

भारतीय मानक

IS 18841 : 2024

Indian Standard

ताले के लिए सिलेंडर कार्ट्रिज — विशिष्टि

**Cylinder Cartridge for Locks —
Specification**

ICS 91.190

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Price Group 8

Utensils, Cutlery and Domestic Hardware Sectional Committee, MED 33

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by Utensils, Cutlery and Domestic Hardware Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard applies to cylinder cartridge for use with mortise locks (*see* IS 16015), padlocks (*see* 15275), cylindrical locks (*see* IS 16016), and rim locks (*see* IS 9131).

The euro profile, swiss profile, and oval profile used in above locks are widely used by the end users for higher security, convenience, and its suitability to accommodate a wide range of door thicknesses. These euro profile, swiss profile, and oval profile lock bodies require additional lock cylinders (also called cylinder cartridges) in order to operate the lock mechanism. Hence, a need was felt to have a standard on this subject, which will cover the performance requirements and test methods.

Special attention is given on performance tests as compared to specification in order to keep the human influence minimum on the product quality and test results.

While formulating this standard considerable assistance has been derived from:

EN 1303 : 2015 'Building hardware — Cylinders for locks — Requirements and test methods'.

The composition of the Committee responsible for the formulation of this standard is given in [Annex C](#).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CYLINDER CARTRIDGE FOR LOCKS — SPECIFICATION

1 SCOPE

This standard covers the requirements for manufacture, dimensions, finish, and performance of cylinder cartridge for locks, which are designed to be used with locks like mortise locks (see IS 16015), padlocks (see IS 15975), cylindrical locks (see IS 16016), and rim locks (see IS 9131).

2 REFERENCES

The standards listed in [Annex A](#) contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 TERMINOLOGY

For the purpose of this standard, following terms and definitions in addition to definitions given in IS 7881 (Part 1) shall apply:

3.1 Cylinder Cartridge — A device different from its associated lock or latch, independently operated by key.

3.2 Key — Separate device corresponding to the cylinder cartridge, which can mechanically operate the cylinder cartridge.

3.3 Keyway — Aperture extending along the whole or part of the length of the plug into which the key is inserted.

3.4 Moveable Detainer (Operating Pins/Levers/Wafers) — Part of the mechanism of a cylinder cartridge, which should first be moved by the key into a pre-determined position before the key and/or plug can rotate/move.

3.5 Plug — Part of a cylinder cartridge that can be rotated/moved when an individually configured key is used.

3.6 Steps — Cuts in the surface of a bit or blade which operates movable detainers.

3.7 Unique Key Combination (Effective Differ) — Difference between cylinder cartridges of similar design, achieved only by the operating pins/levers/wafers, which allows each cylinder

cartridge to be operated only by its own key. The number of key combinations (effective differs) is equal to the number of theoretical combinations after deduction of the combinations suppressed by the manufacturer due to technical constraints and those combinations are suppressed in accordance with the restraints of [6.1.3](#).

4 DESIGN OF CYLINDER CARTRIDGE FOR LOCKS

4.1 Cylinder Cartridge Profiles

The dimensions and shapes of the cylinder cartridge profiles are given below:

- a) Euro profile cylinder cartridge (see [Fig. 1A](#));
- b) Swiss profile cylinder cartridge (see [Fig. 1B](#)); and
- c) Oval profile cylinder cartridge (see [Fig. 1C](#)).

The manufacturers may vary the parameters like length, rear end profile, actuating cams, levers based on the applications or type of lock used.

4.2 Cylinder Cartridge Types

The commonly used configuration of various types of cylinder cartridges are given below:

- a) 1C refers to half cylinder cartridge operated by key (see [Fig. 2A](#));
- b) 2C refers to cylinder cartridge operated by key from both side (see [Fig. 1A](#));
- c) 1CK refers to cylinder cartridge operated by key from one side and by knob from other side (see [Fig. 2B](#));
- d) 1K refers to half cylinder cartridge operated by knob (see [Fig. 2C](#)); and
- e) BK refers to keyless cylinder cartridge for bathroom function which is operated by the knob from one side and has a coin slot on the outside to be used to operate the cylinder cartridge by a coin/screwdriver or any other similar handy device in case of emergency (see [Fig. 2D](#)).

NOTES

1 'C' refers to cylinder/plug.

2 'K' refers to knob.

3 'B' means bathroom turned with coin slot.

4 General representation of euro profile has been given; being wide used cylinder cartridge type in India.

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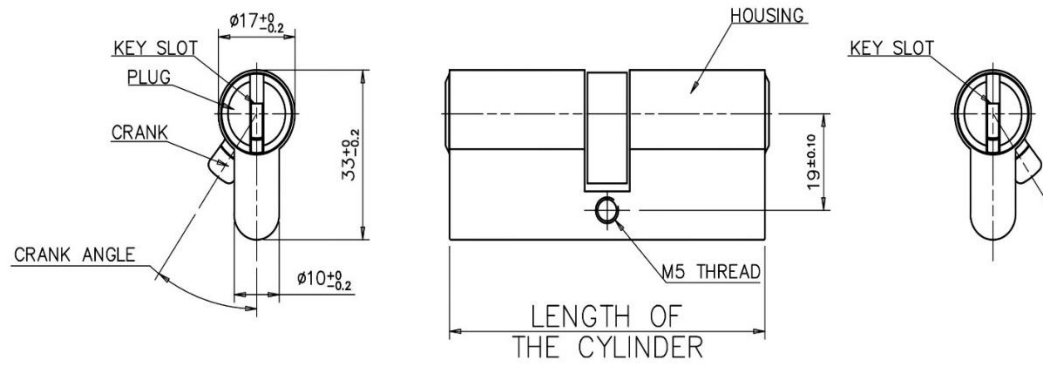


