protection levels defined in this standard are largely consistent across all types of product covered within the scope of this standard. That is, products are required to exhibit appropriate levels of resistance to forced entry attack methods defined in the scope.

This standard attributes one or more performance classifications to a product according to its resistance to the three alternative levels of attacker defined in Clause 3.1.

NPSA use the results of tests conducted in accordance with this standard to determine the forced entry resistance classifications attributed to products listed within the Catalogue of Security Equipment (CSE). Subject to NPSA's agreement, this standard may also be used to determine whether a product is suitable for a specific security application or whether it can be installed as part of a wider security system on a project specific basis.

This standard will be updated to reflect changes to threat faced by UK government and national infrastructure when required, for example due to advancements in tool technology and attacker knowledge. Therefore, the version and date of the standard that a product is tested to shall be recorded within test reports. Likewise, specifications referring to this standard should generally refer to the latest version unless it has been demonstrated that products meeting earlier versions will address the threats identified.

There is no correlation between the performance classifications a product may achieve when evaluated to this standard, or what it may achieve, or have achieved, when evaluated to publicly available standards such as the BRE Global's LPS 1175 standard and the European standard EN 1627. Those looking to determine which standard for forced entry best matches their requirements are advised to consult the NPSA guidance contained in [Forced Entry Standards – A guide to forced entry protection standards for facades and other building elements used within UK](#).

In many situations, it will be appropriate for products to be tested and approved to other standards, which demonstrates the product delivers general security performance; including electronic and cyber as appropriate, according to the technologies incorporated in the product; or other critical performance attributes such as fire, acoustics and general durability.

2 Scope

The performance classification system defined in this standard can be applied to the following products and systems:

- Building fabric (BF) designed to prevent unauthorised access by pedestrians. These include:
 - doorsets, including portals and tubestiles;
 - facades and structural elements (e.g. walls, roofs, floors and ceilings);
 - glazing and window protection systems (e.g. shutters);
 - room systems; and
 - other products (e.g. hatches and vents)
- External perimeter (EP) barriers designed to prevent unauthorised access by pedestrians (e.g. cutting through, climbing over or under). These include:
 - fences and walls;
 - gates; and
 - turnstiles.
- Security containers (SC) designed to prevent unauthorised access to the contents of the container or, where stated, unauthorised removal of the container. These include:
 - fixed security containers, such as security cabinets; and
 - portable security containers.
- Marine perimeter barriers. This is in terms of their resistance to manual forcible attacks aimed at enabling swimmers or marine craft to pass through the marine barrier.
- Other systems which require forced entry resistance.

The standard applies to manual attacks conducted by pairs of attackers. It does not cover attacks conducted by mobs, nor does it cover the use of ballistics, explosives, and other munitions.

This standard does not cover the use of vehicles or marine vessels to impact a product or apply other loads to a product to compromise it. Furthermore, this standard does not cover the use of explosives or firearms to breach the product.

3 Performance Classifications

Products tested to this standard are attributed performance classifications that indicate the following:

- The protection level (BASE, ENHANCED and HIGH). These are defined in Clause 3.2. They correspond to the three levels of attacker defined in Clause 3.1.
- The minimum resistance time achieved by the product when subjected to each level of attack. This is indicated by the resistance time classification defined in Table 2.
- The test criteria applied. This relates to the generic product type, i.e.:
 - BF (Building Fabric);
 - EP (External Perimeter);
 - MB (Marine Barrier)^b and
 - SC (Security Container).

Each product may be attributed more than one performance classification.

A product that fails to achieve a BASE protection level will not be classified in accordance with this standard or listed in CSE for forced entry protection.

3.1 Attacker Definitions

The attackers are defined in Table 1.

Table 1: Definition of Attackers

Attacker	Novice	Knowledgeable	Expert
Threat Represented	Low technical manual attacks conducted by lone terrorists and terrorist organisations that have limited capabilities.	Low-to-medium technical manual attacks conducted by sub-state actors and terrorist groups with advanced capabilities.	Manual attacks conducted by state or state sponsored actors.
Tools	Tools commonly available on the high street.	Tools commonly available on the high street.	Wide range of tools including specialist tools such as those used by state actors (e.g. Special Forces).

Attacker	Novice	Knowledgeable	Expert
Experience of Tool Use	Experience limited to using tools safely to complete common DIY activities.	Professional skills in the following as appropriate to the nature of the product they are attacking and attack methods they intend to use: <ul style="list-style-type: none"> - building fabrics and construction; - electronics; - computing; - mechanics; - installation; or - commercial locksmithing. 	Expert skills in the following as appropriate to the nature of the product they are attacking and attack methods they intend to use: <ul style="list-style-type: none"> - building fabrics and construction; - electronics; - computing; - mechanics; - installation; or - commercial locksmithing.
Experience of Attacking Products	None.	Conduct extensive research about tools/techniques they may use to attack the product, but <u>do not</u> rehearse the methods they intend to use on samples of the product prior to conducting their attack.	Conduct extensive research about tools/techniques they may use to attack the product and rehearse the methods they intend to use on samples of the product prior to conducting their attack.
Knowledge of the Product	Do not have access to any information about the specific construction of the product being attacked other than that which they can obtain through visual inspection of the attack face of the product and open source research.	Aware of the security measures in place and their likely construction and operation.	Full knowledge of the product to be tested including all construction details and operation.
Fitness	Sufficient fitness to conduct their intended method of attack continuously for up to the maximum duration specified in the standard for that generic product type (e.g. 20 minutes for building fabric).		Demonstrate extremely high levels of stamina, strength and agility.

