

Australian Standard[®]

Locksets and hardware for doors and windows

Part 2: Mechanical locksets for doors and windows in buildings



This Australian Standard® was prepared by Committee CS-082, Locksets and Hardware. It was approved on behalf of the Council of Standards Australia on 5 February 2008. This Standard was published on 28 April 2008.

The following are represented on Committee CS-082:

- Architectural Hardware Industry Association
 - ASIS Australia Chapter
 - Australian Chamber of Commerce and Industry
 - Australian Industry Group
 - Australian Window Association
 - Certification Interests (Australia)
 - Locksmiths Guild of Australia
 - Master Locksmiths Association of Australasia
 - New South Wales Police Force
-

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Australian Standard[®]

Locksets and hardware for doors and windows

Part 2: Mechanical locksets for doors and windows in buildings

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PREFACE

This Standard was prepared by the Standards Australia Committee CS-082, Locksets, to supersede AS 4145.2—1993, *Locksets, Part 2: Mechanical locksets for doors in buildings* and AS 4145.3—2001, *Locksets, Part 3: Mechanical locksets for windows in buildings*.

This Standard incorporates Amendment No. 1 (December 2009). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide general design and performance criteria and testing procedures for locksets and latchsets. It covers locksets in residential and commercial buildings. This Standard also includes performance requirements for cylinders supplied separately for installation in locksets.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

The term ‘normative’ has been used in this Standard to define the application of the Appendix to which it applies. A ‘normative’ Appendix is an integral part of a Standard.

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STANDARDS AUSTRALIA

Australian Standard

Locksets and hardware for doors and windows

Part 2: Mechanical locksets for doors and windows in buildings

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies general design criteria, performance requirements, and procedures for testing mechanical locksets and latchsets for their resistance to forced or unauthorized entry and efficiency under conditions of light to heavy usage.

This Standard covers locksets for typical doorways, such as wooden, glass or metal-hinged swinging doors or sliding doors in residential and business premises, including public buildings, warehouses and factories. Requirements for both the lock and associated furniture are included.

Certain areas requiring higher level locking devices (e.g., locking bars, electronic locking devices, detection devices, alarms) are not covered by this Standard.

The Standard also includes performance requirements for cylinders supplied separately for installation in locksets and corrosion resistance requirements.

1.2 APPLICATION

This Standard shall be read in conjunction with AS 4145.1.

NOTE: Other documents which should be consulted are AS 1428.1, AS 1905.1 and the Building Code of Australia (BCA) for specific purpose doors in buildings.

This Standard is intended for use when assessing the security and durability of a lockset. Locksets for use in fire doors, egress doors and emergency exits are subject to further requirements or regulations in the interests of personal safety.

1.3 NORMATIVE REFERENCES

The following documents are indispensable for the application of this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography (see Appendix G)

AS

2331 Methods of test for metallic and related coatings

2331.3.1 Method 3.1: Corrosion and related property test—Neutral salt spray test (NSS test)

2796 Timber—Hardwood—Sawn and milled products

2796.1 Part 1: Product specification

4145 Locksets

4145.1 Part 1: Glossary of terms

BCA Building Code of Australia

ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories

1.4 DEFINITIONS

For the purpose of this Standard the definitions given in AS 4145.1 apply.

1.5 CLASSIFICATIONS

1.5.1 General

Locksets/latchsets, door furniture and cylinders are classified according to the durability, corrosion resistance, and security they provide.

1.5.1.1 Locksets

Locksets and latchsets shall be classified with an alphanumeric code of 14 or less characters. This code shall be composed of the following ratings (in the listed order):

- (a) Physical security.
- (b) Durability.
- (c) Corrosion resistance rating.
- (d) A code for the type of keying security provided and the associated cylinder security.

For locksets operated by key on both sides, if the appearance, fixing or cylinder vary from one side to another, individual codes shall be determined. The available physical security, durability, corrosion, resistance, keying security, and cylinder security designations, shall be given as specified in AS 4145.1.

1.5.1.2 Locks, door furniture and cylinders

Locks, door furniture and cylinders supplied as a separate item shall also be classified in accordance with AS 4145.1.

SECTION 2 DESIGN REQUIREMENTS

2.1 GENERAL

2.1.1 Locking function

Locksets that have a locking provision shall be locked by keys or other means from the inside or outside, or both sides.

2.1.2 Fasteners

Fasteners on which the security of locks, staples or striker plates depend shall be either concealed when the door is locked and the key removed or shall be tamper-resistant. Fasteners exposed on the secure side(s) of the door when the door is closed shall resist any attempts to remove them with the tools used for their installation.

2.2 DIMENSIONS

The dimensions shall be in accordance with Figures 2.1 to 2.13 inclusive.

NOTE: The dimensions given in Figures 2.1 to 2.13 have been included to aid in the identification of the various lock types commonly used in Australia.

2.3 FINISH

A suitable protective coating and compatible finish shall be applied to those internal and external surfaces of the locksets that may be exposed to corroding agents.

NOTES:

- 1 Some examples of suitable protective coatings and finishes are specified in AS 1192, AS 1231, AS/NZS 1026, AS 1789, AS/NZS 3750.9, AS/NZS 3750.15 and AS 3715.
- 2 For corrosion rating, see Clause 3.9.

2.4 KEY CONTROL

2.4.1 Identification marks

Any identification marks on the key or keys supplied with any lock or group of locks shall not directly disclose the combination of the key. In a restricted key system containing traceable keys, these shall be marked for identification purposes.

2.4.2 Key changes

To guard against the lockset being operated by other keys in the same series, the minimum number of effective key changes shall be in accordance with AS 4145.1.

The manufacturer shall be able to demonstrate the calculations made to establish its key change claim. This supporting data shall include the measurements used to create a unit of difference and the range of key cuts or bittings used in production.

2.4.3 Key control levels

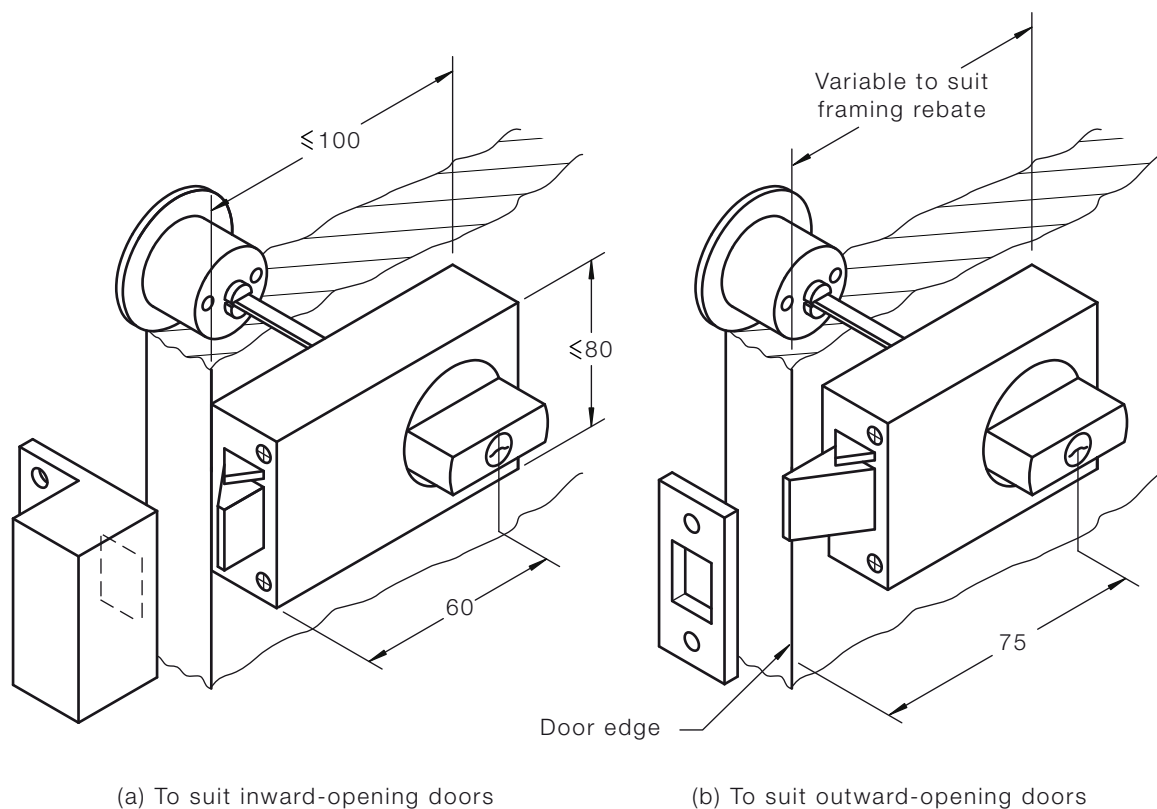
Key control levels shall be in accordance with AS 4145.1.

