PAS 3621:2011

BSI Standards Publication

Multipoint locking assemblies – Keyed egress – Performance requirements and test methods

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

raising standards worldwide™

Full document details: PAS 3621:2011

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 2011

ISBN 978 0 580 64592 1

ICS 13.310; 91.190

The following BSI reference relates to the work on this standard:
Committee reference ZZ/1

Publication history

First published June 2011

Amendments issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

Contents

Foreword *iii*
Introduction *1*
1 Scope *1*
2 Normative references *2*
3 Terms and definitions *2*
4 Classification of locking assembly characteristics *4*
5 Requirements *6*
6 Test conditions *13*
7 Test methods *17*
8 Marking *31*

Annexes
Annex A (normative) General vulnerability assessment *33*
Annex B (normative) Product Information *37*
Annex C (normative) Test sampling and sequencing *40*

List of figures
Figure 1 – Typical load test rig *10*
Figure 2 – Example clenching side seal load *14*
Figure 3 – Typical load test rig *15*
Figure 4 – Example configuration for Test Door *16*
Figure 5 – Typical load test rig (5a) with detail of application tool (5b) *18*
Figure 6 – Section through test door *19*
Figure 7 – Typical sliding door test rig *19*
Figure 8 – Application of side load for latch durability tests *22*
Figure 9 – Typical load test rig (9a) with detail showing application of tool (9b). *23*
Figure 10 – Typical drilling apparatus *24*
Figure 11 – Typical load test jig *25*
Figure 12 – Typical arrangement for testing the security of the locking plate *26*
Figure 13 – Typical test rig for anti-separation *29*
Figure 14 – Typical test jig for 'Disengaging Force' test *30*
Figure 15 – Typical test rig for pulling on locking plates *30*
Figure 16 – Typical test rig for lifting locking plates *31*
Figure B.1 – Example of the illustration required under j) above *39*

List of tables
Table 1 – Required lock assembly characteristics and relevant clauses *5*
Table 2 – Durability requirements *8*
Table 3 – Security Requirements *9*
Table A.1 – List of tools permitted for use in the general vulnerability assessment *35*
Table C.1 – Testing sampling and sequencing *40*

Summary of pages
This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 40, an inside back cover and a back cover.

AVA Documents
Document Sharing Hub

Full document details: PAS 3621:2011

This page deliberately left blank

Documents
Document Sharing Hub
Full document details: PAS 3621:2011

Foreword

Publishing Information

This Publicly Available Specification (PAS) has been prepared by BSI to specify performance requirements and test methods for multipoint locking assembles with keyed egress and came into effect in June 2011. The development of this PAS was sponsored by the Door and Hardware Federation (DHF).

Relationship with other Standards

This PAS refers to BS EN 1303:2005, BS EN 12209:2003, BS 3621:2007 and prEN 15685

Attention is drawn to the fact that BS EN 12209: 2003 takes fully into account the regulatory requirements of the EU Construction Products Directive (89/106/EEC) which is implemented in the UK as the Construction Products Regulations 1991.

This PAS is complemented by PAS 8621: 2011, *Multipoint locking assemblies – Keyless egress,* and by *PAS 10621: 2011 Multipoint locking assemblies – Dual mode operation*, published simultaneously.

Information about this PAS

This PAS provides for lock assemblies that may incorporate a cylinder, with the intention of providing a good standard of attack resistance, particularly in respect of emergent criminal techniques.

For security purposes, there is a need to maintain confidentiality about some characteristics of a thief resistant lock assembly. Moreover, in order to assess a lock's capability of withstanding a criminal attack, it is necessary for it to be exposed to skilled manual testing that simulates such an attack. Such a simulation cannot, by its very nature, be codified so as to be fully reproducible in all circumstances, and for these reasons a formal test method is not published in this PAS.