3.2 Protection Levels

Three protection levels exist; BASE, ENHANCED and HIGH. These are described below. They correspond with the three types of attackers defined in Clause 3.1, i.e. Novice, Knowledgeable and Expert respectively.

3.2.1 BASE

Performance classification at this protection level indicates a security product's resistance to forced entry by a pair¹ of **Novice** attackers, who have a limited knowledge of security products and attack methodologies.

3.2.2 ENHANCED

Performance classification at this protection level indicates a security product's resistance to forced entry a pair of **Knowledgeable** attackers, who are familiar with security products and how they operate and who have received training on the generic attack techniques they may employ.

3.2.3 HIGH

Performance classification at this protection level indicates a security product's resistance to forced entry by a pair of **Expert** attackers, who have a very highly developed level of knowledge and ability to plan attacks in detail and significant resources to support the implementation of their planned attacks, including access to specialist tools such as those used by state actors (e.g. Special Forces).

3.3 Resistance Times

The resistance time classification that forms part of the performance classification attributed to a product is determined according to the minimum working time required to compromise the product when tested to this standard. Table 2 defines the resistance time classifications relevant each generic product type.

Table 2: Resistance Time Classifications

Minimum Working Time (t) Required to Compromise the Product (Minutes)	Resistance Time Classification
0	FAIL ²
0.5	0.5
1	1
2	2
3	3

¹ Two pairs of Novice attackers shall be used to determine the BASE rating achieved by a product.

² No classification would be attributed to the product for that level of attack.

Minimum Working Time (t) Required to Compromise the Product (Minutes)	Resistance Time Classification
5	5
10	10
15	15
20	20

3.4 Example Performance Classifications

The following are examples of performance classifications that may be attributed to security products as a result of testing them in accordance with this standard:

- A 'BASE 20 BF / ENHANCED 10 BF' classification would be attributed to a building fabric product (e.g. doorset) that delivers at least 20 minutes resistance to a BASE level attack and 10 minutes resistance to an ENHANCED level attack.
- A 'BASE 5 BF ' classification would be attributed to a building fabric product (e.g. doorset) that delivers at least 5 minutes resistance to a BASE level attack, but which has not delivered at least 5 minutes resistance to an ENHANCED level attack.
- A 'BASE 1 EP / ENHANCED 0.5 EP' classification would be attributed to an external perimeter product (e.g. fence) that delivers at least 1 minute resistance to a BASE level attack and 0.5 minutes (30 seconds) resistance to an ENHANCED level attack.

4 Forced entry attack tests

4.1 General

The laboratory conducting the testing shall manage the tests in accordance with the requirements specified in BS EN ISO/IEC 17025 (General Requirements for the competence of testing and calibration laboratories). This shall extend to the laboratory's handling of specimens and supporting specification documents, event recording and presentation of the test report.

4.2 Objective of the Test Programme

The objective of the test programme is to determine the products' resistance to forced entry at the protection level(s) sought by the sponsor of the test programme (i.e. BASE, ENHANCED or HIGH). This involves conducting a series of individual attack tests on representative specimens of the product (Clause 4.5 and 4.6) by testers appropriate to the level(s) sought (Clause 4.7).

4.3 Test Method

Prior to conducting the test programme, the testers shall have planned the attacks in accordance with Clause 4.8 and shall have selected the attack tools they use in accordance with Clause 4.9.

Each individual attack test shall commence with the attack test team and their associated tools in the start position defined in Clause 4.11.

Each individual attack test shall continue until either:

- The objective of that individual attack test is achieved (see below);
- The resistance time either exceeds 20 minutes or exceeds the time associated with the performance classification sought; or
- The test must be halted for health and safety reasons or is halted under the direction of NPSA.

The objective of each individual attack test is to achieve one of the failure criteria defined in Table 3 appropriate to the type of product being tested as quickly as possible using the tools selected.

The time taken to complete each attack shall be measured and recorded in accordance with Clause 4.10.

Table 3: Failure Criteria

Failure Criteria	Building Fabric (BF)	External Perimeter (EP)	Marine Barrier (MB)	Security Containers (SC)
Passage of both attackers completely through the product to the protected side together with their chosen tool kit ³ .	✓	✓		
Passage of both attackers completely over or under the product to the protected side with their chosen tool kit.		✓		
Ability to remove the contents of the container (Clause 4.4.2)				✓
Ability to remove the container from the structure to which it is attached.				✓
Ability of a defined vessel or person ⁴ to pass the marine barrier uninhibited (Clause 4.4.3)			✓ ^b	

4.4 Test Blocks

4.4.1 'Person-Sized' Test Blocks

The ability of a person to pass through a product may be determined using a test block of elliptical cross section 400mm (-0 mm/+3mm) major axis by 225mm (- 0mm/+3mm) minor axis that is at least 300mm long.

The product shall be deemed to have been compromised by the attack team when they are able to pass the test block unimpeded⁵ completely through the plane of the specimen from the attack side into the protected area beyond the specimen.

This may be achieved from the attack side by either:

- Operating opening elements on the products. This excludes the use of the key or any access tokens required to legitimately operate any locking devices securing the opening element.
- Removing elements of the product (e.g. cutting a hole in the product)
- Releasing the product from the supporting substrate.