2.5 STRIKE PLATES

Strike plates supplied with hinged door locksets should have the same basic dimensions as the universal strike shown in Figure 5.1. If a larger strike plate is necessary for the lockset, the strike plate shown in Figure 5.2 is preferred. If the strike plate normally supplied with the lockset does not conform to one of the designated types shown in Figure 5.1 or Figure 5.2, it should be compatible with the doorframe cutout.

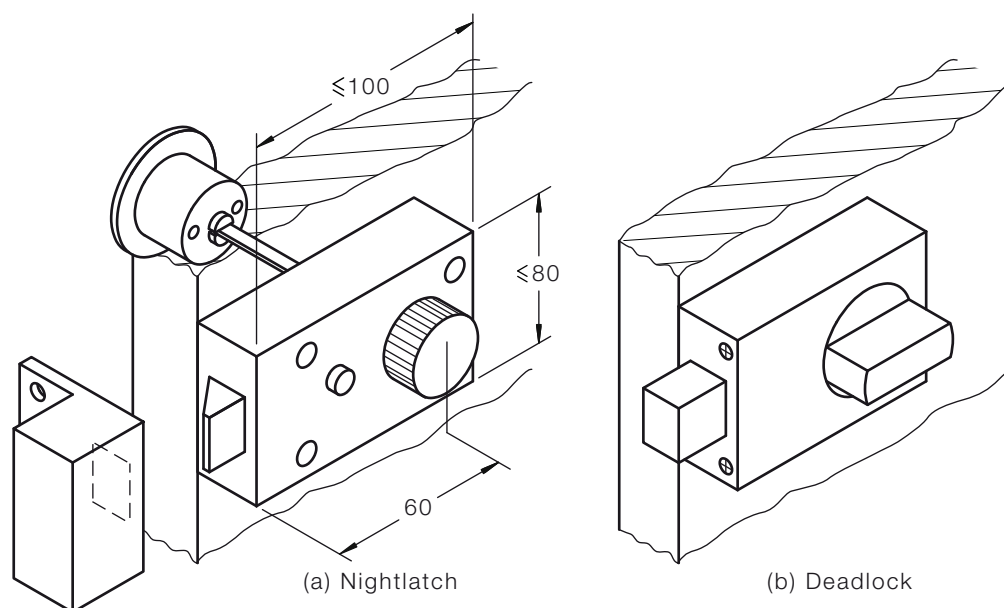
NOTES:

- 1 Strike types normally supplied with the locks should be used.
- 2 The footprint for the strike in Figure 5.2 suits some electric strikes; however, as with any different strike, it is necessary to ensure that the lock bolt and the strike are operationally compatible when selecting strikes.



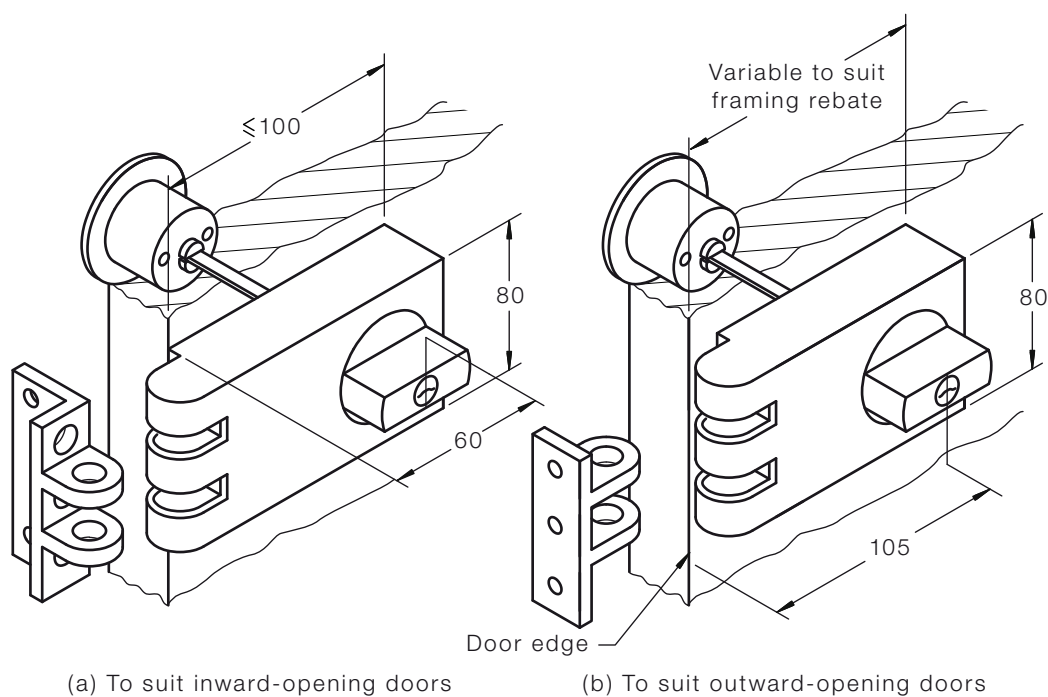
DIMENSIONS IN MILLIMETRES

FIGURE 2.1 TYPICAL RIM DEADLATCHES
(ALSO AVAILABLE WITHOUT KEY FUNCTION ON THE INSIDE)



DIMENSIONS IN MILLIMETRES

FIGURE 2.2 TYPICAL RIM LOCKSETS



DIMENSIONS IN MILLIMETRES

FIGURE 2.3 TYPICAL INTERGRIP RIM DEADLOCKS
(ALSO AVAILABLE WITHOUT KEY FUNCTION ON THE INSIDE)

