Technical ✓ Specification

dhf Raising Standards Safety Assured

TS 007 - 2:2019

Enhanced security for mechatronic cylinders and /or associated hardware

A technical specification produced by **dhf** and the Glass and Glazing Federation

Contents

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Foreword

This specification has been prepared following the emergence of an attack method focused on cylinders used in locks. New door assemblies are covered by PAS 24 and complete mechatronic lock assemblies by DHF TS 621. The intention of this standard is to provide a level of security for mechatronic cylinders comparable to that specified in BS 3621 and PAS 24. This specification covers enhanced security mechatronic cylinders and security hardware intended to be used on dwellings and other buildings requiring similar levels of security.

The classification method permits a 'mix and match' approach with a cumulative star rating defining the required security level. It also allows interchangeability of cylinders and security hardware and gives a flexible approach to product choice.

Whilst the replacement of cylinders and security hardware may improve the security performance of those elements, the overall security of the door assemblies is a function of all the individual components. The preferred solution for refurbishment projects is the installation of door assemblies certified to PAS 24.

dhf and GGF strongly recommends that manufacturers of TS 007-rated cylinders and security door handles/escutcheons carry out third party certification of every product claiming compliance with this specification. This is especially important because the TS 007 specification employs human testing, and certification ensures that this gives, as far as is reasonably practicable, consistent and reproducible results. BSI offers third party certification against TS 007 using its Kitemark brand. In this case, the TS 007 star rating is displayed alongside the Kitemark logo on both products and packaging. (Other certification bodies may offer similar schemes.)

1. Scope

This specification includes a classification method and references test methods and acceptance criteria for the assessment of enhanced security mechatronic cylinders and associated security hardware. It covers replaceable cylinders intended for use with rim locks, and/or mortice locks, (including euro profile, oval and threaded cylinders) and associated security hardware intended to give these cylinders protection from attack. This specification covers such cylinders and associated security hardware supplied either as a package or separately.

In addition to the above, this specification may be used to test and classify any cylinder falling within the scope of BS EN 15684 against the requirements for the one-star rating.

2. Normative References

This specification incorporates, by dated or undated reference, provisions from the publications listed below. For dated references, only the edition referred to applies. For undated references, the latest edition (including amendments) applies.

PAS 24:2016	Enhanced security performance requirements for doorsets and windows in the UK
BS EN 15684:2012	Building hardware. Mechatronic cylinders. Requirements and test methods
BS EN 1906:2012	Building hardware. Lever handles and knob furniture. Requirements and test methods
BS 3621:2017	Lock assemblies operated by key from both the inside and outside of the door
BS EN 12608-1:2016	Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors. Classification, requirements and test methods
DHF TS 621:2018	Thief resistant electronic door locking devices

3. Terms and definitions

The terms and definitions used in this specification are those quoted in PAS 24 and BS 3621, with the following addition:

Cylinder specific device:

Component sold and assembled in conjunction with a specific cylinder to enhance the security performance of that cylinder and in the absence of which the cylinder either cannot be installed, or, once installed, cannot be operated.

4. Requirements and classification

4.1 General

Cylinders and security hardware are classified according to their security performance. Cylinders may achieve one or three stars whilst security hardware may achieve two stars. The overall security performance of a combination of cylinder and associated hardware is the cumulative star rating of the two components.

Where a cylinder and an item of security hardware are sold together as a package, the star rating of the package is the cumulative star rating of the two components. To achieve compliance with this specification, the minimum requirement for the package shall be three stars.

NOTE 1: In order to achieve the level of security to defend against the opportunist burglar, a cumulative star rating of three is the minimum required. Where the cylinder and security hardware are sold separately, it is the responsibility of the installer to achieve the minimum three-star rating by providing either:

1-star cylinder with 2-star security hardware or

3-star cylinder

NOTE 2: This specification applies to the cylinder and, if appropriate, the security hardware. The overall security of a door assembly must take into consideration all components such as the lock, frame, leaf, hinges etc as detailed in PAS24.

A cylinder specific device and the associated cylinder shall be supplied in the same package, shall be capable of being installed without removal of the lock case and shall be supplied with clear fitting instructions. The device shall be located within the thickness of the test block or profile, shall not be attached to the door leaf or lock case but may be independently secured to the specific cylinder. A cylinder specific device shall not be classified with a star rating in its own right.

4.2 One-star rating

For a cylinder to receive a one-star rating, it shall meet the requirements of TS 621:2018 clauses 5, 6 and 7.

