भारतीय मानक

स्टील के दरवाजों के फ्रेम — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

STEEL DOOR FRAMES — SPECIFICATION

(Second Revision)

ICS 77.140.01; 91.060.50

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

May 2003

Price Group 4

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Doors, Windows and Shutters Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1967 and revised in 1976. Major modifications made in this revision are given below:

a) Provision has been made for use of galvanized steel sheets,
b) 1.60 mm thick mild steel sheets have been permitted,
c) Two additional profiles have been introduced,
d) Powder coatings have been permitted, and
e) Other modifications based on the prevailing practices in the country have been made.

Recommendations for the installation of steel door frames are given in Annex A for guidance of the user.

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 '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.

Indian Standard

STEEL DOOR FRAMES — SPECIFICATION

(Second Revision)

1 SCOPE

This standard lays down the requirement regarding material, dimensions and construction of steel door frames for internal and external use.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the latest editions of the standards.

IS No.	*Title*
205 : 1992	Specification for non-ferrous metal butt hinges (*fourth revision*)
206 : 1992	Specification for tee and strap hinges (*fourth revision*)
277 : 1992	Galvanized steel sheets (plain and corrugated) — Specification (*fifth revision*)
362 : 1991	Specification for parliament hinges (*fifth revision*)
513 : 1994	Cold-rolled low carbon steel sheets and strips (*fourth revision*)
1341 : 1992	Specification for steel butt hinges (*sixth revision*)
1365 : 1978	Slotted countersunk head screws (*third revision*)
1477	Code of practice for painting of ferrous metals in buildings:
(Part 1) : 1971	Pretreatment (*first revision*)
(Part 2) : 1971	Painting (*second revision*)
2074 : 1992	Ready mixed paint, air drying, red oxide, zinc chrome, priming — Specification (*second revision*)
4043 : 1969	Recommendations for symbolic designation of direction of closing and faces of doors, windows and shutters
4905 : 1968	Methods for random sampling
6911 : 1992	Stainless steel plate, sheet and strip (*first revision*)
9106 : 1979	Specification for rising butt hinges
10428 : 1983	Glossary of terms relating to doors
12817 : 1997	Specification for stainless steel butt hinges (*first revision*)
13871 : 1993	Powder coatings — Specification

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 10428 shall apply.

4 HANDLING

For the purpose of hinges provisions to the door frames and hardware fittings handing and direction of closing of doors shall be designated in accordance with IS 4043.

5 MATERIAL

Steel door frames shall be manufactured from the materials conforming to relevant Indian Standards as given in Table 1.

Table 1 Material for Door Frames

(*Clause* 5)