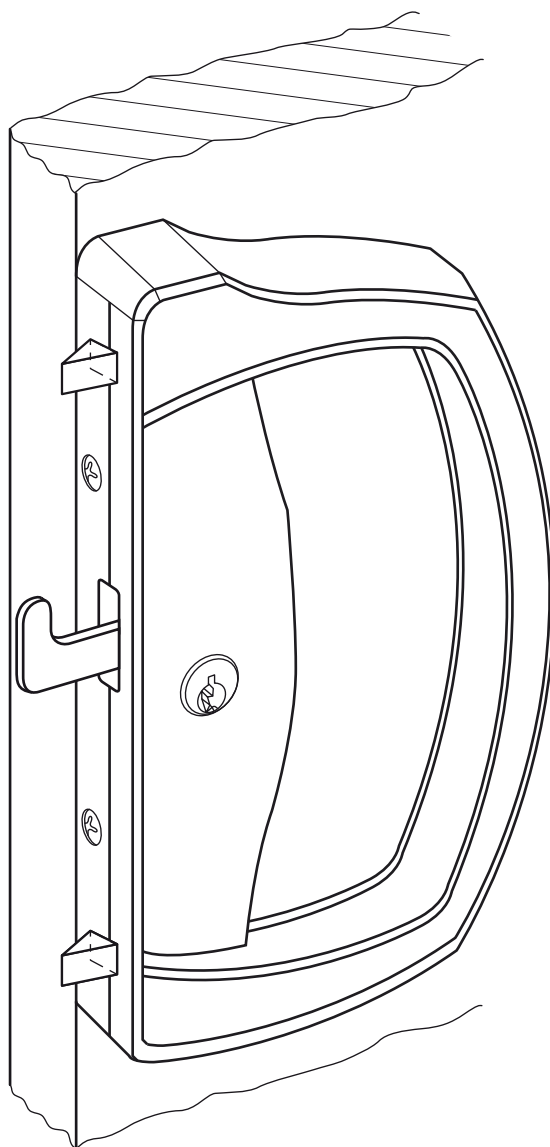
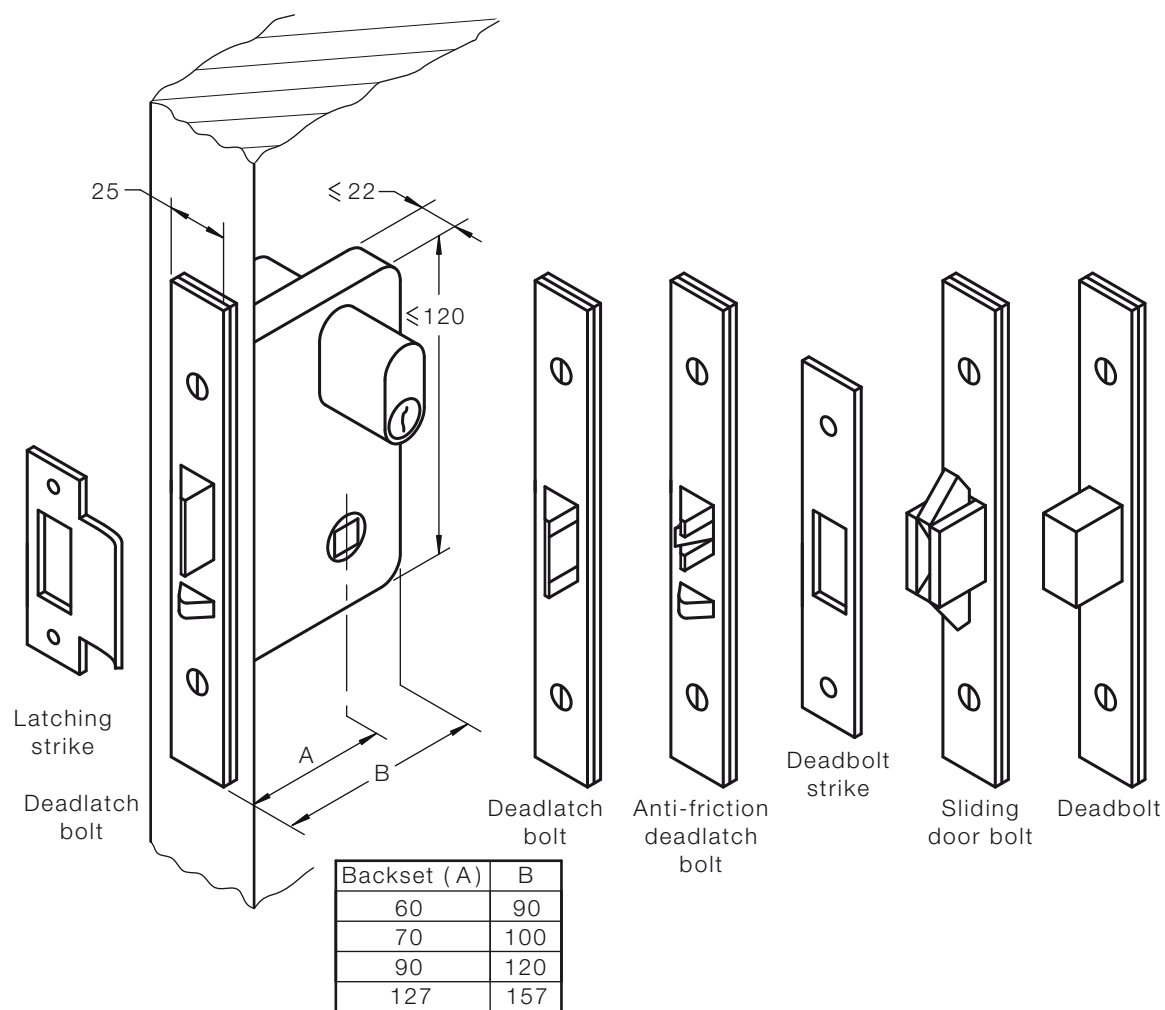
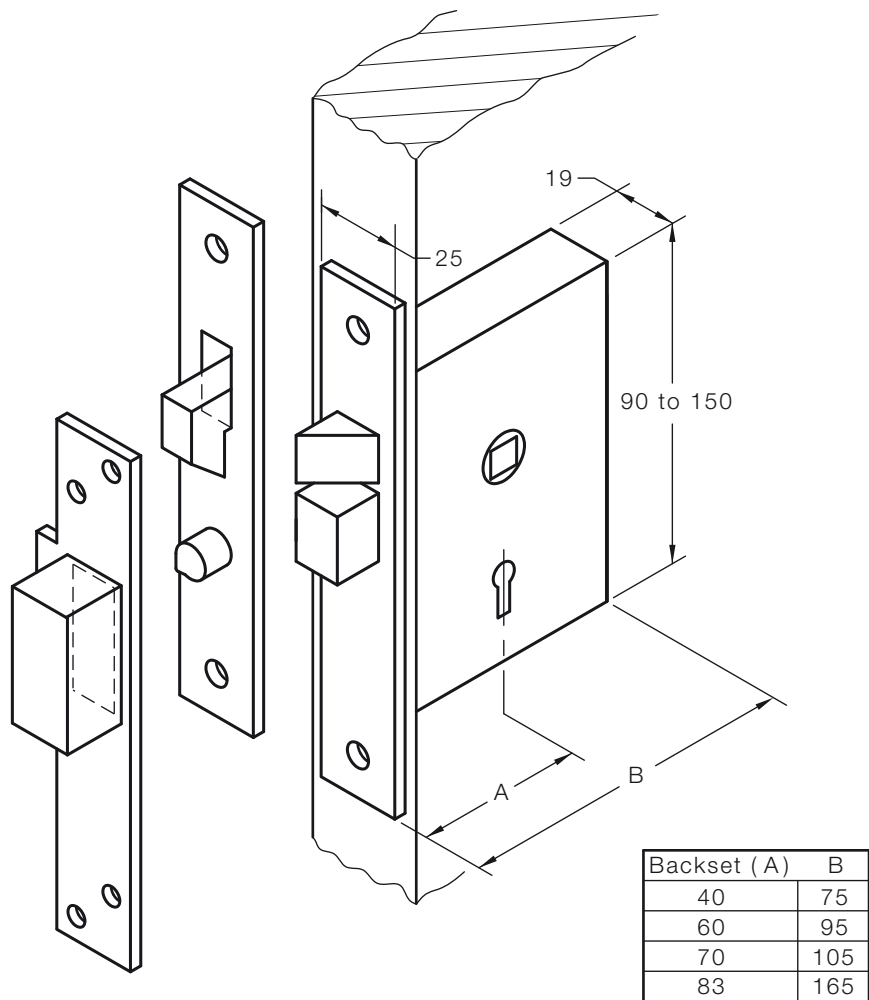


