



BSI Standards Publication

Building hardware — Requirements and test methods — Multipoint locks, latches and locking plates — Characteristics and test methods

National foreword

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European foreword

This document (EN 15685:2024) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by September 2026.

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

No existing standard is superseded.

The performance tests incorporated in this document are considered to be reproducible and as such will provide a consistent and objective assessment of the performance of these products throughout CEN Members.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

The intended use for products according to this document is:

- a) for use in doors in buildings;
- b) for use on fire and smoke compartmentation doors fitted with door closing devices, to enable such doors to close reliably and thus achieve self-closing in the event of fire;
- c) for use on closed fire doors to maintain the fire integrity of the door assembly.

This document is one of a series of European standards dedicated to building hardware products.

European standards for mechanically operated locks and latches (EN 12209) and for electromechanically operated locks and locking plates (EN 14846) are also available.

1 Scope

This document specifies product characteristics and test methods of mechanically operated multipoint locks and their locking plates.

This document covers multipoint locks their locking plates which are either manufactured and placed on the market in their entirety by one producer or assembled from sub-assemblies produced by more than one producer and designed to be used in combination.

This document does not cover assessment of the contribution of the product to the fire resistance of specific fire resistance and/or smoke control door set assemblies.

This document is not applicable to mechanically/electromechanically cylinders, handles, locks for windows, padlocks, locks for safes, furniture locks or prison locks.

This document does not specify mechanically operated locks or their locking plates which are specified by EN 12209.

2 Normative references

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

EN 1303, *Building hardware — Cylinders for locks — Requirements and test methods*

EN 1634-1, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware — Part 1: Fire resistance test for door and shutter assemblies and openable windows*

EN 1634-2, *Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware — Part 2: Fire resistance characterisation test for elements of building hardware*

EN 1634-3, *Fire resistance and smoke control tests for door and shutter assemblies, open able windows and elements of building hardware — Part 3: Smoke control test for door and shutter assemblies*

EN 1670:2007, *Building hardware — Corrosion resistance — Requirements and test methods*

EN 16035, *Hardware performance sheet (HPS) — Identification and summary of test evidence to facilitate the inter-changeability of building hardware for application to fire resisting and/or smoke control doorsets and/or openable windows*

ISO 10899, *High-speed steel two-flute twist drills*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

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

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

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1.1**anti-separation point**

locking point designed to prevent the separation of a door leaf from its frame or adjacent door leaf in the plane of the door

Note 1 to entry: Examples of anti-separation points are hook and mushroom types.

3.1.2**automatic deadlocking**

deadlocking where deadbolt or deadlocked latch movement is self-propelled, and is triggered when the closed position of the door leaf has been reached

3.1.3**centrally controlled**

having release the bolts of all of its locking and/or clenching and/or anti-separation points, from a single lock case

3.1.4**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 (can also be a locking point and/or anti-separation point)

3.1.5**cylinder**

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

3.1.6**cylinder lock**

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

3.1.7**deadbolt**

movable part of a lock that usually engages a locking plate and withdraws into a lock case that is operated at least in one direction by a key, handle or thumb turn

3.1.8**deadlocking**

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

3.1.9**detaining element**

component which is moved by a key into a pre-determined position to allow the bolt to be operated

3.1.10**differ**

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

3.1.11**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 system to be operated only by its own key

Note 1 to entry: 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.

3.1.12

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

3.1.13

forend

part of a case through which the lock is fixed to the door leaf and through which the latch bolt and/or deadbolt pass

3.1.14

interlinked

connected for the purpose of operation

3.1.15

key

device that is removable and portable and is used to operate the lock

3.1.16

latch

self-engaging fastener which keeps the door leaf in a closed position, and which can be released

3.1.17

latch action

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

3.1.18

latch bolt

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

3.1.19

lever lock

lock with integral differs operated by a key

3.1.20

lock

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

3.1.21

lockable follower

mechanism operated by a key to block the rotation of the follower inside a lock case or the rotation of a handle/knob when it is a part of the lock

3.1.22

lock case

part of a lock in which the lock mechanism is housed

3.1.23

locking plate

component, which is usually fixed to a door frame to engage at least a locking point or, latch bolt or an anti-separation point or a clenching point

3.1.24

locking point

arrangement of components interacting between a deadbolt or anti-separation point and locking plate for security purpose

3.1.25**locking snib**

device, usually in the form of a small lever or knob, which can be operated to prevent the locking point, or latch bolt or an anti-separation point or clenching point from being thrown or withdrawn, or to change the operating mode of a lock

3.1.26**lock mechanism**

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

3.1.27**manual deadlocking**

deadlocking where movement of the deadbolt is by key, handle or thumb turn

3.1.28**mortice lock**

lock for fixing in a mortice, usually in the closing edge of a door leaf

3.1.29**multipoint lock**

lock comprising at least two 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

3.1.30**set**

all components necessary for the complete function of the product or a number of components delivered or recommended as a part of a complete multipoint lock

3.1.31**shared latch action**

latch action in which withdrawal of the latch bolt is by means of a handle or key

3.2 Symbols and abbreviated terms

For the purposes of this document, the following symbols and abbreviated terms apply.