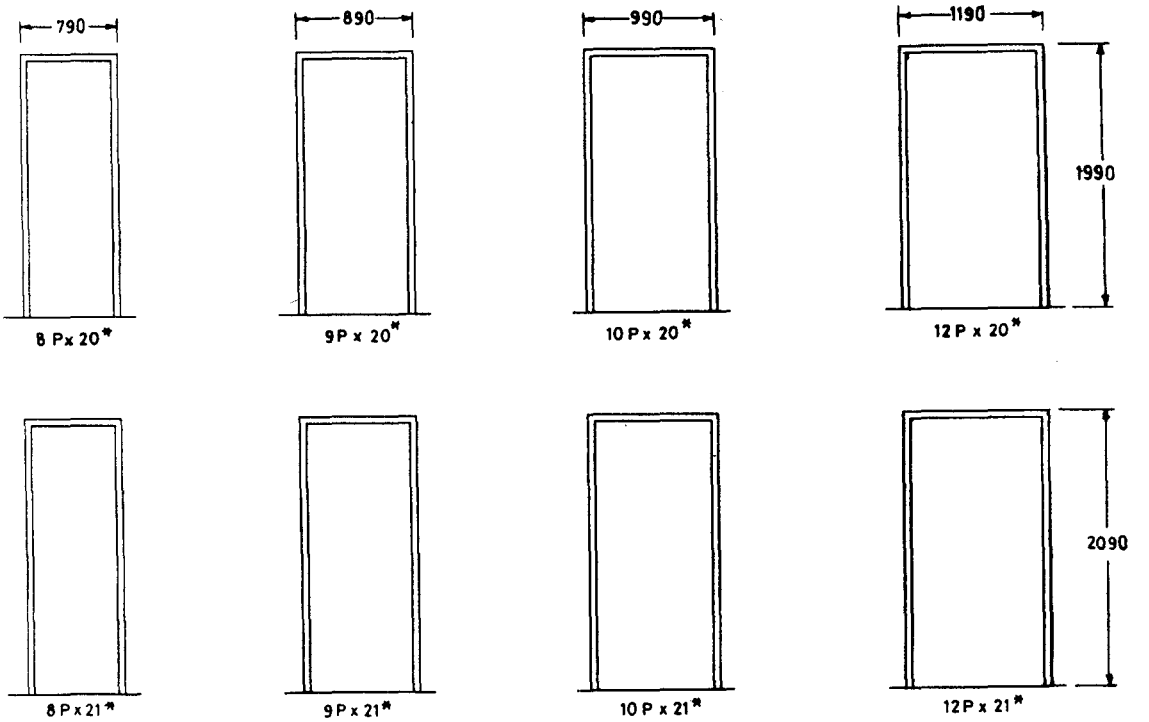
Sl No.	Material	Size Thickness mm	Ref to, Indian Standard
(1)	(2)	(3)	(4)
i)	Mild steel sheet (cold rolled)	1.25/1.60	IS 513
ii)	Galvanized steel sheets — Plain grade — Lock forming (GPL), Zinc coating 120 g/m^2 inclusive of both sides	1.00/1.25/1.60	IS 277
iii)	Stainless steel Grade — X07Cr17 (430) or X04Cr19Ni9 (304 S1)	1.00	IS 6911

6 STANDARD SIZES, TOLERANCES AND DESIGNATIONS

6.1 Sizes

The overall sizes and types of the door frames shall generally conform to the modular sizes as shown in Fig. 1. However, sizes, types, other than those shown in Fig. 1 as agreed to between the manufacturer and the purchaser may also be permitted.

6.1.1 The sizes shown in Fig.1 are overall heights and widths to the outside of pressed steel door frame. These sizes are derived after allowing 5 mm clearance on all the four sides for the purpose of fitting the frame into modular openings.



All dimensions in millimetres.

* The '*X*' in the designation stands for suitable designation for profile such as A, B, C, D and E.

FIG. 1 TYPE AND SIZE OF STEEL FRAMES

6.2 Tolerances

The sizes indicated in Fig. 1 for door frames shall not vary by more than ± 2 mm.

6.3 Designation

Door frames shall be designated by symbols denoting width, type, profile and height on the following basis :

a) P for pressed steel door frames; and

b) A, B, C, D and E denoting profile.

6.3.1 The width and height will be denoted by the number of module, width being given at the beginning and height at the end, for example, 8-PA-21.

7 PROFILE

Steel door frames with or without fanlight shall be made in the five profiles as given in Table 2 (*see* Fig. 2).

7.1 Tolerance of ± 1 mm on all the dimensions of profile shall be permissible.

7.1.1 Any of the five profiles may be supplied to suit doors of either hand, opening inwards or outwards, as required by the purchaser.

Table 2 Profiles for Door Frames

(*Clause* 7)

