IS 3614-1 (1966): Fire-check Doors, Part I: Plate, Metal Covered and Rolling Type [CED 36: Fire Safety]

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IS : 3614 (Part I) - 1966
(Reaffirmed 2002)

Indian Standard

SPECIFICATION FOR FIRE-CHECK DOORS

PART I PLATE, METAL COVERED AND ROLLING TYPE

(Second Reprint MAY 1989)

UDC 69.028.1:699.81

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 5 *September* 1966

Indian Standard

SPECIFICATION FOR FIRE-CHECK DOORS

PART I PLATE, METAL COVERED AND ROLLING TYPE

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SPECIFICATION FOR FIRE-CHECK DOORS

PART I PLATE, METAL COVERED AND ROLLING TYPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 27 May 1966, after the draft finalized by the Fire Safety Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 One of the fire safety requirements to be taken into consideration while planning and designing industrial and non-industrial buildings is to provide the means for restricting the spread of fire, both internally and externally. The spread of fire can be minimized if the respective floor areas are limited and divided into smaller sections, each section being separated by perfect separating walls and openings therein fitted with fire-check doors. The design of fire-check doors and the materials to be used in their construction have to be such that the doors shall be capable of providing an effective barrier to the spread of fire. The fire resistance of two doors should, as far as practicable, be the same as for the wall. This standard has been prepared with a view to providing adequate guidance to both the manufacturer and the user in regard to the materials to be used and the construction to be adopted for fire-check doors capable of giving the required fire protection.

As erection of fire-check doors is a very important aspect in order to achieve the desired degree of fire protection, it is strongly advised that the fire check doors should be erected strictly in accordance with the requirements given in Appendix A of this standard.

0.3 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.4 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 : 2-1960*. 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

1.1 This standard lays down the requirements regarding materials and details of construction of steel plate, metal covered and rolling type of fire-check doors for the protection of openings in walls or floors to restrict the spread of fire within buildings whether from internal fire or from external fire.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Single Fire-Check Door — One door shutter constructed for fitting on one side to an opening.

2.2 Double Fire-Check Door — Two single fire-check door shutters as defined in **2.1** for fitting one on each side to an opening.

3. TYPES

3.1 Fire-check door shall be of the following types:

a) Steel plate doors,

b) Metal covered doors, and

c) Rolling steel shutters.

4. SIZES

4.1 Steel Plate Doors and Metal Covered Doors — The size of steel plate doors and metal covered doors shall suit the size of opening which shall neither exceed 5 m^2 in area nor shall be more than 2·10 m in width or 2·75 m in height.

4.2 Rolling Steel Shutters — The size of rolling steel shutters shall suit the size of doorway which shall neither exceed 5 m^2 in area nor shall be more than 2·4 m in width or 2·10 m in height, measured between the faces of the reveals of opening or projecting jambs and from the floor of the opening to the underside of the barrel.

*Rules for rounding off numerical values (*revised*).

5. MATERIAL

5.1 Mild Steel Plates, Sections, etc — Mild steel plates, sections, etc, used in the construction of fire-check doors shall conform to Grade St 32·0 of IS : 1977-1962*.

5.2 Timber — Timber boards used in the construction of metal covered doors shall be of thoroughly seasoned teak or yellow pine wood. The boards shall be kiln-dried for a period of at least 48 hours with a finishing temperature of at least 107°C during the last 12 hours. The moisture content of seasoned timber when used in door shall not be more than 15 percent. Immediately after their removal from the drying kiln and whilst still hot they shall be thoroughly impregnated by immersion in hot coal tar creosote conforming to IS : 218-1961†.

