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(आई एस 14203 का तीसरा पुनरीक्षण)

DRAFT Indian Standard

**FIRE RESISTING RECORD PROTECTION
CABINETS — SPECIFICATION**

(Third Revision of IS 14203)

**Security Equipments Sectional
Committee, MED 24**

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FOREWORD

(Formal clause would be added later on)

Security equipment play a vital role in the safety of cash, jewellery, important documents, etc., in various establishments such as banks, hotels, commercial organizations, offices, shops, etc. Normally such items including documents are stored in safes which protect these documents against theft and fire depending on the type of safes. However the fire resistance in safe is limited. In hotels, commercial organizations, banks etc., many documents need protection against the fire. This protection may be required during the currency of their use or for a long period of time. Record protection cabinets are generally used to offer such protection against fire to paper media like ledger, account books, legal documents, etc. These cabinets may, in turn, be kept either in strong room/book room in open halls. This standard was first published in 1994 and was revised in 1999 and 2017. In this revision, the following are the major changes:

- 1) Materials for handle and other fittings added.
- 2) To address the requirements of wide customer base, more flexibility added for fittings & internal fixtures like drawers & shelf

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, shall be rounded off in accordance with IS 2: 1960 'Rules for rounding off numerical values (revised). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

This standard specifies the requirements for materials, sizes and details of construction of fire resisting cabinet which offer protection against fire to paper media such as ledgers, account books, legal documents, etc.

2 REFERENCES

The standards listed in Annex A have been referred in this standard. At the time of publication, the editions indicated were valid. All the standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 NOMINAL SIZES

Nominal sizes of the cabinet shall be denoted by its internal height as specified in Table 1.

Table 1 Dimensions of Fire Resisting Record Protection Cabinets (Clauses 3 and 6) All dimensions in millimetres					
Sl No.	Parameter		Nominal Size		
			1000	1300	1600
1	Nominal inside dimensions	Height (± 35)	1000	1300	1600
		Width (± 25)	650	650	650
		Depth (± 25)	600	600	600
2	Height of pedestal	min	50	50	50

4 TYPES

Record protection cabinets shall be of two types as follows:

- a) FR60 — Cabinets having a fire resisting rating of 60 min.
- b) FR120 — Cabinets having a fire resisting rating of 120 min.

5 MATERIALS

Materials for manufacturing of the record protection cabinets specified in table are for general guidance only.

The critical quality parameters of the materials used for the components shall be declared by the manufacturer at the time of type approval and records of details of the material shall be maintained for conformity during routine production.

<i>Sl No.</i> (1)	<i>Material for Different Components</i> (2)	<i>Indian Standards</i> (3)
i)	Steel components	Any grade of steel having minimum tensile strength of 270 MPa [see IS 277, IS 513, IS 1079, IS 1570 (Part 5), IS 1732, IS 2062, IS 5986 and IS 9550].
ii)	Brass/Bronze components	IS 292, IS 306, IS 410, IS 713 and IS 7608 or any equivalent
iii)	Handles and other fittings	Cast brass or tin bronze or mild steel powder coated or stainless steel or ABS or any other material suitable for the purpose

6 DIMENSIONS AND TOLERANCES

The dimensions and tolerances of the fire resisting cabinets shall be as given in Table 1.

7 DESIGNATION

The cabinet shall generally be designated by type and nominal size.

Example: A record protection cabinet of Type FR 60 and nominal size 1600 shall be designated as:

Record Protection Cabinet FR 60 × 1600

8 GENERAL CONSTRUCTIONS

8.1 Cabinet Construction Outer body and inner box shall be fabricated from mild steel or galvanised steel sheets of not less than 0.8 mm nominal thickness. The steel parts shall not have any burrs or dents. If required the outer body shall be suitably stiffened to avoid bulging. The cabinet body of the fire resisting record protection cabinet shall be of double wall type with insulating material filled in-between. The insulating material should not produce toxic gases when the cabinet is exposed to fire situation.

The components shall be assembled by bolting, welding, riveting or by any combination of these methods.