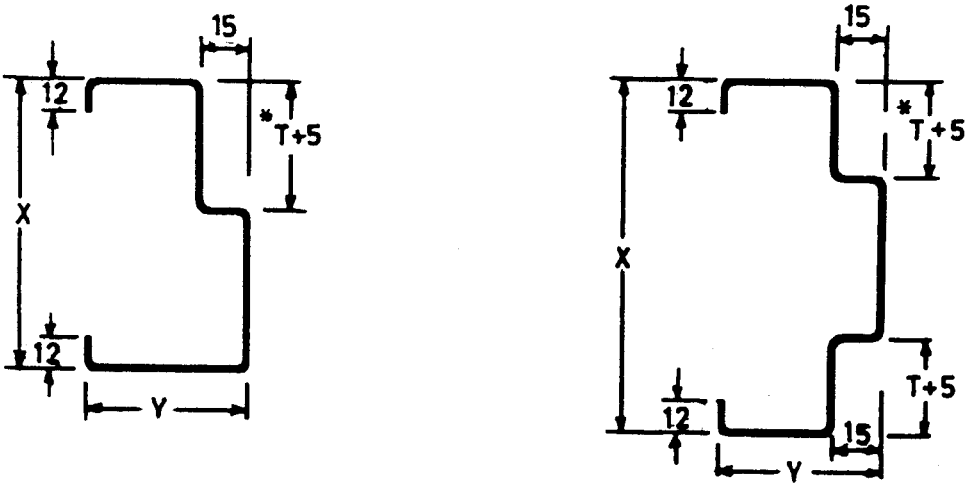
Sl No.	Profile	Size		Rebate
		X mm	*Y* mm	
(1)	(2)	(3)	(4)	(5)
i)	A	90	60	Single
ii)	B	105	60	Single
iii)	C	125	60	Single
iv)	D	125	60	Double
v)	E	165	60	Double

8 CONSTRUCTION

Each door frame shall consist of hinge jamb, lock jamb, head and steel base ties at the bottom of the door frames. The whole frame shall be welded or rigidly fixed together by mechanical means.

9 BASE TIES

Base ties shall be pressed mild steel angle of size 20 mm × 20 mm × 1.25 mm thick to suit floor thickness of 25, 30, 35 or 40 mm either screwed or welded as shown in Fig. 3.



* T is the thickness of the shutter.

All dimensions in millimetres.

FIG. 2 PROFILES OF PRESSED STEEL DOOR FRAMES

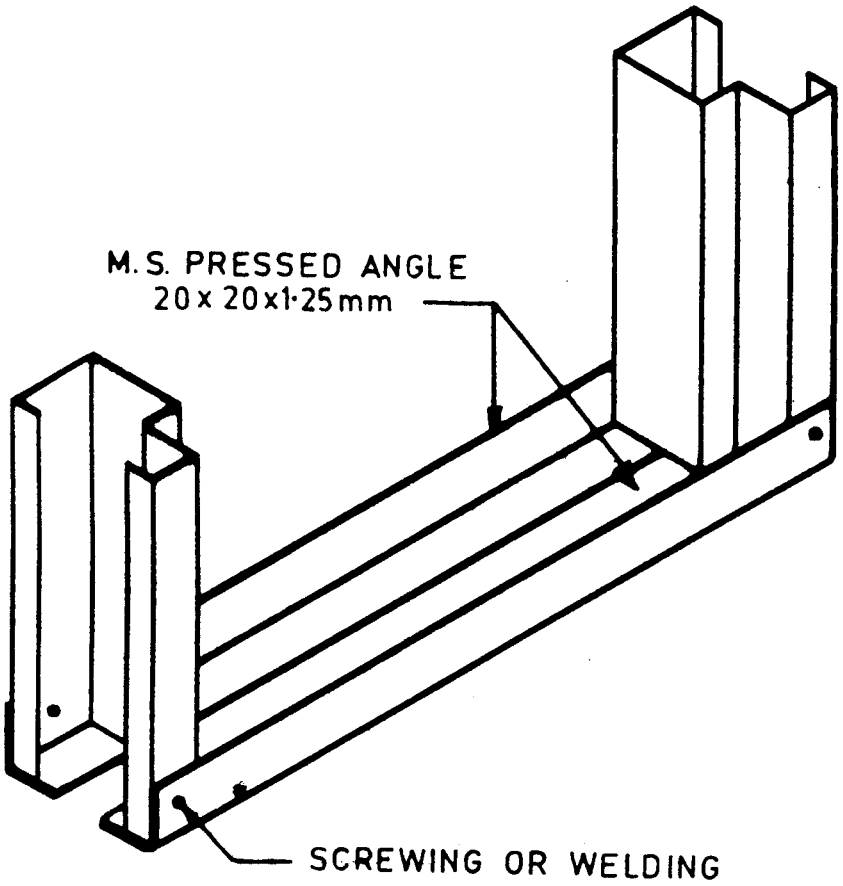


FIG. 3 ARRANGEMENT AT BASE OF DOOR FRAME

10 FITTINGS

10.1 Fixing Lugs (Holdfasts)

There shall be three adjustable lugs (*see* Fig. 4A) with split end tail to each jamb without fanlight and four for jamb with fanlight.