NOTE: Thumbturn cylinders may not offer the same resistance to manipulation as key-key cylinders.

Additionally, cylinders shall meet the following minimum requirements of BS EN 15684:2012 clause 6 (classification) without reinforcement or protection devices:

Category of use	Durability	Fire/smoke	Environmental	Mechanical If applicable	Electronic	System management	Attack resistance
1	6	0	4*	E	F	2	2**

*Corrosion resistance only, grade c or above to EN 1670
**Only resistance to drilling in accordance with BS EN 15684:2012 4.8.2 and torque resistance of plug/cylinder in accordance with BS BS EN 15684:2012 4.8.6 are required. In all cases, the requirement shall be met without the use of furniture.

In addition, the cylinder shall meet the requirements of plug/cylinder extraction in accordance with BS EN 15684:2012 4.8.5, attack resistance grade C when tested without the use of furniture. Alternatively, when tested in accordance with the method described in clause 5.2, first paragraph, it shall not be possible to rotate the cam (via the front face of the cylinder) using a maximum torque of 5 Nm, sufficiently to operate a lock.

Sample selection and test methods shall be as described in clause 5.

4.3 Two-star rating

For security hardware to receive a two star rating, it shall not be possible to withdraw the deadbolt of any of the test lock assemblies to its normal disengaged position when tested in accordance with PAS 24:2016, A.3, security hardware and cylinder test, parts 1 and 2. Sample selection and test methods shall be as described in clause 5.

Additionally, hardware falling within the scope of BS EN 1906:2012 shall meet the following minimum classification:

1	6	-	-	-	3	-	-

Where hardware is outside the scope of BS EN 1906:2012, an evaluation shall be carried out in accordance with the intent of these standards and documented in the test report. Where there is any doubt, the **dhf** Technical Committee and the GGF Hardware Committee shall be consulted.

During the assessment, the 'test' lock assembly shall be fitted with a one-star cylinder lacking anti-snap or snap secure features.

Security hardware falling within the scope of DHF TS 621 shall additionally comply with that standard.

NOTE 1: The purpose of these tests is to test the protection afforded to the cylinder, not the integrity of the lockcase. Consequently, it should not be deemed a failure if the deadbolt can be withdrawn by creating or enlarging a hole in the lockcase itself.

4.4 Three-star rating

For a cylinder to receive a three-star rating, it shall meet the requirements of a one-star cylinder detailed above. It shall not be possible to withdraw the deadbolt of any test lock assembly to its normal disengaged position when tested in accordance with PAS 24:2016 A.3 parts 1 and 2, security hardware and cylinder test, without the fitting of any hardware, with the exception that the total attack time for the tests shall be 2 minutes 30 seconds for each part. Additionally, no cutting or removal of test block or profile material is permitted. Sample selection and test methods shall be as described in clause 5.

A cylinder and cylinder specific device, as defined in clause 3, may also receive a three-star rating. For a cylinder and cylinder specific device assembly to receive a three-star rating, it shall meet the requirements of a one-star cylinder detailed in clause 4.2. Additionally, it shall not be possible to withdraw the deadbolt of any test lock assembly to its normal disengaged position when tested

in accordance with PAS 24:2016 A.3, security hardware and cylinder test, parts 1 and 2. When testing a euro profile or oval cylinder with a cylinder specific device, the total attack time shall be 2 minutes 30 seconds for each part. Additionally, no cutting or removal of test block or profile material is permitted. Sample selection and test methods shall be as described in clause 5.

NOTE 1: The reduction in attack time from 3 minutes in PAS 24 to 2 minutes 30 seconds in this TS is intended to allow for the time taken to remove any hardware and to enlarge the hole around the cylinder. Similarly, the fact that the hole is already sufficiently large means that no cutting is necessary.

NOTE 2: The purpose of these tests is to test the cylinder, not the integrity of the lockcase. Consequently, it should not be deemed a failure if the deadbolt can be withdrawn by creating or enlarging a hole in the lockcase itself.

Rim cylinders with cylinder specific devices shall be tested in accordance with BS 3621:2017 5.2 for the test time specified therein and cutting of the test block shall be permitted. The rim cylinder and cylinder specific device shall be deemed to have failed if the test lock can be opened as a result of testing in accordance with the above standard.

4.5 Masterkeying

Masterkeying shall be in accordance with the requirements of BS 3621.