FIGURE 2.4 TYPICAL NARROW STILE SLIDING DOOR RIM LOCK



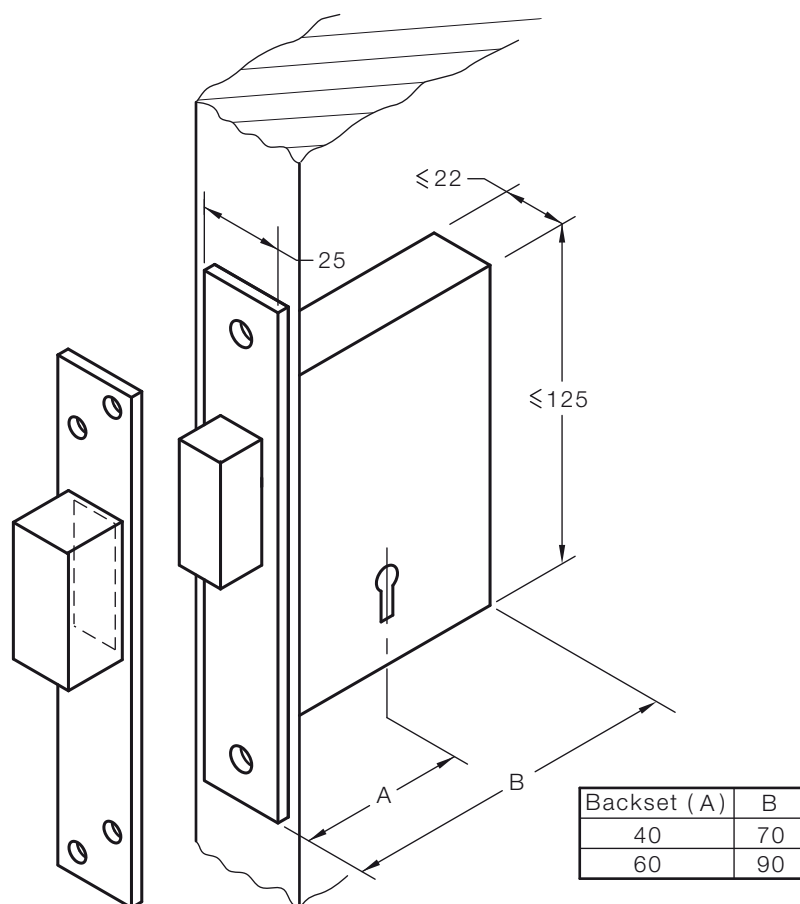
DIMENSIONS IN MILLIMETRES

FIGURE 2.5 TYPICAL CYLINDER MORTICE LOCK AND BOLT TYPES



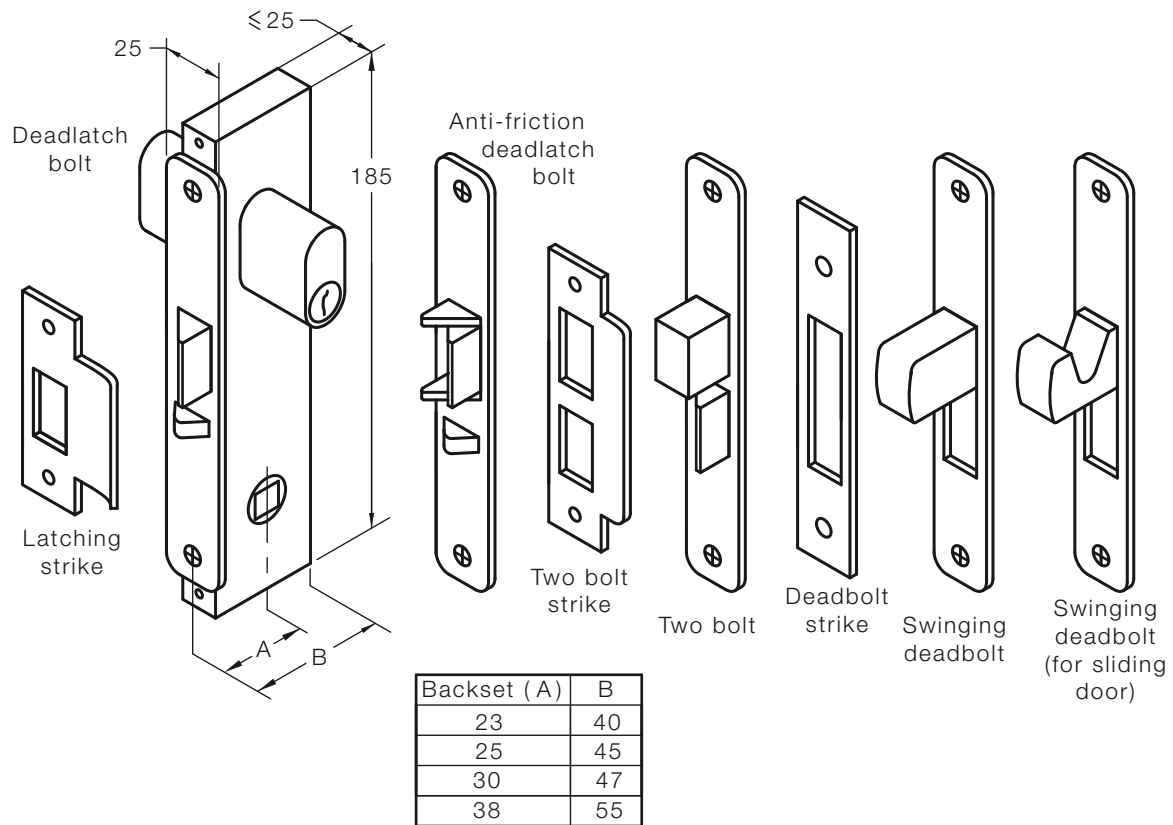
DIMENSIONS IN MILLIMETRES

FIGURE 2.6 TYPICAL TWO-BOLT LEVER MORTICE LOCKS



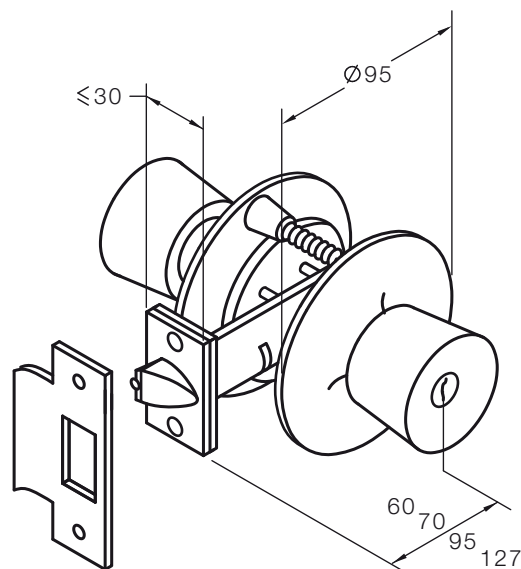
DIMENSIONS IN MILLIMETRES

FIGURE 2.7 TYPICAL LEVER MORTICE DEADLOCK



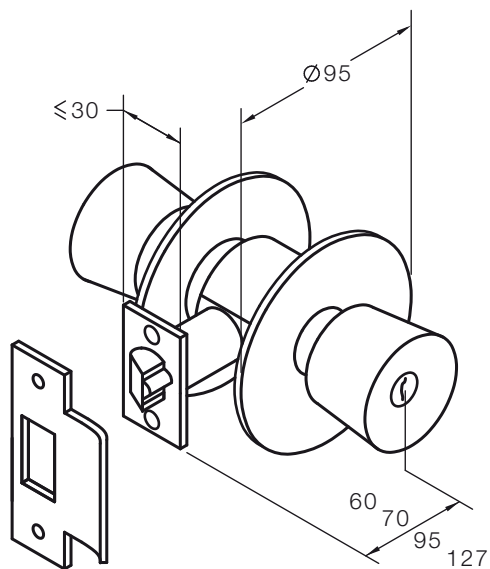
DIMENSIONS IN MILLIMETRES

FIGURE 2.8 TYPICAL SHORT BACKSET MORTICE LOCK AND BOLT TYPES



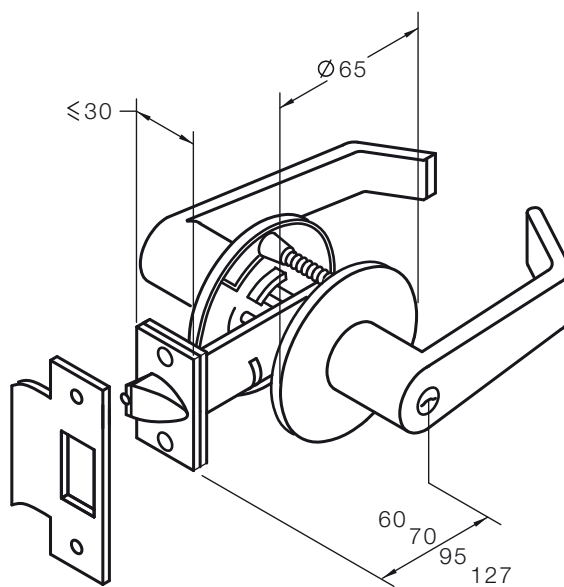
DIMENSIONS IN MILLIMETRES

FIGURE 2.9 TYPICAL TUBULAR DEADLATCH—KNOB FURNITURE



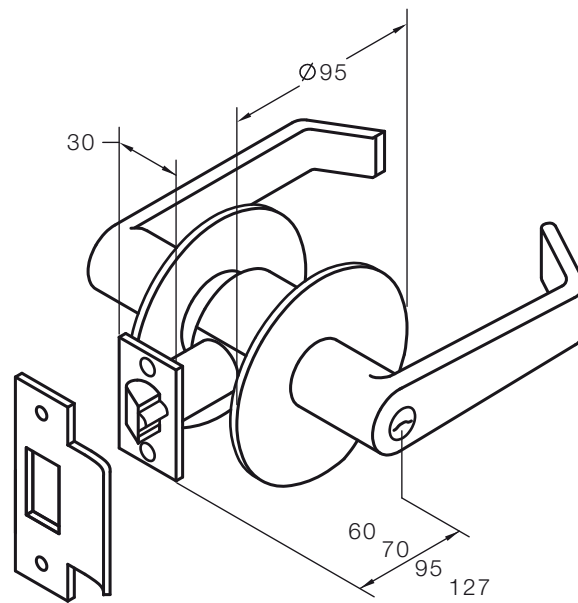
DIMENSIONS IN MILLIMETRES

FIGURE 2.10 TYPICAL CYLINDRICAL DEADLATCH—KNOB FURNITURE



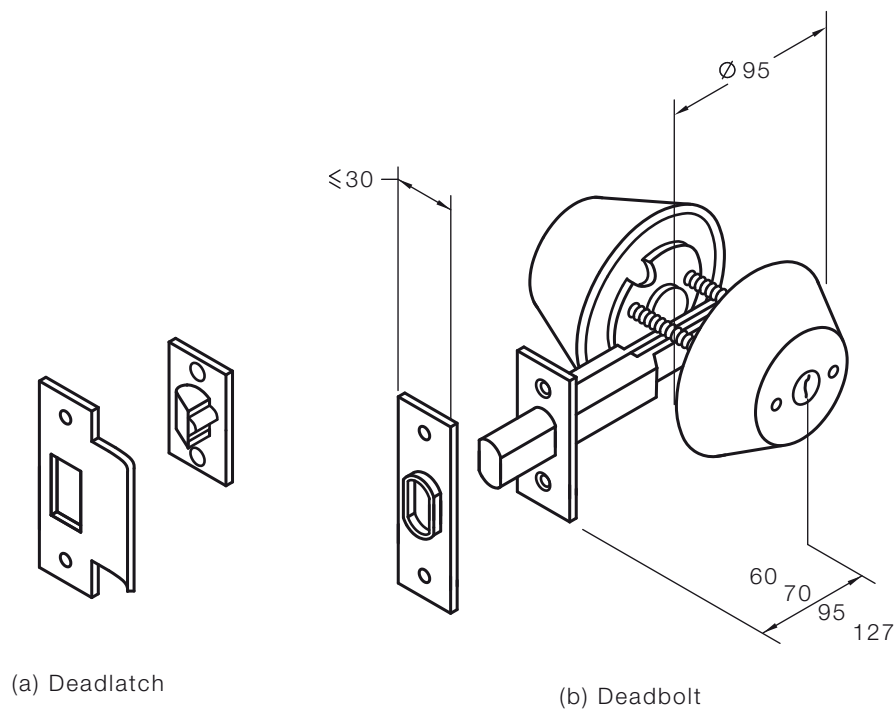
DIMENSIONS IN MILLIMETRES

FIGURE 2.11 TYPICAL TUBULAR DEADLATCH—LEVER FURNITURE



DIMENSIONS IN MILLIMETRES

FIGURE 2.12 TYPICAL CYLINDRICAL DEADLATCH LEVER FUNITURE



DIMENSIONS IN MILLIMETRES

FIGURE 2.13 TYPICAL TUBULAR DEADLOCK
(ALSO AVAILABLE WITHOUT KEY FUNCTION ON THE INSIDE)

SECTION 3 PERFORMANCE REQUIREMENTS

3.1 GENERAL

To comply with the performance requirements of this Section, all applicable components and assemblies shall be tested as specified.

In situations where a certain type of test cannot be conducted as specified due to the design of the product, such as torque test for a free rotating knob, then the product is deemed to have passed that test. All other applicable tests shall be conducted in accordance with the flowcharts in Figures 3.2, 3.3, 3.4 and 3.5.

NOTE: Where products of the same rating are selected from different manufacturers and tested separately, they may not necessarily achieve the same rating when tested as a unit.

