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SPECIFICATION FOR ALUMINIUM DOORS, WINDOWS AND VENTILATORS

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

Gr 8 *April* 1962

Indian Standard

SPECIFICATION FOR ALUMINIUM DOORS, WINDOWS AND VENTILATORS

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Indian Standard

SPECIFICATION FOR ALUMINIUM DOORS, WINDOWS AND VENTILATORS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 2 November 1961, after the draft finalized by the Doors, Windows and Building Furniture Sectional Committee had been approved by the Building Division Council.

0.2 This Specification is an adjunct to IS: 1038-1957 Specification for Steel Doors, Windows and Ventilators, which covers requirements of steel doors, windows and ventilators for use in buildings. With the increasing use of aluminium alloy extruded sections in the manufacture of aluminium doors, windows and ventilators, it was felt that the requirements of such units be covered in a separate standard.

0.3 The sizes of aluminium doors, windows and ventilators and other requirements and details are identical to those of steel doors, windows and ventilators unless otherwise indicated.

0.4 The Sectional Committee responsible for the preparation of this standard has taken into consideration the views of producers, consumers and technologists and has related the standard to the manufacturing and trade practices followed in the country in this field. Due weightage has also been given to the need for international co-ordination among standards prevailing in different countries of the world in this field.

0.5 This standard is one of a series of Indian Standards on metal doors and windows. Other standards in the series are:

*IS: 1038-1957 SPECIFICATION FOR STEEL DOORS, WINDOWS AND VENTILATORS

IS: 1081-1960 CODE OF PRACTICE FOR FIXING AND GLAZING OF METAL (STEEL AND ALUMINIUM) DOORS, WINDOWS AND VENTILATORS

IS: 1361-1959 SPECIFICATION FOR STEEL WINDOWS FOR INDUSTRIAL BUILDINGS

IS: 1949-1961 SPECIFICATION FOR ALUMINIUM WINDOWS FOR INDUSTRIAL BUILDINGS

0.6 Wherever a reference to any Indian Standard appears in this specification, it shall be taken as a reference to the latest version of the standard.

0.7 Metric system has been adopted in India and all quantities and dimensions appearing in this standard have been given in this system.

0.8 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.

0.9 This standard is intended chiefly to cover the technical provisions relating to aluminium doors, windows and ventilators, and it does not include all the necessary provisions of a contract.

*Since revised.

1. SCOPE

1.1 This standard covers the requirements regarding material, fabrication and dimensions of aluminium doors, windows and ventilators manufactured from extruded aluminium alloy sections of standard sizes and designs, complete with fittings, ready for being fixed into the buildings. This standard does not cover the requirements for industrial doors, windows and ventilators.

2. TERMINOLOGY

2.1 For the purpose of this standard, the components of doors, windows and ventilators shall be defined as illustrated in Fig. 1.

3. HANDING

3.1 The side-hung opening position of all doors and windows shall be said to be right-hand or left hand according to the side on which they are hinged looking from the inside (*see* Fig. 2).

4. STANDARD SIZES, TOLERANCES AND DESIGNATIONS

4.1 Sizes — The types and the overall sizes of aluminium doors, windows and ventilators shall be as given in Fig. 3 (*see* P 4).

4.1.1 The dimensions shown are overall heights and widths to the outside of frames of aluminium doors, windows and ventilators. These sizes are derived after allowing 1·25 cm clearance on all

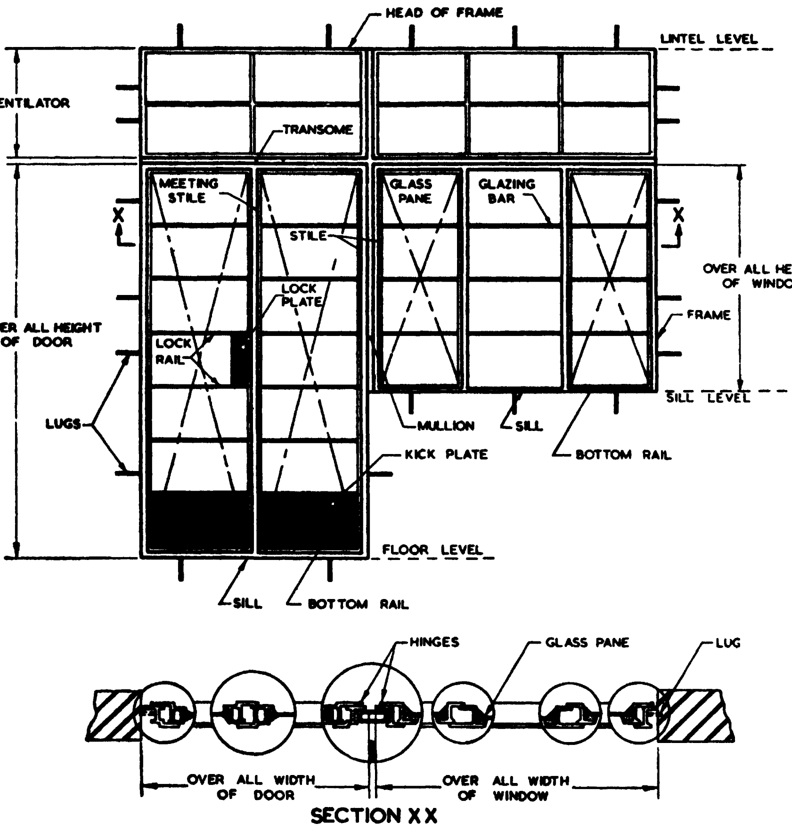


FIG. 1 TERMINOLOGY FOR ALUMINIUM DOORS, WINDOWS AND VENTILATORS

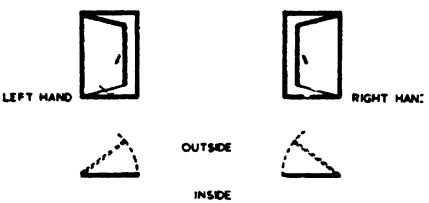


FIG. 2 HANDING OF DOORS AND WINDOWS

the four sides for the purpose of fitting the doors, windows or ventilators into modular openings (*see* Fig. 4 on P 5).

4.2 Tolerances — The sizes for door, window or ventilator frames shall not vary by more than ± 1·5 mm.

4.3 Designation — Doors, windows and ventilators shall be designated by symbols denoting their width, type and height in succession in the following manner:

a) *Width* — It shall be indicated by the number of modules in the width of opening.

b) *Type* — It shall be indicated by the following letters of alphabet:

