

## **DRAFT EAST AFRICAN STANDARD**

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**Windows and doors made from rolled steel sheets and steel sections —  
Specification**

**EAST AFRICAN COMMUNITY**

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## Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

DEAS 1153:2023 was prepared by Technical Committee EASC/TC 035, *Steel and steel products*.

DRAFT FOR PUBLIC REVIEW

# Windows and doors made from rolled steel sheets and steel sections — Specification

## 1 Scope

This draft East African Standard specifies the requirements regarding material, fabrication and finish of steel doors, windows, ventilators and fixed-lights manufactured from rolled steel sheets and rolled steel sections for domestic applications to the specified sizes and designs.

This standard does not cover steel doors, windows, ventilators and fixed-lights for use in institutional and industrial buildings.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

EAS 134, *Cold rolled steel sections — Specification*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods*

ISO 4995, *Hot-rolled steel sheets of structural quality — Specification*

ISO 4996, *Hot-rolled steel sheet of high yield stress structural quality*

ISO 4997, *Cold-reduced carbon steel sheet of structural quality*

ISO 4998, *Continuous hot-dip zinc-coated and zinc-iron alloy-coated carbon steel sheet of structural quality*

ISO 8504-1, *Preparation of steel substrates before application of paints and related products — Surface preparation methods — Part 1: General principles*

ISO 10642, *Fasteners — Hexagon socket countersunk head screws with reduced loadability*

ISO 12944-5, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems*

ISO 21005, *Ships and marine technology — Thermally toughened safety glass panes for windows and side scuttles*

## 3 Terms and definitions

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

### 3.1 subdividing bars

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**

part of a window, sidelight, or fanlight that opens

### **3.4 mullion**

vertical and horizontal bar between the panes of glass in window

### **3.5 head of frame**

the uppermost horizontal component of the frame structure. It is typically a horizontal beam or lintel that spans the top portion of the door or window opening.

### **3.6 lugs**

the projecting extensions or tabs on the frame or sash of the door or window. These lugs serve as attachment points for various components, such as hinges, handles, locks, or other hardware

### **3.7 glazing bars**

the structural elements or divisions that are incorporated into the window or door frame to support and hold the glass panes in place

### **3.8 sties**

Vertical components that sit on the outside edge of the door

### **3.9 trasome**

the horizontal structural component or member that is located above the main opening of the door or window. It is positioned perpendicular to the vertical stiles and separates the main opening from an additional window or panel located above it

### **3.10 meeting stile**

the vertical intersection or junction between two door panels or window sashes where they meet when closed. The meeting stile is specifically associated with double doors or windows that have two separate panels or sashes

### **3.11 lock Rails**

the horizontal components or members of a door or window frame where the locking mechanism is installed. Lock rails are specifically designed to accommodate the various components involved in the locking system, such as locks, latches, deadbolts, or other security devices.

### **3.12 lock plate**

the component that is specifically designed to accommodate the installation of a lock or latch mechanism. The lock plate typically includes holes, recesses, or cut-outs to align with the components of the lock, allowing for secure attachment and proper operation.

### **3.13 glass pane**

the single sheet of glass that is used to fill a specific opening within the door or window frame. Glass panes are transparent or translucent components that allow light to pass through while providing a barrier against the elements.

### 3.14 overall height of window

the total vertical measurement from the bottom to the top of the window unit, including the frame and any additional components

### 3.15 bottom rail

the horizontal component or member of a door or window frame that is located at the bottom of the unit. It serves as a structural element, providing support and stability to the frame and contributing to the overall functionality and performance of the door or window system

### 3.16 kick plate

the protective metal plate that is installed at the bottom portion of a door. The kick plate is specifically designed to withstand frequent impact or abuse, such as kicking, scuffing, or pushing with feet

### 3.17 sub-light

the smaller window or glazed panel located beneath a larger window or primary light source. It is typically positioned below the primary window or light and serves to provide additional light, ventilation, or aesthetic appeal

### 3.18 sill

the horizontal component or member located at the bottom of a door or window frame. The sill plays a crucial role in providing structural support, weather resistance, and proper drainage for the door or window system

### 3.19 overall height of door

the total vertical measurement from the bottom to the top of the door unit, including the frame and any additional components

### 3.20 frame

the structural framework or enclosure that surrounds and supports the door or window unit. The frame provides the structural stability, integrity, and attachment points for the various components of the door or window system

## 4 Standard sizes, tolerances and designations

### 4.1 Sizes and dimensions

Types and overall sizes of steel doors, windows, ventilators and fixed lights shall be clearly indicated by the manufacturer. The dimensions are overall heights and widths to the outside of frames of steel doors, windows, ventilators and fixed-lights. These sizes are derived after allowing 10-mm clearance on all the four sides for the purpose of fitting doors, windows, ventilators or fixed-lights into modular openings.