³ The attackers may instead pass a person sized test block (defined in Clause 4.4.1) through the aperture, if it is considered unsafe for the testers to pass through the aperture. Irrespective of this, they must be able to pass their tools through the aperture created.

⁴ If the marine barrier is designed to prevent swimmers passing through, the same principles as those used for external perimeter shall be used (i.e. penetration, climb over or pass below).

⁵ The test block shall not be used to deform the specimen in order that the test block can be passed through it.

4.4.2 'Contents' Test Block

The ability of a person to access the contents of a security container is determined using one of the following test blocks:

- A cylindrical test block of 125mm (-0mm/+3mm) diameter that is at least 300mm long.
NOTE: *This test block mimics an attacker reaching with their whole arm through the product to access the protected asset.*
- Test block representing the contents of the container being protected from unauthorised access/removal. If this test block is used, it shall be defined in the report and shall be communicated to the test teams prior to them commencing their attack planning.
Example: *A key-sized test block may be used to determine the resistance provided by a key safe to unauthorised removal of the key secured within the key safe.*

4.4.3 Marine Barrier Test Blocks^b

Barrier systems designed to be deployed across areas of water are generally intended to prevent access by vessels' swimmers. Forced entry resistance in this case represents the resistance to the barrier being compromised by cutting or sinking to allow vessel access.

A marine barrier shall be deemed to have been compromised if it is possible for the defined marine vessel and/or swimmer⁶ to pass the marine barrier uninhibited. *A consistent method of measuring this is being developed and will be introduced into the standard at a later date. In the meantime, this aspect of the standard is a working draft.*

Testing of resistance to high speed vessel impact or low speed encroachment attacks is outside the scope of this standard.

The products' resistance to impact by a marine vessel is outside the scope of this standard, as is the product's resistance to attacks involving inducement of any other forces on the product by a marine vessel (e.g. tugging).

4.5 Specimen Preparation⁷

Specimens shall be configured for test in as close to the normal orientation as is possible, and that configuration recorded in the test report.

Doorsets and other building elements shall be installed in/on a rigid structure capable of resisting deflections that may occur during attack tests (e.g. during levering, wedging or impact attacks)⁸.

Free-standing structures (e.g. perimeter barriers) and security containers shall be installed onto/into a substrate representative of that onto/into which the product is designed to be installed for normal use. The specimen's installation shall be conducted in accordance with the manufacturer's installation instructions and shall be recorded within the test report.

Specimens of products that have several locking modes or options (e.g. vision panels or louvre panels) within the scope to be classified to this standard shall be selected and configured for test according to what, in the test director's experience, is likely to be the most vulnerable to

⁶ If the marine barrier is designed to prevent swimmers passing through, the same principles as those used for external perimeter shall be used (i.e. penetration, climb over or pass below).

⁷ Requirements relating to the preparation of specimen marine barriers will be included in a subsequent edition of this standard.

⁸ This is to ensure the energy imparted on the specimen being tested as closely reflects that which would be imparted on the product if those attacks were to be conducted on the product when installed in accordance with the manufacturers standard installation instructions. It is therefore important to ensure limited energy is dissipated through deformation of the supporting test structure. EN 1627 provides further guidance on rigidity of test rigs used for forced entry testing.

forced entry. The configuration tested and reason for its selection should be noted within the test report. Likewise, any restrictions relating to possible extrapolation of the test results to classify the likely performance of alternative configurations within the proposed scope shall be noted in the report.

The limits of the area of the specimen to be targeted during each attack test may be marked on the specimen prior to the attack test⁹.

4.6 Verification of Specimen Construction

The test specimen(s) shall be visually examined to determine whether they reflect the construction defined on documents submitted in support of the product's evaluation to this standard. The results of these checks shall be recorded within the report.

4.7 Test Team

The test team shall include the following personnel.

4.7.1 Test Director

Responsible for directing the test programme to ensure it is conducted in accordance with the requirements of this standard. This includes ensuring each individual attack test is accurately timed and that the methods used to attack the specimen, the features targeted and the damage sustained by the specimen is accurately recorded. They shall also:

- Determine the programme of tests that shall be conducted, in consultation with the NPSA representative responsible for the trials programme. This shall consider the methods of attack identified by the test teams as well as those listed in Part 2 of this standard.
- Provide support to the test teams and help ensure the health and safety of those conducting and witnessing the tests.

The test director may also conduct some of the roles of the test laboratory support staff (Clause 4.7.2).

4.7.2 Laboratory Support Staff

Responsible for timing each individual attack test and recording the attack methods used (written, photographic and video records), the features targeted and the damage sustained by the specimen. They shall also provide support to the test teams and help ensure the health and safety of those conducting and witnessing the tests.

4.7.3 Attack Testers

BASE level attack tests are to be conducted by two teams, each comprising a pair of Novice attackers meeting the criteria defined in Clause 3.1. All Novice testers shall have had limited/no experience of attack testing¹⁰.

9 This is to ensure the damage sustained by that test, or previous tests, does not influence the results of that attack test or subsequent tests. The test blocks defined in clause 4.4 shall not be used as templates to assist those marking out the limits of the test area.

10 Each tester shall have conducted no more than three previous attack test programmes on dissimilar types of products and no more than one previous test programme on a similar product to this standard, LPS 1175 or suitably similar standard. Novices should not have conducted any previous test programmes on the same type of product to any of those standards unless the test programme is a continuation of a previous incomplete programme.