C = Centre-hung shutters,

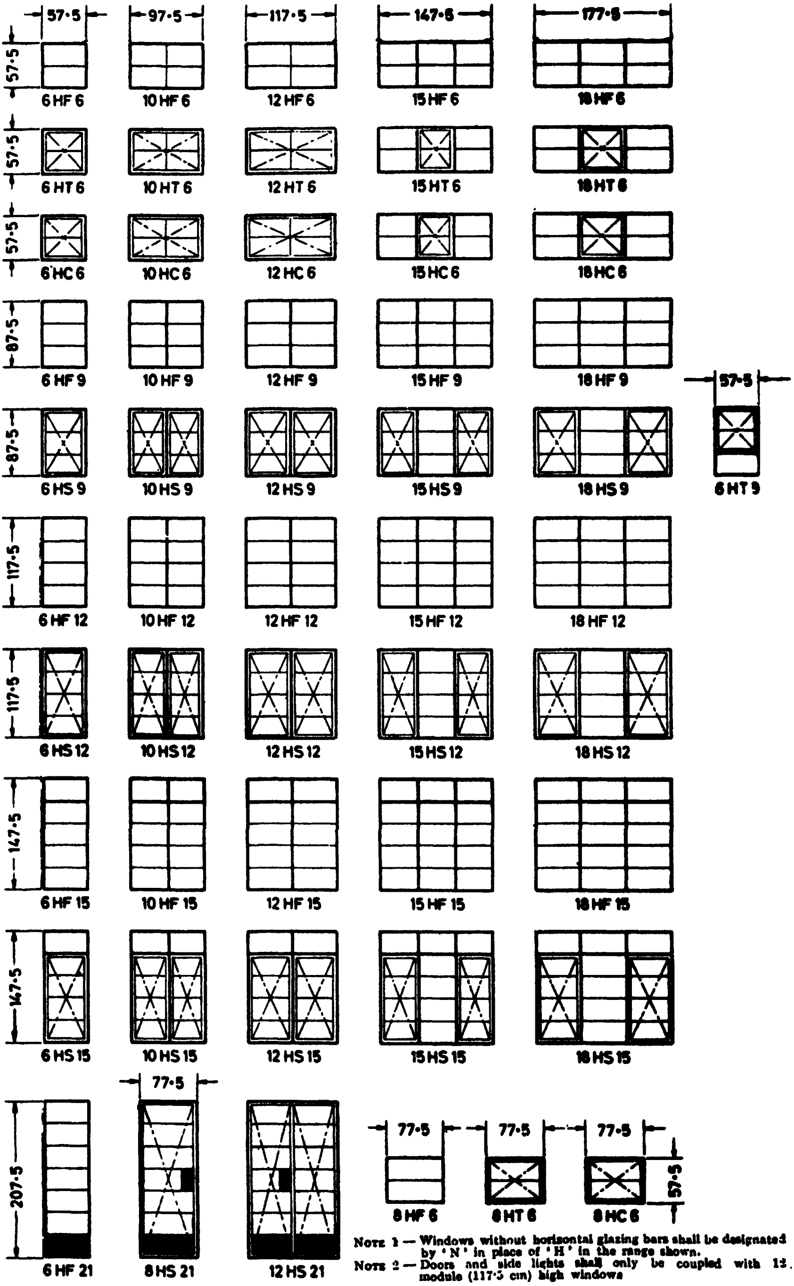
F = Fixed-glass panes,

H = With horizontal glazing bars,

N = Without horizontal glazing bars,

S = Side-hung shutters, and

T = Top-hung shutters.



NOTE 1 — Windows without horizontal glazing bars shall be designated by 'N' in place of 'H' in the range shown.

NOTE 2 — Doors and side lights shall only be coupled with 12 module (117·5 cm) high windows.

All dimensions in centimetres.

FIG. 3 TYPES AND SIZE OF ALUMINIUM DOORS, WINDOWS AND VENTILATORS

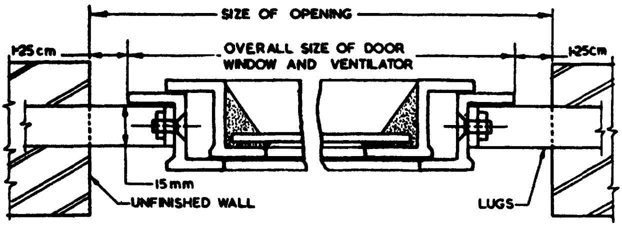


FIG. 4 SIZE OF ALUMINIUM DOORS, WINDOWS OR VENTILATORS IN RELATION TO SIZE OF OPENING

c) *Height* — It shall be indicated by the number of modules in the height of opening.

Example:

A window of a width of 10 modules (97·5 cm) and height 9 modules (87·5 cm), having horizontal glazing bars and side-hung shutters is designated by 10HS9.

4.3.1 Composite doors, windows or ventilators shall be designated in the following manner:

a) A 12 module wide and 21 module high horizontally glazed side-hung door coupled on its two sides with two side-hung horizontally glazed windows 6 module wide and 12 module high is designated by 6HS12/12HS21/6HS12.

b) Two 10 module wide and 12 module high horizontally glazed side-hung windows coupled side by side with two fixed glass pane ventilators at top, each 10 module wide and 6 module high, is designated by

$$\frac{10HF6/10HF6}{10HS12/10HS12}$$

5. MATERIALS

5.1 Aluminium Alloy Extruded Sections

5.1.1 Aluminium alloy used in the manufacture of extruded window sections shall correspond to IS Designation HE9-WP of *IS : 733-1956 Specification for Wrought Aluminium and Aluminium Alloys, Bars, Rods and Sections (For General Engineering Purposes). **Hollow aluminium alloy sections used shall conform to IS Designation HV9-WP of *IS : 1285-1958 Specification for Wrought Aluminium and Aluminium Alloys, Extruded Round Tube and Hollow Sections (For General Engineering Purposes).**

5.1.2 Dimensions and weight per metre run of the extruded sections shall be as given in Fig. 5 (*see* P 6).

5.2 Coupling Sections — Aluminium alloy coupling sections used shall conform to IS Designation HV9-WP of *IS : 1285-1958 Specification for Wrought Aluminium and Aluminium Alloys, Extruded Round Tube and Hollow Sections (For General Engineering Purposes). They shall conform to the dimensions shown in Fig. 5.

*Since revised.

5.3 Glass Panes — Glass panes shall weigh at least 7·5 kg/m² and shall be free from flaws, specks, or bubbles. All panes shall have properly squared corners and straight edges. The sizes of the glass panes for use in doors, windows and ventilators shall be as given in Table I.

NOTE — The metal doors and windows industry has followed the practice of the glazing industry in specifying size of glass. Accordingly, in the metal doors and windows, the practice hitherto has been to specify the height first and the width afterwards. In the building industry and in the case of timber doors and windows the practice is to specify width first and height afterwards. The Committee responsible for the preparation of this standard has considered it desirable to unify the practice in this regard and has adopted the building industry practice, that is, to specify width first and height afterwards.

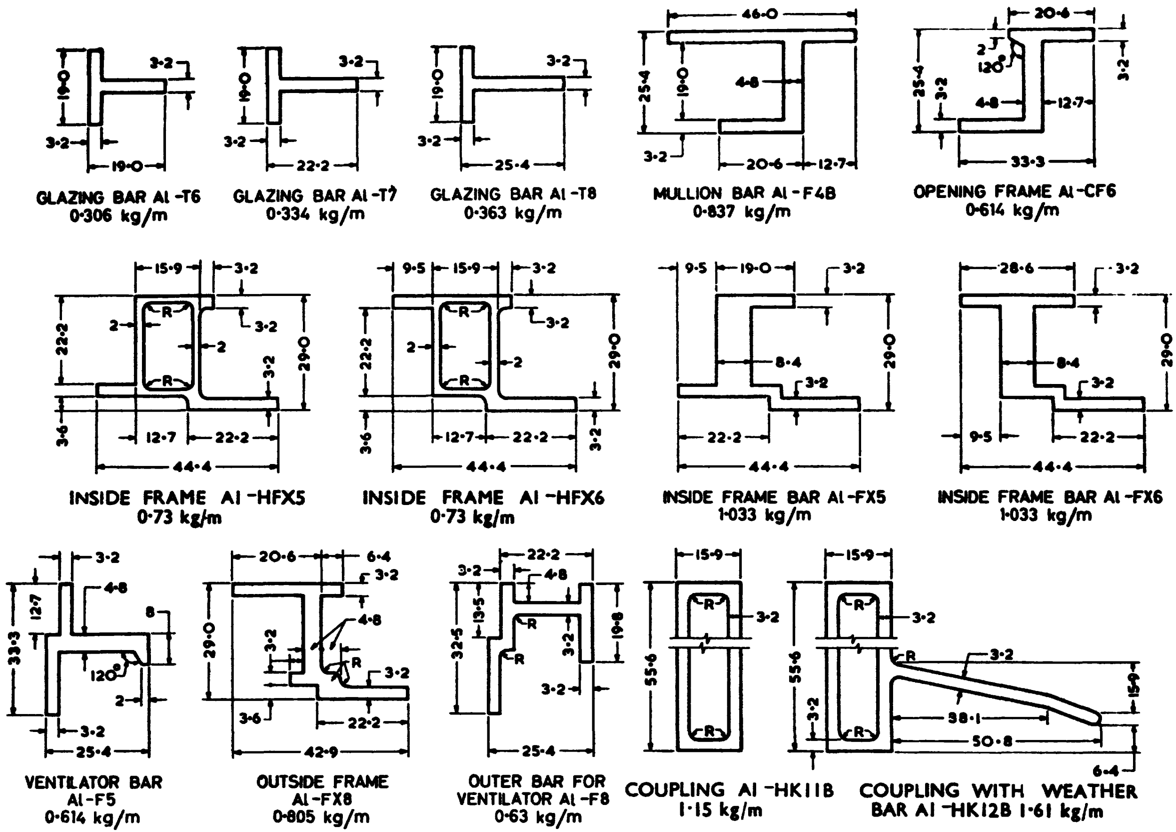
5.4 Screws — Screw threads of machine screws used in the manufacture of aluminium doors, windows and ventilators shall conform to the requirements of *IS: 1362-1959 Dimensions for Screw Threads for General Purposes (Diameter Range 0·25 to 39 mm). Other threads shall be permissible if agreed to between the purchaser and the vendor.