FIG. 1A EURO PROFILE CYLINDER CARTRIDGE (2C)

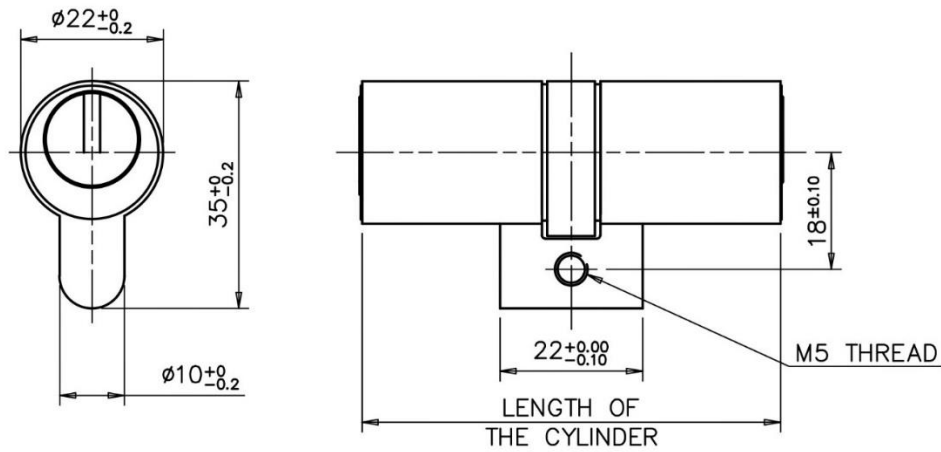


FIG. 1B SWISS PROFILE CYLINDER Cartridge (2C)

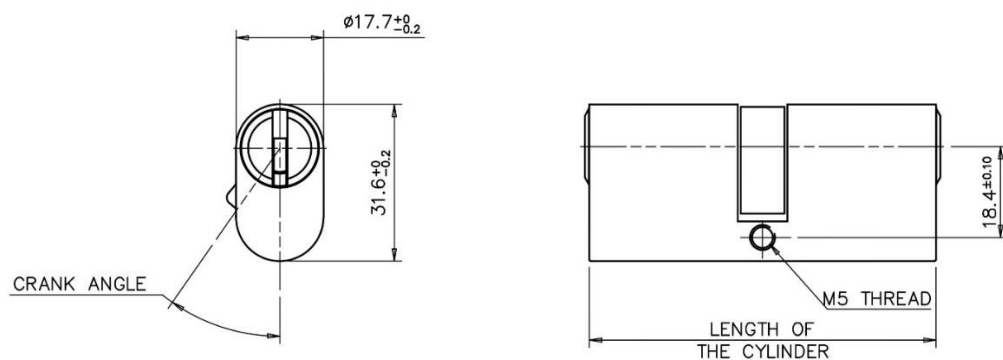


FIG. 1C OVAL PROFILE CYLINDER Cartridge (2C)

FIG. 1 TYPICAL PROFILES OF CYLINDER CARTRIDGE

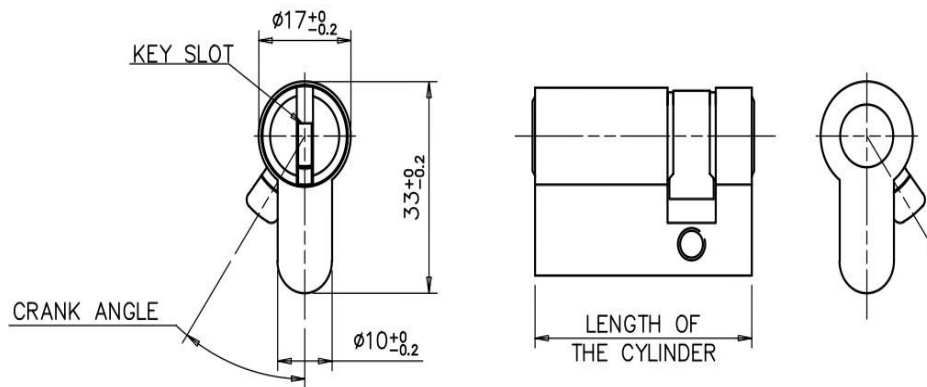


FIG. 2A EURO PROFILE HALF CYLINDER CARTRIDGE (1C)

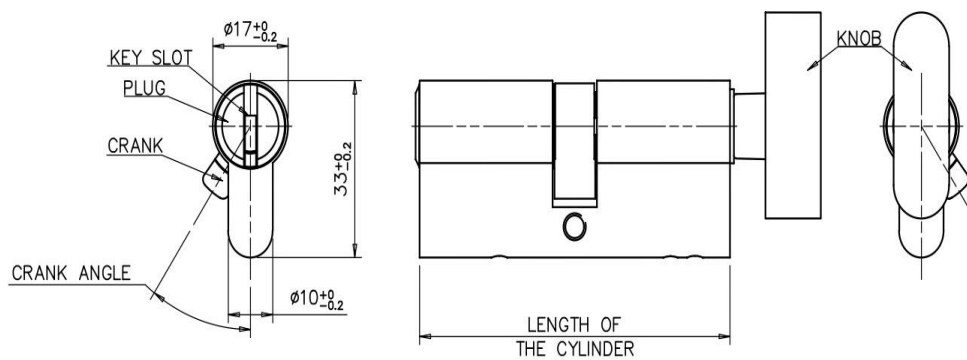


FIG. 2B EURO PROFILE HALF CYLINDER CARTRIDGE (1CK)