Instead, the PAS requires that lock cylinders and lock assemblies, for which conformity to this PAS is claimed, be submitted to a panel of expert assessors to be examined and assessed for their general vulnerability. Details of this examination vary according to the design and type of lock assembly.

These details appear in the Annex A which should be regarded as Normative for the purpose of designing and constructing products in conformity with this PAS.

This PAS is drafted in a manner that enables manufacturers to undertake their own assessments and make declarations of conformity, accordingly. Requirements concerning the necessary qualifications for personnel undertaking such assessments are specified in Annex A.

Acknowledgement is given to the organizations who were involved in the development of this specification as members of the Steering Group.

The Door and Hardware Federation (DHF)

The ASSA ABLOY Group

Grouphomesafe Ltd

Secured by Design

Acknowledgement is also given to the members of the wider Review Panel consulted in the development of this specification.

AVA Documents
Document Sharing Hub

Full document details: PAS 3621:2011

BSI retains ownership and copyright of this PAS and reserves the right to withdraw or amend it on receipt of authoritative advice that it is appropriate to do so.

The PAS process enables a specification to be developed rapidly in order to fulfill an immediate need in industry or in the wider community. The methodology includes a commitment to review the published PAS at intervals not exceeding two years in order to ensure its continued relevance and accuracy and because of this the PAS will be found to have particular benefit in relation to subjects where concepts and technology are as yet untried. This review may lead to confirmation, revision or withdrawal in accordance with perceived need. Any amendments arising from the review will be published as an amended PAS and publicized in *Update Standards.*

Alternatively, a PAS may be considered for further development as a British Standard, or constitute part of the UK input to the development of a European or International Standard.

This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard or if an equivalent European standard is published.

Use of this document

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this PAS 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.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with this PAS cannot in itself confer immunity from legal obligations.

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

Introduction

Experiences relating to security and environmental conditions encountered in residential, commercial and public buildings have indicated a need to provide, in some applications, additional locking points to locks installed on doors, window doors and entrance doors.

These additional locking points, anti-separation points and/or clenching points are designed to ensure sufficient performance, weather tightness and/or attack resistance of doors.

In developing PAS 3621, the objectives were:

- To provide specification for a Multipoint Locking Assembly with keyed egress that is broadly equivalent in terms of security to the single point lock (BS 3621) already in place, where the door design is no part of the lock performance standard.
- To have the strength of the Multipoint Locking Assembly manufactured to PAS 3621: 2011 to be broadly comparable to that of the single point lock defined by BS 3621 but making provision for multiple locking/ security points.
- To establish a standard that will not conflict with the European Standard (EN 15685) currently being developed by CEN that will therefore be able to co-exist with that standard, when it is published. The current draft of the European Standard prEN 15685 provides a series of attribute options from which selection can be made to deliver several different grades of multipoint locking assembly all meeting the requirements of the standard. PAS 3621 identifies a set of specific attributes from the options provided for in the draft European Standard to deliver a single specification for a particular level of security. To do this it draws upon the relevant requirements and test methods currently included in prEN 15685 in order to ensure as far as may be practicable that alignment with the eventual European Standard is achieved.
- It should be noted however that as is the case with BS 3621, PAS 3621 includes requirements relating to cylinders, security furniture and general vulnerability assessment, which are outside the scope of the European Standard.

1 Scope

This PAS specifies performance requirements and test methods for mechanically operated multipoint lock assemblies with keyed egress including locking plates, fitting instructions, cylinders and protective furniture, where supplied as part of the lock assembly, used in doors, window doors and entrance doors of buildings.

This PAS is not applicable to lock assemblies that provide:

- keyless egress i.e. that can always be opened from the inside without the need for a key (PAS 8621: 2011)
- a secure (no egress) mode in addition to keyless egress (PAS 10621: 2011).

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

2 Normative references

The following referenced documents are indispensable for the application of this document. For these dated references, only the edition cited applies.

BS EN 1670: 2007 Building hardware – Corrosion resistance – Requirements and test methods.