6. FABRICATION

6.1 Frames — Frames shall be square and flat, the corners of the frame being fabricated to a true right angle. Both the fixed and opening frames shall be constructed of sections which have been cut to length, mitred and welded at the corners. Where hollow sections are used with welded joints, argon-arc welding or flash butt welding shall be employed (gas welding or brazing not to be done). Subdividing bars of units shall be tenoned and riveted into the frame.

6.1.1 The location of the parts of the doors, windows and ventilators for which details of fabrication are described under **6.1.2** are indicated in Fig. 6 (*see* P 9).

*Since revised and withdrawn.



NOTE 1 — All radii $R = 1 \cdot 6$ mm

NOTE 2 — The weights of sections per metre length as indicated are nominal.

All dimensions in millimetres.

FIG. 5 EXTRUDED ALUMINIUM SECTIONS FOR DOORS, WINDOWS AND VENTILATORS

TABLE I GLASS SIZES (CLEARANCE ALLOWED)

(*Clause* 5.3)

Designation	Quantity	Glass Size Width × Height cm
No Glazing Bar Fixed Type		
6NF6	1	53·0 × 53·0
10NF6	2	45·0 × 53·0
12NF6	2	55·0 × 53·0
15NF6	2	45·0 × 53·0
	1	47·5 × 53·0
18NF6	2	55·0 × 53·0
	1	57·5 × 53·0
6NF9	1	53·0 × 83·0
10NF9	2	45·0 × 83·0
12NF9	2	55·0 × 83·0
15NF9	2	45·0 × 83·0
	1	47·5 × 83·0
18NF9	2	55·0 × 83·0
	1	57·5 × 83·0
6NF12	1	53·0 × 113·0
10NF12	2	45·0 × 113·0
12NF12	2	55·0 × 113·0
15NF12	2	45·0 × 113·0
	1	47·5 × 113·0
18NF12	2	55·0 × 113·0
	1	57·5 × 113·0
6NF15	1	53·0 × 27·0
	1	53·0 × 113·0
10NF15	2	45·0 × 27·0
	2	45·0 × 113·0
12NF15	2	55·0 × 27·0
	2	55·0 × 113·0
15NF15	2	45·0 × 27·0
	1	47·5 × 27·0
	2	45·0 × 113·0
	1	47·5 × 113·0
18NF15	2	55·0 × 27·0
	1	57·5 × 27·0
	2	55·0 × 113·0
	1	57·5 × 113·0
8NF6	1	73·0 × 53·0
6NF21	1	53·0 × 84·5
	1	53·0 × 27·5
	1	53·0 × 56·0
No Glazing Bar Top-Hung Type		
6NT6	1	50·0 × 50·0
10NT6	2	44·5 × 50·0
12NT6	2	54·5 × 50·0
15NT6	2	45·0 × 53·0
	1	45·5 × 50·0
18NT6	2	55·0 × 53·0
	1	54·5 × 50·0
8NT6	1	70·0 × 50·0
6NT9	1	50·0 × 51·5
	1	53·0 × 27·5

(*Contd*)

TABLE I GLASS SIZES (CLEARANCE ALLOWED) — *Contd*

Designation	Quantity	Glass Size Width × Height cm
No Glazing Bar Centre-Hung Type		
6NC6	1	46·0 × 46·0
10NC6	2	42·5 × 46·0
12NC6	2	52·5 × 46·0
15NC6	2	45·0 × 53·0
	1	43·5 × 46·0
18NC6	2	55·0 × 53·0
	1	53·5 × 46·0
8NC6	1	66·0 × 46·0
No Glazing Bar Side-Hung Type		
6NS9	1	50·0 × 80·0
10NS9	2	43·5 × 80·0
12NS9	2	52·5 × 80·0
15NS9	2	43·5 × 80·0
	1	47·5 × 83·0
18NS9	2	52·5 × 80·0
	1	57·5 × 83·0
6NS12	1	50·0 × 110·0
10NS12	2	43·5 × 110·0
12NS12	2	52·5 × 110·0
15NS12	2	43·5 × 110·0
	1	47·5 × 113·0
18NS12	2	52·5 × 110·0
	1	57·5 × 113·0
6NS15	1	53·0 × 27·0
	1	50·0 × 110·0
10NS15	2	45·0 × 27·0
	2	43·5 × 110·0
12NS15	2	55·0 × 27·0
	2	52·5 × 110·0
15NS15	2	45·0 × 27·0
	1	47·5 × 27·0
	2	43·5 × 110·0
	1	47·5 × 113·0
18NS15	2	55·0 × 27·0
	1	57·5 × 27·0
	2	52·5 × 110·0
	1	57·5 × 113·0
8NS21	1	66·0 × 81·0
	1	56·0 × 27·5
	1	66·0 × 56·0
12NS21	2	50·5 × 81·0
	2	50·5 × 56·0
	1	50·5 × 27·5
	1	40·5 × 27·5
Horizontal Glazing Bar Fixed Type		
6HF6	2	53·0 × 26·0
10HF6	4	45·0 × 26·0
12HF6	4	55·0 × 26·0
15HF6	4	45·0 × 26·0
	2	47·5 × 26·0

(*Contd*)

