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प्रारंभिक मसौदा

16 अगस्त 2024

हमारा संदर्भः सीईडी 11/ टी-34

तकनीकी समिति: दरवाजे, खिड़कियाँ और शटर विषय समिति, सीईडी 11

सीईडी 11 के सभी सदस्य

महोदय/महोदया,

निम्नलिखित मानक का मसौदा संलग्न हैं:

प्रलेख संख्या	शीर्षक
सीईडी 11(26383)पी	**मेटल रोलिंग शटर और रोलिंग ग्रिल्स के लिए विशिष्टता के लिए प्रारंभिक ड्राफ्ट (आईएस 6248 का दूसरा पुनरीक्षण)** ICS 69.028.154

सम्मतियॉं भेजने की अंतिम तिथि: 15 सितम्बर 2024.

सम्मति यदि कोई हो तो कृपया अधोहस्ताक्षरी को उपरिलिखित पते पर संलग्न फोर्मेट में भेजें या ced11@bis.gov.in पर ईमेल कर दें ।

धन्यवाद ।

भवदीय,

(**प्रदीप सिंह शेखावत**)
सदस्य सचिव सीईडी 11
वैज्ञानिक 'डी' (सिविल इंजीनियरी)
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संलग्न : उपरिलिखित

भारतीय मानक ब्यूरो
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PRELIMINARY DRAFT

16 August 2024

Our Ref: CED 11/T-34

TECHNICAL COMMITTEE: Doors, Windows and Shutter Sectional Committee, CED 11

ALL THE MEMBERS OF CED 11

Dear Sir/Madam,

Please find enclosed the following document:

Doc No.	Title
CED 11(26383)P	**Preliminary Draft for Specification for Metal Rolling Shutters and Rolling Grills (Second Revision of IS 6248)** ICS 69.028.154

Last date for comments: **15 September 2024.**

Comments, if any, may please be made in the format as enclosed herewith and e-mailed to the undersigned at **ced11@bis.gov.in.**

Thanking you,

Yours faithfully,

(Pradeep Singh Shekhawat)
Member Secretary CED 11
Scientist 'D' (Civil Engineering)
E-mail: ced11@bis.gov.in
Telephone: 011-23608490

Encl: As above

FORMAT FOR SENDING COMMENTS ON BIS DOCUMENTS

(Please use A-4 size sheet of paper only and type within fields indicated. Comments on each clause/sub-clause/table/fig etc. be started on a fresh box. Information in column 3 should include reasons for the comments and suggestions for modified working of the clauses when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work) {Please e-mail your comments to **ced11@bis.gov.in**

***DOC. NO. & TITLE*: CED 11 (26383)P**

Preliminary Draft for Specification for Metal Rolling Shutters and Rolling Grills
(*Second Revision* of IS 6248)

ICS 69.028.154

LAST DATE OF COMMENTS: 15/09/2024.

NAME OF THE COMMENTATOR/ORGANIZATION: _____

Sl. No.	Clause/Para/Table/ Figure No. Commented	Comments/Modified Wordings	Justification of the Proposed Change

BUREAU OF INDIAN STANDARDS

Preliminary Draft Indian Standard

SPECIFICATION FOR METAL ROLLING SHUTTERS AND ROLLING GRILLS

(*Second Revision*)

FOREWORD

(*Formal Clauses will be added later*)

This Indian Standard (*First Revision*) was adopted by Standards Institution on 29 May 1979, after the draft finalized by the Doors**,** Windows and Shutters Sectional Committee had been approved by the Civil Engineering Division Council.

Rolling shutters are being largely provided at the entrances of shops, garages, go downs and even in workshops, power houses, mills and fact ones for affording protection and safety, Rolling grills, which operate on the same principle as rolling shutters, are being provided for showrooms and display windows for exhibiting any goods while ensuring safety. These may also be used in conjunction with rolling shutters where it is desired to have certain amount of ventilation combined with safety.

This standard was first published in 1971. In this revision modifications have been made regarding the size of the guide channel and material specifications. Besides, provisions have also been made for a square bar for extra tying of bracket-plate to guide channel.

This standard contains Appendix A which requires the purchaser to supply certain technical information at the time of placing orders.

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.

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.

Preliminary Draft Indian Standard

SPECIFICATION FOR METAL ROLLING SHUTTERS AND ROLLING GRILLS

(*Second Revision*)

1 SCOPE

1.1 This standard lays down the requirements regarding materials, fabrication and finish of metal rolling shutters and rolling grills for normal use both mechanical and motorised.

Note – Since the term 'rolling shutters' is more commonly used, the reference in this standard is mainly to rolling shutters. However, since rolling shutters and rolling grills are similar in design, construction -and operation, all references to rolling shutters in this standard shall apply to rolling grills also. A separate Clause (SW 9) dealing with the special features of from rolling shutters, has also been incorporated.

2 Terminology

For the purpose of this standard, the main component parts of rolling shutters shall be defined as given in **2.1** to **2.12** (*see* also Fig.1)

2.1 Bottom Lock Plate – The fabricated bar inserted at the bottom of rolling shutter curtain, so as to lie against the sill, including the slide bolts, pulling handles, etc.

2.2 Bracket Plates – The supporting plates at either end on the top, together with the U-shaped clamps supporting the entire moving Mechanism of the rolling shutter.