6. CONSTRUCTION

6.1 Steel Plate Doors

6.1.1 The door shall be of

a) steel plate not less than 6 mm thick, with stiles and rails (and muntins where necessary) on each face of the plate not less than 100 mm in width and 6 mm thick, riveted together with rivets not less than 8 mm in diameter or welded in accordance with IS : 823-1964‡ and spaced not more than 150 mm apart, dividing the door into panels not exceeding 0·8 m^2 each. Except as provided in **6.1.4.1**, the stiles and top and bottom rails shall be set close up to the edge all round the door on both faces making the door not less than 18 mm thick continuously along each edge; or

b) steel plate not less than 6 mm thick, stiffened all round one face at the edges with T-bar not less than ISNT80 and further divided into panels not exceeding 0·8 m^2 each by T-bar of similar section, all riveted or welded as specified in (a).

6.1.2 Cast iron shall not be used for any fittings of the door.

6.1.3 All bolt-straps or clips, sockets, latches, catches, hinges, pivots and other fittings shall be bolted or riveted through the door, and/or bolted through or welded or riveted to the frame, except as otherwise specifically desired by the purchaser.

*Specification for structural steel (ordinary quality).
†Creosote and anthracene oil for use as wood preservatives (*revised*).
‡Code of procedure for manual metal arc welding of mild steel.

6.1.4 *Hinged Type Doors*

6.1.4.1 If the opening exceeds 1·05 m in width, the door shall be in two leaves, (neither of which shall exceed 1·05 m in width) so constructed that a rebated joint not less than 12 mm wide is formed at the meeting stiles when the door is closed. The door or leaf shall not be subdivided into parts hinged together.

6.1.4.2 The door shall be hung on substantial hinges or pivots. There shall be on each leaf a central hinge, or a substantial iron lug or spur which will tie or grip the door to the frame when the door is closed.

6.1.4.3 The door shall have bolts at top and bottom (or if in two leaves there shall be a bolt at the top and bottom of each leaf), and there shall also be a central bolt or latch.

6.1.4.4 The bolts and latches shall be so arranged that the door can be opened from either side. Each bolt shall fasten into or engage the frame or a socket to a depth of at least 6 mm. The latch shall engage the frame or a catch to a depth of at least 12 mm. In the case of a door in two leaves the central bolt or latch on one leaf shall fasten into or engage a socket or catch on the other leaf for at least 12 mm depth.

6.1.4.5 The bolts, clips, sockets, etc shall conform to the following requirements:

a) *Bolts* — Not less than 12 mm thick throughout nor of a cross-sectional area less than 250 mm^2.

b) *Straps or clips* — Not less than 3 mm thick nor less than 25 mm wide.

c) *Sockets* — At least 6 mm in every part.

d) *Latches* — Not less than 10 mm thick nor of cross-sectional area less than 250 mm^2.

e) *Catches* — At least 6 mm in every part.

6.1.4.6 The door frame shall be of steel at least 6 mm thick and riveted together at the corners. It shall be of such a size that it will fit closely to the four sides of the opening. Provision shall be made in the frame so that it can be securely bolted through or keyed into the jambs, sill and head by bolts or keys at not more than 750 mm apart with at least three on each vertical side. A continuous fillet at least 25 × 12 mm in section shall be mounted on all sides of the frame except the bottom. The frame shall be of such depth that the door when closed does not project beyond the outer edge of the frame and fits tightly against the fillet. The fillet shall terminate 25 mm above the

sill to permit the easy removal of refuse. In the case of a door arranged to fold into the thickness of wall, the 25 × 12 mm fillet may be dispensed with, provided that:

a) the frame is formed of T-bar or angle-iron not less than 10 mm least the flanges of which shall not be less than 50 mm or more than 140 mm wide;

b) the flanges overlap the edge of the door when closed by at least 20 mm on all sides except the bottom; and

c) the frame complies with the above requirements in all other respects.

A door in such a T-bar or angle-iron frame may be recessed behind the surface of the wall to an extent not exceeding the thickness of the flanges of the frame.

6.1.5 *Sliding Type Doors*

6.1.5.1 The door shall be in one leaf.

6.1.5.2 The door shall be hung from the top by supporting wheels fitted in steel hangers of substantial design, extending at least 400 mm down the door unless designed with a double strap, in which case they need not extend more than 300 mm. Hangers shall be riveted to the door, If the door exceeds 1·5 m in width, not less than three hangers each with a wheel shall be fitted. Supporting wheels and pins shall be of steel. It is necessary that wheels of low friction type shall be used.

