

1st edition

2021-02-dd

**Windows and doors made from rolled mild
steel sections — Specifications**

ICS 91.060.50

Reference number

RS 462: 2021

© RSB 2021

In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

© RSB 2021

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without prior written permission from RSB.

Requests for permission to reproduce this document should be addressed to:

Rwanda Standards Board

P.O Box 7099 Kigali-Rwanda

KK 15 Rd, 49

Tel. +250 788303492

Toll Free: 3250

E-mail: info@rsb.gov.rw

Website: www.rsb.gov.rw

ePortal: www.portal.rsb.gov.rw

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Requirements	1
4.1 Material	1
4.2 Dimension and tolerances	2
4.3 Construction	2
4.3.1 Straightness and squareness	2
4.3.2 Margins and glazing bars	2
4.3.3 Joints, corners, and locating and tenon holes	2
4.3.4 Operation	3
4.3.5 Coupling	3
4.4 Ancillary components and fittings	3
4.4.1 Ancillary components	3
4.4.2 Fittings	4
5 Glazing	6
6 Finish	6
6.1 Pre-treatment	6
6.2 Coating	6
6.3 Painting	7
7 Workmanship	7
Annex A (normative) common dimension of window, door, ventilator and fixed lights	8
Annex B (normative) sampling and criteria of conformity	12
Annex C (informative) strength of welded joints	14
Annex D (informative) ordering information	15

Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 462- 2021 was prepared by Technical Committee RSB/TC 047, *steel aluminium and related products*.

In the preparation of this standard, reference was made to the following standard (s):

- 1) SANS 727:2003 Windows and doors made from rolled mild steel sections
- 2) IS : 1038 - 1983 SPECIFICATION FOR STEEL DOORS, WINDOWS AND AND VENTILATORS
- 3) BS 6510:2010 Steel-framed windows and glazed doors – Specification

The assistance derived from the above source is hereby acknowledged with thanks.

Committee membership

The following organizations were represented on the Technical Committee on Steel aluminium and related products (RSB/TC 047) in the preparation of this standard.

IPRC Ngoma

S&H Industries

RTDA

SKAT Consulting Rwanda Ltd

Rwanda Standards Board (RSB) – Secretariat

Windows and doors made from rolled mild steel sections — Specifications

1 Scope

This standard lays down the requirements regarding material, fabrication and finish of steel doors, windows, ventilators, and fixed-lights (sidelights, and fanlights) manufactured from rolled steel sections and their fittings.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

RS EAS 134 *Cold rolled steel sections — Specification*

RS ISO 4995 *Hot-rolled steel sheet of structural quality*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply

3.1

Sub-Dividing Bars

These are vertical bars in a fixed-light or window or ventilator.

3.2

Fixed-Light

Doors, windows and ventilators where there is no openable shutter.

3.3

Ventilator

The part of a window, sidelight, or fanlight that opens.

4 Requirements

4.1 Material

4.1.1 Strength requirements for Rolled steel sections for the fabrication of steel doors, windows, ventilators and fixed lights shall be in accordance with table 1

Table 1 — Tensile strength requirements

Grade of steel	Minimum yield stress, N/mm²	Ultimate tensile strength, N/mm²	Minimum elongation as a proportion of gauge length, %
210	210	340	24
250	250	420	22
360	360	480	20

4.1.2 Coupling section to be used as mullions for coupling the unit side by side and coupling section to couple independent units one above the other shall conform to RS EAS 134.

4.1.3 Coupling sections manufactured from galvanized steel plate of minimum 1.6 mm thickness may also be used for coupling if agreed to between the Employer and the manufacturer.

4.2 Dimension and tolerances

4.2.1 The work sizes for overall width and height shall be documented. The size of an assembled frame shall be within 2 mm of the documented work size.

4.2.2 The difference between the diagonals of rectangular frames shall be not more than 4 mm.

Note commonly dimension of window, door, ventilator and fixed lights are identified in Annex A

4.3 Construction

4.3.1 Straightness and squareness

4.3.1.1 any deviation from straightness of a member that is intended to be straight shall not exceed 2 mm for lengths up to and including 1 500 mm and 3 mm for lengths exceeding 1 500 mm.