Test parameter	Definition	Unit
F1	Return force on latch bolt	N
F2	Side force on latch bolt	kN
F3	Side force on latch bolt and locking plate (durability test)	N
F4	Side force on deadbolt and locking plate	kN
F5	End load on deadbolt and locking plate / Disengaging force on hook/claw bolt	kN
F6	Pull force on hook/claw bolt or locking plate	kN
F7	Force on locating device or lifting force on locking plate	kN
F9	Door closing force (classification)	N
F10	Door closing force (durability test)	N
F11	Clenching force	N
H1	Minimum projection	mm
L1	Deadbolt projection	mm
L2	Resulting projection	mm
M1	Torque to operate the latch bolt and/or deadbolt with key	Nm
M2	Torque to operate the latch and/or deadbolt bolt with handle, spring handle or knob	Nm
M3	Torque on follower stop	Nm
M4	Torque on lockable follower (relevant for category of use)	Nm
M5	Torque on lockable follower (relevant for security)	Nm
M6	Strong key torque on lever locks	Nm
M7	Torque resistance on knob or lever handle	Nm
Test parameters also illustrated in the figures		

4 Product characteristics

4.1 General

4.1.1 Essential characteristics

The following characteristics have special significance because they are related to the ability to close and keep the door in a closed position:

- a) self-closing ability/ability to close and keep the door in a closed position:
 - i) 4.1.3, return force of latch bolt;
 - ii) 4.4.2, door closing force.

4.1.2 Dangerous substances

National regulations on dangerous substances can require verification and declaration on release, and sometimes content, when construction products covered by this document are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

Check in accordance with 5.4.1.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through https://ec.europa.eu/growth/tools-databases/cp-ds_en.

4.1.3 Return force of latch bolt

The return force F_1 (see Figure 1) on each latch bolt shall be $\geq 2,5$ N. The test result of a lock without latch bolt shall be expressed as "NPD". The return force shall be tested in accordance with 5.4.2.

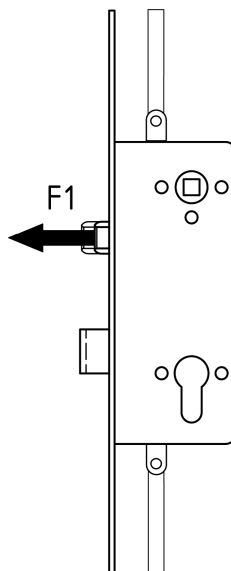


Figure 1 — Return force of latch bolts

4.1.4 Strength of lever lock key

The key for lever lock shall have the strength so it can resist a torque of 2,5 Nm and still be able to operate its lock with the torque M1 appropriate with its grade in 4.2.2.

This requirement is not applicable to cylinder keys which shall conform to EN 1303. The key strength shall be tested in accordance with 5.4.3.

4.1.5 Strength of bolt action

The locking point, anti-separation and clenching point components shall resist a torque of 30 Nm and the latch bolt components shall resist a torque of 20 Nm operated through the follower and the lock shall still be able to operate with the torque M1 and M2 appropriate with its grade in 4.2.2.

The strength of bolt actions shall be tested in accordance with 5.4.4.

4.1.6 Minimum follower restoring torque

The lock shall have a minimum restoring torque on the follower of 0,8 Nm, unless the manufacturer has declared that the product is intended for use with spring supported furniture.

The restoring torque shall be tested in accordance with 5.4.5.

NOTE Product information sheet, see Annex B.

4.2 Category of use (first digit)

4.2.1 Resistance to side force on latch bolt

The latch bolt shall resist a side force F_2 (see Figure 2) as specified in Table 1 after which operating torque shall not exceed that specified in 4.2.2, return force on latch shall still not be less than 2,5 N, and closing force shall not exceed as specified in 4.4.2.

The resistance to side force shall be tested in accordance with 5.5.1.

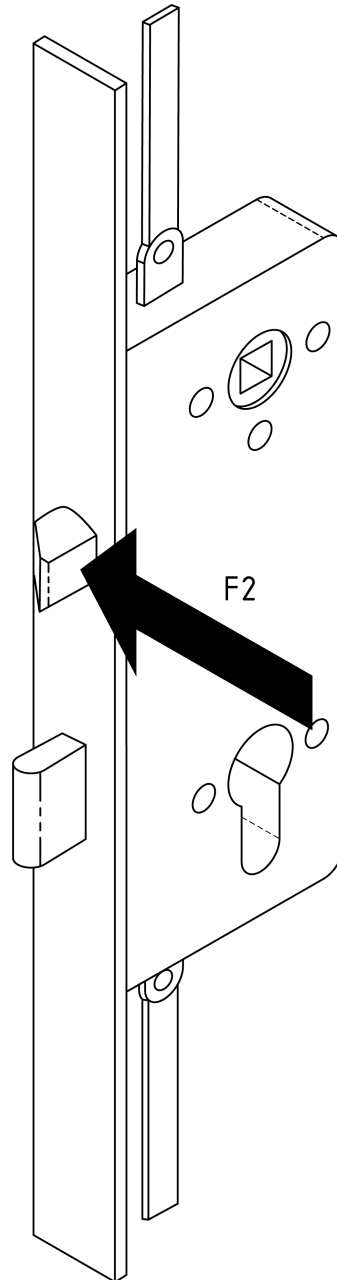


Figure 2 — Resistance to side force on latch bolt

4.2.2 Torque to operate the multipoint lock

4.2.2.1 The multipoint lock shall conform to torque on key 4.2.2.2 or 4.2.2.4 and torque on follower 4.2.2.3 or 4.2.2.5.

4.2.2.2 The torque on the key to operate the latch bolt, locking point(s) or anti-separation point(s) shall not exceed M1 without any force applied (see Figure 3 and Table 1).