8.2 Locking Mechanism

The locking mechanisms shall be of 4 way type. The diameter of shooting bolts shall be 15 mm to 20 mm. There shall be minimum three shooting bolts (two shooting bolts for size 1000) on each side and minimum one vertical shooting bolt each on top and bottom. The shooting bolts shall slide smoothly in recess and engage in body to a minimum depth of 12 mm.

8.3 Locks

The cabinet shall be supplied with a dual control key lock having minimum 6 levers with duplicate keys. The keys shall be made of stainless steel or any other non ferrous metal/alloy having non-corrosive properties. Minimum two sets of the keys shall be supplied. Alternatively

three wheel combination locks in place of key lock or both may be provided, if required by the purchaser.

8.4 Handle can be fixed or detachable. Handles / handle if provided, shall be made from ferrous (powder coated/ plated), non-ferrous material or polymer.

9 INTERNAL FIXTURES

9.1 The cabinet shall be provided with minimum four shelves for nominal size 1 600, three shelves for nominal size 1 300 and two shelves for cabinets of nominal size 1 000. Shelf height shall be adjustable

9.2 A cabinet may also be provided with drawer unit fitted with any suitable lock.

9.3 If drawers are provided, then no of shelves are to be provided as required by the purchaser.

10 PAINTING

10.1 The inside and outside surfaces of cabinet shall be painted or powder coated. In case of paint an appropriate primer and under coating shall be used in accordance with normal industrial practices. The minimum overall thickness of the coatings shall be 50 microns for powder coatings and 70 microns for liquid paints.

10.1.1 Cross hatch test shall be conducted to conform the adhesion of coating in accordance with **10.2**.

10.2 Cross Hatch Test

- a) Make 6 parallel cut marks using sharp metal pointer and straight edge, through the painted/ coated surface, so as to make the base surface visible through cut marks.
- b) Cut marks shall be minimum 20 mm long and at 2 mm distance from each other.
- c) Make 6 similar cut marks in the direction perpendicular to first set of cut marks, with same length and spacing.
- d) These 12 cut marks together shall make a pattern of 25 squares of 2 mm × 2 mm size, totally separated from each other.
- e) A good quality transparent adhesive tape not less than 20 mm width, shall be stuck on the pattern, parallel to any one set of cut marks.
- f) To ensure continuous contact with paint/coat film, rub the tape firmly and remove air bubbles under the tape, if any.
- g) Within 60 to 120 s after sticking the tape, remove it by seizing free end of the tape and rapidly pulling it off at an angle close to 180°.
- h) Painting/Coating quality is considered as acceptable, if no part of any 2 mm × 2 mm square of paint/coat comes off the surface due to pulling the tape.

11 TESTS AND CRITERIA FOR CONFORMITY

11.1 Two samples known to be fully representative of the lot of fire resisting record protection cabinets of same design and construction shall be selected on the basis of random sampling by inspection agency. Out of the selected samples, one sample shall be subjected to fire endurance test (*see B-3.1*) and other sample shall be subjected to fire and impact test (*see B-3.2*).

11.2 The fire resisting record protection cabinets shall be considered to be conforming to the requirements of this standard if they successfully complete the fire endurance test (*see B-3.1*) and fire and impact test (*see B 3.2*).

11.2.1 The fire resisting record protection cabinets shall be considered to be conforming to the requirements of this standard, if they pass the fire endurance test (*see B-3.1*) and fire and impact test (*see B-3.2*) if the contents (*see B-1.1, B-3.1.1, B-3.2.1*) kept in the cabinets during the test are found usable.

11.3 The test specified in 11 shall be considered as type test and shall be carried out for initial approval of design or at any subsequent change in the design of the fire resisting record protection cabinets. These tests shall be carried out once in four years, in such a manner that each type of fire resisting record protection cabinet for which manufacturer has obtained approval, is tested at least once in 4 years.

12 MARKING

12.1 A metal plate showing type of cabinet together with the manufacturer's name and the year of manufacture shall be fixed on the inner face of the door.

12.2 Marking on Keys

The keys shall be marked with an identification number which shall not be the same as the serial number of the cabinet.