6.1.5.3 The rail upon which the supporting wheels run shall be a flat bar of steel at least 75 × 16 mm in section; or a rolled steel T-bar at least 75 × 50 × 12 mm in section; or an angle at least 65 × 65 × 12 in section on which a steel runner bar 16 × 16 mm in section fixed by rivets at 225 mm centres to carry grooved supporting wheels.

6.1.5.4 A frame of steel not less than 6 mm thick at any point for fitting into the opening with bolts or keys not more than 750 mm apart, with at least three on each vertical side, shall be provided.

Along the top, the bottom and the side into which the front vertical edge of the door closes, the frame shall be of channel bar at least 35 mm deep, and the door shall house into the frame to this depth.

Along the remaining side, the frame shall be either of channel bar or angle bar so proportioned and set, that a groove not less than 35 mm deep extending from the top bar to the bottom bar is provided. To engage with and house into this groove to a depth of 35 mm, an angle bar or channel bar of wrought iron or steel 6 mm thick shall

be riveted to the back vertical edge of the door extending the full height of the door.

If the door is stiffened with T-bar as specified above or has an angle iron not less than 35 × 35 × 6 mm riveted to the lower edge of the bottom rail, the frame need not have a channel at the bottom if a projecting sill of brick or cement concrete, not less than 100 mm thick and extending 150 mm beyond the opening on both sides is formed, or a sill of steel plate at least 6 mm thick, bolted or screwed to the frame extending the full thickness of the wall and projecting at least 25 mm beyond the outer face of the door is provided.

6.1.5.5 In order to keep the lower channel clear of refuse, a slot shall be made at the bottom of each side of the frame.

6.2 Metal Covered Doors

6.2.1 The door shall be without panels and the core shall be constructed of layers of planed, tongued and grooved, thoroughly seasoned teak or yellow pine boards not less than 22 mm in thickness. The boards forming the outer layers shall be in single lengths, but the inner layer or layers may be made of not more than two pieces in any one length, provided that every length so formed shall be adjoined by a full length board on each edge. The boards shall be crossed at right angles and fastened together with iron nails shall be clenched. Immediately after completion, the core shall be treated with a coat of coal tar creosote conforming to IS : 218-1961*.

6.2.2 The core of a door protecting an opening not exceeding 3·25 m^2 shall have not less than three layers of boards, but if the openin exceeds 3·25 m^2 there shall be not less than four layers.

6.2.3 One layer less than those specified in **6.2.2** may be used, provided that the wood core be completely covered with sheets made of a hard composition of asbestos and other incombustible mineral ingredients not less than 3 mm in thickness.

6.2.4 The core shall be completely encased in charcoal tinned plate (terne-plate) not exceeding 350 mm × 500 mm and not less than 0·50 mm thick coating or tinning.

6.2.5 The sheets shall be lock-jointed and not soldered, and the width of the lock joints shall be not less than 10 mm. All horizontal and mitre joints shall be formed facing downwards. The sheets covering the edges of the core shall be turned round at least 50 mm on each face.

6.2.6 The sheets shall be attached closely to the core with screws or barbed nails penetrating at least three-quarters of the thickness of the

*Specification for creosote and anthracene oil for use as wood preservatives (*revised*).

core and placed not more than 150 mm apart. The heads of all screws and nails shall be inside the lock-joints.

6.2.7 The whole of the processes described in **6.2.1** to **6.2.6** shall be completed within a period of two weeks.

6.2.8 All doors shall be given one coat of red oxide, red lead or graphite paint before leaving the works and two coats of oil paint immediately after erection.

6.2.9 Cast-iron shall not be used for any parts or fittings of doors and no lead or wood shall be used in fixing.

6.2.10 All bolt-straps or clips, sockets, latches, catches, hinges, pivots and other fittings shall be bolted through the door, and/or bolted through or welded or riveted to the frame except as otherwise specifically desired by the purchaser.