2.3 Crank Handle – The winding handle used for raising and lowering mechanical gear-operated rolling shutters through a bevel gear box.

2.4 Curtain – The main apron of the rolling shutter consisting of the assembly of lath sections with end-locking clips/self crimping and the connecting pieces at the top.

2.5 Guide Channels – The channels on either side in which the shutter moves up and down.

2.6 Hood Cover – A sheet metal cover bent into a suitable shape for covering the roller.

2.7 Lath Sections – The individual rolled interlocking laths or slats with which the rolling shutter curtain is assembled.

2.8 Overall Height – The distance between the sill and the top of the bracket plate of the Rollin, n shutter plus an allowance of not more than150 mm.

NOTE **–** The allowance is meant for taking care of the extra curtain height required for partly covering the roller in the closed position.

2.9 Overall Width – The outer distance between the backs of the two guide channels of the rolling shutter.

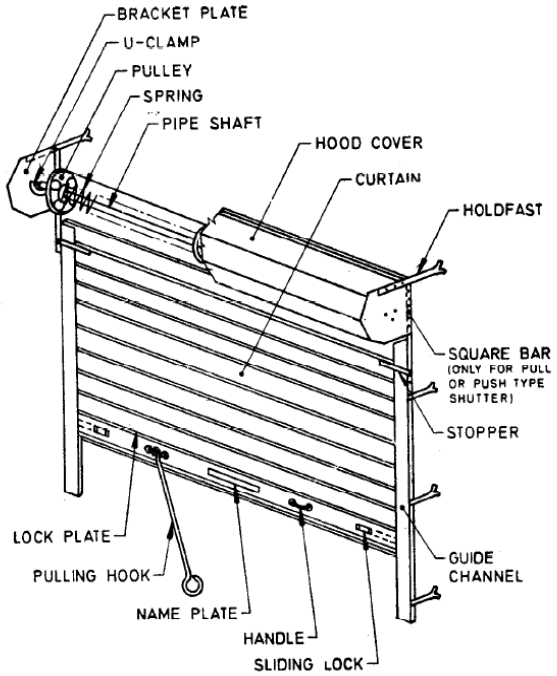


FIG. 1 COMPONENT PARTS OF SELF-COILING ROLLING SHUTTER

2.10 Pulling Hook – The steel rod shaped into a hook at one end and into a ring at the other, used for raising and lowering self-coiling type roiling shutters.

2.11 Roller – The entire rolling portion at the top of the shutter including the suspension shaft, the pulleys, the springs and ball bearing, if any.

2.12 Stopper Height – The stopper height of a rolling shutter shall be the height as measured from the sill to the bottom of the lock plate, when the rolling shutter is in the full open position.

3. SIZES

3.1 The size of a rolling shutter shall be denoted by specifying the clear width (W) shutter and the clear height (H) of the opening for which the rolling shutter is required, in the following manner, care shall be taken to mention the width first always:

2 500 (*W*) x 3 500 (*H*) mm

3.1.1 The clear size of rolling shutters shall be defined and identified as given in **3.1.1.1.**

3.1.1.1 Clear size-The clear size of a rolling shutter, to suit any opening, shall be arrived at by measuring the opening as follows:

a) Clear width – The clear distance between the two jambs of the opening.

b) Clear height – The clear distance between the sill and the soffit (bottom of lintel) of the opening.

NOTE – It is recommended that all openings for taking rolling shutters be designed with width and length rounded off to 0.2 m. rounded off to 0.2 m (0.05 m /50 mm)

3.2.2 Stopper Height – The maximum available stopper height shall be 10 cm less than the clear height of the rolling shutter, although special arrangements may be made for the stopper height to be equal to the clear height, in exceptional cases. The stopper height shall always be specified by the user, whenever there is a minimum height stipulation for the Clearance of vehicles, goods; etc., through the rolling shutter in the open position.

4 TYPES BASED ON POSITION OF FIXING

4.1 The different types of rolling shutters based on standard positions of fixing and the standard designations applicable to them shall be as given in Table 1 (*see also* Fig. 2).

5 TYPES OF SHUTTERS AND APPLICABLE SIZES

5.1 Rolling shutters shall be supplied in the following alternative types based on different methods of operation (*see* 8). The size range applicable to each type shall be as follows:

a) *Self-Coiling Type (Push-Pull Type or Manual Type)* – It shall be used up to a maximum of about 8 m^2 clear area without ball Bearings and up to a clear area of about 12 m^2 with ball bearings.

b) *Gear-Operated Type* (*Mechanical Type*) – It shall be fitted with ball bearings. It shall be used up to ‘a maximum of about 25 m^2 clear area if the rolling shutter is operated by a bevel gear-box and crank handle; and up to a maximum of about 35 m^2 clear area, if the rolling shutter is operated by chain wheel and hand chain, mounted directly on the worm shaft.