The torque on the key shall be tested in accordance to 5.5.2.2.

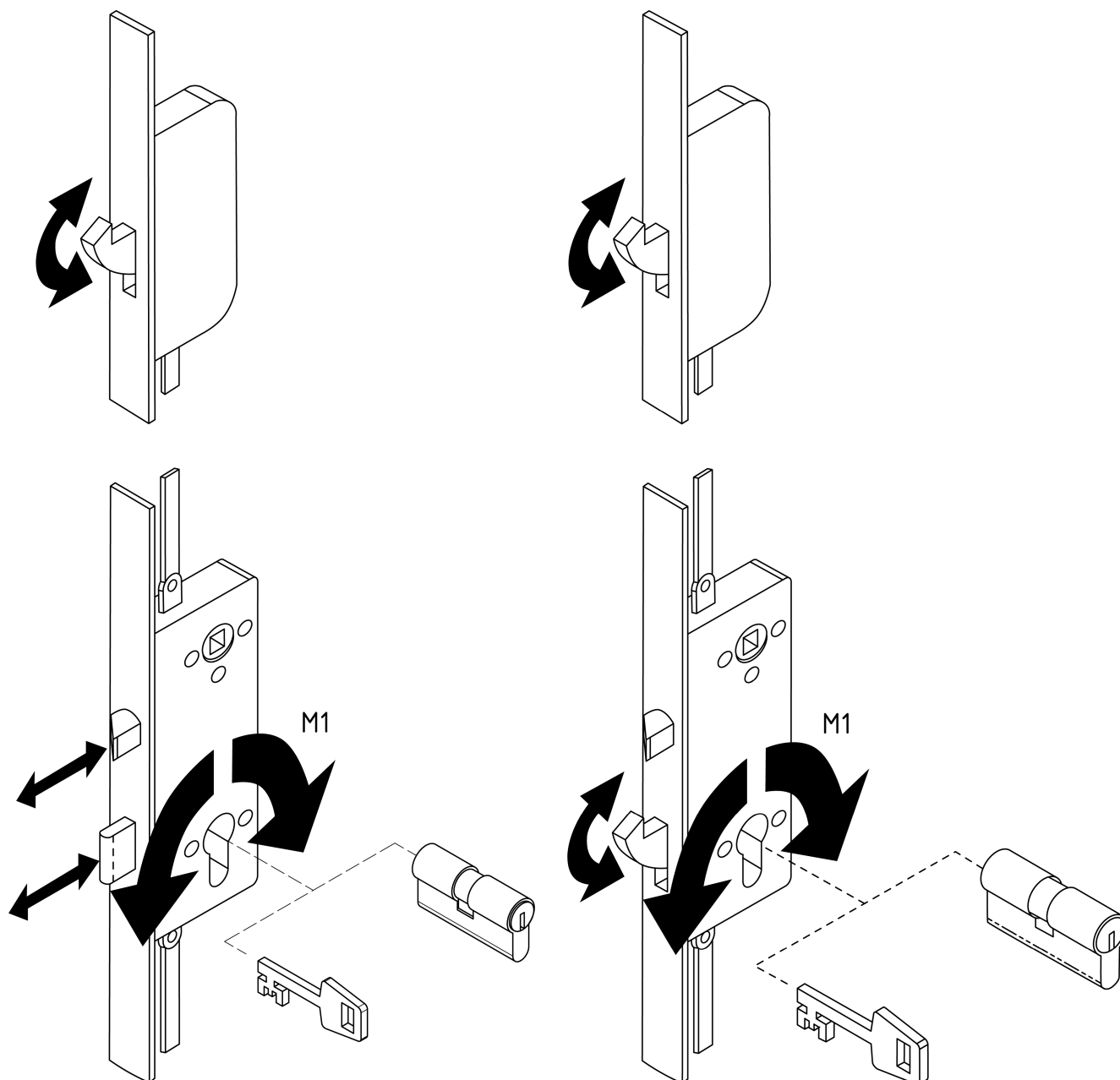


Figure 3 — Torque to operate the multi-point lock with the key

4.2.2.3 The torque on the follower to operate the latch bolt, locking point(s) or anti-separation point(s) without side force shall not exceed M2 without any force applied (see Figure 4 and Table 1).

The torque on the follower shall be tested in accordance to 5.5.2.3.