6.2.11 *Hinged Type Doors*

a) The door shall, preferably, be in one leaf, but may be in two leaves. A door or leaf shall not be subdivided into parts hinged together. If the door is in two leaves they shall be so constructed that a rebated joint not less than 25 mm wide is formed at the meeting edges when the door is closed.

b) A strip of iron or steel plate not less than 3 × 75 mm in section shall be fixed by screws to each side of the door along the bottom edge and project 3 mm below it and a similar strip fixed in the same manner, shall be carried therefrom for 750 mm up each face of each leaf flush with the closing edge.

c) Substantial strap hinges, extending not less than two-third the width of the door or leaf shall be provided for attaching the door, or each leaf, to the frame or wall. If the door is more than 2·10 m in height, three hinges shall be provided for fixing at intervals not exceeding 900 mm.

d) The door shall have bolts at the top and bottom (or if in two leaves there shall be a bolt at the top and bottom of each leaf and there shall also be a central bolt or latch).

e) The bolts and latches shall be so arranged that the door can be opened from either side. The top and bottom bolt shall fasten into or engage the frame or sockets for a depth of at least 6 mm or if there is no frame, then into iron or steel sockets which will be securely fixed in head and sill of the opening. The central bolt or latch shall fasten into or engage for a depth of at least 12 mm the frame or a clip,

socket or catch securely attached to the frame or to the wall. In the case of a door in two leaves the central bolt or latch on one leaf shall fasten into or engage for a depth of at least 12 mm a clip, socket or catch attached to the other leaf.

f) The bolts, clips, sockets, etc, shall conform to the following requirements:

1) *Bolts* — Not less than 12 mm dia throughout nor of a cross-sectional area less than 250 mm².

2) *Straps or Clips* — Not less than 3 mm thick nor less than 25 mm wide.

3) *Sockets* — At least 6 mm in every part.

4) *Latches* — Not less than 10 mm thick nor of a cross-sectional area less than 250 mm².

5) *Catches* — At least 6 mm in every part.

g) The door shall be designed to hang in a steel frame at least 6 mm thick. The frame shall have a rebate at least 50 mm wide on all sides except the bottom.

Alternatively, the door may be designed as to overlap the opening.

6.2.12 *Sliding Type Doors*

a) The door shall be in one leaf and shall be designed to overlap the opening at least 75 mm at the top and sides.

b) *Hangers and supporting rail* — The door shall be hung from the top by steel hangers of substantial design, extending at least 400 mm down the door, unless designed with a double strap, in which case they need not extend more than 300 mm. Hangers shall be bolted through the door. If the door exceeds 1·5 m in width, not less than three hangers shall be fitted. The grooved wheels and pins shall be of steel. Low friction wheels shall be used.

c) The supporting rail upon which the door wheels run shall be of steel at least 65 × 12 mm in section.

d) To prevent the wheels from jumping off the rail and the door falling in the event of the wheels or hangers becoming distorted, two steel angle brackets shall be provided for fitting to the top of the door in such a way that the flanges of the wheels cannot mount the rail. The brackets shall be of such size that their tops can be carried up at the back of the rail to a height at least 6 mm above the lower edge of the rail.

e) With the object of keeping the door close against the wall, when closed, two stops made of steel section not less than 75 × 12 mm shall be provided. The stops shall be of sufficient length so that the portion in contact with the wall will be not less than 230 mm in length. A rubber buffer block shall be fitted in the top. A guide consisting of a metal roller at least 12 mm thick mounted on a spindle at least 20 mm in diameter, securely fixed to a plate at least 12 mm thick shall be provided for building into the wall (or into the sill). This guide is to engage with an iron wedge fixed to the bottom corner of the door.

f) *Striking plates and chaffing strips* — Channel shaped striking plates not less than 100 × 3 mm in section shall be attached to the door to protect those parts which close into the stops, and shall be carried back on each face of the door at least 150 mm from the edge.

g) A strip of iron or steel plate not less than 75 × 3 mm in section shall be fixed by countersunk screws to each side of the door along the bottom edge and project 3 mm below it, and a similar strip, fixed in the same manner, shall be carried therefrom up to the lower striking plate on each face of the door flush with the closing edge.