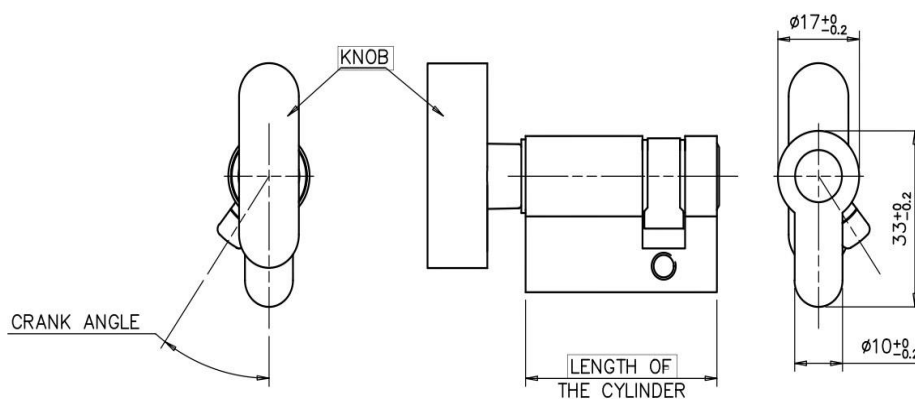


FIG. 2C EURO PROFILE HALF CYLINDER CARTRIDGE (1K)

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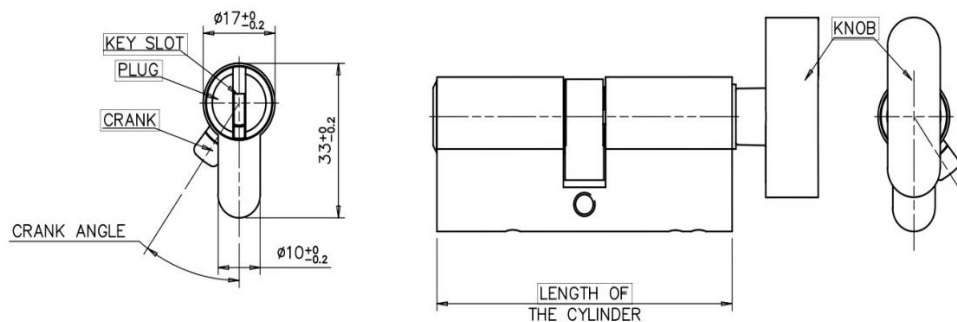


FIG. 2D EURO PROFILE HALF CYLINDER CARTRIDGE (BK)

FIG. 2 TYPICAL CYLINDER CARTRIDGE TYPE

5 CLASSIFICATION

For the purpose of this standard, lock cylinder cartridges have been classified in accordance with the seven-digit coding system as given in 5.1 to 5.7.

5.1 Digit 1 — Category of Use

Based on the category of use, the cylinder cartridge can be classified in three grades as:

- Grade 1 (light duty) — Products under this category will be of light duty or low frequency and not recommended for any commercial application. There is a high incentive to exercise care of the product and small chances of misuse of the product. For example, residential apartments or internal doors;
- Grade 2 (medium duty) — Products under this category will be of medium duty or medium frequency and can be used for commercial application, where there is some incentive to exercise care. The products under this category are mostly used in offices as the user will exercise little care with some chance of misuse. For example, internal office doors or external doors of apartment; and
- Grade 3 (heavy duty) — Products under this category will be of heavy duty or high frequency of use by public or others with little incentive to exercise care, with a high chance of misuse. For example, public office doors.

5.2 Digit 2 — Durability

Based on the durability, the cylinder cartridge can be

classified in three grades as:

Sl No.	Grade	Cycle
(1)	(2)	(3)
i)	Grade 4	25 000 cycles, <i>Min</i>
ii)	Grade 5	50 000 cycles, <i>Min</i>
iii)	Grade 6	100 000 cycles, <i>Min</i>

5.3 Digit 3 — Test Door Mass

No requirement. This shall be marked as ‘-’.

NOTE — Since door mass will not affect the performance of the cylinder cartridge.

5.4 Digit 4 — Fire Resistance

Based on the fire resistance, the cylinder cartridge can be classified in five grades as given below:

Sl No.	Grade	Capacity
(1)	(2)	(3)
i)	Grade 0	Not suitable for use on fire/smoke check doors
ii)	Grade 1	Minimum fire resistance capacity 30 min
iii)	Grade 2	Minimum fire resistance capacity 60 min
iv)	Grade 3	Minimum fire resistance capacity 90 min
v)	Grade 4	Minimum fire resistance capacity 120 min

NOTE — Requirement of fire resistance is not applicable in case of padlocks.

5.5 Digit 5 — Corrosion Resistance (Test for Operation of Cylinder Cartridges against Jamming Due to Corrosion)

Based on the corrosion resistance, the cylinder cartridge can be classified in four grades as:

Sl No.	Grade	Requirement
(1)	(2)	(3)
i)	Grade 0	No defined corrosion resistance
ii)	Grade 1	Mild resistance — Up to 24 h (minimum requirement for internal use)
iii)	Grade 2	Moderate resistance — Up to 48 h (interiors subject to condensation)
iv)	Grade 3	High resistance — Up to 96 h (minimum requirement for damp interior and external use)

5.6 Digit 6 — Key Related Security

Based on the minimum number of key combinations (see [6.1.1](#)), minimum number of types of moveable detainer (see [6.1.2](#)), maximum number of identical steps (see [6.1.3](#)), non-interchangeability of close combinations (see [6.1.4](#)), durability test (see [6.3](#)); six grades of cylinder cartridge have been identified whose requirements are covered in [Table 2](#), [Table 3](#), [Table 4](#) and [Table 5](#) respectively.