ISO 10899 1996: High-speed steel two-flute drills – Technical specifications.

BS 3621: 2007 + A1 2009 Thief resistant lock assembly – Key egress.

BS EN 1303: 2005 Building hardware – Cylinders for locks – Requirements and test methods.

BS EN 12209: 2003 Building hardware. Locks and latches. Mechanically operated locks, latches and locking plates. Requirements and test methods

PAS 24:2007+A2:2011 Enhanced security performance requirements for door assemblies – Single and double leaf, hinged external door assemblies to dwellings.

3 Terms and definitions

To facilitate uniformity of application and understanding, a common set of terms and definitions is included in this standard, in PAS 8621 and in PAS 10621. The following terms and definitions are relevant to the understanding of all three standards although an individual term may not appear in all three documents.

3.1 anti-separation point
arrangement of components to prevent the separation of a door leaf from its frame or adjacent door leaf in the plane of the door

3.2 centrally controlled
having operation of all of its locking and/or clenching and/or anti-separation points, effected, enabled or prevented from a single lock case

3.3 clenching point
arrangement of components to draw together a door and its frame in the door closing direction to reduce distortion of the door and/or compress seal (not necessarily a locking point)

3.4 case
part of a lock or latch in which the lock mechanism and/or latch action is housed

3.5 cylinder
device, usually separate from, but engaging with, its associated lock or latch, that contains the parts operated by the key

3.6 cylinder lock
lock in which the lock mechanism is operated by one or more cylinders

3.7 deadbolt
moveable part of a lock that usually engages a component fixed to a frame, and withdraws into a lock case that is operated at least in one direction by a key, handle and/or thumb turn

AVA Documents
Document Sharing Hub

Full document details: PAS 3621:2011

3.8 deadlocking
action of moving a deadbolt to a thrown position where pushing back of the deadbolt is positively prevented

3.9 manual deadlocking
deadlocking where movement of the deadbolt is by key or handle/thumb turn

3.10 secure manual deadlocking (n):
manual deadlocking in which continuous light pressure is applied to the deadbolt in the direction of deadbolt withdrawal

3.11 automatic deadlocking
deadlocking where deadbolt or deadlocked latch movement is self propelled, and is triggered by the proximity of the locking plate

3.12 detaining element
part of a moveable member which is moved by the key into a pre-determined position in order for the deadbolt or deadlocked latch to be able to move into an open position

3.13 differ
variation between lock mechanisms of similar design, achieved by the detaining elements, which allows each lock to be operated by its own key

3.14 effective differ
difference between lock or key recognition systems of similar design achieved only by the detaining elements which allows each lock or key recognition systems to be operated only by its own key. The number of effective differs is equal to the number of theoretical differs after deduction of the differs suppressed by the manufacturer due to technical constraints

3.15 door leaf
part of a door that is hinged and opens to allow entry/egress of an enclosed space

3.16 face plate (also known as face bar)
part of a lock through which the lock and/or locking points are fixed to the door and through which the latch and/or deadbolt pass

3.17 follower
part of a lock that operates the latch bolt and/or deadbolt(s) and/or clenching and/or anti-separation points when turned by a spindle

3.18 interlinked
connected for the purpose of operation

3.19 key
device that is removable and portable and used to operate the lock or latch

3.20 latch
self engaging fastener which secures a moveable component (eg door) in a closed position and which can be released by hand

3.21 latch action
arrangement and performance of the constituent parts that operate a latch bolt

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

3.22 latch bolt
spring-loaded moveable part of a lock that usually engages a component fixed to a frame, and withdraws into a lock case, automatically engaging a locking plate to keep the door in its closed position

3.23 lock
fastener which secures a door leaf in its closed position and which is operated by a key or other device

3.24 lock case
part of a lock in which the lock mechanism is housed

3.25 locking plate
lock component, which is normally fixed to a door frame to engage at least a deadbolt or latch bolt or an anti-separation point or a clenching point