6.3 Rolling Steel Shutters

6.3.1 *Material* — The construction of the shutter and its component parts shall be throughout of steel, except as otherwise stated. No wood or other combustible material shall be used in any part.

6.3.2 *Curtain* — The curtain shall be formed of rolled steel slats of not less than 1·25 mm in thickness. The steel used for the slats shall be bright mild steel strip, cold or hot rolled and cold annealed, with sheared parallel edges. Each slat shall be provided on both edges with curls to form an inter-locking hinge extending the full width of the curtain; the centre of inter-lock shall be not less than 45 mm or more than 75 mm (nor more than 125 mm if the slats are thicker than 1·60 mm), and the bridge depth shall be not less than 10 mm. The curtain shall extend at least 65 mm into the channel guides.

6.3.3 The curtain shall be secured to the barrel by either of the following methods:

a) Rings or collars of ferrous metal, gun metal or phosphor bronze, not less than three in number, shall be screwed or bolted to the barrel and fixed at centres not exceeding 1 m. A flat steel bar at least 25 × 6 mm shall be attached to the rings or collars, and the top slat shall be attached to the

bar by screws or bolts not less than 8 mm in diameter spaced not more than 300 mm apart; or

b) Chains shall be of mild steel not less than 1·12 mm thick and 40 mm wide, each link being formed of at least three layers of strip riveted together with two 3-mm rivets. The links shall be coupled by means of mild steel pins not less than 3 mm in thickness. Each chain shall be attached to the barrel by screws not less than 8 mm in diameter spaced not more than 300 mm apart and shall be riveted to the top slat of the curtain by at least two rivets not less than 5 mm in diameter, through the connecting link.

6.3.4 The curtain shall be of such a length as to extend from the floor of the opening to the top of the barrel and then round at least a quarter of the circumference of the barrel before fixing to it.

6.3.5 *End Locks* — The end lock shall be constructed of steel not less than 3 mm thick, fitted at each end of each slat and welded or riveted thereto with two tinned or black iron rivets not less than 3 mm diameter.

The end locks shall be so designed as to fit the contour of the curtain slats and fill the channel guides as closely as possible, consistant with the movement of the curtain.

6.3.6 *Bottom Rail* — The bottom rail of the curtain shall be of T-bar not less than ISLT 75, with 65 × 3 mm mild steel backing strip securely bolted or riveted to the lower edge of the curtain by 8 mm bolts or rivets spaced at not more than 300 mm centres, or alternatively, the bottom rail may be built up of two mild steel angles, each not less than 40 × 40 × 3 mm, one angle to be provided on each side of the bottom slat of the curtain, and both angles to be securely bolted or riveted to the curtain as described before. The curtain shall extend to a minimum depth of 35 mm between the angles or plate and T. Spot welding at 300 mm centres, in lieu of bolting or riveting, can be adopted if desired by the manufacturer.

6.3.7 The bottom rail shall extend the full width of the curtain except for that portion necessary for housing within the channel guides, and shall make close contact with the sill when the shutter is closed.

6.3.8 *Lifting Handles* — The curtain shall be provided with two lifting handles or angles on each side, spaced along the bottom rail not more than 750 mm apart, so designed as to leave no opening for the passage of flame or smoke, and so formed and attached as not to prevent the bottom rail from descending directly on to the floor of the opening. Chains shall not be provided in lieu of handles or angles.

6.3.9 *Guides*

6.3.9.1 The curtain shall move in channel guides constructed of steel not less than 3 mm thick extending continuously from within the barrel enclosure to within a distance of not more than 30 mm and not less than 20 mm from the floor of the opening.

6.3.9.2 The guides shall be constructed of two steel plates of the above thickness secured by welding or riveting to a 22 mm square mild steel core or to a 22 mm square by 3 mm mild steel channel, or alternatively, a mild steel channel in one piece, or two mild steel angles.