5.7 Digit 7 — Attack Resistance

Based on the resistance against mechanical attack (see [6.5](#)) and drill resistance (see [6.6](#)), the cylinder cartridge can be classified in three grades as given in [Table 1](#).

Table 1 Summary Attack Resistance

(Clause [5.7](#) and [Table 6](#))

Sl No.	Test	Parameter	Grades		
			0	1	2
(1)	(2)	(3)	(4)	(5)	(6)
i)	Resistance to drilling	Time	See Table 9		
ii)	Resistance to attack by chisel	Blows	–	See 6.5.3.3	
iii)	Resistance to attack by twisting	Twists	–	See 6.5.4.3	
iv)	Resistance to attack by plug/cylinder extraction	Force Time	See Table 8		
v)	Torque resistance of plug	Torque	1)	See Table 6	
vi)	Torque resistance of cylinder cartridge	Torque	1)	See Table 7	

5.8 Example of Classification

5.8.1 The grading of the cylinder cartridge as specified in [5.1](#) to [5.7](#) shall be classified as per following details:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Digit	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7
ii)	Grade number	3	6	—	4	2	5	2

¹⁾ See requirement of key related security.

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5.8.2 If any cylinder cartridge fails to meet the requirement (see [6](#)) of any of the declared grades (see [5.1](#) to [5.7](#)); then it shall be awarded next lower grade subject to it qualifies the requirement as applicable.

6 TEST REQUIREMENTS

The manufacturers can present similar or different set of cylinder cartridge with same locking technology for testing. The testing agency can conduct the desired test on any configurations they desire. A different set of cylinder cartridge has to be provided for any other classification code. The cylinder cartridge has to fulfil the performance requirements mentioned in [5](#) and [6](#).

6.1 General Tests

The cylinder cartridges and keys should be checked for general tests mentioned below before commencing other performance tests.

6.1.1 Minimum Number of Key Combinations (Effective Differs)

This number of key combinations shall be declared by the manufacturer. The minimum number of key combinations shall be as per [Table 2](#).

6.1.2 Minimum Number of Types of Moveable Detainer (Operating Pins)

This number of types of movable detainer shall be declared by the manufacturer. The minimum number of types of movable detainer shall be as per [Table 3](#).

6.1.3 Maximum Number of Identical Steps

The maximum number of identical steps for any key combination being offered by the manufacturer out of the total number of key combinations is restricted as per below [Table 4](#).

6.1.4 Non Interchangeability of Close Combinations

6.1.4.1 After satisfactory verification of the cylinder cartridge at [6.1.1](#), [6.1.2](#), [6.1.3](#) and after successful operation of the cylinder cartridge with correct key, attempt should be made to operate the cylinder cartridge with next closest key. The next closest key is one up or one down being different in one position only by one step, defined by the manufacturer in accordance with its key combinations specified as per [Table 2](#).

Table 2 Minimum Number of Key Combinations (Effective Differs)

(Clauses [5.6](#), [6.1.1](#), [6.1.4.1](#) and [Table 6](#))

Sl No.	Key Related Security Grade	Minimum Number of Key Combinations
(1)	(2)	(3)
i)	1	500
ii)	2	1 000
iii)	3	5 000
iv)	4	30 000
v)	5	75 000
vi)	6	150 000

Table 3 Minimum Number of Types of Moveable Detainer (Operating Pins)

(Clauses [5.6](#) and [6.1.2](#))

Sl No.	Key Related Security Grade	Minimum Number of Types of Moveable Detainers
(1)	(2)	(3)
i)	1	2
ii)	2	3
iii)	3	5
iv)	4	5
v)	5	6
vi)	6	6

Table 4 Maximum Number of Identical Steps

(Clauses 5.6 and 6.1.3)

Sl No.	Key Related Security Grade	Maximum Number of Identical Steps
(1)	(2)	(3)
i)	1	100 %
ii)	2	70 %, 2 adjacent
iii)	3	60 %, 2 adjacent
iv)	4	60 %, 2 adjacent
v)	5	60 %, 2 adjacent
vi)	6	50 %, 2 adjacent

NOTE — The requirements mentioned in Table 4 shall apply to at least one set of moveable detainers (operating pins).

6.1.4.2 For key related security grades 1, 2, 3, and 4, before the durability test (see 6.3) is commenced, the new cylinder cartridge with closest key to its own key using a torque of $1.5_0^{+0.2}$ Nm shall not be operable. For key related security grades 5 and 6, after the durability test is completed (see 6.3), the cylinder cartridge with closest key to its own key using a torque of $1.5_0^{+0.2}$ Nm shall not be operable.

6.2 Key Strength

6.2.1 Typical fixture for key strength test is given in Fig. 3.

6.2.2 The cylinder cartridge shall be mounted on a metal fixture such that the rotation of the crank is blocked. The correct key shall be fully inserted in the cylinder cartridge as recommended by the manufacturer and a torque of $2.5_0^{+0.2}$ Nm shall be applied to the key without shock for a period of 5_0^{+1} s.