12.3 BIS Certification Marking

The record protection cabinets may also be marked with Standard Mark.

12.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made there under. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

13 INSPECTION

The purchaser or his authorized representative shall normally have access to the factory to inspect the fire resisting cabinet at various stages of manufacture.

14 PACKING

Each cabinet shall be packed in accordance with the best trade practices, with its door bolted, but not locked. The keys shall be separately sealed in a box or pouch and placed inside the cabinet. The keys may also be packed and despatched separately or delivered in some other manner if required by the purchaser.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>
196 : 1966	Atmospheric conditions for testing
277 : 2018	Galvanized Steel Sheets (Plain and Corrugated) (Seventh revision)
292 : 1983	Leaded brass ingots and castings (second revision)
306 : 1983	Tin bronze ingots and castings (third revision)
410 : 1977	Cold rolled brass sheet, strip and foil (third revision)
513 (Part 1) : 2016	Cold reduced carbon steel sheet and strip: Part 1 cold forming and drawing purpose (Sixth Revision)
713 : 1981	Zinc base alloy ingots for die casting (second revision)
1079 : 2017	Hot-rolled carbon steel sheet and strip (seventh revision)
1570 (Part 5) : 1985	Schedules for wrought steels: Part 5 Stainless steel and heat resisting steels (second revision)
1732 : 1989	Dimensions for round and square steel bars for structural and general engineering purposes (second revision)
2062 : 2011	Steel for general structural purposes (seventh revision)
5986 : 2017	Hot rolled steel plates, sheets, strips and flats for flanging and forming operation (fourth revision)
7608 : 1987	Phosphor bronze wire for general engineering purposes (first revision)
9550 : 2001	Bright Steel bars- specification (first revision)

ANNEX B

(Clauses 11.1, 11.2 and 11.2.1)

PERFORMANCE TESTS FOR FIRE RESISTING RECORD PROTECTION CABINETS

B-1 TEST EQUIPMENT

B-1.1 Contents of the fire resisting record protection cabinets subjected to these tests shall include 60 to 70 gsm plain paper (approx 90 percent) and normal printed/hand written paper (approx 10 percent).

B-1.2 Thermocouple Thermo couple enclosed in protection tube of suitable material and dimensions shall have time constant of the protected thermocouple assembly within the range from 5 to 7.2 minutes.

B-1.2.1 A typical thermocouple assembly conforming to **B-1.2** may be fabricated by fusion welding, the twisted ends of chromel alumel wire not smaller than 0.52 mm² and not larger than 0.82 mm² in cross-section and mounting the leads in porcelain insulators so that the thermocouple head is 12 mm from the sealed end of a standard weight, normal 12 mm diameter iron, steel or inconel pipe.

B-1.3 FURNACE

B-1.3.1 The furnace fuel and air supplies shall be adjusted such that the fire is uniformly distributed over the exposed faces of the cabinet and regulated to temperatures in accordance with the standard time temperature curve.

B-1.3.2 The furnace temperature, corresponding to time elapsed as given in Table 2 shall follow the equation:

$$T - T_0 = 345 \text{ Log}_{10} (8t + 1)$$

Where

T = furnace temperature in °C at any time,

t = time in minutes; and

T₀ = ambient temperature, in °C.

B-1.3.3 The accuracy of the furnace control shall be such that the area under time temperature curve, obtained by averaging all the furnace thermocouple readings, shall be within 10 percent of the corresponding area under the standard time temperature curve for entire duration of test

B-2 PREPARATIONS FOR TEST

B-2.1 For Fire Endurance Tests

B-2.1.1 The sample to be subjected to fire endurance test shall have a 20 to 25 mm diameter through hole at the bottom. A pipe of the same external diameter shall be welded to outer and inner body sheets of the cabinet. This hole shall be used for insertion of thermo couple wires inside the cabinet. After insertion of the thermo couple wires through the hole it shall be sealed by proper insulating compound from both ends of the hole.

B-2.1.2 All thermocouples shall be located 50 mm from the top of the cabinet interior. Four thermocouples shall be located 25 mm from the side walls, two of these being 25 mm from back and the other two 25 mm from the inner face of the doors. For double door cabinets a fifth thermocouple shall be located 25 mm from the inner face of the doors opposite the centre door joint.