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

### 4.2 Tolerances

The sizes indicated in Figure 1, for door, window and ventilator or fixed-light frames shall not vary by more than  $\pm 1.5$  mm.

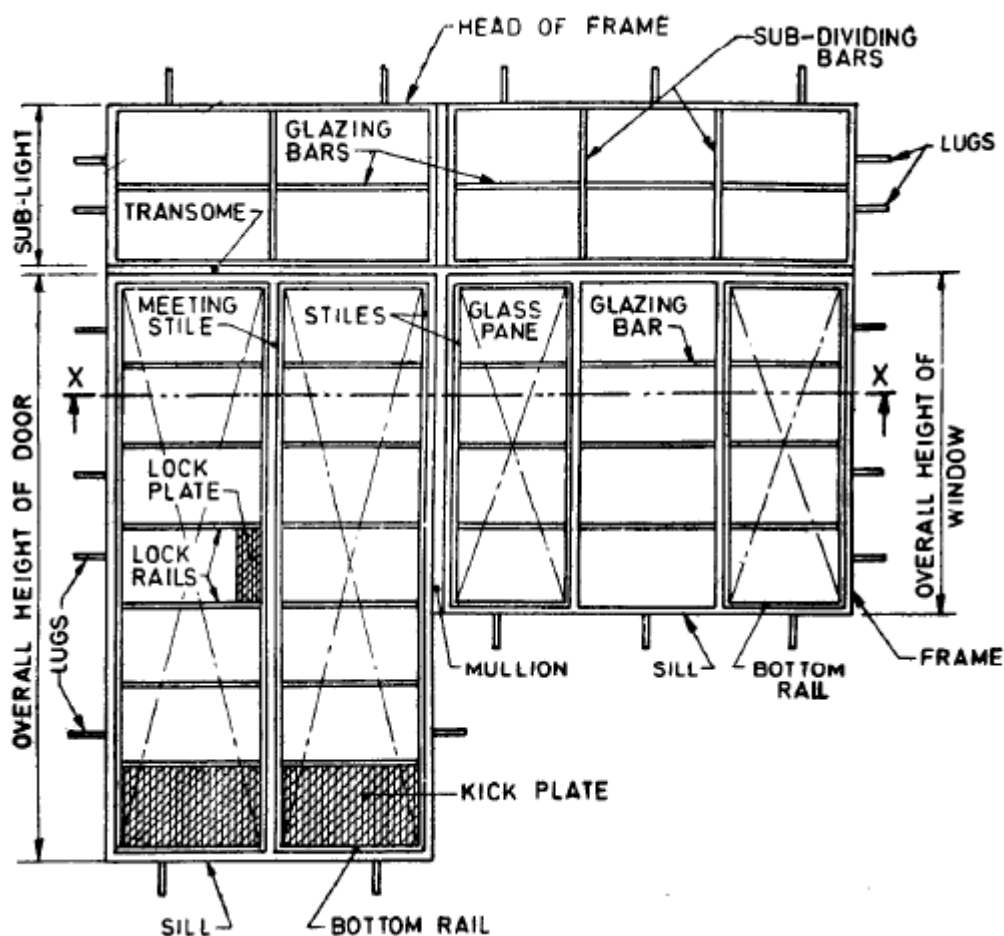


Figure 1: Terminology for steel doors and windows

### 4.3 Designation

4.3.1 Doors, windows, ventilators and fixed-lights shall be designated by symbols denoting their width, type and height in succession in the following manner:

- a) width shall be indicated by the number of modules in the width of opening;
- b) type shall be indicated by the following letters of the alphabet; and
  - i) C = Centre hung shutter;
  - ii) F = Fixed glass panes;
  - iii) H = With horizontal glazing bars;
  - iv) N = Without horizontal glazing bars;
  - v) S = Side hung shutters; and
  - vi) T = Top hung shutters;
- c) height shall be indicated by the number of modules in the height of opening.

EXAMPLE A window of a width of 10 modules and height 12 modules having horizontal glazing bars and side hung shutters is designated by 10HS12.

4.3.2 Composite doors, windows, designated in the following manner: ventilators or fixed-lights to be designated in the following manner:

- 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; and

b) two 10 module wide and 12 module high horizontally glazed side hung windows coupled side by side with two fixed-lights at top, each 10 module wide and 6 module high, is designated by  
10HF6/10HF6  
10HS12/10HS12

## 5. Material requirements

### 5.1 Rolled steel sections

Rolled steel sections for the fabrication of steel doors, windows, ventilators and fixed-lights shall conform to EAS 134.