NOTE Alternative terms for this are strike plate or keep or staple

3.26 locking point
arrangement of lock components interactant between a deadbolt or anti-separation point and locking plate for security purposes

3.27 lock mechanism
constituent parts of a lock that operate at least a deadbolt or latch bolt or an anti-separation point or a clenching point and, where required, provide the differs

3.28 locking snib
device, usually in the form of a small lever or knob, which can be operated to prevent the deadbolt or latch bolt from being thrown or withdrawn, or to change the function of a lock or latch

3.29 slave Lock
lock assembly that is installed in the slave leaf of a double leaf door (i.e. french door)

3.30 multipoint lock
lock comprising two or more points of interaction (security, anti-separation or clenching) interlinked and centrally controlled, where at least two points are more than 200 mm apart in locked or thrown position

3.31 night latch action
latch action in which withdrawal of the latch bolt from the outside is only by means of a key, and from the inside only by means of a handle or knob

3.32 rim lock
lock for fixing on the surface or a door leaf

3.33 shared latch action
latch action in which withdrawal of the latch bolt is by means of a handle and key

4 Classification of locking assembly characteristics

4.1 General

Mechanically operated multipoint locks and their locking plates for which conformance to this standard is claimed, shall be classified in accordance with the nine-digit system specified in Table 1.

AVA Documents
Document Sharing Hub
Full document details: PAS 3621:2011

4.2 Definition of lock characteristics identified in Table 1

4.2.1 Mechanical operation (first digit)

Operational characteristics for closures intended for use by people with some incentive to exercise care but where there is some chance of misuse, e.g. office doors.

4.2.2 Durability (second digit)

Classification criteria: 200 000 test cycles; 25 N load on latch bolt.

NOTE The above information relates to latch action only. Corresponding durability requirements based on number of cycles, apply to the locking point(s), anti-separation point(s), clenching point(s) and snib mechanisms as shown in Table 2.

4.2.3 Door mass and closing force (third digit)

Classification criteria: Up to 100 kg door mass; 25 N maximum closing force.

Table 1 **Required lock assembly characteristics and relevant clauses**

	Characteristics grade identification sequence								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Relevant Clauses	**4.2.1 5.2 6 & 7.1**	**4.2.2 5.3 6 & 7.2**	**4.2.3 5.4 6 & 7.3**	**4.2.4 None**	**4.2.5 5.7 6 & 7.6**	**4.2.6 5.5 6 & 7.4**	**4.2.7 5.6 6 & 7.5**	**4.2.8 5.8 6 & 7.10**	**4.2.9 5.9 6 & 7.2.4**
Characteristics	**Mechanical operation**	**Durability**	**Door mass & closing force**	**Suitability for use on fire/smoke doors**	**Key identification of lever locks (see also Note 2)**	**Corrosion & temperature resistance**	**Security of locking points**	**Security and Anti-separation**	**Clenching**
Lever lock Classification Code (EN 15685)	**2**	**M**	**4**	**O**	**B**	**G**	**5**	**5**	**2**

NOTES to Table 1

NOTE 1 ***Relationship with prEN 15685****. The particular characteristics identified for this PAS are derived from the grade range provided for in prEN 15685 and define the minimum performance required of a lock claimed to conform to this PAS. A lock meeting the requirements of this PAS will therefore also meet the same combination of requirements of prEN 15685.*

NOTE 2 ***Cylinders.*** *For a cylinder lock the classification grade is 0. For cylinder requirements for cylinder locks see* ***5.1.7***

NOTE 3 ***Fire & smoke (Classification digit 4, prEN 15685)*** *Lock assemblies for which conformance to this PAS is claimed are not intended for use in smoke/ fire door assemblies, c****onsequently there are no supporting clauses for column 4 in this PAS.***

NOTE 4 ***Safety*** *Lock assemblies for which conformance to this PAS is claimed are not intended for use in emergency exits. See BS EN 179 and BS EN 1125 for requirements for multipoint locks and locking plates suitable for application as part of exit devices for use on emergency or panic exit doors.*

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

4.2.4 Suitability for use on fire/smoke doors (fourth digit)

See note 3 to Table 1

4.2.5 Key identification of lever locks (fifth digit)

Minimum five detaining elements.