4.3.1.2 The lengths of the diagonals of each frame that is intended to be rectangular, including the frames of opening portions (i.e. ventilators and doors), shall not differ by more than 1 mm in 200 mm.

4.3.2 Margins and glazing bars

5.2.1 Margins shall be not more than 2 mm out of parallel.

5.2.2 When glazing bars are specified by the purchaser, they shall be not more than 2 mm out of line at tenoned joints.

4.3.3 Joints, corners, and locating and tenon holes

4.3.3.1 With the exception of joints that are necessitated by the method of fabrication (such as joints at corners or at changes of section) no joints, welded or otherwise, shall be allowed.

4.3.3.2 Corners shall be mitred and welded.

4.3.3.3 Subdividing bars and glazing bars shall be tenoned and riveted or welded into the frame. If a gap at a tenoned joint exceeds 1.0 mm it shall be filled by welding or any other acceptable method and ground flush on the face.

4.3.3.4 The outer and inner faces of members at joints such as corners shall be flush within 1 mm except where a change in section makes it impracticable.

4.3.3.5 Locating and tenon holes in the webs of the sections shall be permitted whether glazing bars are fitted or not.

4.3.3.6 When a unit is tested in accordance with annex C, there shall be no sign of discontinuity in the weld or of fracture of the weld due to porosity or slag inclusion.

4.3.4 Operation

Opening parts shall operate easily and shall not jam or chatter when opened or closed.

4.3.5 Coupling

4.3.5.1 A unit shall be so constructed that it can be coupled with any other unit.

4.3.5.1 When two or more units are coupled, the overall dimensions of the composite arrangement shall not exceed the specified dimension

4.4 Ancillary components and fittings

4.4.1 Ancillary components

4.4.1.1 Fixing screws

4.4.1.1.1 Fixing screws shall be M6 countersunk screws (The outside diameter of the threads is 6mm). The length of thread shall be at least 12 mm conforming to the requirements of ISO 10642.

4.4.1.1.2 Screws shall be supplied with nuts.

4.4.1.2 Lugs

4.4.1.2.1 Lugs for fixing windows, doors, and sidelights direct to brickwork or masonry shall be of steel (corrugated or flat) and shall have a width of at least 15 mm, a thickness of at least 1,5 mm, and a free length of at least 150 mm

4.4.1.2.2 Lugs shall be supplied either loose (to be bolted on), or welded or riveted to the frame.

4.4.1.2.3 When fixed to the frame, shall be fixed in the following positions and, when supplied loose, enough lugs shall be provided to allow them to be positioned as follows:

- a) Not further than 300 mm from the corners of each side;
- b) spaced not more than 750 mm apart on any one side.

4.4.2 Fittings

4.4.2.1 Hinges

4.4.2.1.1 Hinges shall be of steel and shall have pins of brass or other corrosion-resistant material.

4.4.2.1.2 Projecting hinges for doors and side-hung ventilators shall be so constructed that the pivot lies at least 65 mm outside the outer face of the frame.

6.2.1.3 When tested in accordance with Annex C, hinges shall not fail or be permanently distorted.

4.4.2.2 Locking handle

4.4.2.2.1 A locking handle shall be of brass or other corrosion-resistant material and, if so specified by the purchaser, shall be chromium plated.

4.4.2.2.2 The handle plate shall be of brass or steel and so constructed that the handle can be mounted or removed after the window or ventilator has been glazed.

4.4.2.2.3 A handle for an outward-opening ventilator shall have a two-point nose that shall engage in either position with:

- a) a bevelled brass or other corrosion-resistant material striking plate fitted to the frame, or
- b) an embossed wedge which is part of the window frame.

4.4.2.2.4 Any bolts or screws used in the assembly of locking handles shall be so securely locked as to prevent them from working loose.

4.4.2.3 Sliding stay

4.4.2.3.1 A sliding stay assembly, including screws or bolts (or both), shall be of brass or other acceptable corrosion-resistant material and, if so specified by the purchaser, shall be chromium plated.

4.4.2.3.2 The brackets attached to the frame shall be of steel and shall be of thickness at least 2.8 mm and width at least 12 mm.