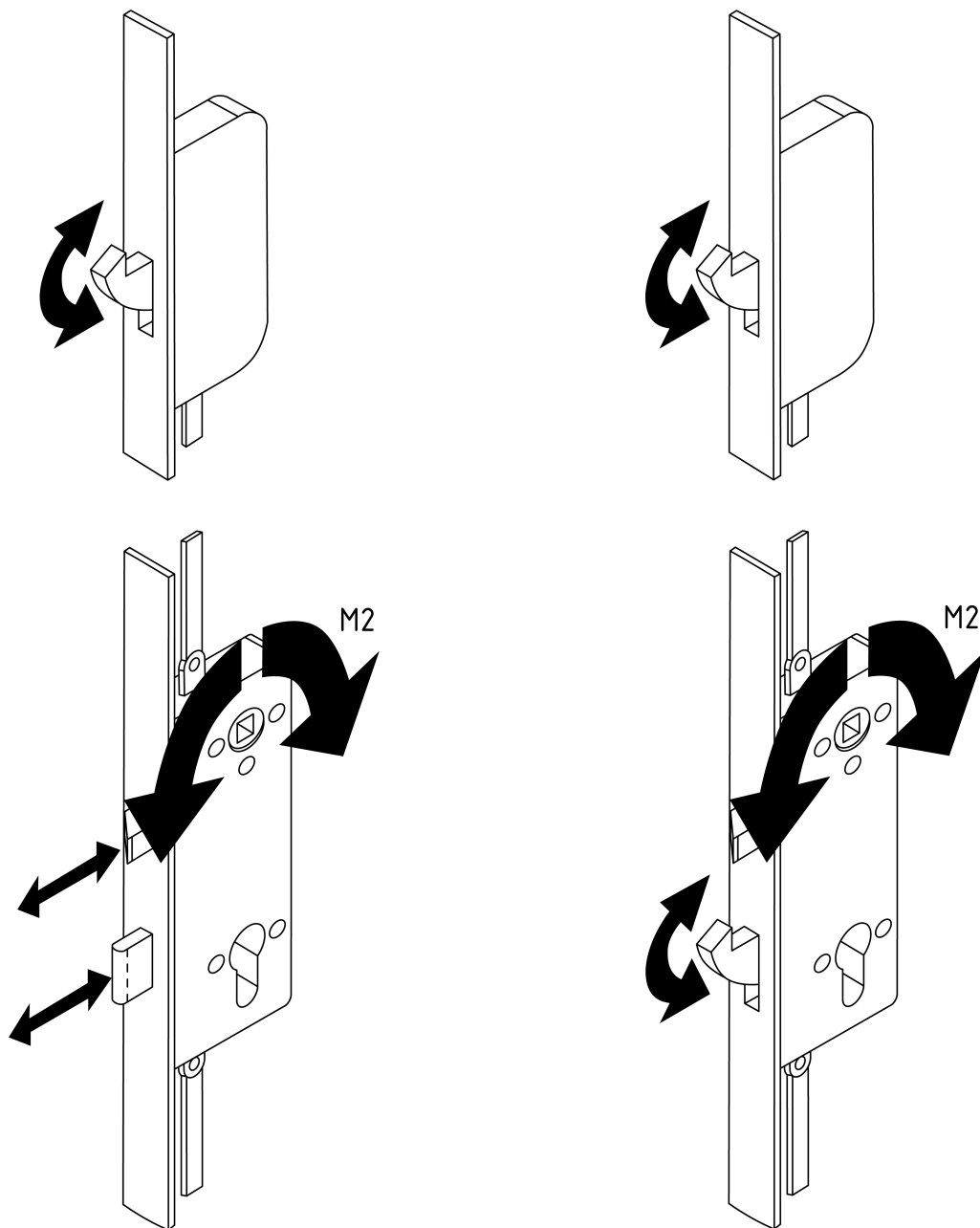


Figure 4 — Torque to operate the multi-point lock with the follower

4.2.2.4 The torque on the key to operate the clenching point shall not exceed $M1$ with the clenching force $F11$ applied, (see 6.2.10, Figure 5 and Table 1).

The torque on the key shall be tested in accordance to 5.5.2.4.

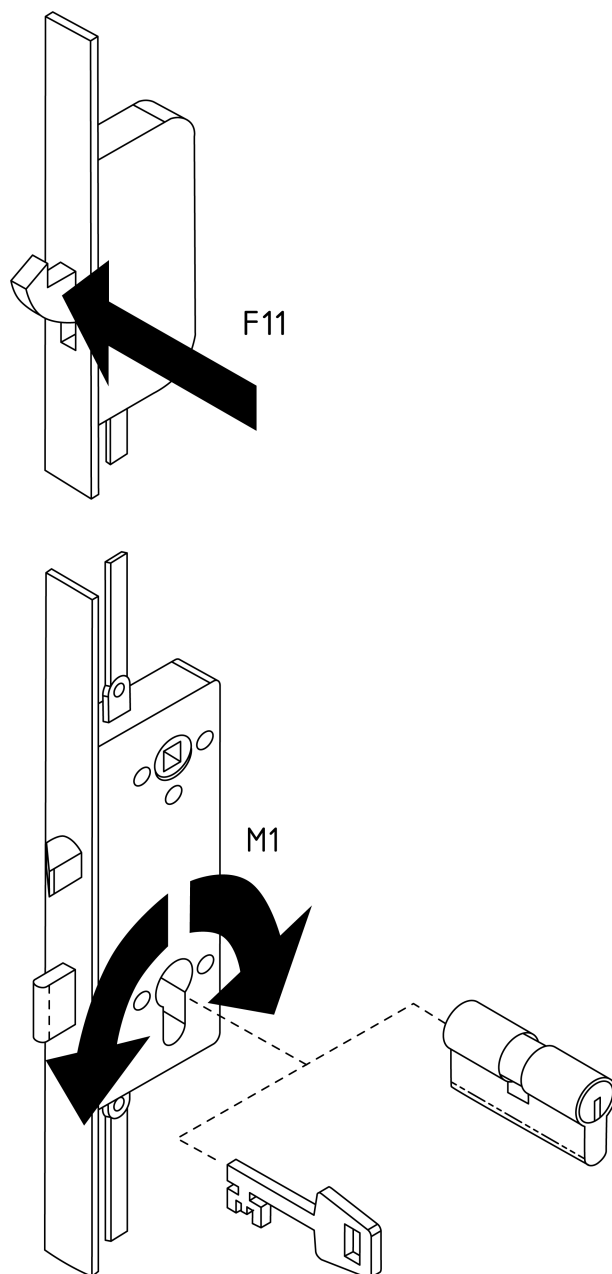


Figure 5 — Torque to operate the clenching with the key

4.2.2.5 The torque on the follower to operate the clenching point shall not exceed M2 with the clenching force F11 applied, (see 6.2.10, Figure 6 and Table 1).