4.2.6 Corrosion and temperature resistance (sixth digit)

Classification criteria: Very high corrosion resistance; temperature requirement: from -25 ^{o} to + 70 ^{o}C.

4.2.7 Security of Locking Points (seventh digit)

Classification criteria: High security with drill resistance.

4.2.8 Anti-separation (eighth digit)

Classification criteria: High performance with drill resistance.

*NOTE Anti-separation requirements and drill resistance are identified in accordance with **5.8** The classification includes anti-separation performance integrated in the locking point or as a separate anti-separation point.*

4.2.9 Clenching (ninth digit)

Classification criterion: Clenching force = 25 N.

5 Requirements

5.1 General

5.1.1 Essential characteristics

Mechanically operated multipoint locks and their locking plates for which conformance to this standard is claimed shall embody the characteristics identified in **Table 1**, and specified in Clauses **4** and **5** and be accompanied by the information specified in **Annex B**.

5.1.2 Key Operation

The lock shall be lockable with a single turn of the key of not more than 360°.

5.1.3 Strength of key (other than cylinder keys meeting the requirements of EN 1303)

When tested in accordance with **7.8.1**, the key shall resist a torque of: 2,5 Nm. The key shall operate in the lock correctly after this test in accordance with **5.2.4**.

5.1.4 Minimum locking points for door types

- A multipoint lock assembly complying with this PAS, including those intended for use with sliding type doors shall have a minimum of 3 locking points each of which shall incorporate anti-separation

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

characteristics. Where a lock assembly has more than 3 locking points the additional points may be without anti-separation.

- A multipoint slave lock assembly shall have a minimum of 2 locking points.

5.1.5 Dangerous substances

Materials in multipoint locks and their locking plates shall not release any dangerous substances in excess of the maximum levels specified in any relevant European Standard for the material.

NOTE The manufacturer may exercise control by monitoring raw materials/components used to verify compliance.

5.1.6 Product Information

Locking assemblies claimed to be in conformance with this PAS shall be accompanied by product information (**Annex B**).

5.1.7 Cylinders

Cylinders for multipoint cylinder locks shall be as specified in BS 8621:2007+A1:2009 (Clause **5**).

5.2 Mechanical operation

5.2.1 Strength of bolt action

When tested in accordance with **7.1.1** the locking point and clenching point components shall resist a torque of 30 Nm and the latch bolt components shall resist a torque of 20 Nm. The lock shall operate correctly after this test and conform to **5.2.4**.

5.2.2 Return force of latch bolts

When tested in accordance with **7.1.2** the return force of the latch bolt shall not be less than 2.5 N.

5.2.3 Resistance to side load on latch bolt

When tested in accordance with **7.1.3** each latch bolt shall resist a side load of 3 kN.

5.2.4 Lock operation torques

5.2.4.1 The lock shall conform to **5.2.4.2** to **5.2.4.5** inclusive, when tested in accordance with **7.1.4**.

5.2.4.2 The torque on the follower to operate the latch bolt, locking point(s) or anti-separation point(s) shall not exceed 7 Nm.

5.2.4.3 The torque on the follower to operate the clenching point shall not exceed 7 Nm with the clenching force applied.

5.2.4.4 The torque on the key to operate the latch bolt, locking point(s) or anti-separation point(s) shall not exceed 1.0 Nm.

5.2.4.5 The torque on the key to operate the clenching point shall not exceed 1.0 Nm with the clenching force applied.

Documents
Document Sharing Hub

Full document details: PAS 3621:2011

5.2.4.6 When tested in accordance with **7.1.6** the locked follower shall resist a torque of 60 Nm. The lock shall be operable after this test.