4.4.2.3.3 The sliding friction device shall be adjustable, the position selected being held by means of a thumb screw that will, when tightened by hand, provide sufficient frictional force to secure the window in any position against an opening force of 50 N applied to the edge of the ventilator remote from the hinges.

4.4.2.3.4 The thumb screw shall be secured effectively to prevent it from being screwed out of the box

4.4.2.4 Peg stay

4.4.2.4.1 Peg stays and peg stay screws shall be of brass or other corrosion-resistant material and, if so specified by the purchaser, shall be chromium plated.

4.4.2.4.2 The construction of peg stays shall be such that the ventilator can be locked securely in an acceptable manner.

4.4.2.5 Spring catch

4.4.2.5.1 A spring catch shall be of brass or other corrosion-resistant material and, if so specified by the purchaser, shall be chromium plated.

4.4.2.5.2 The catch shall have an operating level with eye of inside diameter at least 16 mm. When the catch is in the closed position (and the window open) the spring shall exert an initial force on the catch of 15 ± 5 N.

4.4.2.5.3 The striking plate of a spring catch shall be of steel of thickness at least 3 mm, and the plate shall be so constructed that the ventilator will lock securely.

4.4.2.5.4 To ensure proper engagement even when the catch and striking plate are slightly out of alignment, the size of the hole in the striking plate, measured in a transverse direction, shall be at least 6 mm larger than the diameter of the shaft of the catch.

4.4.2.6 Sliding bolt

4.4.2.6.1 A sliding bolt for a door shall be of brass or other corrosion-resistant material and, if so specified by the purchaser, shall be chromium plated.

4.4.2.6.2 If a striking plate is provided, it shall be of either brass or steel.

4.4.2.6.3 Unless a positive locked position is provided, a friction device to prevent the bolt from moving under its own weight shall be incorporated.

4.4.2.6.4 The force required to open or to close the bolt shall be 20-50 N and,

4.4.2.7 Pivots

4.4.2.7.1 Pivots for horizontal and vertical pivot-hung ventilators shall be cup pivots and shall be of brass or other acceptable corrosion-resistant material.

4.4.2.7.2 The outside diameter of the pivots shall be at least 40 mm, and the width shall be at least 11 mm.

4.4.2.7.3 Friction pivots shall be so designed that they can be adjusted to maintain the ventilator in any desired position between the fully open and the closed positions.

4.4.2.8 Side arms of bottom-hung ventilators

4.4.2.8.1 Side arms of bottom-hung ventilators shall be of the concealed folding type and shall be made of steel or brass or face-mounted remove able fixed stay brackets of steel and shall allow the ventilators to open to an angle of 30-35°.

4.4.2.8.2 When tested in accordance with 8.4, side arms or hopper brackets shall show no sign of permanent deformation or failure.

5 Glazing

5.1 Glass panes shall be at least 3 mm thick

5.2 All glass panes shall have properly squared corners and straight edges.

5.3 The sizes of glass panes for doors, windows, ventilators shall be in accordance with the design, drawings.

5.4 Sheet glass shall be flat, transparent and clear as judged it may, however, possess a light tint, when viewed edge-wise.

5.5 The glass pane shall be free from any cracks.

6 Finish

6.1 Pre-treatment

Methods to pre-treat the surface of the door frames, prior to painting or coating, shall be selected as per ISO 8504-1 to provide a cleaned surface free from rust, dirt, grease, oil, loose scale, weld spatter and any other foreign matter. Any other mechanical means such as sand and shot blasting or chemical means that can provide the same degree of cleanliness may be applied.

6.2 Coating

8.2.1 After pretreatment of the surface the units shall be dipped in a bath of molten zinc in accordance with the requirements laid down in ISO 1461

8.2.2 The thickness of coating shall be uniform and not less than 0.5 kg/m'.

6.3 Painting

6.3.1 All surfaces of the door, windows and ventilator including interior non-visible surfaces, shall receive a factory prime coat complying with the provision of ISO 12944-5.

6.3.2 When specified, top coat and intermediate coats should be on all surfaces of the door frame exposed to view as part of paint finishing as per ISO 12944-5.

6.3.3 If door, windows and ventilator are not factory finish painted, a compatible coat of finish paint shall be applied in the field. The finish paint shall be of a type recommended for use on prime-painted steel. Consult the door and frame manufacturer's literature for description of primer used. The manufacturer of the finish paint should verify compatibility with the primer.