B-2.2 For Fire and Impact Tests

This test shall be conducted without any thermocouple inside the sample.

Table 2 Relationship Between Time Elapsed and Furnace Temperature (Clause B-1.3.2)		
Sl No.	Time Elapsed min	Furnace Temperature °C
i)	5	576
ii)	10	678
iii)	15	739
iv)	20	781
v)	25	815
vi)	30	842
vii)	40	885
viii)	50	918
ix)	60	945
x)	70	968
xi)	80	988
xii)	90	1006
xiii)	100	1022
xiv)	110	1036
xv)	120	1049

B-2.3 Furnace Temperature

The furnace temperature shall be recorded by thermocouples symmetrically distributed. At least four thermocouples shall be used, placed 50 mm from the exposed faces of the test sample including the door face.

B-2.4 Conditioning

The inside temperature of the samples at the start of the test shall be in accordance with IS 196. If the conditions inside the samples are not within the range then the sample shall be conditioned for at least 12 hours prior to the tests the inside conditions.

B-2.5 Lifting Arrangement

Lifting hooks shall be provided on samples for easy handling during fire endurance and fire and impact tests.

B-3 TESTS

Before the start of test it shall be ensured that the cabinets are locked.

B-3.1 Fire Endurance Test

B-3.1.1 The sample of fire resisting record protection cabinet prepared in manner specified in **B-2.1.1** and **B-2.1.2** is placed in the furnace. The storage area shall then be evenly filled with contents (*see B-1.1*) occupying volume equal to 25 to 30 percent of the volume of cabinet. The cabinet is then locked.

B-3.1.2 The furnace shall then be put on and the temperatures shall be read at intervals not exceeding 5 min during the test. Average of all the thermocouples outside the sample shall be recorded and shall be taken as the required value.

B-3.1.3 The pressure in the furnace chamber' during the test shall be maintained as close as possible to atmospheric pressure.

B-3.1.4 The furnace fire shall be continued for 60 min and 120 min for record protection cabinet of 60 min and 120 min rating respectively. During the fire endurance test, it is essential that at no time the internal temperature of the cabinet, as shown by any of the thermocouples placed inside the cabinet, shall exceed 177°C irrespective of ambient temperature.

B-3.1.5 After the specified period, the furnace is switched off. The cabinet is continued to be kept in the furnace for cooling without opening the furnace. Temperature of interior of the sample cabinet shall be continuously recorded until the temperature inside the cabinet shows a definite drop of 3°C min by all thermocouples Thereafter the furnace shall be opened and product shall be removed from the furnace. After fall of the surface temperature to below 60°C the door/ drawer shall be opened and the contents shall be examined to determine their usability as per **11.2.1**.

B-3.2 Fire and Impact Test

B-3.2.1 The sample to be subjected to this test shall have contents as specified in **B-3.1.1** and shall be subjected to test without any thermocouple inside the cabinet.

B-3.2.2 The cabinet shall be subjected to a standard fire exposure in a manner similar to the fire endurance test for a period of 30 min for cabinets of 60 min rating and 45 min for cabinets of 120 min rating.

B-3.2.3 After the fire exposure time, the furnace shall be switched off. The cabinet shall then be hoisted so that its bottom is 4 m above a layer of brick rubble (30 cm depth) on a heavy

concrete base, and then dropped. Not more than 20 minutes shall be elapsed from the time the furnace fire is extinguished until the cabinet is dropped.

B-3.2.4 Immediately after the impact, the cabinet shall be inverted, put back in the test furnace, and again subjected to a standard fire exposure for a period of 30 min for cabinets of 60 min rating and 45 min for cabinets of 120 min rating. Then the furnace shall be switched off and shall be allowed to cool to less than 160°C without opening the furnace. After the furnace has cooled to a temperature less than 160°C, the sample shall be removed from the furnace and the door shall be opened after fall of the surface temperature to below 60°C to examine its heat insulating properties, as evidenced by the usability of the contents as per **11.2.1**.