The torque on the follower shall be tested in accordance to 5.5.2.5.

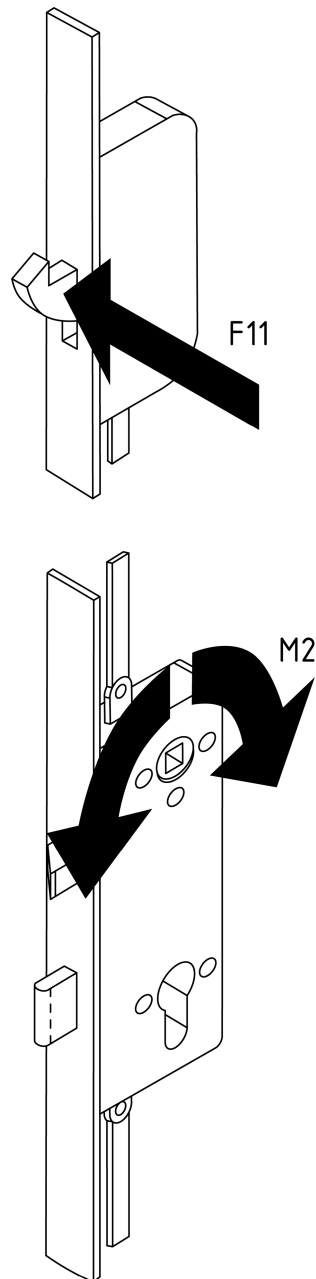


Figure 6 — Torque to operate the clenching with the follower

4.2.3 Strength of follower stops

The latch components and travel limit stops shall resist a torque M3, (see Figure 7) as specified in Table 1, and the multi-point lock shall still be able to operate with the torque appropriate with its grade in 4.2.2.

The strength of follower stops shall be tested in accordance with 5.5.3.

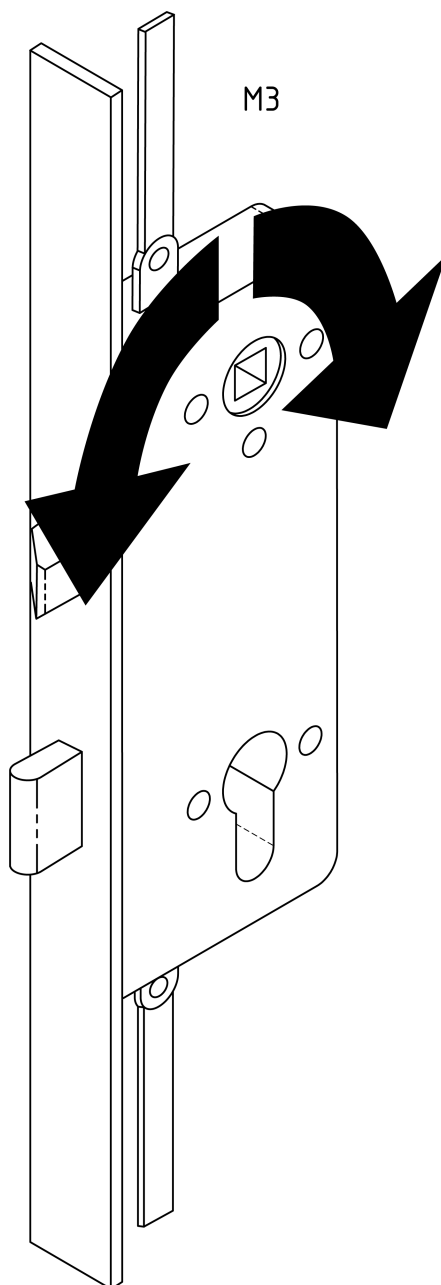


Figure 7 — Strength of follower stops

4.2.4 Torque resistance of lockable deadbolt operation by handle/knob

4.2.4.1 Torque resistance of lockable followers

A lock with a lockable follower shall resist a torque of M4 (see Figure 8) as specified in Table 1, and the lock and its lockable follower shall still be able to operate with the torque M1 and M2 appropriate with its grade in 6.2.1. If, due to component failure, it is not possible to apply a torque of M4 the test shall also be considered as passed.

The resistance of lockable followers shall be tested in accordance with 5.5.4.

4.2.4.2 Torque resistance of rim lock with integral lockable handle/knob

A rim lock with an integral lockable handle or knob shall resist a torque of M4 (see Figure 8.), where $M4 \text{ (Nm)} = 400 \text{ (N)} \times \text{maximum radius in m of the handle/knob after which the lock and its lockable handle/knob shall still be able to operate with the torque appropriate with its grade in 4.2.2.}$

The torque resistance shall be tested in accordance with 5.5.4.