A red oxide primer so applied as to give a dry film thickness of at least 20 micrometer

7 Workmanship

Surfaces of frames that can be seen after a unit has been built in shall meet the followings:

- a) be smooth level with the faces of the members
- b) show no unsightly hammer or grinding marks.
- c) Irregularities such as burrs or weld fins shall be removed from hidden surfaces but need not be ground smooth.

Annex A (normative)

common dimension of window, door, ventilator and fixed lights

Types and overall sizes of steel doors, windows, ventilators and fixed lights shall be as given in Fig. 2.

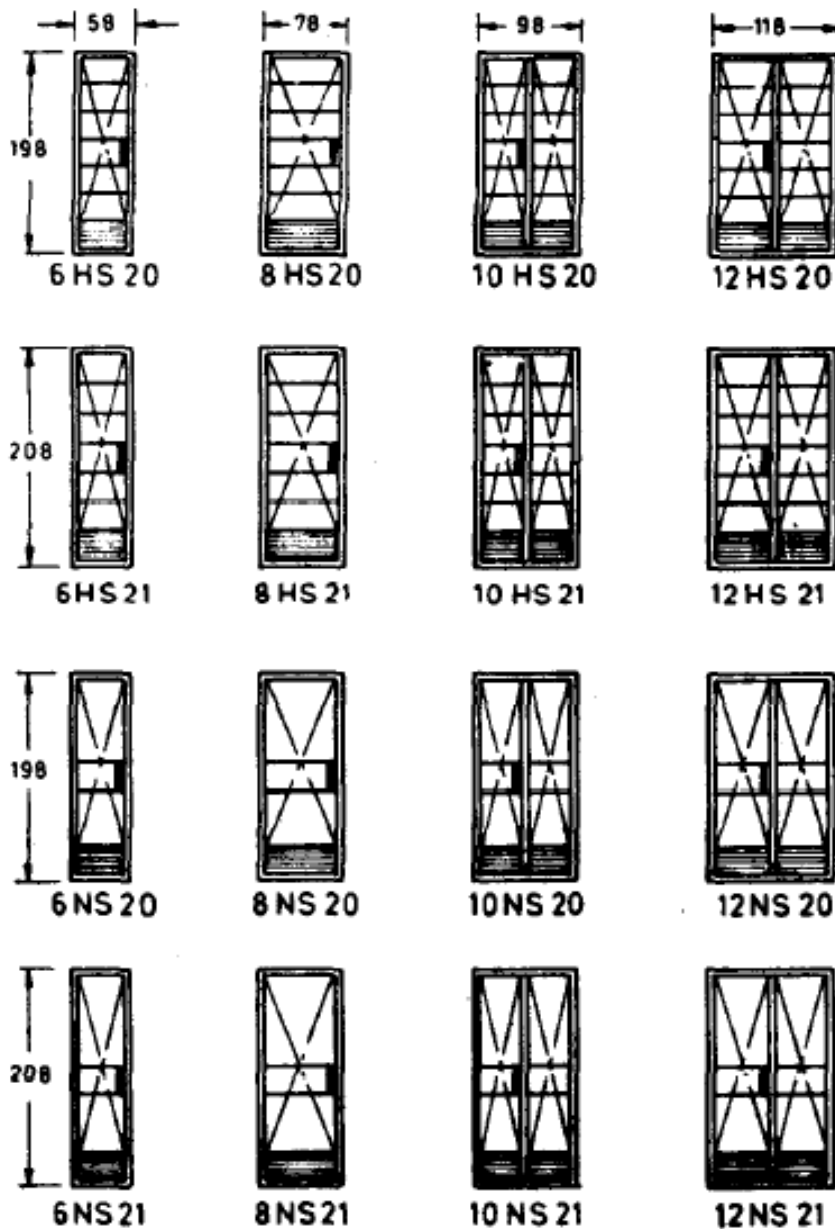


Figure 1 Doors

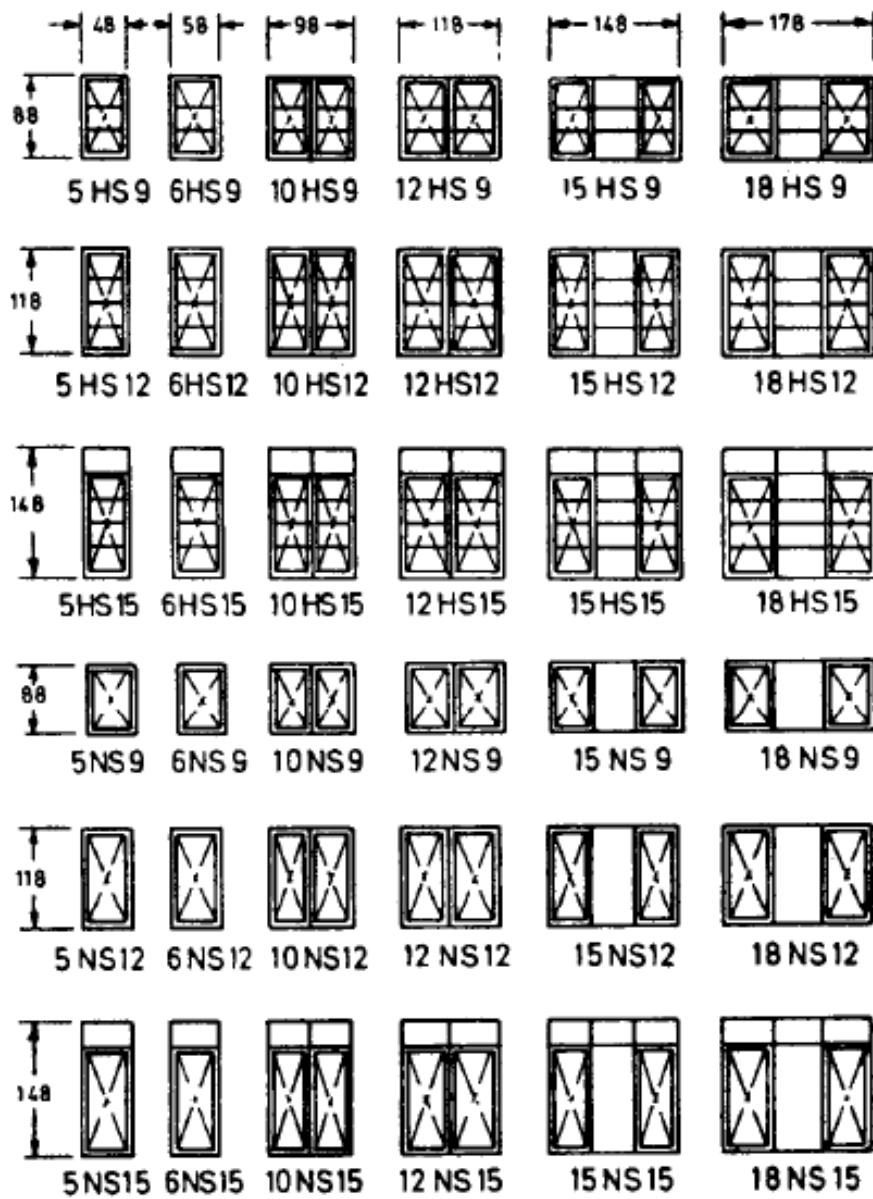


Figure 2 windows



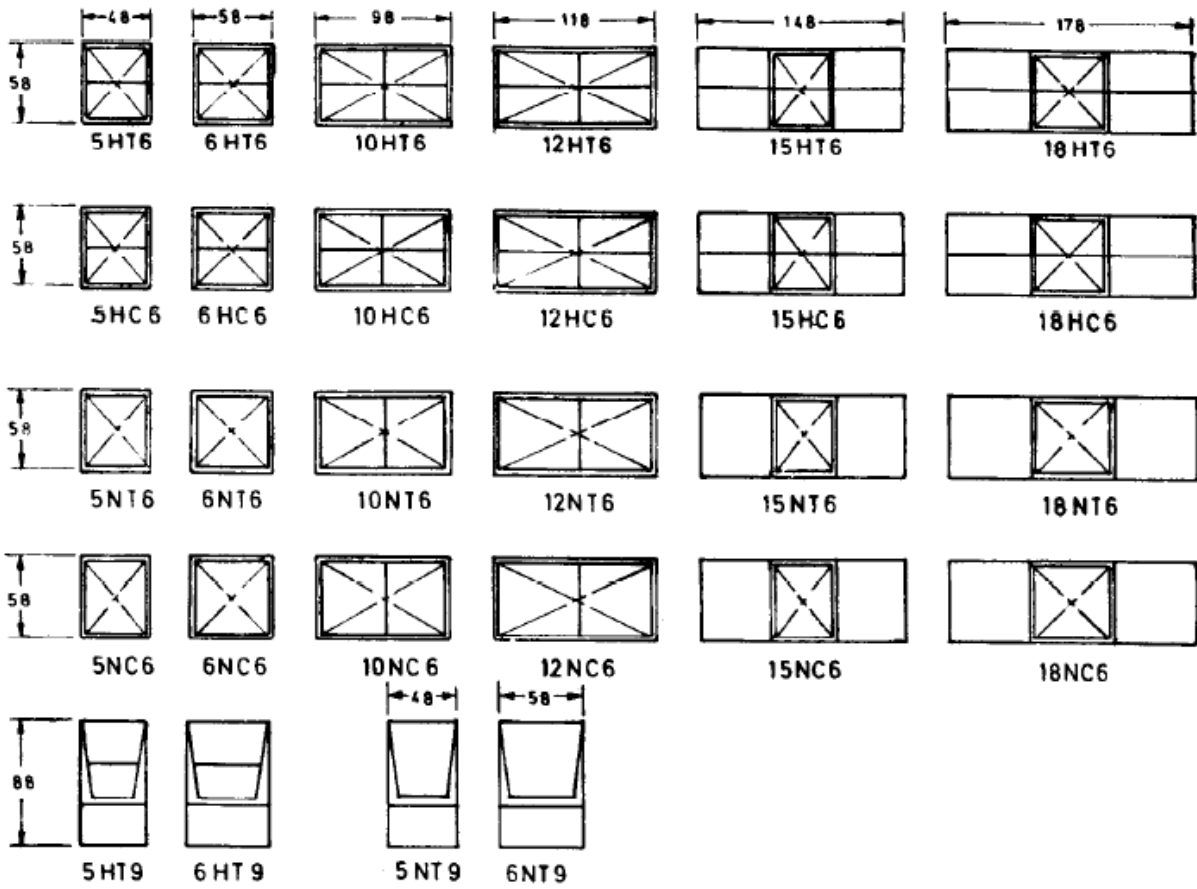


Figure 3 ventilators

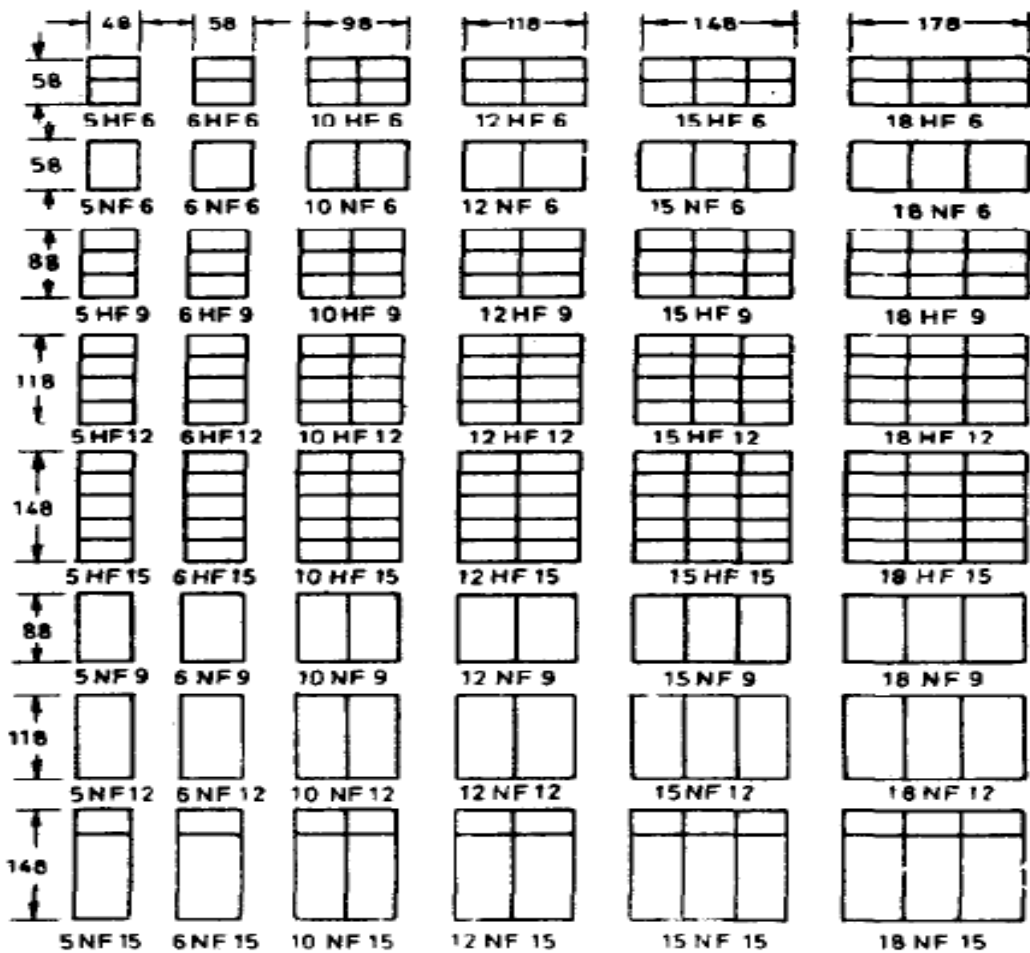
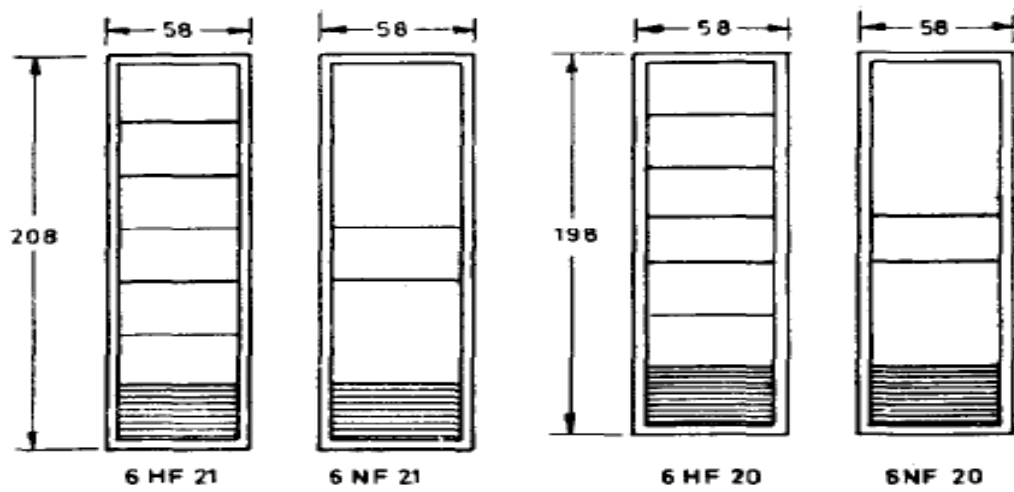


Figure 4 fixed lights

Annex B (normative)

sampling and criteria of conformity

B.1 Sampling

B.1.1 the doors/windows/ventilators/fixed-lights shall be sampled in accordance with table 2

Table 2 sampling of test pieces

Lot size, units	Sample for inspection		Sample for testing	
	Sample size, units	Acceptance number	Sample size for non-destructive tests, units	Sample size for destructive tests, units
5 – 15	2	0	3	1
16 – 25	3			
26 – 90	5			
91 – 150	8	1	5	2
151 – 280	13			
281 – 500	20	2	7	4
501 – 1 200	32	3	10	6

B-2. CRITERIA FOR CONFORMITY

B-2.1 the doors/windows/ventilators/fixed-lights selected in the sample under B-1 shall be inspected for

- a) Dimension (annex A)
- b) tolerances (sub clause 4.2),
- c) materials (clause 4.1),
- d) construction (4.3)
- e) positioning of holes, fixing screws and lugs (4.4),

f) Glazing (5).

g) finishing (6)

B.2.2 any door/window/ventilator/fixed-light not satisfying any one or more of the requirements inspected for shall be classified as defective.