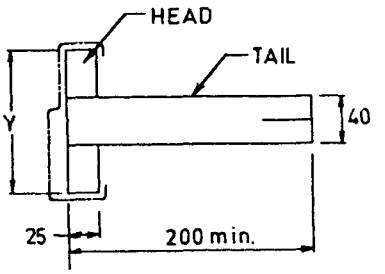
10.1.1 The head of the fixing lug shall be of one of the following lengths:

a) 85 mm long for use with profile A,
b) 100 mm long for use with profile B,
c) 120 mm long for use with profile C and D, and
d) 160 mm long for use with pofile E.

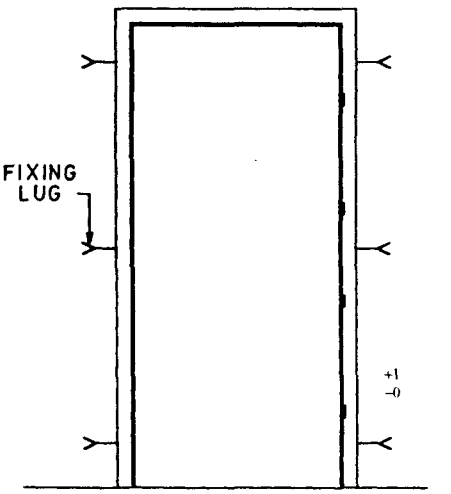
The head shall be made from flat steel strip 25 mm wide and having nominal thickness of 1.25 mm.

10.1.2 The tail of the lugs for use with profiles A, B, C, D and E shall be 200 mm long and shall be made of steel strip not less than 40 mm wide and having nominal thickness of 1.25 mm.

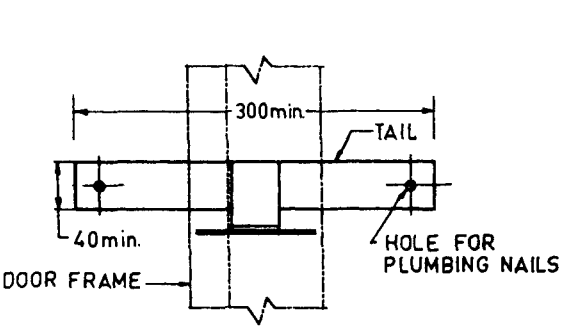
10.1.3 Frame shall be fixed to the R.C.C. column side by using fixing lugs/holdfasts as shown in Fig. 4B. The specification of these fixing lugs are same as per above fixing lugs/holdfasts (*see* Fig. 4A) except length of tail shall be minimum 300 mm, with holes for the plumbing nails of suitable size to fix the door frame with R.C.C. column.

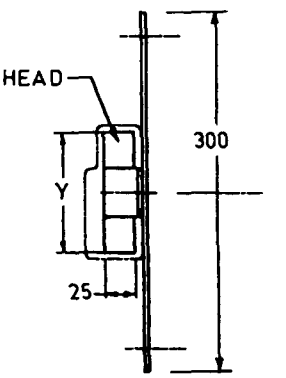


4A Fixing Lug (Holdfast)
(Required for Masonry)



4C Location of Fixing Lug (Holdfast)





4B Fixing Lugs (Holdfasts) (Required for R.C.C. Column Side)

Profile	Y*
A	85
B	100
C and D	120
E	160

All dimensions in millimetres.

* Tolerance on dimension 'Y' shall be $^{+1}_{-0}$ mm.

FIG. 4 FIXING LUGS (HOLDFASTS) TO THE FRAME

10.1.4 The material of steel strips used for fixing lugs/holdfasts shall conform to IS 513 or IS 277.

10.1.5 The fixing lugs/holdfasts shall be painted with red oxide zinc chromate primer paint (*see* IS 2074) by brushing, spraying or dipping method.

10.2 Hinges

Frames shall be provided with any one type of the hinges, conforming to the relevant Indian Standards as given in Table 3.