6.3.9.3 The guides shall be of a depth sufficient to allow the curtain to extend at least 65 mm into the guides and to expand laterally therein.

6.3.10 *Brackets, Supporting Axle and Roller* — The brackets shall be of steel and shall be of enclosed type, arranged to support the bearings of the axle and shall be of sufficient size to close completely the ends of the barrel enclosure.

6.3.11 *Barrel and Axle*

6.3.11.1 The barrel shall be of mild steel tube not less than 80 mm outside diameter and not less than 3 mm in thickness, mounted on a mild steel axle not less than 25 mm diameter, the axle to extend the full length of the barrel with a minimum bearing of 25 mm at each end. The barrel shall enclose helical steel springs for counter-balancing the curtain.

6.3.11.2 The barrel shall be mounted on rigid or self-aligning ball bearings and be fitted with a spring charging device to enable the spring to be adjusted after curtain is in position.

6.3.11.3 *Barrel enclosure*

a) The barrel shall be completely enclosed as follows:

1) *Top, bottom and back* — The top, bottom and back shall consist of:

i) A 6-mm pressed steel casing, with the front edge of the bottom plate where the curtain passes through, shaped to form an angle, or, alternatively stiffened for the full width of the opening with 40 × 40 × 5 mm angle iron riveted thereto with 10-mm rivets at not more than 115 mm centres; the angular formation next to the slot where the curtain passes through the bottom

plate be as close to the face of the curtain as possible;

or

ii) A built-up casing of 6 mm mild steel plate, all held together along each abutting edge by riveting to 40 × 40 × 5 mm angle iron with 10 mm rivets at not more than 115 mm centres, the bottom plate shall be stiffened throughout its length along the front edge where the curtain passes through with 40 × 40 × 5 mm angle iron riveted thereto as described above, the angle iron next to the slot where the curtain passes through the bottom plate shall be as close to the face of the curtain as possible.

2) *Ends* — The ends of the barrel enclosure shall be the steel brackets referred to above, to which the casing forming the top, bottom and back of the enclosure shall be secured by riveting to angle iron all as described above.

3) *Dividing plate* — Where double shutters are fitted and the barrels are accommodated in the same enclosure, the barrels shall be at the same level and separated from each other by a dividing plate extending from bracket to bracket and for the full depth of each bracket. The dividing plate shall be constructed of 6 mm mild steel securely joined to the end bracket with 40 × 40 × 5 mm angle iron, the latter being riveted to the dividing plate with 10 mm rivets at not more than 115 mm centres and bolted or riveted to the end brackets at similar centres. The dividing plate shall be stiffened throughout its length on the top and bottom edges with 40 × 40 × 5 mm angle iron, such angle iron being riveted to the dividing plate with 10 mm rivets at 300 mm centres.

In all such cases the soffit or bottom plate and the top plate of the barrel enclosure shall be constructed of not less than 1 mm steel sheets but the bottom plate shall be stiffened along its edges as described above.

NOTE — Soffit or bottom plates where detachable shall be fixed by set screws not less than 8 mm diameter and at not more than 115 mm centres.

4) *Front or fascia plate* — A front or fascia plate of 6

mm mild steel shall be provided to form the front of the barrel enclosure, and shall overlap the opening in which the barrel is fixed by not less than 100 mm at each end. The fascia plate shall be shaped at the bottom edge to form an angle, extended as close to the face of the curtains as possible, the edge next to the curtain shall be stiffened throughout its length by an angle iron as described above. Alternatively, the opening between the front of the curtain and the fascia plate shall be filled in with a 6 mm mild steel plate secured to the fascia plate by 40 × 40 × 5 mm angle iron riveted thereto and stiffened along the edge next to the curtain with angle iron as described above.