B-2.3 the lot having satisfied the requirements listed in B-2.1 shall be inspected for requirements of welded joints. For this purpose a sub-sample of the size given in Table 1 shall be selected from the doors/windows/ventilators/fixed-lights which have been found non defective under B-2.1. The doors/windows/ventilators/fixed-lights in the sub-sample shall be tested according to Annex C

Copy for public comments

Annex C (informative)

strength of welded joints

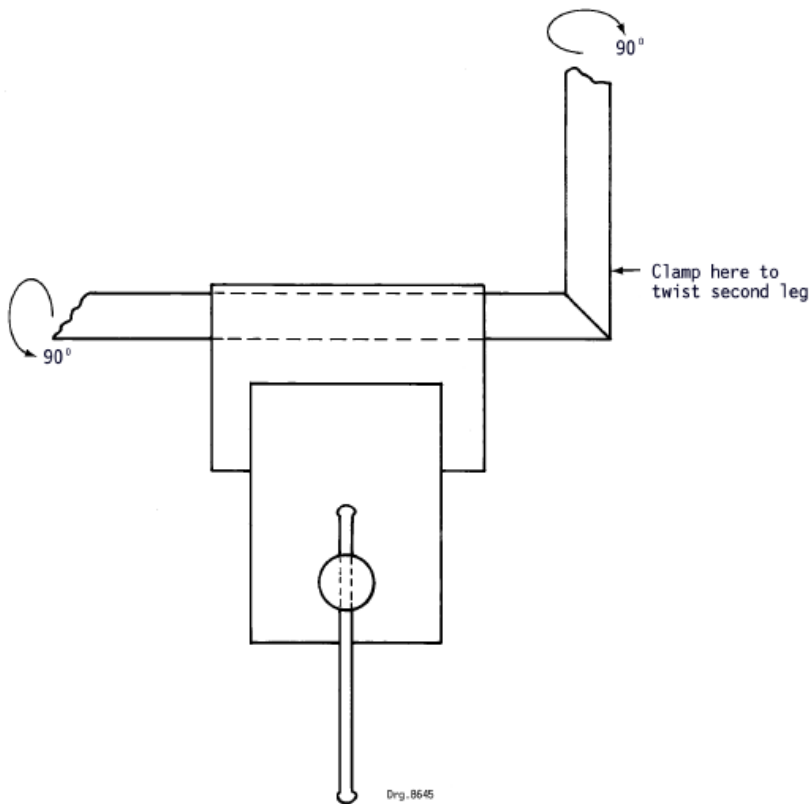
Strength of welded corners

C.1.1 cut out a typical corner of the frame so that the legs are approximately 250 mm long. Grip one leg in a vice so that the distance between the jaws of the vice and the inner edge of the free leg is 75 ± 5 mm.

C.1.2 Twist the free leg through 90° in a plane perpendicular to the axis of the clamped leg.

C.1.3 Repeat this procedure in the opposite direction of twist and with the other leg gripped in the vice and then examine the corner for compliance with the requirements of **Annex C.1.4** (see also figure 9). When relevant, repeat the test on a corner of each opening portion of the frame unit.

C.1.4 There shall be no sign of discontinuity in the weld or of fracture of the weld due to porosity or slag inclusion.



Annex D
(informative)

ordering information

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

- a) Type and size of door, window
- b) Whether the units are to be fixed in brick masonry, stone masonry, concrete or steel;
- c) Type of hinges required, for example, whether projecting, non-projecting or friction type;
- d) Details of fittings required including couplings, weather bars, etc;
- e) Whether the mullions and transoms are to be cut to suit masonry or steel work;
- f) Whether removable fly-proof screens are required;
- g) Whether the shutters are required to be opened from inside or outside;
- h) Type of finish to be provided conforming to the requirements laid down in 8;
- i) Whether wood or metal bead is to be provided in place of putty glazing; and
- j) Any other relevant information.

Copy for public comments

Price based on **nnn** pages

©RSB 2021 - All rights reserved