ENHANCED level attack tests shall be conducted by a team of two Knowledgeable attackers meeting the criteria defined in Clause 3.1. Each tester shall be very experienced at using tools and conducting attack tests¹¹.

HIGH level attack tests shall be conducted by a team of two Expert attackers meeting the criteria defined in Clause 3.1. Each tester shall have significant experience of tool use and conducting attack tests on the type of product to be tested and shall have been able to practise their intended attack methods on specimen's representative of the product to be tested.

Both attackers in each team may attack the product simultaneously using any tool, or combination of tools, selected from the tool kit chosen by that team for the attack test programme¹².

Climbing (scaling) and burrowing attack tests on external perimeter (EP) products shall be conducted by testers who are experienced with conducting such attacks tests and with the associated safety procedures and measures to be employed during such attack tests. The attack tools and methods used by those testers during BASE tests shall be as directed by the Novice attack team unless either the experienced testers or the Test Director consider a method is unsafe.

The Knowledgeable attack testers used to conduct climbing (scaling) and burrowing attack tests on external perimeter (EP) products may differ from those used to conduct the penetration attack tests on the same product.

Marine barriers (MB) shall be tested by testers who are experienced with conducting attacks tests on such products and with the associated safety procedures and measures to be employed during such attack tests. The attack tools and methods used by those testers during BASE tests shall be as directed by the Novice attack team unless either the experienced testers or the Test Director consider a method is unsafe.

¹¹ Each tester shall have previously conducted at least 20 attack test programmes of which at least one should preferably have been conducted on the same generic type of product as that being tested but not the specific model being tested. Those tests may have been conducted in accordance with this standard, LPS 1175 or other appropriately similar standard.

¹² This is unless health and safety concerns prevent this; for example, due to risk of a fire when using thermal or grinding tools or due to concerns regarding safety of testers scaling fences with barbed toppings.

4.8 Planning

4.8.1 Planning for BASE Attack Tests

Prior to conducting any BASE attack tests on a product, each team of attackers shall:

- View the attack face of the specimen(s) to be tested¹³.
- Witness attack tests conducted on the product, or similar products, by Knowledgeable attackers. Those tests may be conducted live in front of the Novice attackers¹⁴, relayed live to the Novice attackers using a suitably secure AV link, or recorded and played back to the Novice attackers.
- Familiarise themselves with the dimensions of the test block(s) defined in clause 4.4. However, they shall NOT use a test block as a template to mark their intended aperture on the specimen to be tested.
- Select tools¹⁵ from the high street tools listed in Appendix A. The maximum total combined weight of the tools and associated consumables each attack team may select for a test programme¹⁶ to be conducted on a particular product is 30kg¹⁷.
- List the alternative methods of attack aimed at achieving the test objective defined in Clause 4.1 they propose to conduct using the tool kit they have selected. The attack team shall rank the alternative methods of attack they have identified in order of their perceived likelihood of success.

The Test Director shall review each team's lists of proposed attack methods and tools to determine an attack test programme which, in their experience, should:

- Result in the minimum resistance time (Clause 4.10) being achieved by each team; and
- Permit the teams to attempt at least two alternative attack methods¹⁸.

13 This is to enable the testers to consider how they may attack the product in order to achieve the test objective defined in Clause 4.1.

14 The novices shall not be permitted to approach the specimens to view the damage sustained.

15 These shall include the associated tool consumables; such as batteries, drill bits, blades and discs.

16 Penetration, scaling and burrowing tests may be conducted as separate test programmes. Each attack team may select different tool kits for each of these programmes, with each tool kit tailored to a specific programme and prohibited from being used by that team for other programmes unless they opted to select a common tool kit for more than one of the programmes. For example; they may predominantly select penetration tools (e.g. cutting tools, impact tools and levering tools) to conduct the penetration test programme; scaling tools (e.g. ladders and ropes) to conduct scaling tests; and burrowing tools (e.g. spades and pick axes) to conduct burrowing tests.

17 If the Test Director notes the tools selected by a Novice attack team do not include ones considered to be the most effective on that generic product or for the attack methods they propose to attempt, the Test Director or their designated assistant may advise that Novice attack team to reconsider their tools kit accordingly. In such cases, the attack team shall be given up to 15 minutes to consider changes to their tool kit in order to include the tools identified by the Test Director. The total weight of the revised tool kit must remain within the 30 kg limit.

18 The Test Director's ability to achieve this depends on the products' resistance to attack, the ratings sought, the number of specimens presented for test and damage incurred by those specimens during preceding attack tests. Ideally there would be at least one specimen available per team and; in the case of smaller products; additional specimens would be available to enable the alternative methods of attack to be attempted.

Each team of Novice attackers shall not:

- Conduct two individual attack tests concurrently unless it is considered they are suitably fit to do so safely and effectively.
- Witness the other teams' attack tests¹⁹ once that Novice team has conducted their first attack test on the product.
- Consult the other teams regarding the relative success of the tests they conducted.
- View the damage sustained by the specimen(s) during other team's attack tests, at close quarters (i.e. within 2 metres). Such damage shall therefore be concealed following the attack test, prior to subsequent attack tests being conducted²⁰.