c) Electrically Operated Rolling Shutters – As given in 8.3

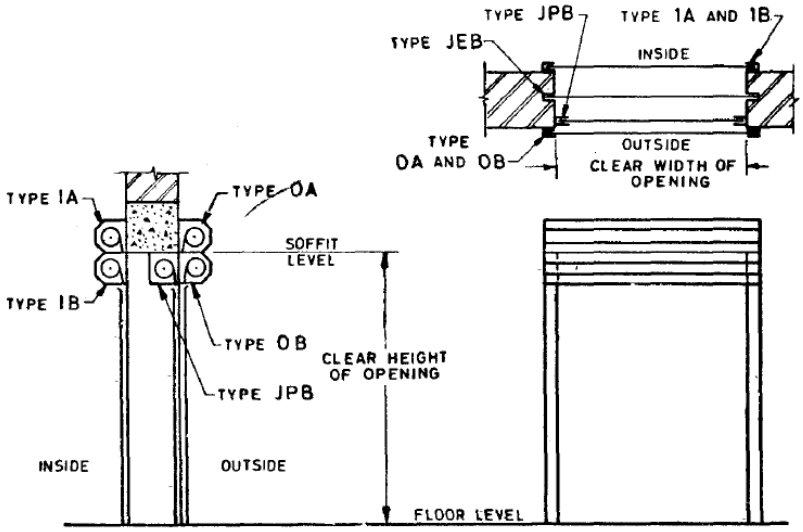


FIG. 2 METHOD OF FIXING ROLLING SHUTTERS

6 MATERIALS

6.1 Cold-Rolled/Galvanized/SS/Aluminium Steel Strips – Material for rolling shutter lath sections shall be one of the following:

a) Cold-rolled steel strips used for rolling shutter lath sections shall conform to temper No. 5, dead soft quality of IS 4030: 1973.
b) Galvanised steel as per IS:277:2018
c) Stainless steel of 300 series shall conform to IS 6911 : 2017
d) Aluminium alloy sheets to be used for curtain lath, shall conform to 52000 (NS 4), 53000 (NS 5) or 64430 (HS 30) of IS : 737 : 2008.
e) Aluminium alloy extrusion to be used for curtain lath, aluminium shall conform to 53000 (NE5) or 64430 (HE 30) of IS: 733 : 2008.

Note: Aluminium curtains offer less stiffness and therefore less security. Aluminium curtains are less in weight and ease in operation. It is suitable for indoor uses than as shutters in peripheral walls.

6.2 Mild Steel Sections – Material for rolling shutter side guide, brackets and lock plates, bottom profile can be a combination of one of the following material

a) Mild steel as per IS 5986: 1970 & IS 513
b) Galvanised steel as per IS 277: 2018

~~sheets and plates used for manufacturing the guide channels, brackets and lock plate shall be of hot-rolled steel of thickness not less than 3.15 mm and shall be free from surface defects and edges cleanly sheared as per IS 5986: 1970.~~

TABLE 1 TYPES OF SHUTTERS BASED ON STANDARD POSITION OF FIXING
(*Clauses*)

DESIGNATION	REPBERENTING	DESCRIPTION
(1)	(2)	(3)
Type IA	Inside and above soffit	With guide channels overlapping the jambs on the inside face of the wall on either side and with the roll on the face of the lintel inside.
Type IB	Inside and below soffit	With guide channels as in Type IA, but with the roll below soffit level inside.
Type OA	Outside and above soffit	With guide channels overlapping the jambs on the outside face of the wall on either side and with the roll on the face of the lintel outside
Type OB	Outside and below soffit	With guide channels as in Type OA, but with the roll below soffit level outside (where sunshades, CHAJJAS, etc., project from the soffit level
Type JPB	Jamb, projecting and below soffit	With guide channels projecting into the opening in front of the jambs and with the roll mounted in between the jambs just below soffit level (for example, when a large opening is surrounded by concrete columns on either side and a concrete beam on top)
Type JEB	Jamb, embedded and below soffit	With guide channels embedded inside the jambs in groove sand

		with the roll mounted in between the jambs (slightly recessed at the top) just below soffit level. The exact position where the guide channel is to be embedded in the thickness of the wall is left to the preference of the user, as it will not affect the fabrication.

6.3 Steel Pipes – Mild steel pipes used for the suspension shaft of the roller shall be heavy duty pipe suitable for mechanical purposes and shall conform to IS: 1161.2014.

6.4 Cast Iron Castings – Cast iron castings used for roller pulley wheels, U-clamps and bevel gears shall be free from blow & holes, surface defects, such as cracks, burns, etc., and shall conform to Grade FG 150 of IS: 210 :2009.

6.5 Springs -The springs used in the roller for counterbalancing the rolling shutter shall be made either from high tensile spring steel wire or flat spring steel strip. Not applicable for electrically operated rolling shutter

6.5.1 The spring steel wire used for helical spring shall conform to Grade SL or SM of IS: 4454 (Part I):2001.

6.5.2 Flat spring steel strip used for spiral spring shall be from 0.8 to 1.0 percent carbon steel strip, specially hardened and tempered.

6.6 Malleable Cast Iron – Malleable Cast Iron used for clips shall conform to IS: 2108-1977.

6.7 Aluminium Alloy Sheets - Aluminium alloy sheets to be used for curtain in case of rolling shutters / grills, shall conform to 52000, 53000 or 64430 of IS : 737:2008.

6.8 Aluminium Alloy Extrusions - Aluminium alloy extrusion for the, components of rolling shutters of aluminium shall conform to 53000 or 64430 of IS: 733-2008.