The fascia plate shall be fixed independently of the barrel enclosure by securing to the head and jambs by 12 mm bolts not less than 115 mm long, located 25 mm from the top edge and not 50 mm from the ends of the fascia, at the centre line of the opening and intermediately at points not more than 600 mm apart, with two additional bolts at the ends, one 50 mm from the bottom edge and the other midway between the top and bottom of the fascia. All bolt holes provided in the fascia shall be slotted and 50 mm in length and all bolts shall be set centrally in the slots.

NOTE — As an alternative to riveting, the top, bottom, back and dividing plates, and the end brackets, but not the front or fascia plate, may be welded to the angle iron specified, provided that all joints are welded throughout their entire length.

b) To permit of the adjustment of the barrel springs an opening in the barrel enclosure not exceeding 200 × 75 mm is permitted provided the opening is covered by 6 mm steel plate at least 50 mm longer and wider than the opening. The cover plate shall be attached by not less than four screws or bolts.

Alternatively, the fascia plate may be in two parts provided the abutting vertical edges are completely covered by a 6 mm steel plate not less than 100 mm in width, attached by not less than 12 mm diameter bolts, with nuts welded to the back of the fascia plate.

c) A small hole of the minimum size necessary for the passage of a wire or chain in connection with

a fusible link arrangement is permitted in a barrel enclosure.

6.3.11.4 *Bolts, nuts and washers* — All bolts shall be provided with adequate nuts and washers. In the fixing of the channel guide the front or fascia plate the washers shall take the shape of the slotted holes provided therein. Lead washers shall be provided in the fixing of the channel guides.

6.3.11.5 *Expansion* — The barrel enclosure, including the brackets and the fitting of the barrel therein, the fixing of the guides and the depth of the curtain within the guides shall be so arranged as to allow for expansion based on 1 mm per 75 mm run, due regard being paid to the curtains extending the minimum depth into the guides.

7. MARKING

7.1 Every fire-check door and shutter shall have a metal plate attached giving the manufacturer's name or trade-mark and the date of manufacture.

7.1.1 The fire-check door and shutter may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

APPENDIX A

(*Clause* 0.2)

INSTALLATION OF FIRE-CHECK DOORS

A-1. PREPARATION OF OPENING

A-1.1 Steel Plate Doors and Metal Covered Doors

A-1.1.1 The sill, jambs and head may be formed of brick, stone or cement concrete. The sill shall be protected by an iron or

steel plate. Steel lintels may also be adopted provided they are protected by brick work or by reinforced cement concrete of thickness not less than 25 mm.

A-1.1.2 The sill shall be raised not less than 50 mm in order to check the flow of water from one building to another.

A-1.2 Rolling Steel Shutters

A-1.2.1 An opening which is to be fitted with double steel rolling shutters shall be so constructed as to provide that the distance between the inner faces of the shutter is not less than the full thickness of the wall but in no case less than 400 mm.

A-1.2.2 To meet the requirements specified in **A-1.2.1** and to provide for fixing of the channel guides in the jambs, the floor, jambs and head shall be built out equally on each side of the wall; such projections shall be constructed in accordance with the requirements laid down in **A-1.2.3** to **A-1.2.8** and bonded with or tied into the wall.

A-1.2.3 The floor shall be constructed of brick work or concrete not less than 130 mm thick without any cavity, and shall extend to the line of projecting jambs and under the channel guides.

NOTE — The raising of the sill at least 50 mm is recommended in order to check the flow of water from one building to another.

A-1.2.4 The jambs shall be constructed of brick work or concrete without cavity, the projection required under **A-1.2.2** shall be of similar material not less than 330 mm in width extending from the floor of the opening up to the bottom of the barrel enclosure with chases 115 × 115 mm provided therein for the channel guides. The chases shall be set back at least 115 mm from the front of the projecting jambs.

A-1.2.5 From the level of the barrel enclosure the projecting jambs shall be carried up of sufficient width, in no case less than 115 mm to support a projecting head conforming to the requirements of **A-1.2.8.**

A-1.2.6 The thickness of any jamb or lining shall not be included in the above dimensions.

A-1.2.7 Where openings are to be made for passage of trucks, adequate protection shall be provided to the edges of the jambs to prevent damage.