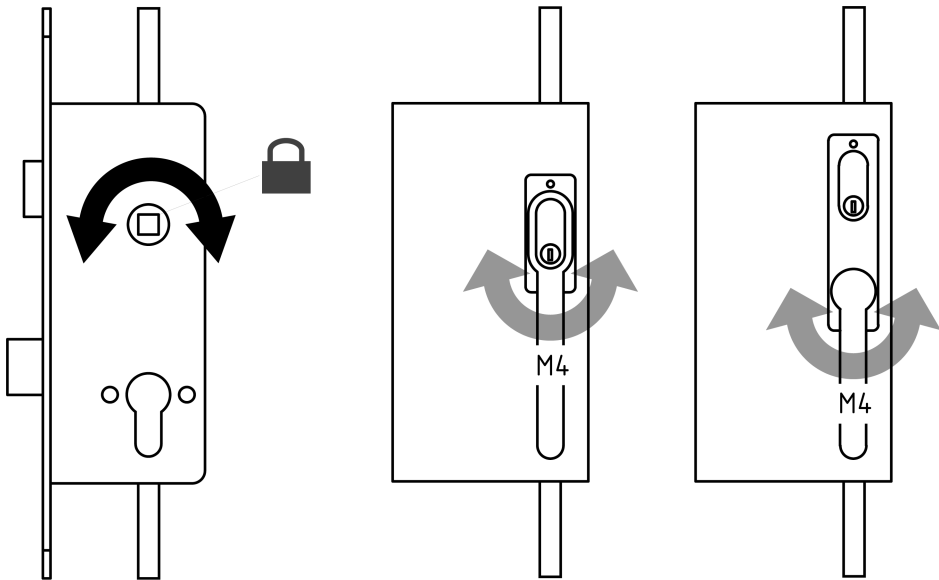


Figure 8 — Torque resistance of lockable follower

Table 1 — Category of use

Sub-clause	Requirement	Test method	Test parameter	Grade 1	Grade 2	Grade 3	Unit
4.2.1	Resistance to side force on latch	5.5.1	F 2	2	3	3	kN
4.2.2.2 4.2.2.4	Maximum torque to operate latch bolt, locking, anti-separation and clenching points by key	5.5.2	M 1	1,2	1,0	0,8	Nm
4.2.2.3 4.2.2.5	Torque to operate latch bolt, locking, anti-separation and clenching points through follower	5.5.2	M 2	10	7	5	Nm
4.2.3	Strength of follower stops	5.5.3	M 3	20	40	60	Nm
4.2.4.1	Torque resistance of lockable follower	5.5.4	M 4	30	50	70	Nm
4.2.4.2	Torque resistance of Rim lock with integral lockable handle/knob	5.5.4	M 4	400 (N) × maximum radius (m)	400 (N) × maximum radius (m)	400 (N) × maximum radius (m)	Nm

4.3 Durability characteristics (second digit)

4.3.1 Durability of latch action

The latch action, the shared latch action (where applicable) or automatic deadbolt shall complete a number of latch test cycles at the appropriate force in accordance with the grade selected in 6.2.2.

After the test the operation of the latch action with key or follower shall not exceed the torque M1 and M2 for the selected grade in 4.2.2.

The door closing force F9 as graded in 4.4.2 shall remain after the selected number of test cycles. The test method for durability of the latch action is described in 5.6.1 or 5.6.2.

4.3.2 Durability of locking action

The locking point and anti-separation point mechanism shall complete a number of deadbolt test cycles in accordance with the grade selected from Table 2.

After the test the operation of the locking point and anti-separation point mechanism with key or follower shall not exceed the torque M1 and M2 for the selected grade in 6.2.1. The test method for durability of locking action described in 5.6.3.

When the deadbolt is automatically operated it shall be tested in accordance with 5.6.2.

4.3.3 Durability of locking snib mechanism

The locking snib mechanism shall complete the minimum number of cycles specified in Table 2 without affecting the change of the different functions influenced by the snib position.

The test method for durability of locking snib mechanism is described in 5.6.4.

4.3.4 Durability of clenching

The clenching action shall complete the minimum number of cycles to the grade selected in Table 2. The two extreme clenching points (where applicable) on the product shall be affected by the force F11 at the same time. Regarding general requirements for the clenching see 4.11.

The multi-point lock shall operate after the test with the specified maximum operating torque M1 and M2 in accordance with Table 2.

The test method for durability of clenching action is described in 5.6.5.

Table 2 — Durability characteristics

Grade	Number of cycles					
	Latch action	Shared latch action		Locking point(s), anti-separation point(s) and/or clenching point(s)		Snib mechanism
		Key	Handle	Manually locking	Automatically locking	
0	1 – 49 999	25 % of latch action	75 % of latch action	25 % of latch action	100 % of latch action	25 % of latch action
A	50 000 – 99 999					
B, L, R, W	100 000 – 199 999					
C, M, S, X	≥ 200 000					

4.4 Door mass and closing force (third digit)

4.4.1 Door mass

The dimensions and mass of the test door are specified in 5.2.1 and 6.2.3. Door mass shall be verified in accordance with 5.7.1.

NOTE The door mass is the mass of the door leaf.

4.4.2 Door closing force

The door closing force F₉, on the test door in accordance with the grade in 6.2.3 shall be sufficient to enable the latch bolt to correctly engage the locking plate every time.

This requirement also applies to multipoint locks with automatic engaging point(s).

The door closing force shall be tested in accordance with 5.7.2.

The test result of a lock without latch bolt shall be expressed as “NPD”.

4.5 Suitability for use on fire resistance and/or smoke control door set (forth digit)

4.5.1 General

The evidence and test application/method shall be shown in the product information.

NOTE 1 The use of a deadbolt can prevent self-closing of the smoke-controlled door. It is the responsibility of the national regulation body to decide which type of dead bolt operation is acceptable.

NOTE 2 It is the responsibility of the specifiers to ensure that the fire resisting evidence for any lock grade B or grade N covers the type of fire-resistant door for which the multipoint lock is intended.