TABLE I GLASS SIZES (CLEARANCE ALLOWED) — *Contd*

Designation	Quantity	Glass Size Width × Height cm
Horizontal Glazing Bar Fixed Type		
18HF6	4	55·0 × 26·0
	2	57·5 × 26·0
6HF9	2	53·0 × 27·5
	1	53·0 × 26·0
10HF9	4	45·0 × 27·5
	2	45·0 × 26·0
12HF9	4	55·0 × 27·5
	2	55·0 × 26·0
15HF9	4	45·0 × 27·5
	2	45·0 × 26·0
	2	47·5 × 27·5
	1	47·5 × 26·0
18HF9	4	55·0 × 27·5
	2	55·0 × 26·0
	2	57·5 × 27·5
	1	57·5 × 26·0
6HF12	4	53·0 × 27·5
10HF12	8	45·0 × 27·5
12HF12	8	55·0 × 27·5
15HF12	8	45·0 × 27·5
	4	47·5 × 27·5
18HF12	8	55·0 × 27·5
	4	57·5 × 27·5
6HF15	1	53·0 × 27·0
	4	53·0 × 27·5
10HF15	2	45·0 × 27·0
	8	45·0 × 27·5
12HF15	2	55·0 × 27·0
	8	55·0 × 27·5
15HF15	2	45·0 × 27·0
	1	47·5 × 27·0
	8	45·0 × 27·5
	4	47·5 × 27·5
18HF15	2	55·0 × 27·0
	1	57·5 × 27·0
	8	55·0 × 27·5
	4	57·5 × 27·5
8HF6	2	73·0 × 26·0
6HF21	6	53·0 × 27·5
Horizontal Glazing Bar Top-Hung Type		
6HT6	2	50·0 × 24·5
10HT6	4	44·5 × 24·5
12HT6	4	54·5 × 24·5
15HT6	4	45·0 × 26·0
	2	44·5 × 24·5
18HT6	4	55·0 × 26·0
	2	54·5 × 24·5
6HT9	1	50·0 × 26·0
	1	50·0 × 24·5
	1	53·0 × 27·5
8HT6	2	70·0 × 24·5
6HC6	2	46·0 × 22·5

(*Contd*)

TABLE I GLASS SIZES (CLEARANCE ALLOWED) — *Contd*

Designation	Quantity	Glass Size Width × Height cm
Horizontal Glazing Bar Top-Hung Type		
10HC6	4	42·5 × 22·5
12HC6	4	52·5 × 22·5
15HC6	4	45·0 × 26·0
	2	43·5 × 22·5
18HC6	4	55·0 × 26·0
	2	53·5 × 22·5
8HC6	2	66·0 × 22·5
Horizontal Glazing Bar Side-Hung Type		
6HS9	3	50·0 × 26·0
10HS9	6	43·5 × 26·0
12HS9	6	52·5 × 26·0
15HS9	6	43·5 × 26·0
	2	47·5 × 27·5
	1	47·5 × 26·0
18HS9	6	52·5 × 26·0
	2	57·5 × 27·5
	1	57·5 × 26·0
6HS12	2	50·0 × 26·0
	2	50·0 × 27·5
10HS12	4	43·5 × 26·0
	4	43·5 × 27·5
12HS12	4	52·5 × 26·0
	4	52·5 × 27·5
15HS12	4	43·5 × 26·0
	4	43·5 × 27·5
	4	47·5 × 27·5
18HS12	4	52·5 × 26·0
	4	52·5 × 27·5
	4	57·5 × 27·5
6HS15	1	53·0 × 27·0
	2	50·0 × 26·0
	2	50·0 × 27·5
10HS15	2	45·0 × 27·0
	4	43·5 × 26·0
	4	43·5 × 27·5
12HS15	2	55·0 × 27·0
	4	52·5 × 26·0
	4	52·5 × 27·5
15HS15	2	45·0 × 27·0
	1	47·5 × 27·0
	4	43·5 × 26·0
	4	43·5 × 27·5
	4	47·5 × 27·5
18HS15	2	55·0 × 27·0
	1	57·5 × 27·0
	4	52·5 × 26·0
	4	52·5 × 27·5
	4	57·5 × 27·5
8HS21	1	66·0 × 24·0
	4	66·0 × 27·5
	1	56·0 × 27·5
12HS21	2	50·5 × 24·0
	9	50·5 × 27·5
	1	40·5 × 27·5