7 Fabrication

7.1 Curtain - The curtain shall be built up of interlocking lath section formed from cold-rolled/Galvanized steel: strips (see 6.1). The thickness of .the sheets from which the lath sections have been rolled shall be not less than 0.800 mm for shutters up to 3.5 m width and not less than 1.20 mm for, shutters above 3.5 m width. If stainless steel sheet is used sheet thickness shall not be less than 0.80mm for shutters upto 3.5 m width and 1.00mm for shutters more than 3.5m. Curtain above 9 metres in width should be divided into 2 parts with provision of one middle fixed or movable guide channel or

supported from the back side to resist wind pressure. The lath section shall be rolled so as to have interlocking curls at both edges and a deep corrugation at the centre with a bridge depth of not less than 12 mm to provide sufficient curtain stiffness for resisting manual pressure and normal wind pressure (see Fig. 3). Each lath section shall be continuous single piece without any welded joint. When interlocked, the lath sections shall have a distance of 75 mm between rolling centres, although lath Sections with 50 mm and 25 mm rolling centres may be used for special purposes, like small show windows, bus windows, etc. Each alternate lath section shall be fitted

If aluminium sheets or extrusion is used, section or profile shall be as agreed between the manufacturer and purchasers. If the extrusion profile has any tubular area it may be filled with poly urethane foam or polystyrene if any thermal insulation is required if required so by purchaser. The profile of lath for the curtain shall be so selected that, when assembled, the curtain does not deflect excessively resulting in release from the guide channels and limited to a deflection of 10mm at its centre of width from its normal straight position when loaded. This shall be tested by keeping the assembled curtain horizontally, supported in the guide channels by inserting at both ends and loading the curtain with 100 kg/m along the centreline of the width. When loaded for 1 minute, the curtain shall not release from the guide channel and deflection along the loading line shall not be more than 10mm. Full height of the curtain need not be tested but a minimum of 1m of assembled laths and width being the full assembled width of the curtain.

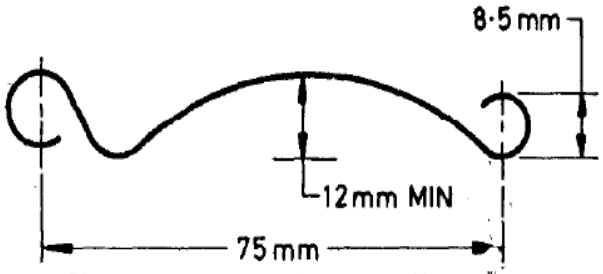


FIG. 3 TYPICAL LATH SECTION

7.2 Lock Plate - A fabricated lock plate of riveted construction made of mild ‘steel sheet of not less than 3.15 mm thickness, reinforced with mild steel angle section of not less than 35 x 35 x 3.15 mm size at the bottom, shall be interlocked with bottommost lath section of curtain so as to provide contact against the sill, when closed. Alternatively, the lock plate may also be fabricated out of unequal mild steel angles or ‘T’ section, of size minimum 50 x 50 x 5mm. The lock plate shall be fitted with sliding bolts at either end to engage with suitable receiving pockets at the bottom of guide channels. The sliding bolts shall be capable of being locked by means of padlocks both from outside and inside. The lock plate shall also be provided with pulling handles, one handle for widths up to 2.5 m and two handles for widths of above 2.5 m. Pulling handles shall be fixed on both the interior side and exterior side of the lock plate.

7.3 Guide Channels

7.3.1 The guide channels shall be of mild/Galvanized steel deep channel section and of rolled, pressed or built up (fabricated) construction. The thickness of the sheet used shall not be less than 3.15 mm. The depth of the guide should be such that there is sufficient clearance between the curtains ‘and the inner surface of the guide to avoid any rubbing or obstruction for free movement of the curtain. The curtain shall project into the guide a least 40 mm up to 3.5 m width and 60 mm for greater width and there shall be a clearance of 10 mm minimum between the guide wall and the end clips of the curtain to permit free movement of the curtain under nor wind pressure. Where the shutter is installed in heavy wind zones special wind locking arrangements shall be provided to prevent the curtain coming out of the guide.

7.3.1.1 –The gap, on either side, between the edge of curtain and the inside edge of the guide channel shall be about 5 mm to allow for the free movement of the curtain and at the same time to prevent rattling of the curtain due to wind.

7.3.1.2 – Size of the guide channel – The depth and width of the channel shall be as under:

a) Depth

Clear width of shutter	Depth of guide channel, mm
Up to 3.5 m	65 mm
3.5 m up to 8 m	75 mm
8 m and above	100 mm

b) Width of guide channel shall be 25 mm for lath sections with bridge depth of about 12 mm and 32 mm for lath sections with Bridge depth of about 16 mm.

7.3.2 Each guide channel shall be provided with a minimum of three fixing cleats or supports for attachment to the walls or column by means of bolts or screws. The spacing of cleats shall not exceed 0.75 m. Alternatively, the guide channels may also be provided with suitable dowels, hooks or pins for embedding in the walls.

7.3.3 The guide-channels shall be attached to the jambs, plumb and true, either in the overlapping fashion, projecting fashion or embedded in grooves, depending on the method of fixing.

7.3.4 For DA and OB Type fixings, the guide channels shall have a box welded on at the bottom to conceal the end of the slide bolt.