4.8.2 Planning for ENHANCED Attack Tests

Prior to conducting any ENHANCED attack tests on a product, the team of Knowledgeable²¹ attackers shall have up to 1 hour to:

- View the attack face of the specimen(s) to be tested¹³.
- Familiarise themselves with the dimensions of the test block(s) defined in clause 4.4. However, they shall NOT use a test block as a template to mark their intended aperture on the specimen to be tested.
- Select tools¹⁵ from the high street tools listed in Appendix A. The maximum total combined weight of the tools and associated consumables each attack team may select for a test programme¹⁶ to be conducted on a particular product is 30kg¹⁷.
- List the alternative methods of attack aimed at achieving the test objective defined in Clause 4.1 they propose to conduct using the tool kit they have selected. The attack team shall rank the alternative methods of attack they have identified in order of their perceived likelihood of success.

The Test Director shall review each team's lists of proposed attack methods and tools to determine an attack test programme which, in their experience, should:

- Result in the minimum resistance time (Clause 4.10) being achieved by each team; and
- Permit the teams to attempt at least two alternative attack methods¹⁸.

The knowledgeable attackers shall be given sufficient time between two concurrent individual attack tests to recuperate to avoid fatigue affecting the results of subsequent attack tests conducted as part of the test programme and to reduce the likelihood of accidents occurring due to fatigue.

4.8.3 Planning for HIGH Attack Tests

Prior to conducting any HIGH attack tests on a product, the Expert team may conduct unlimited tests on specimens that are representative of the product to be trialled to determine the most effective tools and entry methods to use to compromise the product. These tests may be conducted using any of the high street tools listed in Appendix A together with a range of specialist method of entry tools.

¹⁹ This is because research conducted as part of the development of this standard demonstrated the novices develop their knowledge during a test programme and learn from other teams during the course of a trial. Preventing them witnessing other teams during the trial prevents them adapting their methods other than as a result of their own tests.

²⁰ This is to prevent the decisions on tool choice and methods of attack employed being influenced by knowledge a novice attacker would not otherwise have.

²¹ In the interests of health and safety; the Knowledgeable team used to conduct scaling tests may differ from the Knowledgeable team used to conduct penetration tests on the same perimeter barrier.

Once they have determined their preferred tool kit and method(s) of attack, they shall record their choices and their reasons for those choices.

4.9 Attack Tools

Each test team shall select tools¹⁵ from those listed in Appendix A up to a total combined weight of 30kg for each test programme¹⁶. Multiple units of any one tool or associated consumable may be included within a tool kit.

Tools that are lost during an individual attack test shall not be replaced during that attack test. However, they may be replaced by equivalent tools between individual attack tests, i.e. prior to conducting subsequent attack tests.

Consumables that are lost during an individual attack test shall only be replaced by other consumables contained within the tool kit selected by the attack team during that individual attack test. However, they may be replaced between individual attack tests, i.e. prior to conducting subsequent attack tests.

Tools¹⁵ that are damaged during an individual attack test shall not be replaced during that particular attack test unless it is considered that the damage sustained by the tool¹⁵ was caused during previous tests and was likely to have an artificial influence on the result of that test. In such cases the tool¹⁵ may be replaced and the time taken to replace the tool¹⁵ shall be discounted from the total working time recorded for that attack test.

Tools¹⁵ that are damaged during an individual attack test may be replaced between individual attack tests, i.e. prior to conducting subsequent attack tests.

4.10 Resistance Times

The resistance to manual forced entry (delay) provided by a product is determined according to how long it resists being compromised during each individual attack test. This is called the resistance time.

The resistance time includes all time required to attack the product, change tools, for members of the attack team to confer and for the test block to be passed uninhibited⁵ through the product.

The resistance time does not include any time during which the attack test may be suspended for health and safety reasons. However, during such periods, the members of the attack team are prohibited from:

- Discussing their attack strategy.
- Repairing or replacing their tools unless permitted in Clause 4.9.

The resistance time achieved by the specimen(s) during each individual attack tests shall be recorded together with the attack methods attempted.

The timing device used to measure the resistance time shall have a resolution of at least 0.01 second. At the conclusion of the test the resistance time shall be rounded to the nearest full second.

4.11 Starting Positions

For consistency and realism each attack shall be started from a tools-off position. Tools may be held ready before starting but shall not be placed against the product being tested.

In the case of penetration attack tests conducted on building fabric and perimeter security products; the attackers and all their tools shall be located between 1m and 2m away from the attack face of the product at the start of each individual attack test.

In the case of climbing attacks²², the attackers and all their tools shall be located between 5m and 6m away from the attack face of the product at the start of each individual attack test.

²² For health and safety reasons, safety mats may be used. These may be in place before the attack has started, or moved into place immediately after the attacker has cleared the ground.

5 References

- BS EN 1627: 2021 Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Requirements and classification. BSI, 2021.
- BS EN ISO/IEC 17025. General Requirements for the competence of testing and calibration laboratories. BSI, 2017.
- LPS 1175: Issue 8. Requirements and testing procedures for the LPCB certification and listing of intruder resistant building components, strongpoints, security enclosures and free-standing barriers. BRE Global Limited, 2019.

Appendix A High Street Toolkit (Normative)

The tools listed in the following table shall be made available to the attack testers. Each attack test team may select more than one of each of the tools listed.