Table 3 Hinges for Door Frames

(*Clause* 10.2)

Sl No.	Description	Size (in mm)/ Designation	Ref to, Indian Standard
(1)	(2)	(3)	(4)
i)	Steel butt hinge—medium weight	100	1341
ii)	Stainless steel butt hinges medium weight	100	12817
iii)	Steel rising butt hinges	100	9106
iv)	Non-ferrous metal butt hinges	100 C 22	205
v)	Mild steel parliament hinges	75	362
vi)	Mild steel light weight tee hinges	300	206

10.2.1 For mild steel and galvanized plain steel sheet door frames, medium weight hinges of size 100 mm conforming to IS 1341, shall be used. For stainless steel frame, stainless steel butt hinges of size 100 mm conforming to IS 12817 shall be used. Hinges other than above as specified by the purchaser may be provided.

10.2.2 Hinges shall be provided as follows:

a) Frames for doors 1 000 mm wide and below : Three hinges screwed to one jamb

b) Frames for doors more than 1 000 mm wide : Six hinges for double leaf door, three screwed to each jamb or four hinges for single leaf door

10.2.3 In all cases the hinges shall be so fixed that the distance from the inside of the head rebate to the top of the upper hinges is about 200 mm and the distance from the bottom of the door frame to the bottom of the bottom hinge is also kept about 200 mm. The middle hinges shall be at equal distance from lower and upper hinges or as agreed to between the purchaser and the supplier.

10.2.4 *Fixing of Hinges to the Frame*

Hinges shall be screwed to the frame (*see* Fig. 5) by any one of the following method:

a) Mild steel plate of size 120 mm × 30 mm × 6 mm thick shall be welded inside to the frame. The plate shall be threaded to the required size of machine screw [M5 × 20 CSK] conforming to IS 1365 (*see* Fig. 5A),

b) Mild steel plate of size 120 mm × 30 mm × 6 mm thick shall be welded inside to the frame. The plate shall be threaded to the required size of machine screw [M5 × 20 CSK] conforming to IS 1365 (*see* Fig. 5A), and

c) Mild steel flat of size 150 mm × 30 mm × 2 mm thick shall be welded inside the pre-punched slot of the frame. The threaded inserts/nut M5 shall be fixed to the mild steel flat. The hinges shall be screwed with the machine screw M5 × 20 CSK conforming to IS 1365. Mortar guard made out of sheet 1.25 mm thick shall be welded from inside to each hinge (*see* Fig. 5B).

10.3 Mortar Guards

Mortar guard sheet 1.25 mm thick or of any other thickness shall be welded to the frame at the head of the frame having tower bolt holes. It shall also be welded to the frame behind the hinges, mortize locks and latches slots, aldrop and sliding bolts and tower bolt holes.

10.4 Aldrops, Sliding Bolts and Tower Bolts

Provisions shall be made for aldrops, sliding bolts and tower bolts in the frames as per the positions given by the purchaser. Necessary mortar guards/metallic or nylon bushes shall be provided inside the frames for aldrops, sliding bolts and tower bolts.

10.5 Lock Strike Plate

Provision shall be made to fix lock strike plates of mortise locks or latches, complying with the relevant Indian Standards. A slot suitable for lock strike plate shall be pierced into the rebate of the frame and necessary fixing arrangement and mortar guard from the inside of the frame shall be provided (*see* Fig. 6A).

10.6 Shock Absorbers

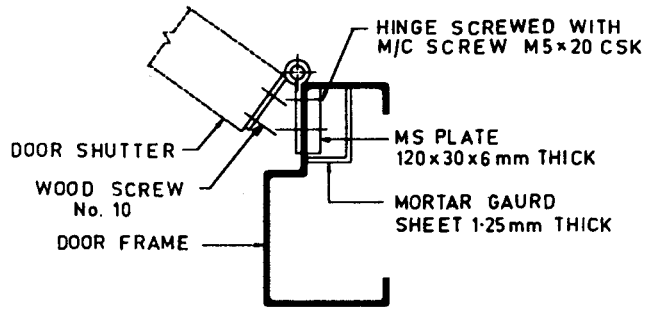
For side-hung door there shall be not less than three buffers of rubber or other suitable material inserted in holes in the rebate and one shall be located at the centre of the lock jamb of frame and other two shall be 300 mm from top and bottom of the frame as shown in Fig. 6A. For double leaf doors two buffers shall be provided as shown in Fig. 6B.