5. Sample selection and test methods

5.1 Test apparatus

During the test, the test block or profile and lock assembly shall be mounted in a rigid fixture such that the cylinder is at a working height similar to the intended location when installed in a door; nominally 1 000 mm from the floor and equidistant between the top and bottom supports.

When conducting the tests detailed in PAS 24:2016 the test engineer shall remain on the attack side of the sample and no part of the test engineer's body shall cross the plane of the attack surface of the sample.

NOTE: The aim is to ensure that the test engineer has the same access and freedom of movement as would be encountered if the cylinder assembly were mounted in a full doorset located flush in a wall.

Typical test rig configurations are shown in figure 1a-1d. The test rig for rim cylinders is described in BS 3621:2017 5.2.1 (b)

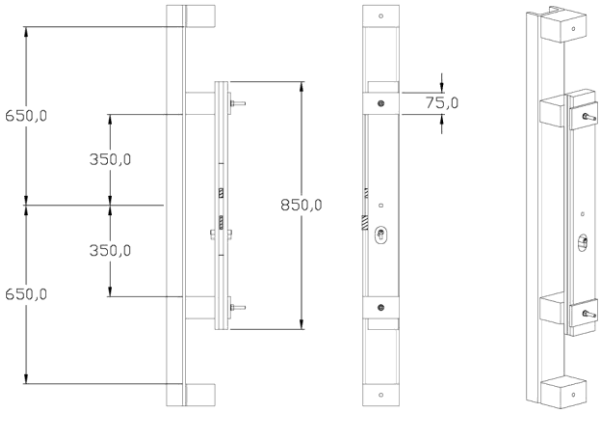

FIGURE 1a – Test rig configuration for oval or euro profile cylinder test in plywood block. Alternatively, a block as specified in BS 3621:2017 5.2.1 (b) may be used.

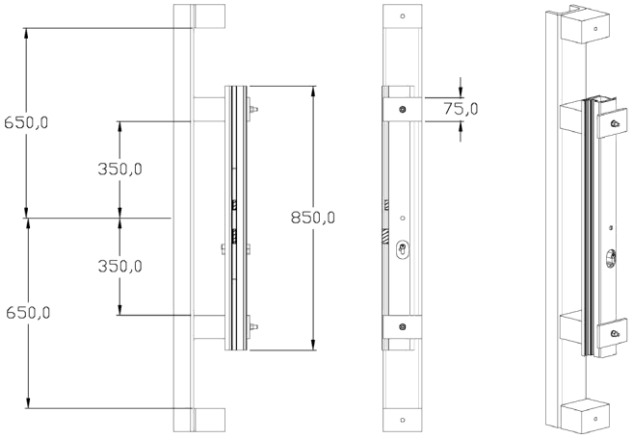

FIGURE 1b – Test rig configuration for oval or euro profile cylinder test in PVC-u profile.

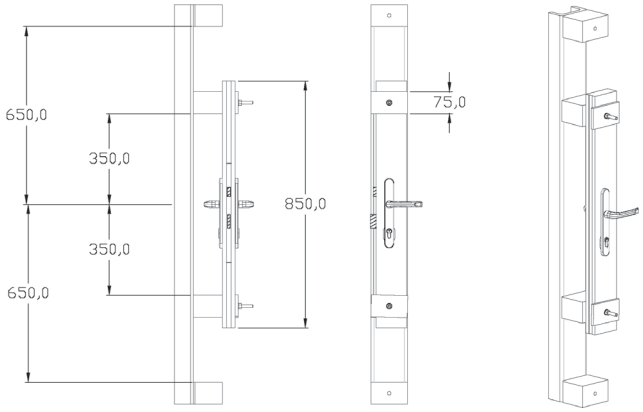

FIGURE 1c – Test rig configuration for handle test in plywood block. Alternatively, a block as specified in BS 3621:2017 5.2.1 (b) may be used.

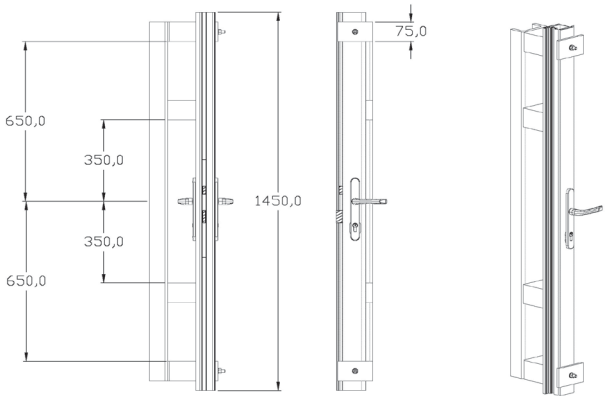

FIGURE 1d – Test rig configuration for handle test in PVC-u profile.