Test samples shall be supplied for testing from normal production stock, complete with accessories and mounting instructions. The test samples shall be tested in the 'as received' condition and shall not be dismantled unless it is required to do so for mounting purposes.

3.2 APPLICABLE REQUIREMENTS AND TEST SEQUENCE

3.2.1 Locksets

Locksets shall comply with the performance requirements of Clauses 3.3 to 3.6 inclusive. The sequence of testing for locksets shall be in the same order in which the tests are shown in the flowcharts shown in Figures 3.2, 3.3, 3.4 and 3.5.

For Locksets that can be locked by key on both sides (see Clause 1.5.1.1), both sides shall be tested and both sides shall comply with the required level of test. If both sides of the lock are identical, one side only may be tested.

3.2.2 Cylinders

Cylinders supplied separately to the lock body shall comply with the performance requirements listed in Tables 3.3 and 3.5 with tests conducted in the order in which they appear in the flowcharts given in Figures 3.2 and 3.3.

3.2.3 Performance test samples

3.2.3.1 General

Where a lockset (locks, furniture and cylinders) is a combination of individually tested components, the complete unit rating shall be—

- (a) that of the lowest rated component; or
- (b) tested and rated as a complete unit in accordance with this Standard.

Testing shall be carried out by a testing authority accredited to ISO/IEC 17025 by NATA, IANZ or other accreditation body with which NATA or IANZ has a mutual recognition agreement, or verified by an independent accredited certification body to ISO/IEC Guide 65.

3.2.3.2 Locksets

As knobs and levers are not integral in all locksets, if no knobs or levers are supplied, locksets shall be tested in accordance with Appendices A and B, using lock furniture or an appropriate adaptor at the discretion of the manufacturer or tester.

NOTES:

- 1 For the cycle tests in Appendix C, the cylinder and key may be replaced by a test key mechanism.
- 2 This Clause relates to testing of the lock cam. For cylinder testing, see Appendix E.

3.2.3.3 Cylinders

For cylinders supplied separately to the lock body, the performance requirements shall be in accordance with Clauses 3.5.6, 3.5.10, 3.5.11, 3.5.12 and 3.5.13. For the cylinder's retention in the lock body, the performance requirements shall be in accordance with Clause 3.5.9 with the cylinder fitted to the locksets with which it is intended to be used.

3.2.4 Lubrication

Additional lubrication is permissible only when specifically provided for by the test method. If the test specimen is lubricated during testing, it shall be reported in the test report.

3.3 EASE OF OPERATION

3.3.1 General

The ease of operation test shall comply with the requirements of Clauses 3.3.2 to 3.3.6 and Table 3.1. When the ease of operation is tested at each level of durability, the test result shall not exceed the appropriate maximum values specified in this Clause by more than 20% for the following tests:

- Retracting the latch or deadlatch bolt by the lock furniture and latching by contact between the bolt and strike.
- Projecting and retracting the deadbolt by turnknob (for locks with deadbolts only).
- Projecting and retracting the deadbolt by test key mechanism or cylinder (for locks with deadbolts only).
- Retracting latchbolt by test key mechanism or cylinder and latching by contact between the bolt and the strike.
- Latching door with bolt projected (for sliding door locks with latching strikes only).
- Operation of hub locking device by test key mechanism or cylinder.

After completion of the test cycles, all functions of the lockset shall still operate.

TABLE 3.1
EASE OF OPERATION AND VALUES FOR LOCKSETS

Locksets excluding keying security	Clause reference		Value for designation
	Requirement clause	Procedure (Appendix A) Paragraph	
<i>Ease of operation</i>			
Torque to retract friction-free bolt—	3.3.2	A5.1	
by turnknob	3.3.2(a)	A5.1	$D_{\text{kno}} \times 0.05 \text{ Nm max.}$
by key	3.3.2(b)	A5.1	$D_{\text{key}} \times 0.05 \text{ Nm max.}$
by knob	3.3.2(a)	A5.1	$D_{\text{kno}} \times 0.05 \text{ Nm max.}$
by lever	3.3.2(c)	A5.1	$L_{\text{lever}} \times 0.04 \text{ Nm max.}$
Torque to operate hub locking device	3.3.7	A5.6	$D_{\text{key}} \times 0.05 \text{ Nm max.}$
Torque to retract friction-loaded bolt—	3.3.4	A5.2	
by turnknob	3.3.4(a)	A5.2	$D_{\text{kno}} \times 0.1 \text{ Nm max.}$
by key	3.3.4(b)	A5.2	$D_{\text{key}} \times 0.22 \text{ Nm max.}$
by knob	3.3.4(a)	A5.2	$D_{\text{kno}} \times 0.1 \text{ Nm max.}$
by lever	3.3.4(c)	A5.2	$L_{\text{lever}} \times 0.07 \text{ Nm max.}$
Force to latch door	3.3.5	A5.3	20 N max.
Projection of deadlatch plunger to effect deadlocking action	3.3.6	A5.5	4 mm $\pm$ 1 mm

3.3.2 Torque to retract friction-free bolt

When tested in accordance with Paragraph A5.2, Appendix A, the bolt shall be fully retracted with the maximum measured torque not exceeding the appropriate value calculated from the following equations:

- (a) *Knob or turnknob* The maximum torque for a knob or turnknob shall be calculated from the following equations:

$$T_{\max.}(\text{knob}) = D_{\text{knob}} \times 0.05$$

where

$$T_{\max.}(\text{knob}) = \text{maximum torque, in newton metres}$$

$$D_{\text{knob}} = \text{maximum diameter of turnknob or knob-gripping surface, in millimetres}$$

- (b) *Key* The maximum torque for a key shall be calculated as follows:

$$T_{\max.}(\text{key}) = D_{\text{key}} \times 0.05$$

where

$$T_{\max.}(\text{key}) = \text{maximum torque, in newton metres}$$

$$D_{\text{key}} = \text{maximum diameter of key bow-gripping surface (see Figure 3.4), in millimetres}$$

- (c) *Lever* The maximum torque for a lever shall be calculated as follows:

$$T_{\max.}(\text{lever}) = L_{\text{lever}} \times 0.04$$

where

$$T_{\max.}(\text{lever}) = \text{maximum torque, in newton metres}$$

$$L_{\text{lever}} = \text{maximum length of lever, in millimetres}$$

3.3.3 Torque to retract friction-free bolt (sliding)

Test in accordance with Clause 3.3.2.

3.3.4 Torque to retract friction-loaded bolt

When tested in accordance with Paragraph A5.2, Appendix A, the bolt shall fully retract upon application of a torque not exceeding the appropriate torque for each means of retracting the bolt, and shall be calculated from the following equations, at least twice:

- (a) *Knob or turnknob* The maximum torque for a knob or turnknob shall be calculated as follows:

$$T_{\max.}(\text{knob}) = D_{\text{knob}} \times 0.10$$

where

$$T_{\max.}(\text{knob}) = \text{maximum torque, in newton metres}$$

$$D_{\text{knob}} = \text{maximum diameter of turnknob or knob gripping surface in millimetres}$$

- (b) *Key* The maximum torque for a key shall be calculated as follows:

$$T_{\max.}(\text{key}) = D_{\text{key}} \times 0.22$$

where

$$T_{\max.}(\text{key}) = \text{maximum torque, in newton metres}$$

$$D_{\text{key}} = \text{maximum diameter of key bow-gripping surface in (see Figure 3.4), in millimetres}$$

- (c) *Lever* The maximum torque for a lever shall be calculated as follows:

$$T_{\max.}(\text{lever}) = D_{\text{lever}} \times 0.07$$

where

$T_{\max.}(\text{lever})$ = maximum torque, in newton metres

D_{lever} = maximum length of lever, in millimetres

3.3.5 Force to latch door

When tested in accordance with Paragraph A5.3, Appendix A, for swinging doors or Paragraph A5.4, Appendix A, for sliding doors, the door shall latch with the maximum force not exceeding 20 N.