5.2.4.7 When tested in accordance with **7.5.1** with between 61 and 150 Nm of torque it shall not be possible to force the lock open. The lock does not need to be operable after this test.

5.2.4.8 When tested in accordance with **7.1.1.4** the restoring torque on the follower shall be: >0.8 Nm.

5.2.5 Strength of follower stops

When tested in accordance with **7.1.5**, the latch components and follower stops shall resist a torque of 40 Nm. The latch action shall function correctly after this test, fulfilling the requirement of **5.2.4**.

5.3 Durability requirements

5.3.1 Durability of latch action

When tested in accordance with **7.2.1** the latch action shall complete the minimum number of 200,000 cycles with a load of 25 N applied. The latch action shall function correctly after this test fulfilling the requirements **5.2.4** and **5.4.2**.

5.3.2 Durability of locking action

When tested in accordance with **7.2.2** the locking point mechanism (and if applicable anti-separation point) shall complete the minimum number of cycles in accordance with **Table 2**. The locking point mechanism shall function correctly after this test, fulfilling the requirements **5.2.4**.

5.3.3 Durability of locking snib mechanism

When tested in accordance with **7.2.3** the locking snib shall complete the minimum number of cycles specified in **Table 2**. The function shall operate after the test.

5.3.4 Durability of clenching

When tested in accordance with **7.2.4** the clenching shall complete the minimum number of cycles in accordance with **Table 2** with a force on the two extreme clenching points of 25 N. The lock shall operate after the test within the specified maximum operating torque.

Table 2 **Durability requirements**

Latch Action	Shared Latch Action		Locking points(s), anti-separation point(s) and/ or clenching point(s) manually locking	Locking point(s), anti-separation point(s) and/ or clenching point(s), automatically Locking	Snib Mechanism
	Key	Handle			
200 000	50 000	150 000	50 000	200 000	25 000

Documents
Document Sharing Hub
Full document details: PAS 3621:2011

5.4 Door mass and closing force

5.4.1 Door mass

The dimensions and mass of the test door that shall be used are described in clause **4.2.3** and **6.1.3**

5.4.2 Door closing force

When tested in accordance with **7.3.2** a closing force of 25 N shall be sufficient to enable the latch bolt to correctly engage the locking plate every time.

5.5 Corrosion resistance and temperature

5.5.1 Corrosion resistance

When tested in accordance with **7.4.1** the torques on the key, or follower, to operate the locking point(s) or anti-separation or clenching function or latch bolt(s) shall not exceed those specified in **5.2.4** by more than 20%.

NOTE For the purpose of this PAS, the ability to operate after the test is the only criterion; appearance is irrelevant.

5.5.2 Operation at extremes of temperature

When tested in accordance with **7.4.2** the torque to operate the locking point(s) and/or anti-separation function and/or clenching function and/or latch bolt shall not exceed requirements in clause **5.2.4** as appropriate, by more than 20% (-25/+70 °C)

5.6 Security of locking points

5.6.1 General security requirements

The lock and keep plates shall meet the requirements identified in **Table 3**.

Table 3 **Security Requirements**

Requirement	Value	Unit
Side load on locking point	7	kN
Net drilling time at each locking point for side load test	3	Minutes
Total drilling time at each locking point for side load test	5	Minutes
Minimum deadbolt projection	20	mm
Minimum resulting projection after load applied	17	mm
Net drilling time at each locking point for end load test	3	Minutes
total drilling time at each locking point for end load test	5	Minutes
Resistance to end load without boxed locking plates	5	kN
Resistance to end load with boxed locking plate	2	kN
Minimum resulting projection after load applied	19	mm
Resistance to side load on locking plate	7	kN

Documents
Document Sharing Hub

Full document details: PAS 3621:2011