Non-attack face support plate

The support plate fixed to the non-attack face of the test blocks for 3-star cylinders shall be made of aluminium, minimum 60 mm wide 120 mm high and 12 mm ±1mm thick with an appropriate shaped hole suitable for the cylinder under test. The hole shall be prepared to the dimensions of the cylinder under test giving 0.5-1.0 mm clearance around the cylinder. The cylinder shaped hole shall only support the cylinder for the outer 4 mm of the thickness of the plate. See figure 2.

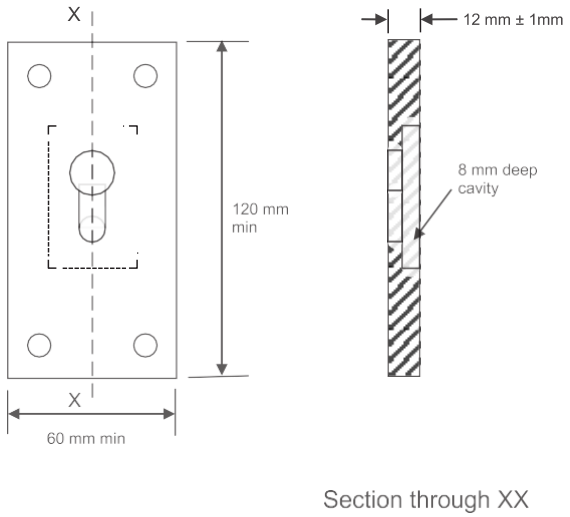

FIGURE 2 - **Support plate**

Preparation of blocks and profiles for oval or euro profile cylinders

The plywood blocks and PVCu profiles shall be prepared for cylinders by routing a 60 mm x 40 mm slot with 20 mm radius ends (+/- 1 mm). See figure 3. If the cylinder is to be tested with a cylinder specific device, the device shall be fitted as instructed by the manufacturer. However, no additional test block preparation shall be required to accommodate the installation of any cylinder specific device.

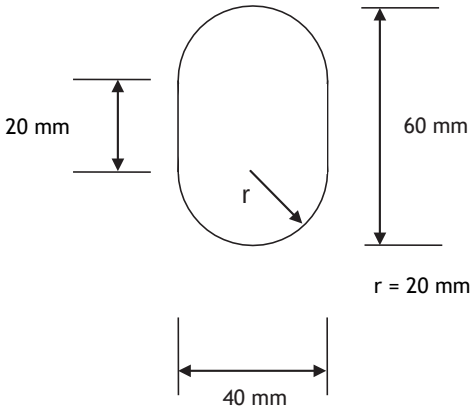

FIGURE 3 - **Preparation**

5.2 Cylinder

For cylinders anticipated to achieve one-star rating, the sample requirements are detailed in BS 3621 annex A and BS EN 15684:2012. In addition, two sample cylinders shall be tested for resistance to plug extraction as follows: the cylinder shall be mounted in a fixture (without the use of furniture) as illustrated in BS EN 15684:2012, figures 4a, 4b or 4c (as appropriate), with the variation that the cylinder body shall be restrained from all movement whilst the plug shall be unrestrained. Using the attack time and tools described in
PAS 24:2016 A.3.3 Part 2, an attempt shall be made to remove the plug by the following method: `

i) attempt to screw the self-cutting traction screw into the plug so that it provides suitable fixing force for activity ii);

ii) attempt to extract the plug by applying a nominally axial force to the screw using the hooked head attachment and torque gauge

NOTE: 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.

For oval or euro profile cylinders anticipated to achieve a three-star rating, sample requirements are detailed in BS 3621 annex A and BS EN 15684:2012. A further 4 cylinders shall be mounted in test lockcases fitted in plywood blocks as specified in BS EN 15684:2012 5.10.2, except that the dimensions of the block shall be as specified in clause 5.3 below. Alternatively, a block as specified in BS 3621:2017 5.2.1 (b) may be used. Two of the cylinders shall be supported on the non-attack face of the plywood block by the support plate detailed in section 5.1 Test apparatus. A further 4 cylinders shall be mounted in test lockcases fitted in PVCu profile as specified in clause 5.3 below except that the length of the PVCu profile shall be at least 850 mm, with 700 mm (+/- 10 mm) between supports. Two of the cylinders shall be supported on the non-attack face of the PVCu profile by the support plate detailed in section 5.1 Test apparatus.