11 FINISH

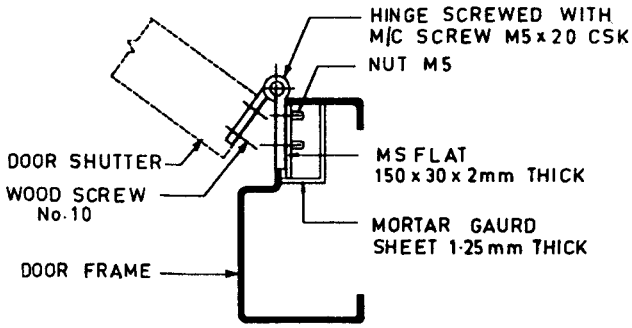
11.1 Pre-treatment and Phosphating

11.1.1 *Door Frames of Mild Steel (Cold Rolled)*

The surface of the door frames manufactured from the

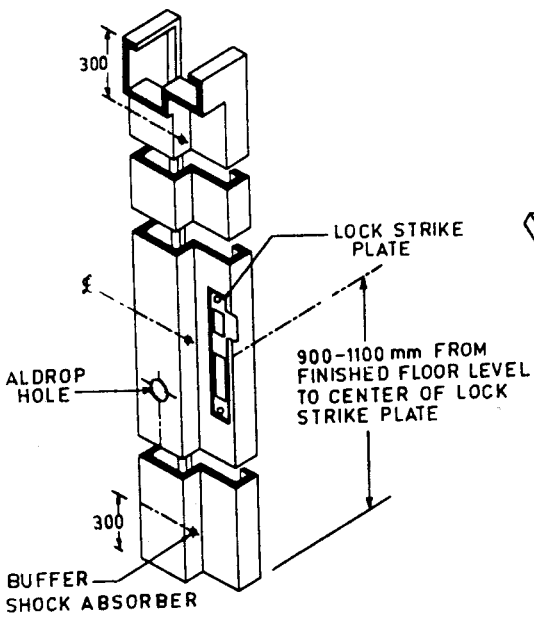


5A FIXING OF HINGE TO THE FRAME — SCREWED TO THE M.S. FLAT

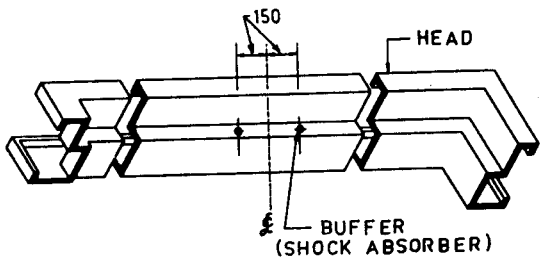


5B FIXING OF HINGE TO THE FRAME — SCREWED TO THE NUT

FIG. 5 FIXING OF HINGE TO THE FRAME



6A SIDE HUNG DOOR FRAME



6B DOUBLE LEAF DOOR FRAME

All dimensions in millimetres.

FIG. 6 LOCATION OF SHOCK ABSORBERS, LOCK-STRIKE PLATE AND ALDROP

material mild steel cold rolled shall be thoroughly cleaned free from rust, dirt, oil, etc, either by mechanical means, for example sand or shot blasting or by chemical means, for example pickling, and phosphating conforming to IS 1477 (Part 1), then finished with either painting or powder coating as may be agreed to between the purchaser and the manufacturer.

11.1.2 *Door Frames of Galvanized Plain Steel Sheets*

The surface of the door frames manufactured from the material galvanized plain steel sheet shall be pre-treated and phosphated by chemical means conforming to IS 1477 (Part 1). No pickling is required for galvanized surface. Then frames shall be finished with either painting or powder coating as may be agreed to between the purchaser and the manufacturer.

11.1.3 *Stainless Steel Door Frames*

The surface of the stainless steel frames shall be pre-treated as per the procedure laid down in IS 1477 (Part 1) in which pickling shall be carried out by using mixed acid of nitric plus hydrofluoric and then passivate the surface by using nitric acid followed by water rinsing and drying. Generally stainless steel door frames need no painting but if any purchaser require painted or powder coated frames to blend with the interior decor, this can be done by spray painting or by powder coating.