7.4 Brackets Plate - The bracket plate shall be fabricated out of mild steel of 3.15 mm thickness (minimum), thicker plates may be used depending upon the height of, shutter. The size of the bracket plate for different heights of rolling shutters shall be as follows:

Clear Height	Site of Bracket Plate, Min
m	mm x mm x mm

Up to 2.3	300 x 300 x 3.15
Above 2.3 and up to 2.6	325 x 325 x 3.15
Above 2.6 and up to 3.0	350 x 350 x 3.15
Above 3.0 and up to 3.5	375 x 375 x 3.15
Above 3.5 and up to 4.5	400 x 400 x 6
Above 4.5 and up to 5.5	450 x 450 x 6
Above 5.5 and up to 6.5	500 x 500 x 10
Above 6.5	To be designed

The bracket -plate shall be of hexagonal, square or circular contour. The bracket plate shall have fitted at the centre a U-shaped cast iron or mild steel clamp riveted or welded to it. Since the .bracket plate carries the full load of the shutter, it should have sufficient cross-sectional area to resist the shear force and it shall be held in position rigidly by means of suitable foundation bolts. In the case of push and pull shutter, extra tying of the bracket plate to the guide channel is provided by means of a square bar not less than 20 mm size (*see* Fig. 4).

7.4.1 This square bar shall be welded on to the back of the guide channel for a length of at least 20 cm. The bracket plate shall then be attached to the top of this square bar by means of 6 mm, countersunk rivets at a spacing of not more than 100 mm. An angle 40 x 40 x 6 mm split at one end is firmly riveted or welded at the top line of the bracket so that this will act as a foundation holdfast. The angle shall extend at least 20 cm from the edge of the bracket plate. This angle is grouted firmly into the wall with the split end of the angle well buried in concrete.

7.4.2 When the bracket is to be fixed on concrete the angle is suitably bent and fixed to the concrete beam or lintel with anchor sleeves and bolts of at least 16 x 75 mm size.

7.4.3 A stopper made out of 40 x 6 mm flat is bolted on to the square bar so that the lock plate may be arrested from going beyond the limit.

7.5 Roller

7.5.1 The suspension shaft of the roller shall be made of steel pipe conforming to, heavy duty of IS 1161:2014* and of sufficient diameter so as to testis deflection due to the weight of the rolling shutter. The Deflection shall not exceed 5 mm per metre width. The recommended Sizes of pipes for various widths of rolling shutters/ grills are given below; the height of the shutter being limited to a maximum other than those given below, the size of shaft shall be designed taking into consideration the permissible deflection:

Width	Size of Pipe
Up to 2m	32 mm nominal bore
Up to 3m	40 mm nominal bore
Up to 6m	50 mm nominal bore

7.5.1.1 The pipes of the suspension shaft which are clamped to the brackets shall be fitted with rotatable cast iron pulleys to which the curtain is attached, the pulleys and

the pipe of pretensioned helical springs to counterbalance the weight of the curtain and to keep the shutter in equilibrium in any partly opened position.

7.5.2 When the width, of the opening is greater than 3.5 m, the pulleys shall be interconnected with a cage formed out of mild steel flats of at least 32 x 6 m and mild steel dummy rings made of similar flats so that the torque is distributed uniformly. In such cases, self-aligning two row ball bearings shall be provided with special cast iron castings at the extreme pulleys at either ends. The caging rings shall have a minimum spacing of 15 cm and there shall be at least 4 number flats running throughout the length of the roller.

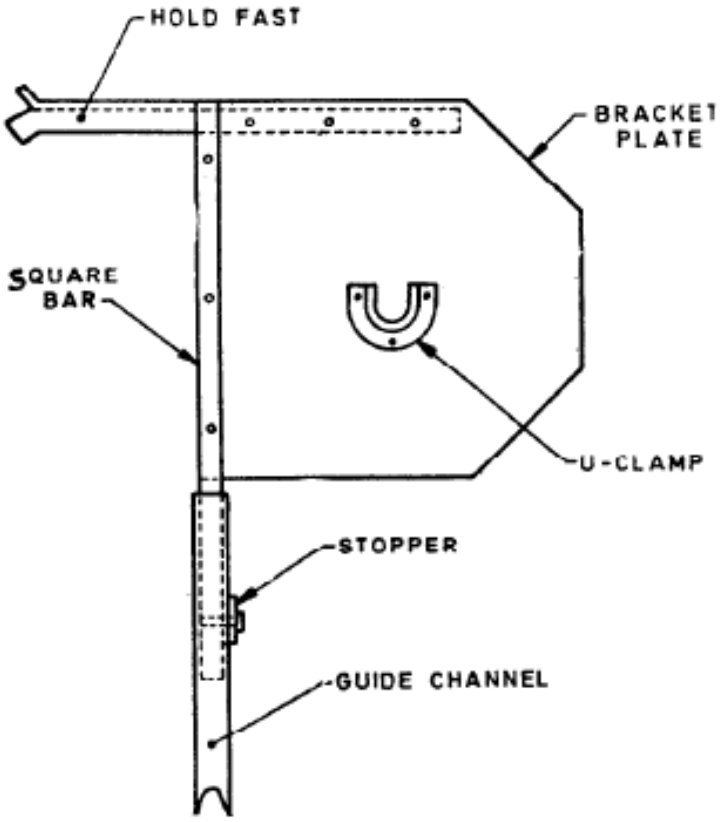


FIG. 4 DETAILS OF SQUARE BAR FIXTURE

FIG.4 DETAILS OF SQUARE BAR FIXTURE.