For oval or euro profile cylinders and cylinder specific devices anticipated to achieve a three-star rating, sample requirements are detailed in BS 3621 annex A and BS EN 15684:2012; a further 4 cylinders shall be mounted in test lockcases fitted in plywood blocks as specified in clause 5.3 below. Alternatively, a block as specified in BS 3621:2017 5.2.1 (b) may be used. Two of the cylinders shall be supported on the non-attack face of the plywood block by the support plate detailed in section 5.1 Test apparatus. A further 4 cylinders shall be mounted in test lockcases fitted in PVCu profile as specified in clause 5.3 below except that the length of the PVCu profile shall be at least 850 mm, with 700 mm (+/- 10 mm) between supports. Two of the cylinders shall be supported on the non-attack face of the PVCu profile by the support plate detailed in section 5.1 Test apparatus.

NOTE: Cylinders that achieve a three-star rating when fitted with cylinder specific devices will be classified as one-star only if installed without the cylinder specific devices. Cylinder specific devices will not be classified as two-star rated and cannot be used in conjunction with another one-star cylinder to achieve a three-star combination rating.

The length of the cylinder shall be such that the projection is between 10 mm and 15 mm from the face of the test block. The lock case shall be equidistant between the attack and non-attack faces of the block.

The test lockcases for testing in PVCu shall be generic 16 mm faceplate, 35 mm backset multi-point lockcases. For testing in wood, the test lockcases shall be single point lockcases certified to BS 3621 with a 45 mm backset.

For rim cylinders with cylinder specific devices anticipated to receive a three-star rating, sample requirements are detailed in BS 3621:2017+ 5.2.1(a) and annex A and in BS EN 15684:2012. The cylinder specific device shall be fitted as instructed by the manufacturer and the test lockcase shall be of an appropriately dimensioned type to accommodate fixings as required by the cylinder and cylinder-specific device under test. The test method shall be as specified in BS 3621:2017 5.2.

5.3 Security hardware

For security hardware anticipated to achieve a two star rating, four samples shall be supplied, two fixed to plywood test blocks nominally 44 mm thick by 150 mm wide (+/- 10mm) and two fixed to typical 70 mm thick PVCu 3- to 5-chambered residential door profiles without reinforcement and compliant with BS EN 12608 class B.

The length of the plywood block shall be at least 850 mm, with 700 mm (+/- 10 mm) between supports.

The PVCu test sample door profile section shall be at least 1450 mm in length. The distance between the supports shall be 1300 mm (+/- 10 mm). The sample shall be clamped firmly to the supports. Each support and clamp shall be 75 mm (+/- 5 mm) in length. A solid material insert shall be used to prevent distortion of the profile in the clamped area. This insert shall not extend into the sample beyond the clamp area. The intermediate support blocks shown in figure 1 remain in place but the sample shall not be fixed at these points.

The security hardware shall be fitted in accordance with the manufacturer's fitting instructions, a copy of which shall be available to the tester. Where the manufacturer declares that the security hardware is suitable only for a specific material, the **dhf** Technical Committee and the GGF Hardware Committee shall be consulted about methods of demonstrating compliance and potential limitations of use.

Each sample shall be assembled with a 'test' lock assembly including a one-star cylinder lacking anti-snap or snap secure features and which is considered to be vulnerable to attack by the traction screw specified in PAS 24:2016 A.3 part 2. The cylinder shall be of appropriate length as defined by the security hardware manufacturer's fitting instructions. For testing in PVCu, the lock case shall be of a generic 16 mm faceplate, 35 mm backset multi-point design unless the hardware manufacturer declares that the security hardware is not compatible with this type of lock case. In this situation, an appropriately-dimensioned lock case shall be used. For testing in wood, the test lockcases shall be single point lockcases certified to BS 3621 with a 45 mm backset, unless the hardware manufacturer declares that the security hardware is not compatible with this type of lock case. In this situation, an appropriately-dimensioned lock case shall be used.