4.5.2 Grade 0

No characteristics.

4.5.3 Grade A

Products representative of their type, being classified grade A in 6.2.4, shall have been subjected to a successful evaluation proving their suitability for use on smoke control doors.

All part of the product that are responsible for keeping the door in its closed position shall be made out of material with a melting point of not less than 300 °C. If the multipoint lock is equipped with a latch bolt and the latch bolt could be the only part of the multipoint lock that keeps a smoke door in its closed position, then the projection of the latch bolt shall be at least 10 mm.

Alternatively, the suitability for use on smoke control doors shall be determined by a successful test conducted in accordance with 5.8.1.

Installation instruction shall confirm that the engagement of the latch bolt inside the locking plate shall not be less than 6 mm.

It is not necessary for the product to be operable after such a test.

4.5.4 Grade B

Products representative of their type, being classified to grade B in 6.2.4, shall have been subjected to a successful fire resisting and/or smoke control door set test, in accordance with 5.8.2 to prove the effect of the product on the fire resistance of the complete door assembly.

The evidence and test application/method shall be shown in the product information corresponding to EN 16035 Hardware Performance Sheet (HPS).

It is not necessary for the product to be operable after such a fire resisting test.

4.5.5 Grade N

Products representative of their type, where other means are responsible for keeping the smoke control and fire resistance door set in its closed position during the smoke control and fire resistance test, shall be classified grade N in 6.2.4.

Such product shall have been subjected to a successful smoke control and fire resistance test, in accordance with 5.8.3 to prove the effect of the product on the smoke control and/or fire resistance of the complete door assembly.

The evidence and test application/method shall be shown in the product information corresponding to EN 16035 Hardware Performance Sheet (HPS).

It is not necessary for the product to be operable after such a fire resistance test.

4.6 Safety (fifth digit)

Not applicable.

NOTE See EN 179 and EN 1125 for multipoint locks and locking plates that are part of exit devices for use on emergency or panic doors.

4.7 Corrosion resistance and temperature (sixth digit)

4.7.1 Corrosion resistance

The multi-point lock shall resist the time specified in 6.2.6 in a corrosion chamber.

The torques on the key, or follower, to operate the locking point, anti-separation point and clenching point and/or latch bolt shall not exceed M1 +20 % or M2 +20 % specified in Table 1.

The door closing force as graded in 6.2.3 shall remain after the specified time in the corrosion chamber.

The return force of the latch bolt in 4.1.3 shall not be less than 2,5 N.

The corrosion test shall be in accordance with 5.10.1.

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

4.7.2 Operation at extreme temperatures

The torque to operate the locking point, anti-separation point and clenching point and/or latch bolt at extreme temperature as specified in 6.2.6 shall not exceed M1 or M2 specified in Table 1. The return force of latch bolt in 4.1.3 shall not be less than 2,5 N.

Operation torque at extremes of temperature shall be tested in accordance with 5.10.2.

4.8 Security of locking point (seventh digit)

4.8.1 General

Characteristics for classification of the locking point of the multipoint lock are given in Table 3. The characteristics given in 4.8.2, 4.8.4, 4.8.5, 4.8.6, and 4.8.7 apply to all dead locking bolts.

Locking points can be operated linearly or by rotation. Locking points which have an anti-separation function shall also be graded in accordance with 6.2.9 and if a locking point also has a clenching function it shall also be graded in accordance with 6.2.10. See Table B.2.

It is not necessary for the lock to be operable after the security tests.

4.8.2 Locking

Locks in security grade 1 to 7 shall be capable of deadlocking in one of the following ways, as defined in 4.8.3.

The type of deadlocking shall be declared in the product information in accordance with Annex B.

4.8.3 Deadlocking

4.8.3.1 Manual locking without intermediate locking positions

It shall not be possible to remove the key from the multipoint lock unless the deadbolt is in its unlocked or fully thrown and deadlocked position.

The manual deadlocking shall be verified in accordance with 5.11.1.1.

4.8.3.2 Manual locking with intermediate locking positions

The deadbolt shall be deadlocked in all positions in which the key can be removed.

When the locking point is operated with multi turn with intermediate position, the bolt shall be exposed to an end load on every position where the key can be removed. 5.11.1.2 shall be upgraded with the end load in the intermediate position on the locking point:

- Grade 0 = 0 kN;
- Grade 1 = 1 kN;
- Grade 2–7 = 2 kN.

Under 5.11.5 the end load test with the force F5 shall be made when the bolt is in its fully thrown position.

The manual locking with intermediate locking position shall be verified in accordance with 5.11.1.2.

4.8.3.3 Manual locking with multi-turn key operation

When the key has been turned to fully throw the locking points, the locking points shall be deadlocked when the key is withdrawn. No requirement between the open and deadlocked position.

The manual locking with multi-turn key operation shall be verified in accordance with 5.11.1.3.

4.8.3.4 Automatic deadlocking bolt

The deadbolt shall be able to reach its fully thrown and deadlocked position with a gap of 5 mm between the locks forend and the locking plate.

The automatic deadlocking bolt shall be verified in accordance with 5.11.1.4.

4.8.3.5 Automatically locking latch bolt

The deadlocking latch shall be able to reach its fully thrown and deadlocked position with a gap of 5 mm between the locks forend and the locking plate.

The automatic deadlocking latch bolt shall be verified in accordance with 5.11.1.5.