6.2.3 After the release of the torque, the key shall not break.

6.3 Durability Test

$5_0^{+0.2}$

6.3.1 Typical fixture for durability test of cylinder cartridge is given in Fig. 4.

6.3.2 The cylinder cartridge shall be mounted on the testing fixture along with suitable lock body (for example, mortise lock) as recommended by the manufacturer. The cylinder cartridge shall meet the requirements of 5.2 for durability. The key rotation torque, during the durability test shall not exceed 1.5 Nm at any given time during this test.

6.3.2.1 For 2C, 1C, 1K and BK cylinder cartridge type, following test sequence shall be followed:

- Insert the key;
- Rotate the key in locking direction by 360° or to the maximum rotation permitted by the design to completely locked position;
- Rotate the key in unlocking direction to the initial position of key insertion;
- Withdraw the key outside the cylinder cartridge by at least 50 percent; and
- Repeat a) to d) for required number of cycles as per 5.2. The test sequence from a) to d) shall be counted as one cycle in the durability test. For 1K and BK cylinders cartridge types, only b) and c) can be performed with the help of knob and shall be counted as one test cycle.

6.3.2.2 For a 1CK cylinder cartridge type, following test sequence shall be followed:

- Insert the key;
- Rotate the key in locking direction by 360° or to the maximum rotation permitted by the design to completely locked position;
- Rotate the key in unlocking direction to the initial position of key insertion;
- Withdraw the key outside the cylinder cartridge by at least 50 percent; and
- Rotate the knob on the other side by minimum of 45° as recommended by the manufacturer; and

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- f) Repeat a) to e) for required number of cycles as per [5.2](#). The above test sequence from a) to e) will be counted as one cycle in the durability test.

6.3.3 Repeat the sequence (see [6.3.2.1](#) and [6.3.2.2](#)) at a speed of five to twelve cycles per minute. The maximum speed for inserting and withdrawing the key should not exceed 50 mm/s. The maximum speed of key rotation [see [6.3.2.1\(b\)](#) and [6.3.2.2\(b\)](#)] shall not exceed 60 rpm. During this test, if the lock body fails; it shall be replaced with a fresh lock and the test to be continued.

6.3.4 The key used for this test can be cleaned and the cylinder cartridge shall be lubricated in accordance with the instructions of the manufacturer at each 5 000 cycles.

6.3.5 After completion of the test cycles as per [5.2](#), the cylinder cartridge shall be able to operate for one cycle as given in [6.3.2](#) (as applicable) using a new key.

6.3.6 [Table 5](#) gives the requirements for the relation between category of use and its durability.

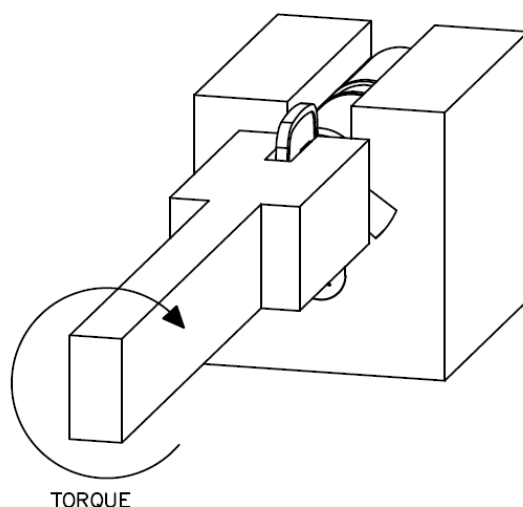


FIG. 3 TYPICAL FIXTURE FOR KEY STRENGTH TEST

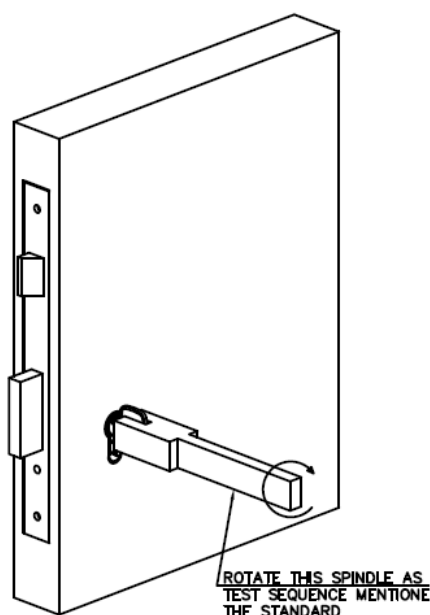


FIG. 4 TESTING FIXTURE FOR DURABILITY OF CYLINDER CARTRIDGES FOR LOCK

Table 5 Relation between Category of Use and Durability

(Clauses 5.6 and 6.3.6)

Sl No.	Category of use		Durability	
	Grade	Duty of Use	Grade	Numbers of Cycles
(1)	(2)	(3)	(4)	(5)
i)	See 5.1	Light duty	4	25 000
ii)		Medium duty	5	50 000
iii)		Heavy duty	6	100 000

NOTES

1 For durability grade 1, 2, and 3 have not been identified.

2 For category of use grade 4, 5, and 6 have not been identified.

6.4 Corrosion Resistance (Test for Operation of Cylinder Cartridges against Jamming due to Corrosion)

The cylinder cartridge shall qualify the requirements of 5.5, when tested for corrosion resistance test in accordance with IS 9844. The cylinder cartridge shall be mounted on a test block and placed in test cabinet, so that the cylinder cartridge is oriented in a manner that they would assume in use.

The corrosion resistance test is applicable to check only the functionality of the cylinder cartridge. No distinction is made between inside and outside of the cylinder cartridge and/or door.