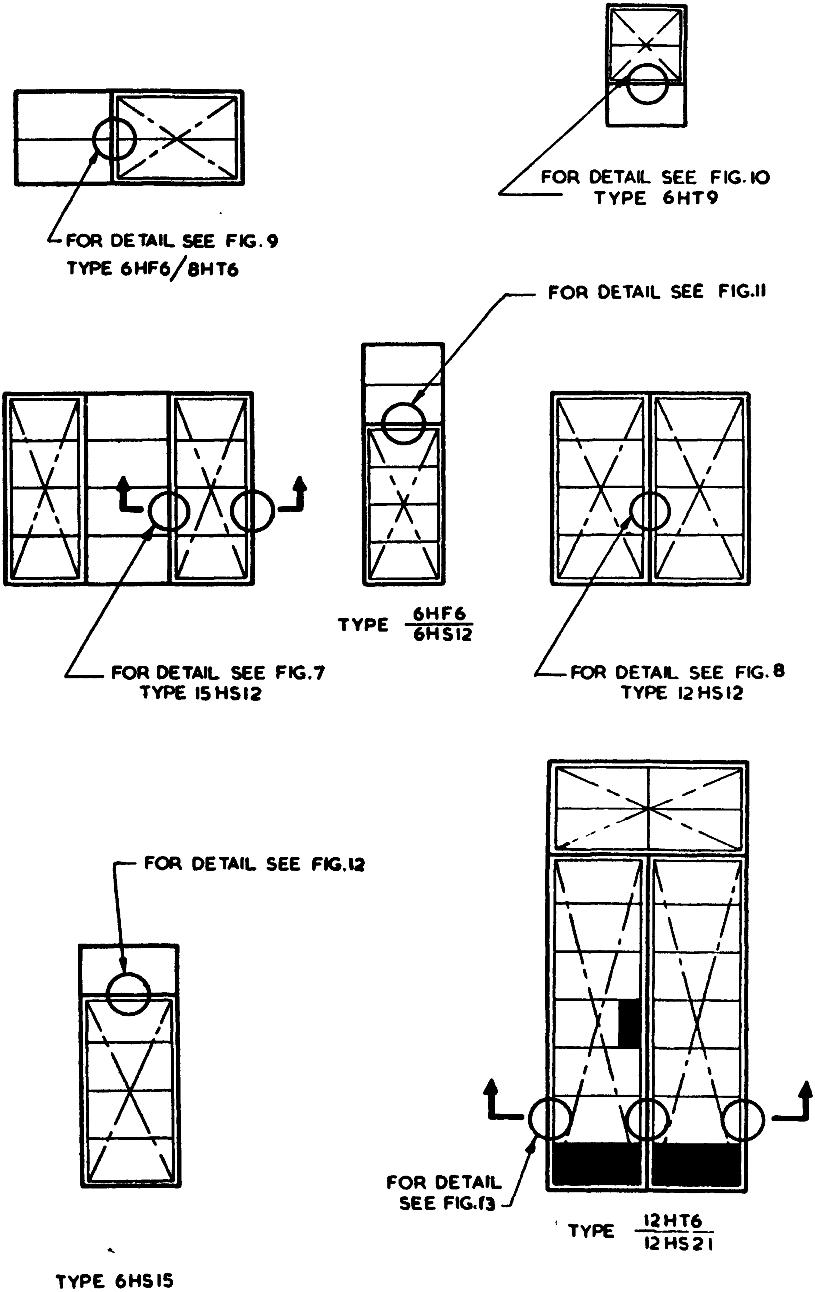


FIG. 6 LOCATION OF PARTS OF ALUMINIUM DOORS, WINDOWS AND VENTILATORS FOR WHICH DETAILS ARE SHOWN

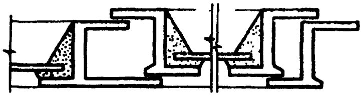


FIG. 7 MULLION WITH FIXED GLASS ON ONE SIDE AND SIDE-HUNG ON OTHER SIDE

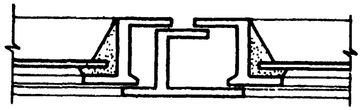


FIG. 8 MULLION WITH SIDE-HUNG SHUTTER BOTH SIDES

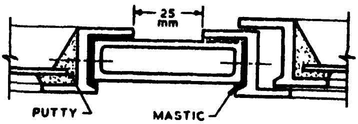


FIG. 9 COUPLING SECTION EXTRUDED FOR COUPLING WINDOWS SIDE BY SIDE

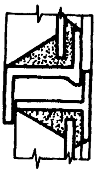


FIG. 10 DETAIL THROUGH BOTTOM OF TOP-HUNG VENTILATOR

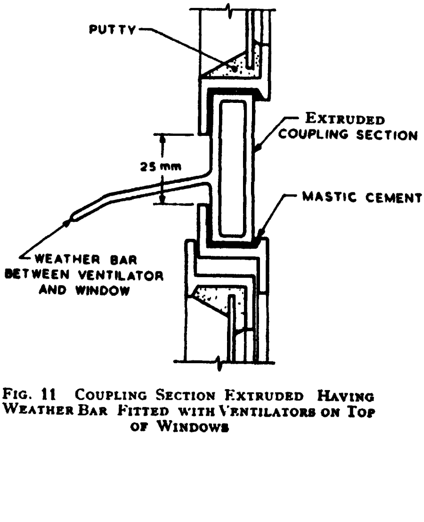


FIG. 11 COUPLING SECTION EXTRUDED HAVING WEATHER BAR FITTED WITH VENTILATORS ON TOP OF WINDOWS

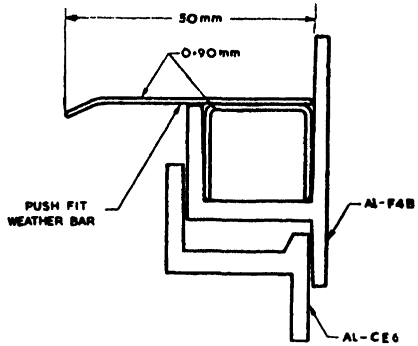


FIG. 12 WEATHER BAR OVER EXTERNAL OPENING SHUTTER WITH FIXED LIGHT ABOVE

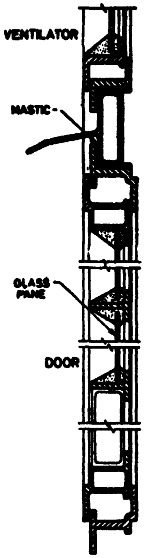
6.1.2 Details of construction of doors, windows and ventilators shall be as indicated in Fig. 7 to 13 (*see* P 10 and 11).

6.2 Side-hung Shutters — For fixing aluminium alloy hinges, slots shall be cut in the fixed frame and the hinges inserted inside and may be riveted to the frame. The hinges shall normally be of the projecting type 67 mm wide (*see* Fig. 14). The aluminium alloy for cast hinges shall conform to IS Designation A-5-M of IS : 617-1959 Specification for Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes (*Revised*) and for extruded section of hinges to IS Designation HE10-WP or HE30-WP of *IS : 733-1956 Specification for Wrought Aluminium and Aluminium Alloys, Bars, Rods and Sections (For General Engineering Purposes). The pins for hinges shall be of stainless steel of non-magnetic type or of aluminium alloy HR30. Irrespective of hinges being anodized or not, the aluminium alloy pins shall be anodized to a minimum film thickness of 0·025 mm and shall be sealed with oil, wax or lanolin. Non-projecting types of hinges (*see* Fig. 15) may also be used, where agreed to between the purchaser and the supplier.

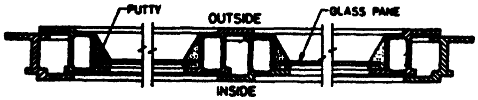
6.2.1 Friction hinges may be provided for side-hung shutter windows, in which case peg stay as mentioned under **6.2.3** may not be required. The working principle of the friction hinge is illustrated in Fig. 16 (*see* P. 12).

6.2.2 The handle for side-hung shutters shall be of cast aluminium conforming to IS Designation A-5-M of IS: 617-1959 Specification for Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes (*Revised*) and mounted on a handle plate welded or riveted to the opening frame in such a way that it could be fixed before the shutter is glazed. The handle should have anodized finish with minimum anodic film thickness of 0·015 mm. The handle shall have a two-point nose which shall engage with an aluminium striking plate on

*Since revised.



VERTICAL SECTION OF DOOR



HORIZONTAL SECTION OF DOOR

FIG. 13 DETAIL OF ALUMINIUM DOUBLE SHUTTER DOOR

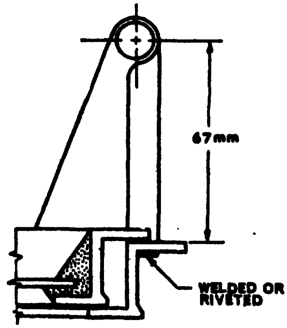


FIG. 14 TYPICAL PROJECTING TYPE HINGE FOR SIDE-HUNG SHUTTER

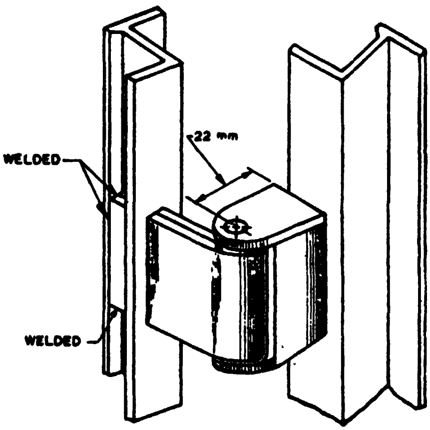


FIG. 15 TYPICAL NON-PROJECTING TYPE HINGE FOR SIDE-HUNG SHUTTER

FIG. 16 ILLUSTRATION SHOWING WORKING PRINCIPLE OF FRICTION HINGES

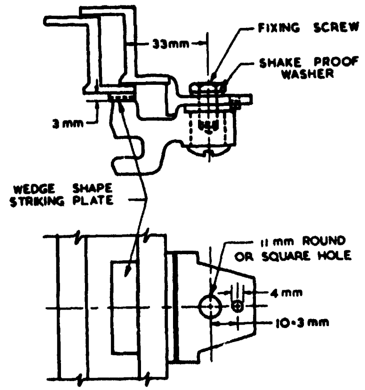


FIG. 17 A TYPICAL HANDLE FOR SIDE-HUNG SHUTTER

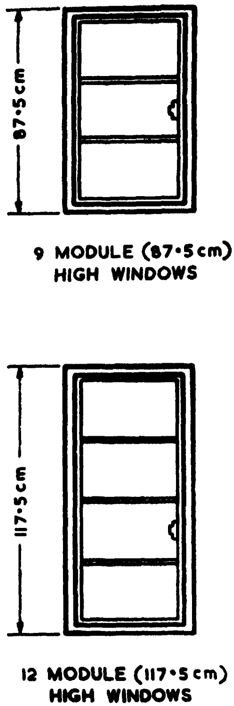


FIG. 18 POSITION OF HANDLE PLATES IN RELATION TO HEIGHTS OF 'HS' TYPE OF WINDOWS

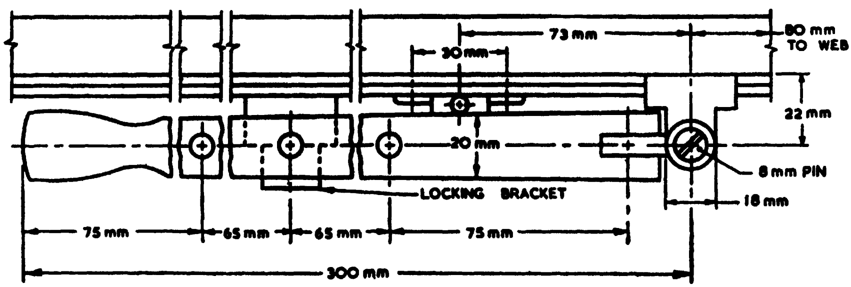


FIG. 19 A TYPICAL PEG STAY FOR SIDE-HUNG SHUTTERS AND TOP-HUNG VENTILATORS

the fixed frame in a slightly open position as well as in a fast position (*see* Fig. 17 on P 12). The height of the handles in each type of side-hung shutters shall be fixed in approximate positions as indicated in Fig. 18 (*see* P 12).