7.5.3 In the case of shutters for larger openings where the operation of the shutter is carried out using mechanical gear [see 5.1(b)] the roller shall be fitted with a pinion wheel at one end which is in contact with a worm fitted to the bracket plate. In this case also the pulleys shall be interconnected with caging as in **7.5.2**, with two ball bearings.

7.6 Hood Covers – Hood cover shall be made of mild/Galvanized steel sheets not less than 0.900 mm (0.8mm) thick. They shall be of hexagonal, square or circular contour depending on the contour of the bracket plate.

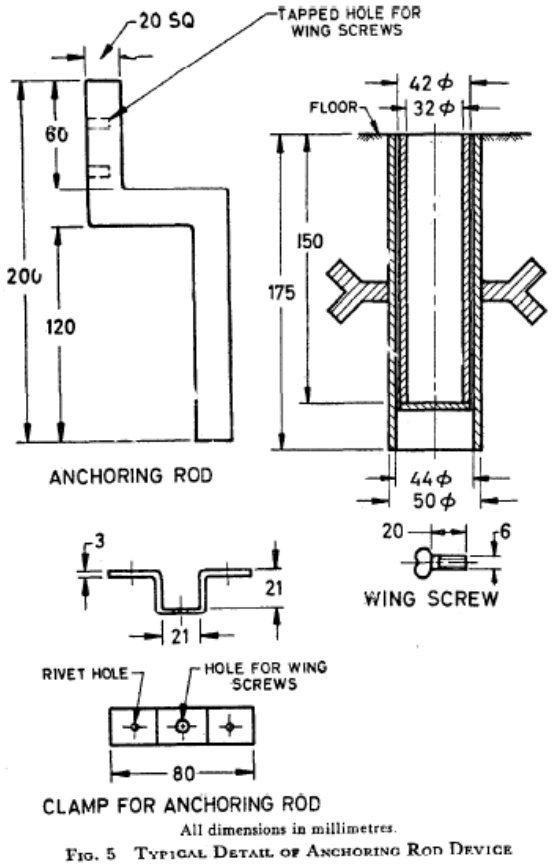
7.6.1 The hood cover shall be stiffened with angle or flat stiffeners at top and bottom edges to retain shape. The hood cover shall be fixed to the bracket plate by means of angle cleats and supported at the top at suitable intervals for preventing sagging.

7.7 Gears Worms, etc. - All gears, worms, etc., used in the assembly of the roiling shutters shall be machine-cut. Worm gear wheels shall be of High grade cast iron or mild steel or phosphor bronze. The worms shall be of mild steel or gun-metal or phosphor bronze.

7.8 Fixing Bolts - All fixing bolts shall be of good quality and adequate strength and at sufficiently close pitch to ensure strength and rigidity of the rolling shutter after erection.

7.9 Safety Devices - For width up to 2.5 m, a properly fabricated and Reinforced bottom lock plate shall be provided to give protection. For widths above 2.5 m, one or both of the safety devices mentioned in **7.9.1** and **7.9.2** may be provided.

7.9.1 *Anchoring Rods*– A crank shaped rod, filled with clamp, behind Bottom lock plate shall be provided-by means of removable wing screws (see Fig. 5). There shall be -a suitable pocket on the sill of the opening, lined with two close fitting pipes of approximate1.y 150 mm length for receiving bottom end of the anchoring rod to a length of at least 100mm.



All dimensions in millimetres.

FIG. 5 TYPICAL DETAIL OF ANCHORING ROD DEVICE

Of the two pipes, the outer pipe shall be grouted to the floor and thinner pipe shall be removable and. have a closed bottom to enable any dust accumulation to be cleared, periodically. The pipes shall be embedded in the sill so as not to project above the sill surface. Anchoring rods shall be provided at the rate of one per extra 2.5 m width or part thereof above a clear width of 2.5 m. Anchoring rods prevent the bottom lock plate from being pulled forward by tampering instruments, such as pullers used by burglars. The anchoring rod may be removed from the bottom lock plate, when opening the shutter, so as not to cause any obstruction in the door way and May then be replaced when closing the shutter.

7.9.2 *Central Hasp and staple* – In case of shutters of large width an additional safety device is necessary in order to cut down the unsupported length of the bottom lock plate to prevent tampering. This shall be achieved by providing a central hasp and staple outside at the centre of the bottom lock plate. The hasp shall be grouted on the ground so as to be in level with the sill and thus not to cause any obstruction. The staple shall be fitted at the centre of the bottom lock plate outside at a correct position so that the hasp may properly engage with the staple when the shutter is in the closed position and bottom lock plate lies against the sill. Normally, one central hasp and staple outside will be sufficient for any width of door.

7.10 Optional Features

7.10.1 *Intermediate Posts or Mullions* - Intermediate posts or mullions may be of the fixed, removable or sliding type and are used for sectionalizing the rolling shutters for multiple door installations or unusually wide openings. These mullions form the guide channels between the various sections of the rolling shutters. The sliding mullions may also be of the winch operated type for large sizes. The intermediate posts or mullions shall be fitted so as to be plumb and true, when placed in position before closing the rolling shutters.