11.2 Painting

After pre-treatment and phosphating of the surface of the frames, two coats of any of the ready mixed paint, air drying, red oxide zinc chrome, priming (*see* IS 2074) shall be applied by brushing, spraying or dipping method as per procedure laid down in IS 1477 (Part 2).

Paint other than above may be used as agreed to between the purchaser and the manufacturer.

11.3 Powder Coatings

After pre-treatment and phosphating the surface of the frame shall be powder coated conforming to IS 13871. The colour, taken from colour shade card of indigenous powder manufacturer shall be used as agreed to between the purchaser and the manufacturer.

12 MARKING

12.1 Each door frame shall be marked with the name of the manufacturer or trade-mark, if any.

12.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

12.2.1 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 details of conditions under which licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

13 SAMPLING

The method of drawing representative samples of steel door frames and the criteria for conformity shall be as given in Annex B.

14 DELIVERY

The purchaser shall supply the information as given in Annex C, when ordering for steel door frames.

ANNEX A

(*Foreword*)

RECOMMENDATIONS FOR INSTALLATION OF PRESSED STEEL DOOR FRAMES

A-1 INSTRUCTIONS

A-1.1 While fixing the pressed steel door frame, following instructions shall be followed:

a) Place the frame in position at correct height from finished floor level.

b) Plumb to ensure that frame is upright, square and free from twists.

c) Pressed metal door frames are liable to develop bow in the heights or sag in the widths either during fixing or during subsequent building work. To avoid this, fix temporary struts across the widths preventing sides bulging inwards by the weight of wall or partitions.

d) Build the walls up solid on each side after placing in position the door frame filled previously with cement grout 1 : 3 : 6 by volume.

e) Three lugs shall be provided on each jamb and the lugs shall not be placed more than 750 mm apart.

f) Do not remove temporary struts till brick work is set.

g) In case screwed base tie is provided, leave it in position until floor is laid when it shall be removed.

ANNEX B

(*Clause* 13)

SAMPLING OF STEEL DOOR FRAMES

B-1 SCALE OF SAMPLING

B-1.1 Lot

In any consignment all the frames of the same size, designation, profile and manufactured under similar conditions of production shall be grouped together to constitute a lot.

B-1.2 Samples shall be selected and tested from each lot separately to determine its conformity or otherwise to the requirements of the standard.

B-1.3 The number of frames to be selected at random from a lot for inspection and testing shall depend upon the size of the lot and shall be in accordance with Table 4.

B-1.4 The samples from the lot shall be selected at random and to ensure the randomness of selection, procedures given in IS 4905 may be followed.

B-1.5 All the frames selected in the sample shall be inspected for material (*see* **5**), dimensions and tolerances (*see* **6**), construction (*see* **8**), base ties (*see* **9**), fittings (*see* **10**) and finish (*see* **11**).

Table 4 Sample Size and Permissible Number of Defectives

(*Clause* B-1.3)

Sl No.	Lot Size	Sample Size	Permissible Number of Defectives
(1)	(2)	(3)	(4)
i)	Up to 50	8	0
ii)	51 to 100	13	1
iii)	101 to 150	20	2
iv)	151 to 300	32	3
v)	301 to 500	50	5
vi)	501 and above	80	7

B-2 CRITERIA FOR CONFORMITY

A frame which is found not meeting any one or more of these requirements inspected for (*see* **B-1.5**) shall be considered as defective.

ANNEX C

(*Clause* 14)

INFORMATION TO BE SUPPLIED BY THE PURCHASER WHEN ORDERING

C-1 When ordering metal door frames, the purchaser shall clearly indicate the following:

a) Designation, size and profile of door frame (*see* **6** and **7**);

b) For external doors, state whether the door is required to open inwards or outwards;

c) The handing of the door;

d) Type and location of lock, aldrop, tower bolts, etc; and

e) Thickness of door shutter.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act,* 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc : No. CED 11 (6050).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Printed at Prabhat Offset Press, New Delhi-2