Tool	
Accessories	Adhesive tape (<i>e.g. gaffer tape</i>)
	Cable tie
	Chalk
	Crocodile clips
	Electronic cable (<i>single core</i>)
	Engineers' hooks
	Fishing hooks
	Fishing line (<i>e.g. polypropylene multi-fibre</i>)
	Flexible plastic coupon (<i>e.g. credit card</i>)
	Fuel for petrol driven tools
	Glass-carrying pads
	Hand guards for chisels
	Insulated frame
	Jump leads
	Magnet (<i>10mm by 5mm</i>)
	Manhole key
	Marker pen
	Masking tape
	Modelling clay (<i>e.g. 'Plasticine'</i>) or 'Blue Tac'
	Pipe lagging
	Rope
	Rubber electrical matting
	Scriber
	String
	Tape measure (<i>for marking out</i>)
	Traction screw ²³ (<i>selection 5.5mm diameter x 60mm long (carbon steel, single and twin start versions with choice of two varieties of thread/tip: deep thread and gimlet point; and self-tapping thread with drill point)</i>)
	Tweezers
	Wire (<i>e.g. 0.8mm diameter welding wire</i>)
Axes	Felling axe (<i>'3.5lb' felling axe between 840mm and 860mm long</i>)
	Hand axe (<i>'20oz' hand axe between 330mm and 350mm long</i>)
	Ice axe (<i>approximately 0.5m long</i>)
	Maul (<i>'6lb' between 840mm and 900mm long</i>)
	Maul (<i>'8lb' between 840mm and 900mm long</i>)
	Pickaxe (<i>'5lb' between 880mm and 920mm long with head between 525mm and 535mm long</i>)

²³ Also commonly referred to as 'self-tapping' screws or 'self-drilling' screws.

Tool	
Batteries	'AA' batteries
	'AAA' batteries
	'C' batteries
	'D' batteries
	'PP3' batteries
	12v batteries (<i>for use with 12v battery powered tools</i>)
	18v batteries (<i>for use with 18v battery powered tools</i>)
	36v batteries (<i>for use with 36v battery powered tools</i>)
Bolt cutters	'300mm' bolt cutters (<i>with high tensile jaws</i>)
	'350mm' bolt cutters (<i>with high tensile jaws</i>)
	'450mm' bolt cutters (<i>with high tensile jaws</i>)
	'1050mm' bolt cutters (<i>with high tensile jaws</i>)
	Spare jaws for '300mm' bolt cutters (<i>high tensile jaws</i>)
	Spare jaws for '350mm' bolt cutters (<i>high tensile jaws</i>)
	Spare jaws for '450mm' bolt cutters (<i>high tensile jaws</i>)
	Spare jaws for '1050mm' bolt cutters (<i>high tensile jaws</i>)
Chainsaws ²⁴	36v wood cutting chainsaw (<i>excluding battery</i>)
	Timber cutting chainsaw (<i>petrol driven</i>)
Chisels	'Facom' steel cutting cold chisel (between 235 and 245mm long)
	Brick bolster - 225mm long 'Roughneck' with 70mm wide blade
	Cold chisel - 165mm long with 16mm wide blade
	Cold chisel - 180mm long with 18mm wide blade
	Cold chisel - 195mm long with 22mm wide blade
	Cold chisel - 200mm long with 18mm wide blade
	Cold chisel - 200mm long 'Roughneck' with 25mm wide blade
	Cold chisel - 240mm long with 25mm wide blade
	Cold chisel - 250mm long with 19mm wide blade
	Wood chisel - 265mm long with 6mm wide blade
	Wood chisel - 265mm long with 12mm wide blade
	Wood chisel - 265mm long with 18mm wide blade
	Wood chisel - 265mm long with 25mm wide blade
	Wood chisel - 265mm long with 32mm wide blade
Circular saws ²⁴	18v circular saw (<i>excluding battery</i>)
	36v circular saw (<i>excluding battery</i>)
Circular saw blades	Circular saw blades (<i>metal cutting</i>)
	Circular saw blades (<i>timber cutting</i>)

²⁴ Weights noted exclude associated batteries and consumables (e.g. drill bits, blades, etc).

Tool	
Climbing equipment	Crampons
	Fence-climbing aids (<i>e.g. hooks and loops</i>)
	Grappling hooks
	Rock climbing equipment, such as: karabiners; harnesses; pulleys; nuts; and cams (<i>Various</i>)
Chemicals	Fluorocarbon freeze spray (<i>otherwise referred to as pipe freeze spray</i>)
	WD40
Disc cutters / grinders ²⁴	Grinder key – approximately 170mm long (<i>required to change discs</i>)
	Grinder key - approximately 240mm long (<i>required to change discs</i>)
	18v disc cutter / grinder (<i>excl. battery</i>)
	36v disc cutter / grinder (<i>excl. battery</i>)
	Petrol driven disc cutter (<i>3.2kW with 300mm diameter discs</i>)
	Petrol driven disc cutter (<i>5kW with 400mm diameter discs</i>)
Drills ²⁴	Hand drill
	12v drill (<i>excluding battery</i>)
	18v drill (<i>excluding battery</i>)
	36v drill (<i>excluding battery</i>)
Drill and chisel bits	Arbour and pilot bits (<i>between 100mm and 120mm long</i>)
	6mm diameter carbide tipped drill bit - 94mm long (<i>Jobber</i>)
	8mm diameter carbide tipped drill bit - 115mm long (<i>Jobber</i>)
	10mm diameter carbide tipped drill bit - 136mm long (<i>Jobber</i>)
	13mm diameter carbide tipped drill bit - 150mm long (<i>Jobber</i>)
	6mm diameter HSCO drill bit - 94mm long (<i>Jobber</i>)
	8mm diameter HSCO drill bit - 115mm long (<i>Jobber</i>)
	10mm diameter HSCO drill bit - 136mm long (<i>Jobber</i>)
	13mm diameter HSCO drill bit - 150mm long (<i>Jobber</i>)
	6mm diameter HSCO drill bit (<i>Long Series</i>)
	8mm diameter HSCO drill bit (<i>Long Series</i>)
	10mm diameter HSCO drill bit (<i>Long Series</i>)
	13mm diameter HSCO drill bit (<i>Long Series</i>)
	6mm diameter masonry drill bit (<i>Jobber</i>)
	8mm diameter masonry drill bit (<i>Jobber</i>)
	10mm diameter masonry drill bit (<i>Jobber</i>)
	13mm diameter masonry drill bit (<i>Jobber</i>)
	6mm diameter masonry drill bit (<i>Long Series</i>)
	8mm diameter masonry drill bit (<i>Long Series</i>)
	10mm diameter masonry drill bit (<i>Long Series</i>)
	13mm diameter masonry drill bit (<i>Long Series</i>)
	6mm diameter rasp drill bit
	Ball ended rasp drill bit
	Cylindrical rasp drill bit
	SDS chisel bit - 250mm long with 20mm wide blade