After the completion of the corrosion resistance test, the cylinder cartridge shall be operatable for minimum one cycle within 5 minutes with a maximum torque of $1.5_0^{+0.2}$ Nm on the key, where the key may be inserted several times and/or moved in a rotating way. In case the cylinder cartridge is found jammed, the cylinder cartridge may be lubricated before and/or during the operation test as per manufacturer's recommendation.

NOTE — The key shall be inserted within 1 minute of completing the corrosion resistance test for the first time.

6.5 Test for Resistance Against Mechanical Attack

6.5.1 Torque Resistance of Plug of Cylinder Cartridge

6.5.1.1 The cylinder cartridge shall be mounted on a metal fixture such that the rotation of the crank is blocked and the cylinder cartridge projection is 5_{-1}^0 mm out of the test fixture. Typical fixture for this test is given in Fig. 3.

6.5.1.2 A torque shall be applied on the plug without shock in accordance with Table 6. During the test, the plug shall not rotate. It is not necessary for the correct key to operate the cylinder cartridge after test.

6.5.2 Torque Resistance of Cylinder Cartridge

6.5.2.1 The cylinder cartridge shall be mounted on a metal fixture such that the rotation of the crank is blocked and the cylinder cartridge projection is 5_{-1}^0 mm out of the test fixture. Typical fixture for this test is given in Fig. 3.

6.5.2.2 A torque shall be applied on the cylinder cartridge without shock in accordance with Table 7. During the test, the cylinder cartridge shall not break. It is not necessary for the correct key to operate the cylinder cartridge after test.

6.5.3 Resistance to Attack by Chisel

6.5.3.1 Typical fixture for this test is given in Fig. 5.

6.5.3.2 The test shall be carried out with a button head chisel of nominal size 30 mm as per IS 402. Drop hammer shall have mass of 6_{+1}^0 kg for this test. The cylinder's cartridge, including any reinforcement or protection device supplied with them, shall be mounted to the wooden block to give the maximum permissible projection, in accordance with the manufacturer's instructions. The chisel applied to the protection or the cylinder cartridge at an angle not exceeding 10 degree from the surface of the test block. The thickness of the wooden test block shall be as per the mounting instruction of the manufacturer.

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6.5.3.3 For grade 1-cylinder cartridge (see 5.7), 30 blows shall be given to the chisel with a drop hammer falling from a height of 700^{+10}_0 mm. For grade 2-cylinder cartridge (see 5.7), 40 blows shall be given to the chisel with a drop hammer falling from a height of 700^{+10}_0 mm.

6.5.3.4 After 6.5.3.3, the crank of the cylinder cartridge shall not rotate without the correct key using a maximum torque of 5 Nm. It is not necessary for the cylinder cartridge to operate with correct key after the test.

Table 6 Relation Between Attack Resistance and Key Related Security for Torque on Plug

(Table 1 and clause 6.5.2.2)

Sl No.	Attack Resistance Grade	Key Related Security Grade	Torque (Nm)	Tolerance (Nm)
(1)	(2)	(3)	(4)	(5)
i)	See Table 1	1	2.5	+ 0.25
ii)		2	5.0	+ 0.5
iii)		3	7.5	+ 1.0
iv)		4	10.0	+ 1.5
v)		5	12.5	+ 1.5
vi)		6	15.0	+ 1.5

Table 7 Maximum Torque on Cylinder Cartridge as per Attack Resistance Grade

(Table 1 and clause 6.6)

Sl No.	Attack Resistance Grade	Torque Nm	Net Time Allowed min
(1)	(2)	(3)	(4)
i)	0	—	—
ii)	1	$10^{+1.5}_0$	3
iii)	2	$15^{+1.5}_0$	5

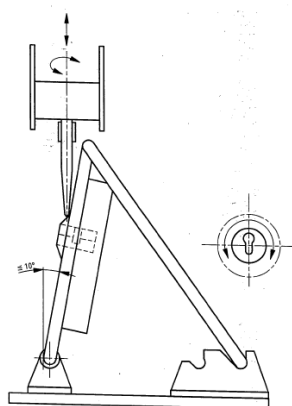


FIG. 5 TESTING FIXTURE FOR RESISTANCE TO ATTACK BY CHISEL AND TWISTING

6.5.4 Resistance to Attack by Twisting

6.5.4.1 Typical fixture for this test is given in [Fig. 5](#). The cylinder's cartridge, including any reinforcement or protection device supplied with them, shall be mounted to the wooden block to give the maximum permissible projection, in accordance with the manufacturer's instructions.

6.5.4.2 During the test, suitable arrangement shall be made to keep the cylinder cartridge firmly in its place. An attempt shall be made to break the cylinder cartridge by twisting action by applying a torque of 250 ± 5 Nm. The torque shall be applied in 5 s progressively without shock to the cylinder cartridge and shall be sustained for 4 s. The torque shall then be released. This constitute one twist.

6.5.4.3 For grade 1-cylinder cartridge (see [5.7](#)), total of 20 twists shall be given; 10 in clockwise direction and 10 in anti-clock wise direction. For grade 2-cylinder cartridge (see [5.7](#)), total of 30 twists shall be given; 15 in clockwise direction and 15 in anti-clock wise direction.

6.5.4.4 After [6.5.4.3](#), the crank of the cylinder cartridge shall not rotate without the correct key using a maximum torque of 5 Nm. It is not necessary

for the cylinder cartridge to operate with correct key after the test.

6.5.5 Resistance to Attack by Cylinder Cartridge Extraction

6.5.5.1 Typical fixture for this test is given in [Fig. 6](#). The cylinder's cartridge, including any reinforcement or protection device supplied with them, shall be mounted to the wooden block to give the maximum permissible projection, in accordance with the manufacturer's instructions.