7.10.2 *Wicket Doors* - Where required by the purchasers for main entrances of mills, feretories, etc., a subsidiary door known as the ‘wicket door’ may be provided. The wicket door is a hinged service door provided in the-rolling shutter for affording pedestrian access without opening the rolling shutter when it is closed. The wicket door may be of 600x1200 mm size for large mm size, for ordinary use, and 900 **x** 1 800 mm size for large installations. Larger size wicket doors are not recommended as ‘these cause difficulties in installation and operation. The wicket doors shall be of robust construction 2nd shall be fitted with a good lever lock operated by key, Lockable both from inside and outside. The wicket doors shall be erected in such a way as not to foul with the main rolling shutter when opening or closing. The wicket doors shall be swung clear of the opening before the rolling shutter is raised or lowered.

7.10.3 *Safety Lever Locks* - In addition to the padlock arrangement, one pair of safety lever locks may be fitted on either end of the bottom lock plate so as to secure the slide bolts in the closed position for extra Security.

7.10.4 *Galvanizing* - In order to deal with the problem of corrosion in the vicinity of the sea, in chemical factories, etc., the lath sections, the guides, the lock plate, the bracket plates, the suspension shaft and the hood cover may be hot-dip galvanized with a zinc coating containing not less than 97.5 percent pure zinc. The weight of the zinc coating

shall be not less than 230 g/ m^2 and the coating shall be free from flaking or peeling [see IS: 1477 (Part I)-1971].

8 OPERATION

8.1 Self-Coiling Type Rolling Shutters - Self-coiling type rolling shutters shall be raised or lowered manually by means of a puffing hook applied to the pulling handles fixed on the bottom lock plate. The length of the pulling hook shall be adequate to push the bottom lock plate to the top most position with ease (see Fig. 1).

8.2 Gear-Operated Type Rolling Shutters - Gear-operated type rolling shutters ordinarily employ a worm drive arrangement, the worm driving the worm wheel attached to one end of the roller. Worm drive is preferred in view of its irreversible nature, which provides a safeguard against any accidental downward descent of the curtain due to failure of the springs.

8.2.1 *Gear-* operated type rolling shutters shall be operated: (a) by means of bevel gear box and crank handle or, and (b) by a chain wheel and endless hand chain mounted directly on the worm shaft (see Fig. 6A and 6B) respectively. The bevel gear box shall be mounted on the wall adjacent to the shutter at a height of approximately 0.85 m from the floor. The gear box shall operate the worm by a straight shaft connecting the top of the gear box and the worm. The crank handle of the gear box shall be detachable. If so desired by the customer, the crank handle operation shall be provided on both sides of the wall by extending the horizontal shaft of the gear box jacquards and providing an extra crank Handle at the back of the wall. Chain wheel and hand chain operation May also be provided from both sides, if needed. The endless h, nil chain shall hang to a distance of approximately 0.85 m from the floor level. The gear reduction snail Abe calculated to reduce the pressure exerted, on the crank handle or the pull exerted on the hand chain to not over 16 kg.

8.3 Electrically Operated Rolling Shutters - Electrically operated rolling shutters shall be operated by an electric motor operating on 400/ 440 V, 3 phase or 230 V, 1-phase and 50 cycles ac supply. The electric motor shall drive the worm shaft by chain or Vee-belt drive or through a reduction gear box. The reduction gear box shall have a control lever within easy reach from the floor so that the motor may disengaged and the auxiliary chain gear operating mechanism may be engaged instantly in the event of power failure. Alternatively hand chain mechanism to be provided. The motor unit shall be so mounted that the motor may be completely removed without interfering with the operation of the rolling shutter or the auxiliary drive. The electric drive shall be so designed as to limit the speed of movement of the curtain in either direction to not more than about 10 cm/s (see Fig. 6 C).

8.3.1 The controls provided for the electric motor shall include push button control through the medium of a 3-phase / 1-phase reversing starter with interlocking contractors and overload protection. The reversing starter/push button shall be wall-mounted and fitted adjacent to the shutter in a convenient position. A minimum of 3 phase buttons marked ‘Forward ‘, ‘Reverse & ‘, ‘Stop’ or ‘Up’, ‘Down’, ‘Stop’ shall be provided with a mechanical locking arrangement to prevent unauthorized or irregular

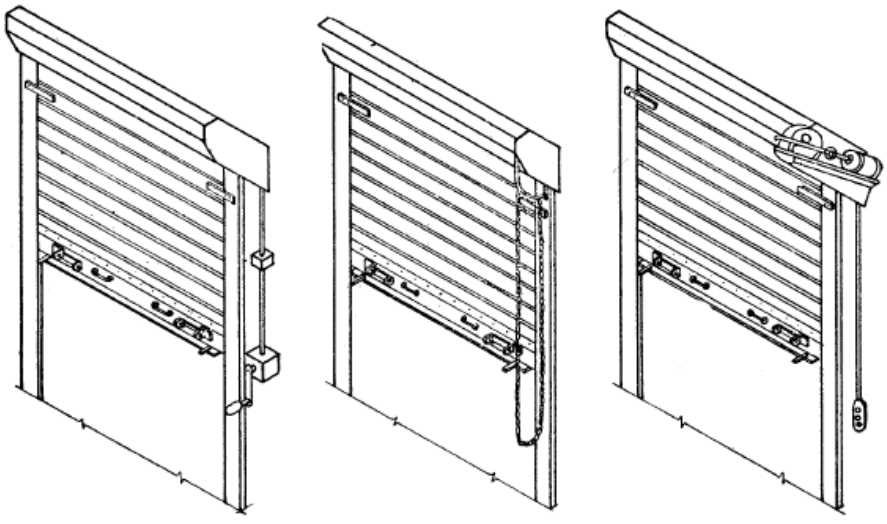
operation of the push buttons. Limit switches shall be provided to cut coil's current to the motor when the rolling shutter reaches the limit of its travel in the 'Up' and 'Down' directions.