A-1.2.8 The head of the openings shall be constructed of brick work or concrete. The projecting heads required under **A-1.2.2** shall be of concrete not less than 130 mm thick cavity and shall rest on the projecting jambs and extend up to the full width and projection of the jambs.

A-2. INSTALLATION REQUIREMENTS

A-2.1 Steel Plate Doors — The doors shall be so installed that the bottom of the door is within 3 mm of the sill. No wood or lead shall be used in fixing the frame of the door in the opening. In the case of doors of hinged type, the door frame shall be fitted closely to the four sides of the opening and securely bolted through, or keyed into the jambs, sill and head by substantial bolts or keys, not more than 750 mm apart with at least three on each vertical side. In the case of doors of sliding type the rail upon which the supporting wheels are to run shall be securely bolted through or keyed into the wall by substantial bolts or keys which shall be spaced at not more than 750 mm apart and shall be so placed that there is one directly opposite each hanger when door is closed; the door frame shall be securely fixed in the opening by bolts or keys at not more than 750 mm apart with at least three on each vertical side.

A-2.2 Metel Covered Doors

A-2.2.1 *Hinged Type Doors* — The door, or each leaf, as the case may be, shall be attached to the frame or wall by substantial strap hinges. Where the hinges are to be attached to the wall, the portion in contact with the wall shall be at least 250 mm in length and shall be bolted through or keyed into the wall at two points 150 mm centre to centre. The door shall hang in the door frame which will be securely bolted through or keyed into the wall by substantial bolts or keys not more than 750 mm apart or it shall be installed to overlap the opening at least 75 mm at the top and sides. The portion of the wall overlapped shall be faced up with cement so as to ensure close contact when the door is closed. If the frame is omitted the bottom of the door shall be protected by a 150 mm projecting sill of brick, cement concrete or stone, not less than 100 mm thick and extending 150 mm beyond the opening on both ends, thereof, or by a sill of steel plate 6 mm thick, bolted or keyed into and extending the full thickness of the wall and projecting at least 25 mm beyond the outer face of the door.

A-2.2.2 *Sliding Type Doors* — The portion of the wall overlapped shall be faced up with cement so as to ensure close contact when the door is closed. The bottom of the door shall be protected by a 150 mm projecting sill of brick or cement concrete or stone not less than 100 mm thick and extending 150 mm beyond the opening at both ends thereof, or by a sill of steel plate 6 mm thick, bolted or keyed into and extending the full thickness of the wall and projecting at least 25 mm beyond the outer face of the door. The bottom of the door when closed shall be within 6 mm of the sill. The supporting rail upon which the door pulleys run shall be securely and directly bolted through or keyed into the wall. The wall bolts or keys shall be spaced at not more than 750 mm apart and shall be so placed that there is one directly opposite each hanger when the door is closed.

A-2.3 Rolling Steel Shutters

A-2.3.1 The guides shall be set back as far as possible within the chase provided in the jamb, shall be fitted as close as possible to the front side of the chase and shall be wholly contained within the chase and shall not project beyond the face of the jamb, excluding any jamb lining. The guides shall be secured by 10 mm bolts taken through the thickness of the jamb, or by rag or expanding bolts securely grouted in position with adequate lead and iron washers and nuts. One bolt shall be provided within 150 mm of the barrel enclosure, one within 150 mm of the floor of the opening, and other intermediately at points not more than 600 mm apart. With the exception of the top-most fixing, the fixing holes in the guides shall be slotted (about 50 mm in length) and arranged in relation to the bolts so as to allow for expansion in a downward direction. The lead and iron washers shall take the shape of the slotted holes.

A-2.3.2 The brackets together with the barrel enclosure, shall be supported on the projecting jambs and fixed by bolts or ragged caulking blocks and set screws not less than 12 mm diameter. Each bracket shall be fixed with at least two bolts which shall be of sufficient length to obtain sound and suitable fixing.

A-2.3.3 The end of the brackets shall be protected by brick work or concrete not less than 115 mm thick.

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