6.5.5.2 A self-cutting traction screw of a maximum diameter of 5.5 mm shall be screwed into the plug of the cylinder cartridge. Attempt shall be made to withdraw the plug from the cylinder cartridge by application of the force specified in [Table 8](#), applied progressively without shock within the specified time. The time shall start from insertion of the traction screw.

6.5.5.3 After [6.5.5.2](#), the crank of the cylinder cartridge shall not rotate without the correct key using a maximum torque of 5 Nm. It is not necessary for the cylinder cartridge to operate with correct key after the test.

Table 8 Resistance to Plug/Cylinder Extraction

([Table 1](#) and clause [6.5.5.2](#))

Sl No.	Attack Resistance Grade	Force Applied kN	Net Time Allowed min
(1)	(2)	(3)	(4)
i)	0	—	—
ii)	1	10 ± 1	3
iii)	2	15 ± 1	5

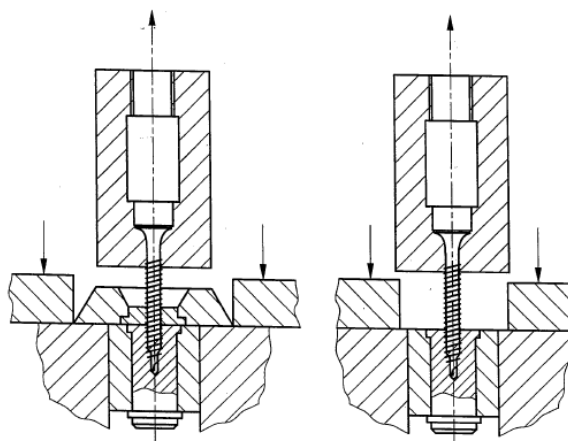


FIG 6 TESTING FIXTURE FOR RESISTANCE TO ATTACK BY PLUG/CYLINDER EXTRACTION

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6.6 Resistance to Drilling

6.6.1 The cylinder's cartridge, including any reinforcement or protection device supplied with them, shall be mounted to the wooden block to give the maximum permissible projection, in accordance with the manufacturer's instructions.

6.6.2 A minimum 700 W drilling machine with a speed of 500 rpm to 800 rpm shall be mounted on a sliding block. A force of $200 +^{10}_0$ N shall be applied axially by the drill to cylinder cartridge without shock as per the requirement of [Table 9](#) within the specified time. Three high-speed steel drills of progressive sizes, not exceeding diameter of plug shall be used. Net drilling time is the time when three drill bits are in contact with the cylinder cartridge and performing drilling operation. Total test time is the time which includes net drilling time and drill switch over time. After total test time is over, the testing shall be stopped.

6.6.3 After [6.6.2](#), it shall not be possible to rotate the lock driving element of the cylinder cartridge using torque of 5 Nm to the opening position by means of a suitable tool.

Table 9 Maximum Torque on Plug as per Attack Resistance Grade

([Table 1](#) and clause [6.6.2](#))

Sl No.	Attack Resistance Grade	Net Drilling Time	Total Test Time
		min	min
(1)	(2)	(3)	(4)
i)	0	–	–
ii)	1	2	5
iii)	2	5	10

6.7 Fire Resistance Test

The cylinder cartridge fitted on test door assemblies shall qualify the requirements of [5.4](#) when tested for fire resistance test as per IS 3614. The manufacturer may indicate the method of fixing which may be used, together with the details of any additional material necessary to achieve the required performance under the test.

7 MARKING

7.1 Each cylinder cartridge packaging shall be legibly and permanently marked with the following minimum information:

- Classification as per [5.8](#);
- Name or trade mark of the manufacturer;
- Batch number;
- Indication of the source of manufacture or trade-mark; and
- Size of the cylinder cartridge;

7.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

8 PACKING

Each cylinders cartridge for lock shall be suitably packaged to avoid any damage during transit.

9 SAMPLING

Sampling and inspection of a consignment of cylinder cartridge shall be carried out in accordance with the provisions laid down in [Annex B](#).

ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 402 : 1990	Cold chisels — Specification (third revision)	IS 9844 : 1981	Methods of testing corrosion resistance of electroplated and anodized aluminium coatings by neutral salt spray test
IS 3614 : 2021	Fire doors and doorsets — Specification (first revision)	IS 15275 : 2003	Padlocks — Specification
IS 7881 (Part 1) : 2023	Glossary of terms relating to builders' hardware: Part 1 Locks (first revision)	IS 16015 : 2022	Mortise locks and latches (mechanically operated) — Specification (first revision)
IS 9131 : 2021	Rim locks and latches (mechanically operated) — Specification (first revision)	IS 16016 : 2013	Cylindrical locks with pin tumbler mechanism — Specification

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ANNEX B

(Clause 9)

SAMPLING AND CRITERIA FOR CONFORMITY

B-1 LOT

B-1.1 In any consignment all the cylinder cartridge of the same size and grade shall constitute a lot. This shall be ascertained by carrying out a general visual inspection of the consignment to check that the lot is of the same type and size and appears to be homogenous in regard to origin source of production period of manufacture and any other visual ascertainable characteristics in case the consignment does not appear to be homogenous within itself and treated as a separate group each group being homogeneous within itself and treated as a separate lot for the purpose of sampling.

B-1.2 Number of cylinder cartridges to be selected at random from a lot shall depend upon the size of the lot and shall be in accordance with col (2) and col (3) of [Table 10](#).