8.3.2 Arrangement shall also be provided for emergency mechanical operation of the rolling shutter in the event of failure of electricity or electrical equipment. The emergency mechanical potation shall be by an auxiliary chain wheel and hand chain drive on the worm shaft.

9 ROLLING GRILLS

9.1 Rolling grills are similar .in design, construction and operation to rolling shutters and consequently all the provisions applicable to rolling shutter apply equally to rolling grills, except in respect of the curtains. Rolling grill curtains may be built of aluminium alloy (see **6.7** and **6.8**) of suitable profile / section or cold-rolled steel sheet links of 0.90 mm thickness assembled on tubes or rods. Grills may also be manufactured out of 8 mm diameter mild steel or aluminium alloy round bars.

9.1.1 Rolling grill links may be manufactured in a number of designs to suit manufacturer's convenience and customer's preference as also the purpose, the degree of safety required, etc. The details of fabrication and



6A Gear-Operated Type with Crane Handle

6B Gear-Operated Type with Chain Wheel and Hand Chain

6C Electrically Operated Type

FIG. 6 OPERATION OF SHUTTER

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Assembly of the rolling grill curtain depend on the actual type of links Chosen. The function of a rolling grill is to provide visibility and/or ventilation, where necessary. At the same time, it provides less protection and less safety as compared to a rolling shutter. This factor shall be borne in mind when specifying rolling grills

9.2 Rolling Shutter-cum-Grill - In situations where a certain amount of ventilation combined with safety is called for, for example, in transformer rooms, sub-stations,

etc., the rolling shutter may have a small rolling grill portion either at the top or at the bottom or at both places. The height of the grill portion shall be a maximum of 0.5 m.

10 PROTECTIVE COATING

10.1 All component parts of the rolling shutter (excepting sprigs and the inside of guide channels) shall be given one coat of a brushing quality ready mixed primer conforming to IS: 102-1962 before despatch. Where a rust inhibiting quality of paint is called for, a zinc chromate primer shall be used. The portions to' a rolling shutter where there is contact between aluminium and steel shall be panted with a zinc chromate primer to avoid possibility of corrosion due to electrolytic action [see IS: 1477(Part I)-1971 and IS 1477 (Part 2):1971.

10.1.1 Phosphate treatment may be given prior to painting, if required, by mutual agreement between the purchaser and the supplier.

10.1.1 Alternatively, all component parts of the rolling shutter (excepting sprigs and the inside of guide channels) shall be powder/ PU/Pre-painted coil coated, minimum 70 micron thickness (IS 13871). Colour may be as agreed between the manufacturer and purchaser.

11 PACKING

11.1 The rolling shutter curtains can be packed and shipped as an assembly or in slats ready to be assembled at site. Assembled rolling shutter curtain and bottom lock plate shall be interlocked together and rolled in one piece, and wire bound at the point of manufacturing before dispatch.

Manufacturers supplying slats to in knock down form for assembly at site shall pack the same in sets of individual packs and ship it along with other components. The other parts like guide channels, bracket plates, rollers, etc., shall be despatched separately. Small parts like bolts and nuts, rivets, keys, fixing screws, etc., shall be separately packed in a bundle. If necessary, the component of the rolling shutter may be crated to prevent scratching of material and paint and for safe handling in transit, at the option of the purchaser.

12 MARKING

12.1 Each shutter shall be clearly and legibly marked with the following information:

a) Manufacturer's name or trade-mark, if any;
b) Serial number for traceability, if any;
c) Sizes in width x height; and
d) Year of manufacture.

12.1 The shutter may also be marked with the Standard Mark

Note –The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard 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 which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked. By BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the standard mark may be obtained from the Bureau of Indian Standards.

ANNEX -A
(Clause 0.3)
INFORMATION TO BE SUPPLIED BY THE PURCHASER WHILE PLACING THE ORDER

A-1. The purchaser shall furnish information to the manufacturer or the supplier in regard to the following points:

a) Clear width and clear height of the opening, together with a Drawing of the opening, if possible (see 3.1.1);

b) Special stopper height to be stipulated, if any;

c) Material of lath section, thickness of lath section required, that is, 0.900 mm or 1.25 mm in case of steel sheets; 0.8mm or 1.00 mm in case of stainless steel; aluminium sheet or extrusion.

d) Position of fixing (see **4**);

e) Type of shutter required, that is, self-coiling type or gear operated type or electrically-operated type (see 5.1);

f) Protective coating required (See 10);

g) Details of contraction or masonry around the opening, that is, whether brick masonry, stone masonry, concrete or structural steel;

h) Details of any beams, sunshades, etc., that may be present near the opening, either parallel to it or perpendicular to it, with the clearance, etc.

i) Thickness of wall or column, where gear-operated shutters require crank handle or chain gear operation both from inside and outside; and

j) Special or optional features required, if any (see Note to 6.1 and 7.10).