Tool	
	SDS chisel bit - 250mm long with 40mm wide blade
	SDS chisel bit - 250mm long with pointed tip
	Step drill bit (<i>otherwise referred to as a cone cutter bit</i>)
	Glass and tile drill bit (6mm, 8mm and 10mm diameters)
	Wood boring spade bits (<i>various diameters between 13mm and 32mm</i>)
Excavating tools	Garden spade
	Trowel
Files	Flat file (<i>approximately 300mm long</i>)
	Half round file (<i>approximately 300mm long</i>)
	Round file (<i>approximately 300mm long</i>)
Grinding / cutting discs	125mm diameter by 1mm thick cutting disc
	125mm diameter by 2.5mm thick grinding disc
	125mm diameter 'FR3' grinder disc
	300mm diameter diamond cutting disc
	300mm diameter metal cutting disc
	300mm diameter universal cutting disc
	400mm diameter diamond cutting disc
Hammers	Claw hammer (<i>'20oz' anti-vibration, approximately 360mm long</i>)
	Club hammer (<i>'3lb' forge steel, approximately 280mm long</i>)
	Club hammer (<i>'3lb' anti-vibration steel, approximately 280mm long</i>)
	Plasterboard hammer (<i>'14oz' forged steel, approximately 250mm long</i>)
	Sledgehammer (<i>'3lb' short-handled, approximately 400mm long</i>)
	Sledgehammer (<i>'7lb', approximately 850mm long</i>)
	Sledgehammer (<i>'10lb', approximately 900mm long</i>)
	Sledgehammer (<i>'14lb', approximately 900mm long</i>)
Hex keys (Allen keys)	Imperial and metric hex keys (1.5mm to 10mm)
Hole Saws	Hole saws (19mm, 22mm, 29mm, 38mm, 44mm and 57mm diameters)
Jacks	Bottle jack - Manually operated (2 tonne, 4 tonne, 6 tonne and 12 tonne capacities)
	Scissor jack - 1.5 tonne capacity
	Scissor jack crank handle
	Trolley jack - 2 tonne capacity
Jigsaws ²⁴	18v jigsaw
	36v jigsaw

Tool	
Knives and glass cutters	Craft knife
	Glass cutter (<i>six-wheel</i>)
	Hunting knife (<i>approximately 215mm long by 2.5mm thick blade</i>)
	Putty knife
	Scalpel
	'Stanley' knife
Ladders	Telescopic ladder (<i>between 3.5 and 4.0m long</i>)
	Extension ladder (<i>triple section; total length between 10m and 10.5m</i>)
	Combination ladder (<i>five way; total height between 8m and 9m</i>)
	Roof ladder (<i>between 7.5 and 8.0m long</i>)
	Escape ladder (<i>2 storey and 3 storey versions</i>)
Levers	Multipurpose lever/moulding tool ²⁵ (<i>between 200mm and 300mm long</i>)
	'600mm' crowbar
	'1m' crowbar
	Nail bar
	1500mm pinch bar (<i>approximately 30mm diameter</i>)
	1800mm pinch bar (<i>approximately 30mm diameter</i>)
	Tyre lever
Lighting	Head-mounted torch
	Pocket torch
	Large torch
	UV lamp
Paint scrapers	Flat bladed paint scraper
	'Triangular' paint scraper
Pliers	Adjustable spanner (<i>approximately 300mm long</i>)
	Cable cutters (<i>approximately 170mm long</i>)
	Cutting pliers (<i>between 150mm and 180mm long</i>)
	Engineering pliers (<i>between 175mm and 200mm long</i>)
	Nail pincers (<i>approximately 180mm long</i>)
	Long nose pliers (<i>approximately 200mm long</i>)
Punches	Centre punch (<i>approximately 100mm long</i>)
	3mm pin punch (<i>approximately 200mm long</i>)
	4mm pin punch (<i>between 150mm and 200mm long</i>)
	4.5mm pin punch (<i>between 150mm and 200mm long</i>)
	6mm pin punch (<i>between 150mm and 200mm long</i>)
	8mm pin punch (<i>between 200mm and 250mm long</i>)
	10mm pin punch (<i>between 200mm and 250mm long</i>)

²⁵ Also commonly referred to as a utility bar, e.g. Stanley 55-117 lever.