6. Marking

Products claiming compliance with this specification shall be marked with:

i) The number of this specification

ii) The claimed star rating

iii) The name or trade mark of the manufacturer or other means of identifying the manufacturer

iv) A means of identifying the model number or name of the product; this information may be in coded form

In the case of cylinders, the marking shall be visible when the cylinder is removed from the lock. If the ends of the cylinder have different levels of security, then the end designed to resist attack shall be clearly differentiated.

In the case of a one-star oval or euro profile cylinder, the following statement shall accompany the product:

"User information:

This cylinder offers resistance to many types of attack. It is designed to be used in conjunction with two-star security door hardware to ensure enhanced resistance to all commonly used attack methods. **Therefore, this product MUST be used in conjunction with two-star security door hardware meeting TS 007 to ensure security.**

Such hardware can be recognised by the two-star marking which may either be visible from the outside on an installed handle or, failing this, will be visible once the outside handle has been removed.

Security hardware can be of several types, including a handle with a reinforced backplate, an escutcheon or a device which is concealed behind the handle backplate. In all cases, the purpose is to protect your cylinder from force attack."

In the case of one-star cylinders packaged for sale to the consumer, the text in bold above shall be reproduced on the packaging or on an attached label so that it is visible to the consumer at the point of sale.

No one-star cylinder shall be accompanied by any marking or description stating or implying that the cylinder is resistant to snapping, other than when the cylinder is protected by two-star security hardware.

In the case of security hardware, the marking shall be visible when the hardware has been removed from the door leaf. The parts intended to be fitted to the attack side of the door shall be clearly marked.

In the case of two-star security hardware, the following statement shall accompany the product:

"User information:

This security hardware offers additional defence to several types of attack. However, to ensure enhanced resistance to all commonly used attack methods, **this product MUST be used in conjunction with a one-star or three-star cylinder meeting TS 007 to ensure security.**

The star marking will be marked on the cylinder itself. However, in the case of an already-installed cylinder, checking this may

require removal of the cylinder from the door. Cylinders supplied before the availability of this specification may be marked with the BSI "Kitemark" logo without any indication of star rating. **These should be accepted as equivalent to a one-star cylinder under this specification.**

In a cylinder lock, it is the cylinder which actually recognises the correct key and provides protection from picking and other forms of manipulation; cylinders which have been successfully tested against these forms of attack under this specification will carry 1-star. A three-star cylinder offers the same protection as a one-star cylinder plus protection from force attack."

In the case of two-star security hardware packaged for sale to the consumer, the text in bold above shall be reproduced on the packaging or on an attached label so that it is visible to the consumer at the point of sale.

In the case of a three-star oval or euro profile cylinder, the following statement shall accompany the product:

"User information:

This cylinder offers resistance to the commonly used types of attack. No specific security hardware is required but installing this three-star cylinder in conjunction with security hardware complying with TS 007 will increase attack resistance still further.

Security hardware can be of several types, including a handle with a reinforced backplate, an escutcheon or a device which is concealed behind the handle backplate. In all cases, the purpose is to protect your cylinder from force attack."

In the case of a three-star oval or euro profile cylinder and cylinder specific device, the following statement shall accompany the product:

"User information:

This combination of cylinder and cylinder specific device offers resistance to the commonly used types of attack. No additional security hardware is required but installing this three-star cylinder and cylinder specific device combination in conjunction with security hardware complying with TS 007 will increase attack resistance still further.

Security hardware can be of several types, including a handle with a reinforced backplate, an escutcheon or a device which is concealed behind the handle backplate. In all cases, the purpose is to protect your cylinder from force attack."

NOTE: Where cylinders or hardware are supplied in bulk to trade customers (as opposed to consumers), it would be sufficient to provide one copy of the user information with each bulk package. If such bulk packages are subsequently broken down and individual items are sold to consumers, it is strongly recommended that copies of the user information be provided to each such consumer.

7. Bibliography

PAS 3621:2011 Multipoint locking assemblies – Keyed egress – Performance requirements and test methods

PAS 8621:2011 Multipoint locking assemblies – Keyless egress – Performance requirements and test methods

PAS 10621:2011 Multipoint locking assemblies – Dual mode egress – Performance requirements and test methods

DHF TS 621:2018 Thief resistant electromechanically operated lock assemblies

Contact us for more information

Email: info@**dhf**online.org.uk

Telephone: (0)1827 52337

Address: **dhf** The Barn, Shuttington Fields Farm, Main Road, Shuttington, Tamworth, Staffordshire B79 0HA