6.2.3 The peg stay shall be either of cast aluminium conforming to IS Designation A-5-M of IS: 617-1959 Specification for Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes (*Revised*), or folded from IS Designation NS4 aluminium alloy sheet conforming to *IS: 737-1955 Specification for Wrought Aluminium and Aluminium Alloys, Sheet and Strip (For General Engineering Purposes). It shall be 300 mm long, complete with peg and lock-

*Second revision in 1974.

ing bracket (*see* Fig. 19 on P 12). The stay shall have holes for keeping the shutter open in three different positions. The peg and locking bracket shall be riveted or welded to the fixed frame.

6.2.4 Alternatively, and if specifically required by the purchaser, side-hung shutters may be fitted with an internal removable fly screen of 0·375 mm wire and equivalent to IS Sieve 100 in a 0·900 mm aluminium alloy sheet conforming to IS Designation NS3-1/2H of *IS: 737-1955 Specification for Wrought Aluminium and Aluminium Alloys, Sheet and Strip (For General Engineering Purposes), applied to the outer frame of the shutter by cast or extruded

*Second revision in 1974.

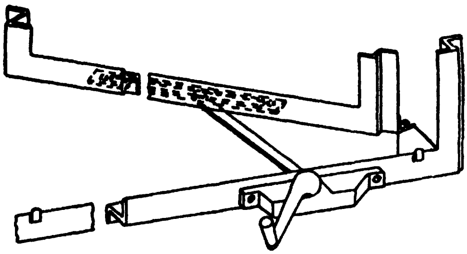


FIG. 21 TYPICAL ROTOR OPERATOR FOR SIDE-HUNG SHUTTERS FITTED WITH FLY SCREEN

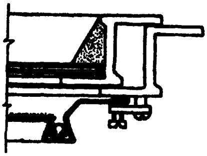


FIG. 20 DETAIL THROUGH JAMB SHOWING TURNBUCKLE

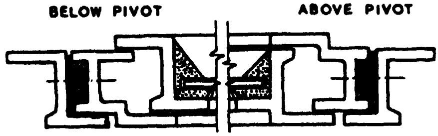


FIG. 22 DETAILS OF HORIZONTAL CENTRE-HUNG VENTILATOR

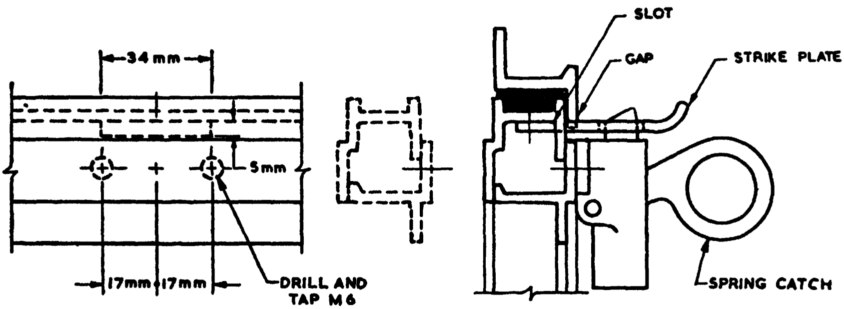


FIG. 23 SPRING CATCH FOR CENTRE-HUNG VENTILATOR

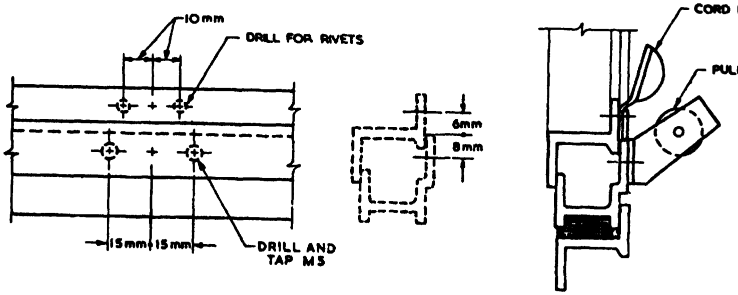


FIG. 24 CORD EYE AND PULLEY ARRANGEMENT FOR CENTRE-HUNG VENTILATOR

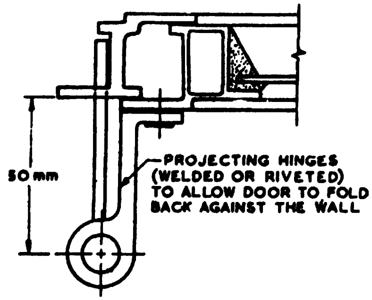


FIG. 25 TYPICAL PROJECTING TYPE HINGE FOR DOOR

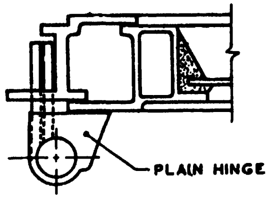


FIG. 26 TYPICAL NON-PROJECTING TYPE HINGE FOR DOOR

aluminium alloy turn-buckle at the jambs (*see* Fig. 20) and by aluminium or plated bronze (gunmetal) shoes at the sill to allow of the screen being readily removed; and with a rotor operator at the sill to permit the operation of the shutter through an angle of 90° (*see* Fig. 21). On fly-screened shutters the peg stay is omitted and the normal handle shall be replaced by a locking handle to hold the shutter in the fast position.

6.3 Top-Hung Ventilators — The aluminium hinges for top-hung ventilators shall be either cast or fabricated out of extruded sections and shall be riveted to the fixed rail after cutting a slot in it. The aluminium alloy for cast hinges shall conform to IS Designation A-5-M of IS: 617-1959 Specification for Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes (*Revised*), and for extruded section of hinge to IS Designation HE10-WP or HE30-WP of *IS : 733-1956 Specification for Wrought Aluminium and Aluminium Alloys, Bars, Rods and Sections (For General Engineering Purposes).

6.3.1 The peg stay shall be 300 mm long as in side-hung shutter (*see* Fig. 19). The locking bracket shall be fixed to the fixed frame.

6.4 Centre-Hung Ventilators — Centre-hung ventilators (*see* Fig. 22) shall be hung on two pairs of cup pivots of aluminium alloy to IS Designation NS-4 of †IS: 737-1955 Specification for Wrought Aluminium and Aluminium Alloys,

*Since revised.
†Second revision in 1974.