Tool	
Rams	Fence post rammer
Ratchet/socket sets	Ratchet with attachments (<i>set in box</i>)
	1/4" Ratchet
	1/2" Ratchet
Reciprocating saws ²⁴	12v reciprocating saw
	18v reciprocating saw
	36v reciprocating saw
Saw blades	Circular saw blade (<i>e.g. 300mm diameter FR3 blade</i>)
	Hacksaw blade (<i>315mm long, 18 TPI</i>)
	Jigsaw blade for manual jigsaw (<i>HSS</i>)
	Jigsaw blade for battery powered jigsaw (<i>6 TPI between 90mm and 135mm long</i>)
	Jigsaw blade for battery powered jigsaw (<i>10 TPI between 90mm and 135mm long</i>)
	Jigsaw blade for battery powered jigsaw (<i>14 TPI between 90mm and 135mm long</i>)
	Jigsaw blade for battery powered jigsaw (<i>18 TPI between 90mm and 135mm long</i>)
	Jigsaw blade for battery powered jigsaw (<i>24 TPI between 90mm and 135mm long</i>)
	Compass saw blade
	Reciprocating saw - Masonry cutting blades (<i>between 150 and 305mm long</i>)
	Reciprocating saw - Metal cutting blade (<i>between 150 and 305mm long</i>)
	Reciprocating saw - Multi-purpose cutting blade (<i>between 150 and 305mm long</i>)
	Reciprocating saw - Rescue blade (<i>between 150 and 305mm long</i>)
	Reciprocating saw - Timber cutting blade (<i>between 150 and 305mm long</i>)
Saws	Compass saw - 200mm (<i>with wood cutting / metal cutting blades</i>)
	General purpose saw (<i>with HSS blade</i>)
	Hacksaw (<i>with HSS blade</i>)
	Junior hacksaw (<i>with HSS blade</i>)
	Padsaw (<i>with HSS blade</i>)
	Scissors and shears
	Kitchen/office scissors
	Metal cutting (plate) shears (<i>approximately 300mm long</i>)
	Tailors' scissors/shears

Tool	
Screwdrivers	Adjustable screwdriver (<i>with set of interchangeable bits</i>)
	Cross-headed screwdriver with round shaft
	Electricians flat-bladed screwdriver (<i>up to 150mm long</i>)
	Flat ended (flared) screwdriver with round shaft (<i>up to 280mm long with blades up to 10mm wide</i>)
	Impact screwdriver - 6.5mm square shaft and flat blade (<i>approximately 200mm long</i>)
	Impact screwdriver - 14mm square shaft and flat blade (<i>approximately 370mm long</i>)
	Pozi-drive screwdriver with round shaft (<i>up to 280mm long with shafts up to 10mm diameter</i>)
	Stubby flat-bladed screwdriver (<i>up to 100mm long</i>)
	Stubby crosshead or pozi-drive screwdriver (<i>up to 100mm long</i>)
Spanners	Spanners to suit metric fixings between 6mm and 32mm (<i>up to 360mm long</i>)
Tubes	Steel tube (<i>approximately 38mm inner diameter, 42.2mm outer diameter, 500mm long</i>)
	Steel tube (<i>approximately 48mm outer diameter, 40mm inner diameter, 1.0m long</i>)
	Steel tube (<i>approximately 48mm outer diameter, 40mm inner diameter, 2.3m long</i>)
	Steel tube (<i>approximately 48mm outer diameter, 40mm inner diameter, 2.3m long with flattened end</i>)
Wedges	Steel wedge - Large (<i>Approximately 150mm long</i>)
	Steel wedge - Medium (<i>Approximately 150mm long</i>)
	Steel wedge - Small (<i>Approximately 150mm long</i>)
	Steel wedge - 'wood grenade' wedge (<i>Approximately 175mm long</i>)
	Timber door wedge (<i>Approximately 150mm long</i>)
	Timber wedges (<i>Various sawn timber wedges</i>)
Wrenches, grips and adjustable spanners	Adjustable spanner ²⁶ (<i>Approximately 140mm long</i>)
	Adjustable spanner ²⁶ (<i>Approximately 180mm long</i>)
	Adjustable spanner ²⁶ (<i>Approximately 220mm long</i>)
	Pipe wrench (<i>Approximately 220mm long</i>)
	Slip-joint pliers (<i>Approximately 220mm long</i>)
	Stilsons (<i>Approximately 580mm long</i>)

²⁶ Also commonly referred to as mole-grips

Appendix B Resistance Times (*Informative*)

The resistance times relevant to each generic product type are defined in Clause 3.3.

Users should not attempt to interpret the resistance time noted in the performance classification attributed to a product as being the actual resistance times the product will deliver. This is because:

- Products are rated based on a limited number of indicative attack tests. The scope of attack methods considered during each attack test programme is not exhaustive. Other attack methods may exist that, if attempted, may result in a different resistance time being achieved.
- The results of the tests conducted only apply to the specimens tested. This standard does not provide for any mechanism for verifying on-going conformity of the quality and performance of the products placed on the market.
- Testing to 'BASE' relies on the use Novice attackers whose skills, strength and stamina varies to an extent that may affect the classifications attributed to a product. In order to reduce the effect of these variances, 'BASE' ratings are based on the lowest result achieved by two teams of Novices.
- Products must exceed the required minimum resistance time to achieve that classification.
- A product's rating to this standard is ultimately at the discretion of NPSA.

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