B-1.3 Cylinder cartridge for the sample shall be selected at a random from at least 10 percent of the packages subject to a minimum of three packages, equal number of cylinder cartridge being selected from each such packages.

B-2 CRITERIA FOR CONFORMITY

The cylinder cartridge selected according to [B-1.3](#) shall be inspected for conformity to dimensions, workmanship and finish manufacturing details and testing for smooth working. The lot shall be considered as conforming to these requirements, if the number of cylinder cartridge failing in any one or more of the requirements does not exceed the permissible number of defectives given in col (4) of [Table 10](#).

Table 10 Scale of Sampling and Permissible Number of Defective Cylinder Cartridge

(Clauses [B-1.2](#) and [B-2](#))

Sl No.	Lot Size	Sample Size	Permissible Number of Defectives
(1)	(2)	(3)	(4)
i)	Up to 200	15	0
ii)	201 to 300	20	1
iii)	301 to 500	30	2
iv)	501 to 800	40	2
v)	801 and above	50	3

ANNEX C

(Foreword)

COMMITTEE COMPOSITION

Utensils, Cutlery and Domestic Hardware Sectional Committee, MED 33

<i>Organization</i>	<i>Representative(s)</i>
In Personal Capacity (A-504, K G Chandra Vista, OMR, Opp to Satyabhama University, Sholinganallur, Chennai - 600119)	SHRI G. SHANMUGANATHAN (Chairperson)
All India Stainless Steel Industries Association, Mumbai	SHRI SAILESH SHAH SHRI JAGESH JAIN (<i>Alternate</i>)
Anna Aluminium Company Private Limited, Kizhakkambalam	SHRI K. CHANDRASHEKARAN PILLAI SHRI V. THULASIDHARAN (<i>Alternate</i>)
Butterfly Gandhimathi Appliances Private Limited, Chennai	SHRI K. SHANMUGAVELU SHRI S. R. SIVAKUMAR (<i>Alternate</i>)
Consumer Voice, New Delhi	SHRI B. K. MUKHOPADHYAY SHRI M. A. U. KHAN (<i>Alternate</i>)
Delhi Test House, Delhi	SHRI DINESH GOEL SHRI ROHIT GOEL (<i>Alternate</i>)
Directorate General Quality Assurance, Ministry of Defence, Kanpur	SHRI M. SATYANARAYANA SHRI AMIYA KUMAR MALLICK (<i>Alternate</i>)
D. P. Garg and Company Private Limited, Noida	SHRI S. M. GARG
Federation of Hardware MFG and Traders Welfare Association, Gurugram	SHRI TAKSHAY BANSAL SHRI NAVEEN HANDA (<i>Alternate I</i>) SHRI VIKAS NARWAL (<i>Alternate II</i>)
Godrej and Boyce Manufacturing Company Limited, Mumbai	SHRI KSHITIJ R. GAIKAR SHRI VINAYAK G. NALGIRKAR (<i>Alternate</i>)
Hamilton Housewares Private Limited, Mumbai	SHRI SANJAY MORESHWAR MHATRE SHRI INDUPRAKASH SINGH (<i>Alternate I</i>) SHRI VIKAS SURENDRA KUMAR BHATIA (<i>Alternate II</i>)
Hawkins Cookers Limited, Thane	SHRI RAJESH SHARMA SHRI SANJAY SASIKUMAR (<i>Alternate I</i>) SHRI RAVINDRA MALI (<i>Alternate II</i>)
Hindalco Industries Limited, Mumbai	SHRI DEVESH KUMAR SHRI ATUL GUPTA (<i>Alternate</i>)
Indian Stainless Steel Development Association, Gurugram	SHRI ROHIT KUMAR SHRI KARAN KUMAR PAHUJA (<i>Alternate</i>)
Jindal Stainless Limited, Hisar	SHRI BISWABASU ROY Ms NISHA GOEL (<i>Alternate</i>)
Nanobot Housewares Solutions Private Limited, Jodhpur	SHRI VIKAS JAIN SHRI MANOJ JAIN (<i>Alternate I</i>) SHRI SHANTANU RAJPUROHIT (<i>Alternate II</i>)
Office of Development Commissioner (MSME), New Delhi	SHRI SUVANKAR SANTRA
Pritam International, New Delhi	SHRI RAHUL KHERA SHRI ROHIT KHERA (<i>Alternate</i>)

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<i>Organization</i>	<i>Representative(s)</i>
Royal Kitchen Appliances Private Limited, Sonipat	SHRI SURESH AGARWAL
Sat Rattan Engineering Works, New Delhi	SHRI G. L. Khera
Shriram Institute for Industrial Research, Delhi	SHRI ALOK KUMAR SHRI ANEESH KUMAR (<i>Alternate I</i>) SHRI PUNEET KAPOOR (<i>Alternate II</i>)
Sivanesan Company, Chennai	SHRI N. MANIKANDA RAJA SHRI K. S. NETHRA MANJARI (<i>Alternate</i>)
Steel Authority of India Limited (SAIL) - Salem Steel Plant, Salem	SHRI R. JAFFARULLAH SHRI SUNIL KUMAR MURATHIA (<i>Alternate</i>)
TTK Prestige Limited, Bengaluru	SHRI ANTO VIMAL ANAND SHRI S. RAJASEKARAN (<i>Alternate</i>)
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Member Secretary
SHRI LOKRAJ MEENA
SCIENTIST 'C'/DEPUTY DIRECTOR
(MECHANICAL ENGINEERING), BIS

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