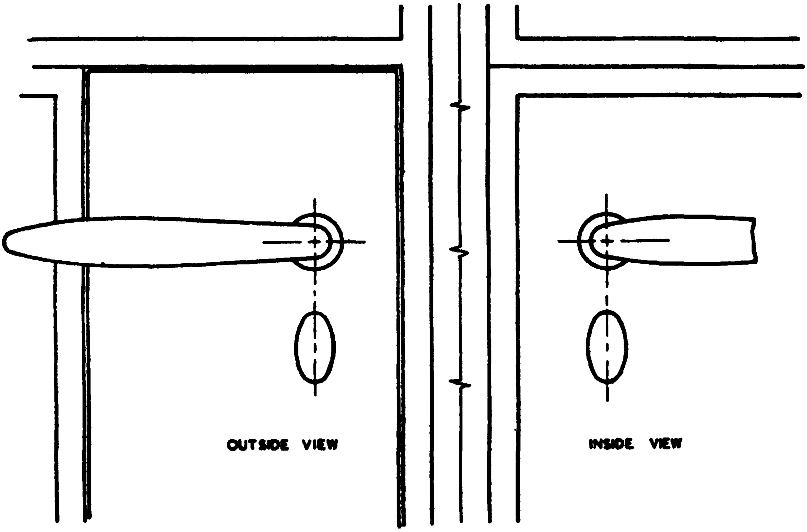


FIG. 27 TYPICAL DOOR HANDLE

Sheet and Strip (For General Engineering Purposes) and IS Designation A-5-M of IS: 617-1959 Specification for Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes (*Revised*) or on brass or bronze cup pivots which should be either chromium or cadmium plated and riveted to the inner and outer frames of the ventilator to permit the ventilator to swing through an angle of approximately 85°. The opening portion of the ventilator shall be so balanced that it remains open at any desired angle under normal weather condition.

6.4.1 Cast aluminium conforming to IS Designation A-5-M of IS: 617-1957 Specification for Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes (*Revised*) or bronze (gunmetal) which shall be either chromium-plated or cadmium-plated spring catch shall be fitted in the centre of the top bar of the ventilator for the operation of the ventilator. This spring catch shall be secured (preferably screwed or riveted) to the frame and shall close into an aluminium catch plate riveted or welded to the outside of the outer ventilator frame bar (*see* Fig. 23).

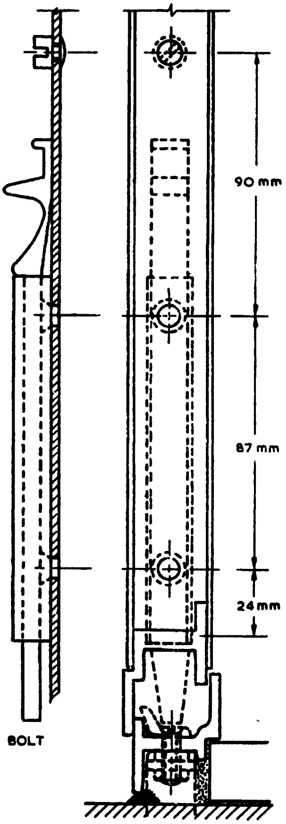


Fig. 28 Typical Vertical Bolt for Double Shutter Door

6.4.2 Aluminium- or cadmium-plated brass cord pulley-wheel in an aluminium bracket shall be fitted at the sill of the ventilator with aluminium or glavanized or cadmium-plated steel screws or, alternatively, welded together with an aluminium cord eye riveted or welded to the bottom inner frame bar of the ventilator in a position corresponding to that of pulley (*see* Fig. 24).

6.5 Doors — The outer fixed frame shall be of section Al-FX8. The shutter frame shall be of either hollow sections Al-HFX5 and Al-HFX6 or of solid sections Al-FX5 and Al-FX6 shown in Fig. 5. Details of construction shall be as shown in Fig. 13.

6.5.1 The kick panels shall be of 1·25 mm aluminium alloy sheet conforming to IS Designation NS3-1/2H of *IS: 737-1955 Specification for Wrought Aluminium and Aluminium Alloys, Sheet and Strip (For General Engineering Purposes) and shall be screwed to the frame and the glazing bar.

6.5.2 *Hinges* — Cast or extruded aluminium alloy hinges for doors shall be of the same type as in the windows but of larger size. The hinges shall normally be of the 50 mm projecting type (*see* Fig. 25). Non-projecting type of hinges (*see* Fig. 26) may also be used.

6.5.3 The handle for doors may be of the design indicated in Fig. 27.

6.5.4 A suitable lock for the door operable either from inside or outside shall be provided.

Note — From the point of view of security, the lock which is operable from only one side is better and in the case of such locks, a bolt shall be provided to make them inoperable from the other side.

6.5.5 In double shutter doors the first closing shutter shall have a concealed aluminium alloy bolt at top and bottom (*see* Fig. 28). It shall be so constructed as not to work loose or drop by its own weight.

6.5.6 Single and double shutter doors may be provided with a three-way bolting device (*see* Fig. 29 on P 16). Where this is provided in the case of double shutter door, concealed aluminium bolts may not be provided.

6.6 Composite Units — The doors shall be coupled to windows or side-lights by extruded aluminium sections made from aluminium alloy conforming to IS Designation HE9-WP of †IS: 733-1956 Specification for Wrought Aluminium and Aluminium Alloys, Bars, Rods and Sections (For General Engineering Purposes). The coupling member should comform to the dimensions indicated in Fig. 30 (*see* P 17).

6.7 Weather Bar — Where a coupling member is fitted over an external opening shutter, the coupling member should incorporate an integrally extruded weather bar as indicated in Fig. 5.

*Second revision in 1974.
†Since revised.