4.8.4 Characteristics to side force

4.8.4.1 General

Side force shall be applied to lock mechanisms in accordance with Figures 31, 32 or 33 as appropriate, depending upon the intended use of the multi point lock and any limitations identified in Annex B.

4.8.4.2 Resistance to side force on deadbolt

This requirement applies to lock points and anti-separation points without drill protection that is security classified at grades 1 to 4 and 6.

The locking point and anti-separation points shall resist a side force of F4 when the force is held for 60 s, (see Figure 9 and Table 3).

It is not necessary for the multi point lock to be operable with an operation torque M1 or M2 after the side force test.

The side force on locking point shall be tested in accordance with 5.11.3.1.

4.8.4.3 Resistance to drilling and side force on deadbolt

This requirement applies to locking points and anti-separation points with drill protection that are security classified at grades 5 and 7.

Side force shall be applied to lock mechanisms in accordance with Figures 31, 32 or 33 as appropriate, depending upon the intended use of the multi point lock and any limitations identified in 4.1.4.

The dead locking bolt of locking point and anti-separation point shall have drill resistance and resist a side force of F4 when the force is held for 60 s, (see Figure 9 and Table 3).

It is not necessary for the multi point lock to be operable with an operation torque M1 or M2 after the drill and side force test.

The side force and drill resistance on the locking point and anti-separation point shall be tested in accordance with 5.11.3.2.

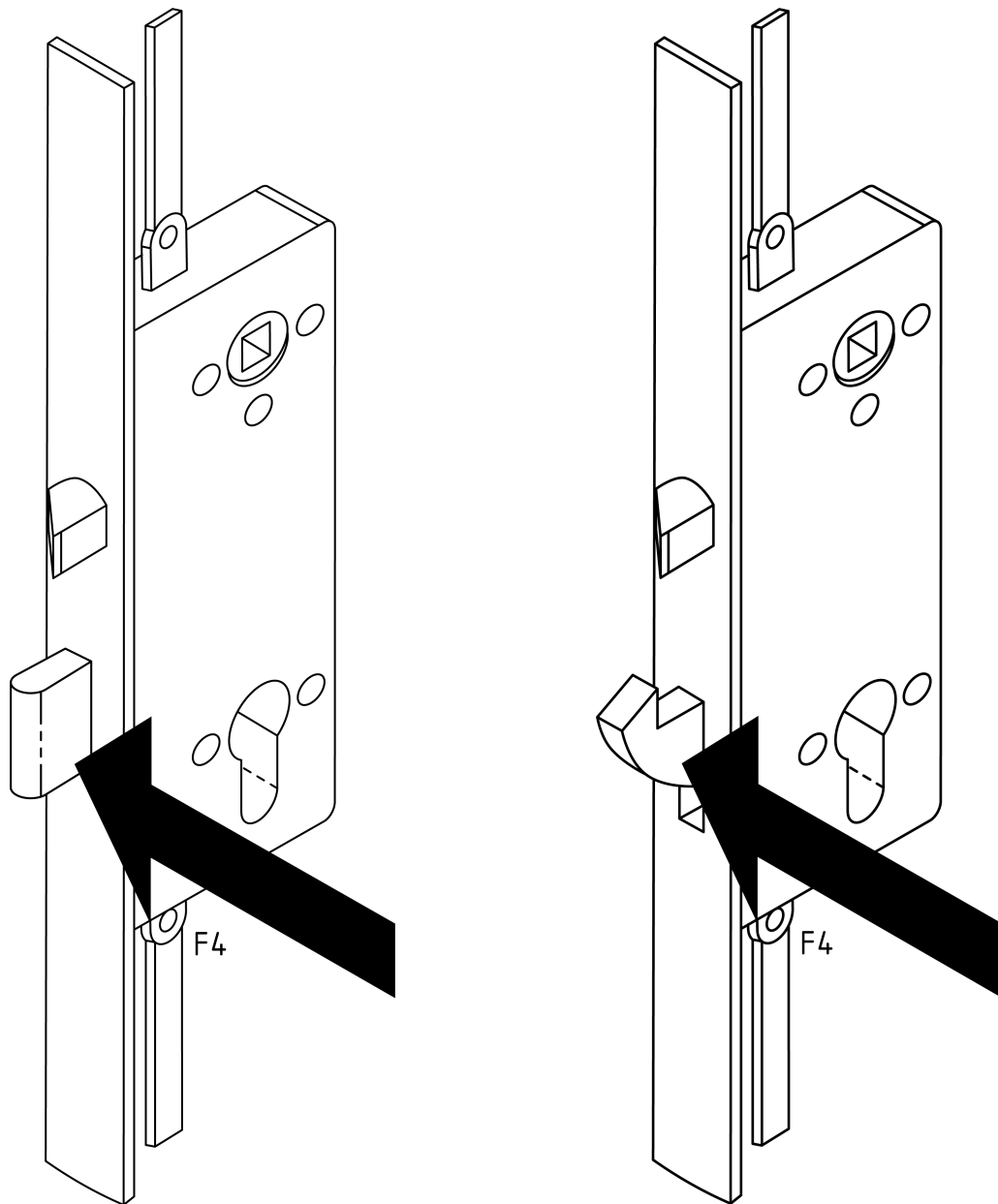


Figure 9 — Resistance to side force on locking points

4.8.5 Locking point projection

The unloaded deadbolt of the locking point that is in its fully thrown and detained position shall have a minimum length of L_1 as specified in Table 3, (see Figure 10).

The projection shall be measured in accordance with 5.11.4.