3.3.6 Minimum projection of deadlatch plunger or auxiliary bolt from the front of a lock to effect the deadlocking action

When tested in accordance with Paragraph A5.5, Appendix A, effective deadlocking action shall be attained with a projection of the deadlatch plunger or auxiliary bolt not less than 4 ± 1 mm.

3.3.7 Torque to operate hub locking device

When tested in accordance with Paragraph A5.6, Appendix A, the hub locking device shall be operated with the maximum measured torque not exceeding the appropriate value calculated from the following equation:

$$T_{\max.}(\text{key/turnknob}) = D_{(\text{key/turnknob})} \times 0.05$$

where

$T_{\max.}(\text{key/turnknob})$ = maximum torque, in newton metres

$D_{\text{key/turnknob}}$ = maximum diameter of key/turnknob bow gripping surface in millimetres (see Figure 3.1)

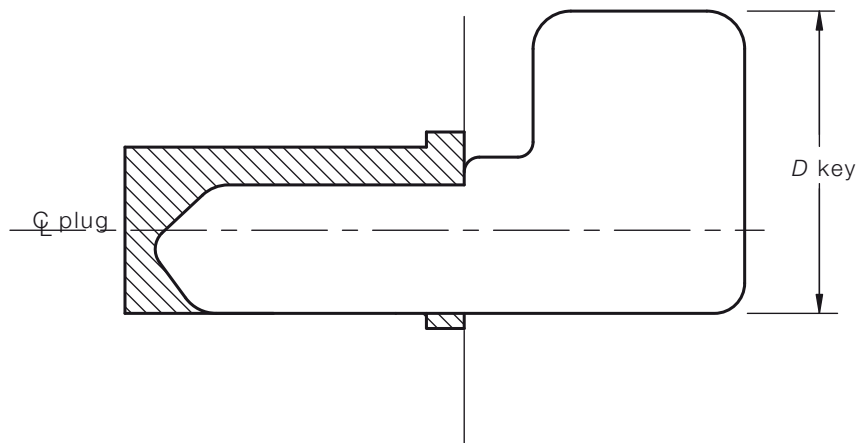


FIGURE 3.1 KEY BOW-GRIPPING SURFACE

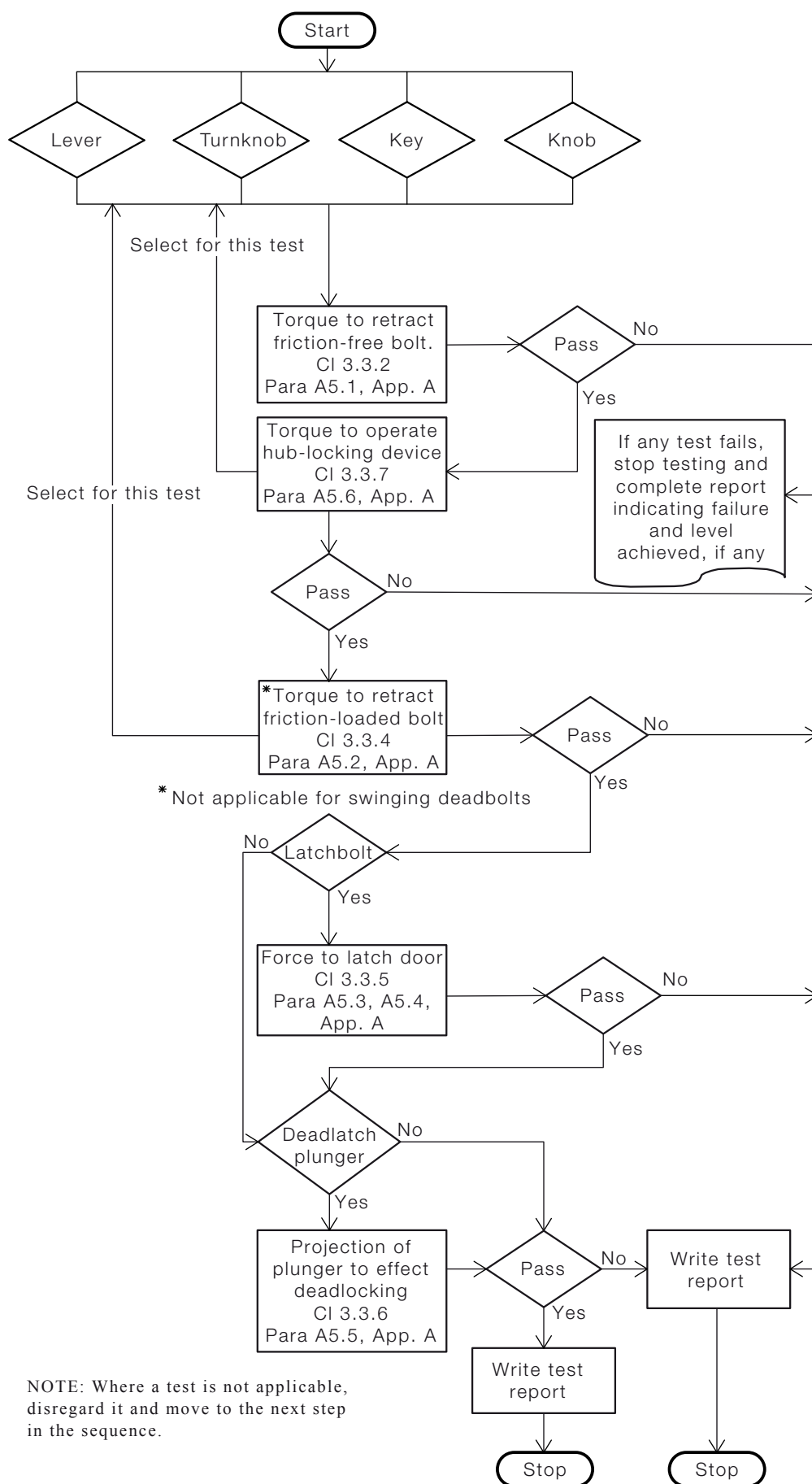


FIGURE 3.2 FLOWCHART—EASE OF OPERATION TESTS

3.4 DURABILITY

3.4.1 General

For a lockset to be given a durability rating, it shall with the requirements of this Clause and Clause 3.3 to ensure ease of operation of the lockset.

Cyclic operations of the lock and cylinder or lock and furniture durability shall be in accordance with Table 3.2.