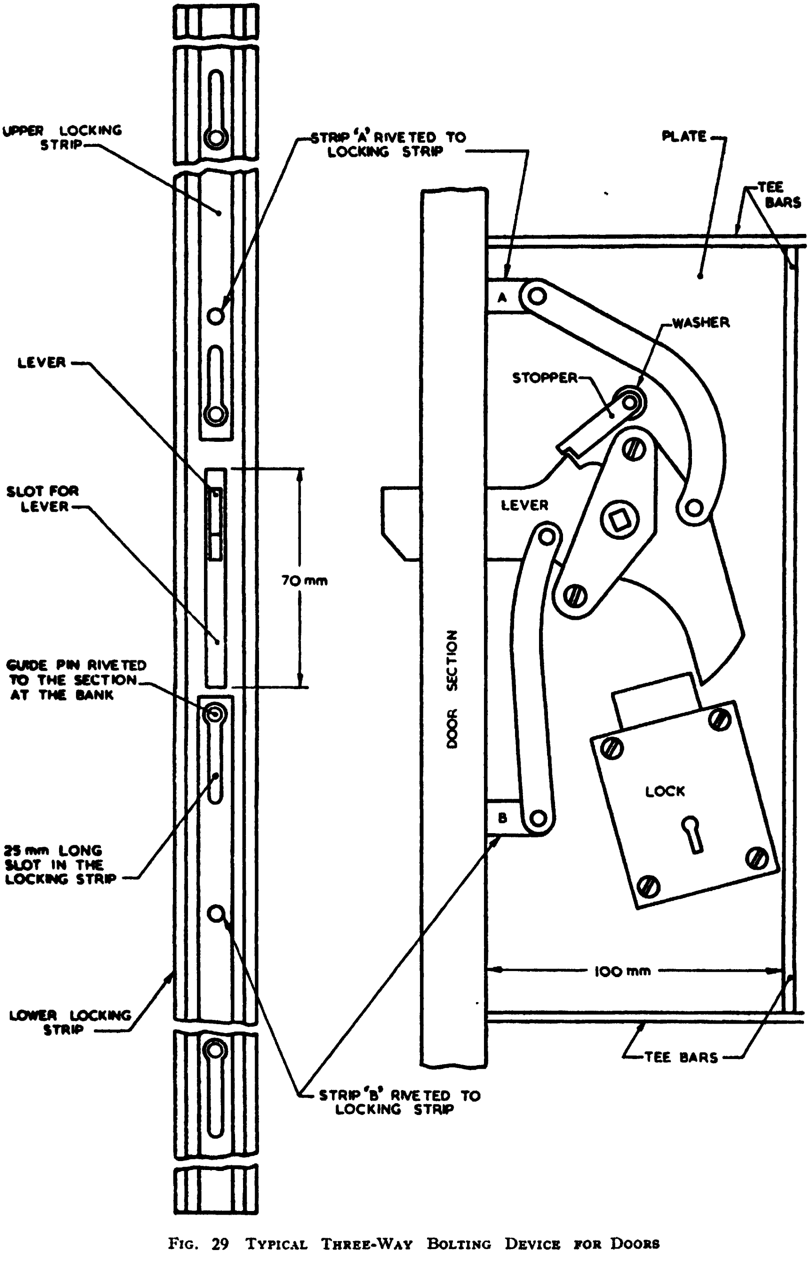


FIG. 29 TYPICAL THREE-WAY BOLTING DEVICE FOR DOORS

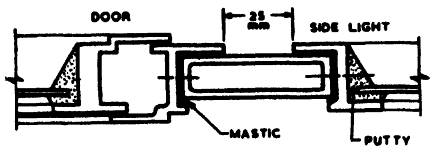
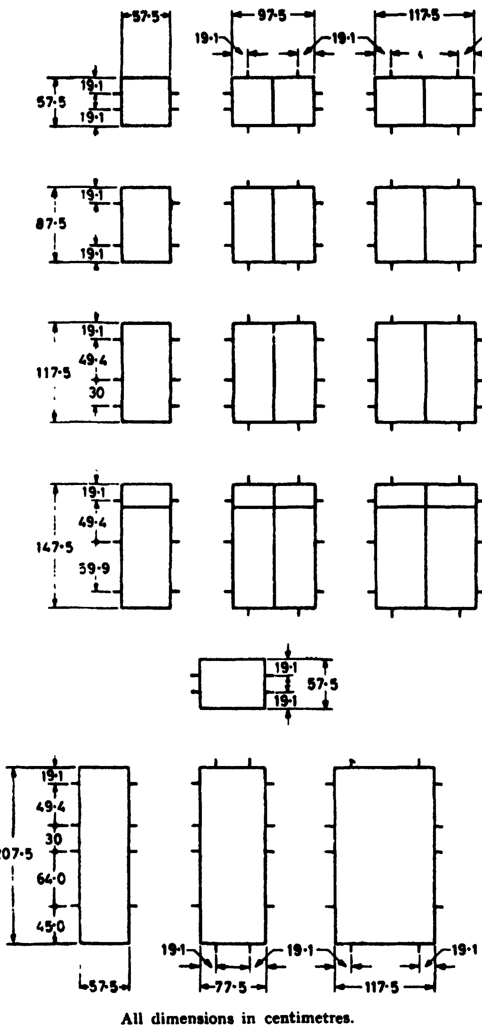


FIG. 30 COUPLING SECTION EXTRUDED FOR COUPLING DOOR TO WINDOW OR SIDE LIGHT

7. POSITION OF BOLTS, FIXING SCREWS AND LUGS

7.1 Outer frames shall be provided with fixing holes centrally in the web of the sections in the position indicated in Fig. 31 (*see* P 17). Moreover, any steel lugs coming in contact with aluminium should be either galvanized or given one coat of bituminous paint.

7.2 The fixing screws and lugs shall be as given in Table II (*see* P 18).



All dimensions in centimetres.

FIG. 31 CHART SHOWING APPROXIMATE POSITIONS OF FIXING HOLES AND NUMBER OF FIXING LUGS

8. FINISH

8.1 Aluminium doors, windows and ventilators may be supplied in either matt, scratch-brush or polished finish. They may, additionally, also be anodized, if so required by the purchaser. If colour anodizing is to be done then only approved light-fast shades should be used.

8.2 A thick layer of clear transparent lacquer based on methacrylates or cellulose butyrate, shall be applied on aluminium doors, windows and ventilators by the suppliers to protect the surface from wet cement during installation. This lacquer coating shall be removed after installation is completed.

9. GLAZING

9.1 Glazing shall be provided on the outside of the frames.

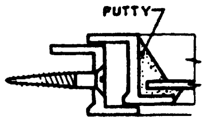
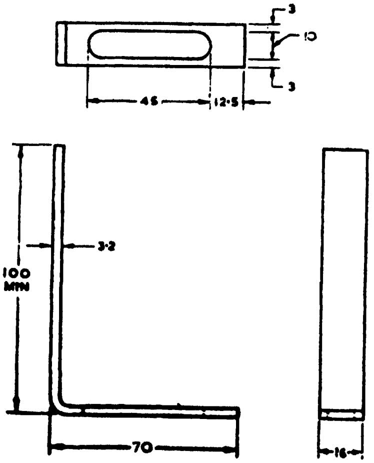


FIG. 32 FIXING SCREW FOR WOODEN FRAMES OR PLUGS IN CONCRETE



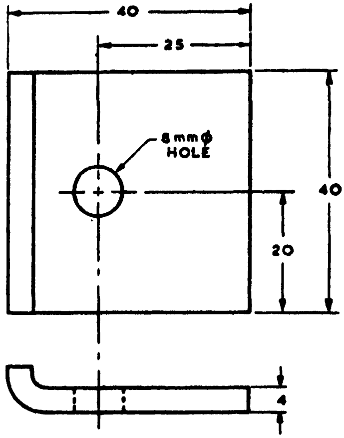
All dimensions in millimetres.

FIG. 33 SLOTTED FIXING LUG (FOR BRICKWORK AND MASONRY)

TABLE II FIXING SCREWS AND LUGS

(*Clause* 7.2)

SL No.	PLACE OF FIXING	SIZE OF SCREW OR LUG
i)	To wooden frames rebated on the outside	30 mm × No. 10 galvanized wood-screws (*see* Fig. 32)
ii)	To plugs in concrete, stone or brick work rebated on the outside	do
iii)	To plugs in concrete, stone or brick work not rebated on the outside (that is plain or square jambs)	45 mm × No. 10 galvanized wood-screws
iv)	Direct to brick work or masonry (that is plain or square jambs)	Slotted steel adjustable lugs (natural finish) not less than 100 × 16 × 3 mm countersunk galvanized machine screws and nuts 19·0 × 6·3 mm (*see* Fig. 33)
v)	To steel work	Standard clips and 8 mm galvanized bolts with hexagonal nuts (*see* Fig. 34)



All dimensions in millimetres.

FIG. 34 FIXING CLIP FOR STEEL WORK

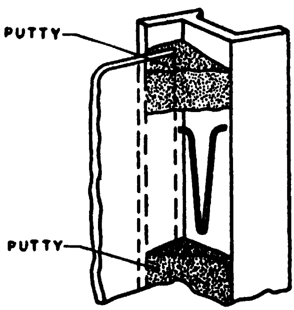


FIG. 35 GLAZING CLIPS

9.1.1 If required, glazing clips (*see* Fig. 35 on p. 18) may be provided as extra fittings by mutual arrangement between the purchaser and the supplier. Four glazing clips may be provided per glass pane, except for door type 8HS21 where the glazing clips shall be six per glass pane. In case of doors, windows and ventilators without horizontal glazing bars the glazing clips shall be spaced according to the slots in the vertical members, otherwise, the spacing shall be 30 cm.

NOTE — Glazing clips are not usually provided for normal size glass panes. Where large size glass panes are required to be used or where the door or the window is located in heavily exposed situation, holes for glazing clips have to be drilled prior to fabrication and cannot be done at any later stage. Use of glazing clips, where necessary, shall be specified while placing the order.

10. PACKING

10.1 All doors, windows and ventilators shall be despatched with the opening parts suitably secured to preserve alignment when fixing and glazing.

10.2 Fixing lugs, coupling fittings and all hardware shall be despatched separately.

10.3 Composite windows shall be despatched uncoupled.

11. MARKING

11.1 All doors, windows and ventilators shall be suitably marked on the frames with a mark identifying the manufacturer and the type.

11.1.1 The units 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.

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