TABLE 3.2
DURABILITY DESIGNATION

Durability designation	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Latching cycles	N/A	N/A	N/A	N/A	N/A	100 000	300 000	500 000	N/A	N/A
Deadlocking cycles (lock operation)	N/A	N/A	N/A	N/A	N/A	30 000	50 000	80 000	N/A	N/A
Key operations cycles	N/A	N/A	N/A	N/A	N/A	30 000	50 000	80 000	N/A	N/A
Door furniture unlatching cycles	N/A	N/A	N/A	N/A	N/A	100 000	300 000	500 000	N/A	N/A
Latching deadbolt with bolt projected (sliding)	N/A	N/A	N/A	N/A	N/A	30 000	50 000	80 000	N/A	N/A
Operating the hub locking device by test key mechanism	N/A	N/A	N/A	N/A	N/A	8 000	10 000	20 000	N/A	N/A

3.4.2 Retracting the latchbolt by the furniture

The following applies:

- Before commencement of the cycle test in accordance with Paragraph B6.1 of Appendix B, the test sample shall be subjected to the required ease of operation tests in accordance with the requirements specified in Clause 3.3 and listed in Table 3.1.
- At the completion of the cycle test, the test sample shall again be subjected to the required ease of operation tests and the results for the tests in Paragraph A5 of Appendix A shall not exceed the appropriate maximum values listed in Table 3.1 by more than 20%.

3.4.3 Retracting the latchbolt by test key mechanism

The following applies:

- Before commencement of the cycle test in accordance with Paragraph B6.2 of Appendix B, the test sample shall be subjected to the required ease of operation tests in accordance with the requirements specified in Clause 3.3 and listed in Table 3.1.
- At the completion of the cycle test, the test sample shall again be subjected to the required ease of operation tests and the results for the tests in Paragraph A5 of Appendix A shall not exceed the appropriate maximum values listed in Table 3.1 by more than 20%.

3.4.4 Projecting and retracting the deadbolt, hookbolt and swinging bolt by test key mechanism

The following applies:

- Before commencement of the cycle test in accordance with Paragraph B6.3 of Appendix B, the test sample shall be subjected to the required ease of operation tests in accordance with the requirements specified in Clause 3.3 and listed in Table 3.1.

- (b) At the completion of the cycle test, the test sample shall again be subjected to the required ease of operation tests and the results for the tests in Paragraph A5 of Appendix A shall not exceed the appropriate maximum values listed in Table 3.1 by more than 20%.

3.4.5 Projecting and retracting the deadbolt, hookbolt or swinging bolt by turnknob, knob or lever

The following applies:

- (a) Before commencement of the cycle test in accordance with Paragraph B6.4 of Appendix B, the test sample shall be subjected to the required ease of operation tests in accordance with the requirements specified in Clause 3.3 and listed in Table 3.1.
- (b) At the completion of the cycle test, the test sample shall again be subjected to the required ease of operation tests and the results for the tests in Paragraph A5 of Appendix A shall not exceed the appropriate maximum values listed in Table 3.1 by more than 20%.

3.4.6 Latching door with bolt projected (for sliding door lock with latching strike only)

The following applies:

- (a) Before commencement of the cycle test in accordance with Paragraph B6.5 of Appendix B, the test sample shall be subjected to the required ease of operation tests in accordance with the requirements specified in Clause 3.3 and listed in Table 3.1.
- (b) At the completion of the cycle test, the test sample shall again be subjected to the required ease of operation tests and the results for the tests in Paragraph A5 of Appendix A shall not exceed the appropriate maximum values listed in Table 3.1 by more than 20%.

3.4.7 Operation of hub locking device by test key mechanism

The following applies:

- (a) Before commencement of the cycle test in accordance with Paragraph B6.6 of Appendix B, the test sample shall be subjected to the required ease of operation tests in accordance with the requirements specified in Clause 3.3 and listed in Table 3.1.
- (b) At the completion of the cycle test, the test sample shall again be subjected to the required ease of operation tests and the results for the tests in Paragraph A5 of Appendix A shall not exceed the appropriate maximum values listed in Table 3.1 by more than 20%.

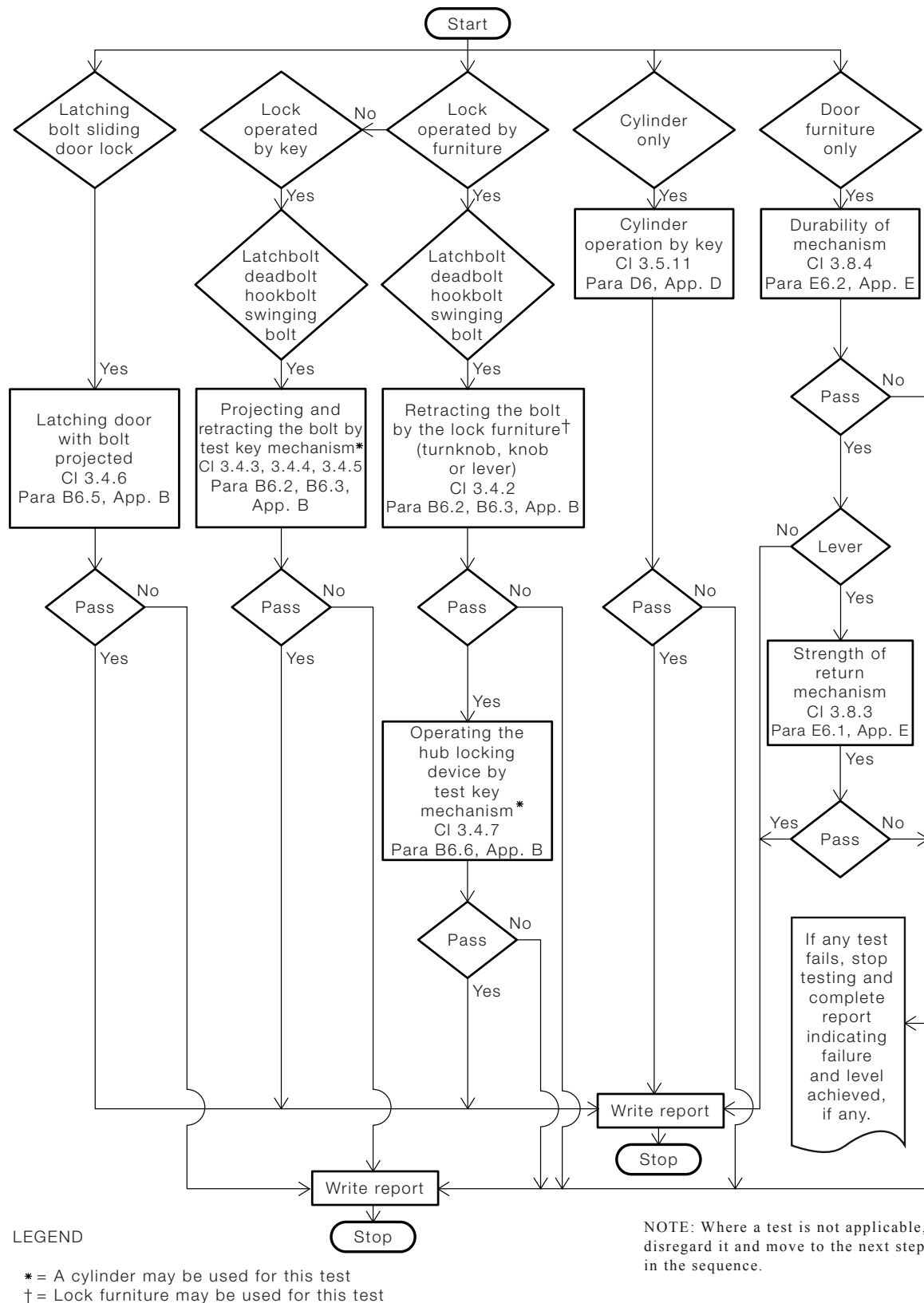


FIGURE 3.3 FLOWCHART—DURABILITY CYCLIC TESTS