Strength requirements for rolled mild 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/mm <sup>2</sup>	Ultimate tensile strength, N/mm <sup>2</sup>	Minimum elongation as a proportion of gauge length, %
210	210	340	24
250	250	420	22
360	360	480	20

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

### 5.2 Rolled steel sheets

The steel sheets for the fabrication of steel doors, windows, ventilators and fixed-lights shall conform to ISO 4995, ISO 4996, ISO 4997 or ISO 4998.

## 6.0 Construction and fabrication

### 6.1 Straightness and squareness

6.1.1 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.

6.1.2 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.

### 6.2 Joints, corners, and locating tenon holes

6.2.1 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.

6.2.2 Corners shall be mitred and welded.

6.2.3 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.



6.2.4 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.

6.2.5 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.

### 6.3 Operation

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

### 6.4 Coupling

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

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

6.4.3 Coupling section may be used as mullions for coupling the units side by side and coupling independent units one above the other.

6.4.4 Coupling sections manufactured from galvanized steel plate of minimum 1.6 mm thickness conforming to the dimensions shown in Figure 2 may also be used for coupling if agreed to between the purchaser and the manufacturer.

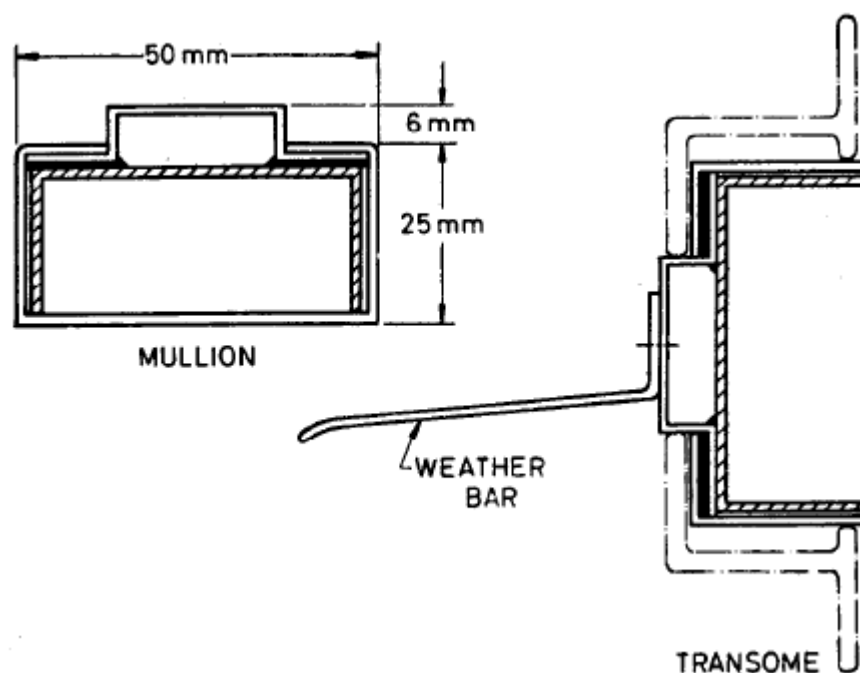


Figure 2 — Details of weather bar with steel parts

6.4.5 Tubular section shall be rued for coupling at varying angles to form bay composites, right angle composites, et cetera.

### 6.5 Position of holes, fixing screws and lugs

Outer frames shall be provided with fixing holes centrally in the web of the section. Additional holes are provided in certain types of doors and windows for manufacturing purposes and for the use of fixing. Fixing lugs and fixing screws are to be supplied for the positions as given in Table 1.

**Table 1: Fixing screws and lugs**

S/No.	Place of fixing	Size of the screw or lugs
1	To wooden frames rebated on the outside	35 mm No. 10 galvanized wood screw
2	To plugs in concrete work or brick work rebated on the outside	35 mm No. 10 galvanized wood screws
3	To plugs in concrete work or brick work rebated on the outside (that is, plain or square jambs)	65 mm No. 10 galvanized wood screws
4	Direct to brick work or masonry (that is, plain or square jambs)	Slotted steel adjustable lugs (natural finish) not less than 70 mm x 14 mm x 3.15 mm countersunk galvanized machine screws and nuts 12 mm x 6 mm
5	To steel work	Fixing clips and 8 mm galvanized bolts and hexagonal nuts

## 6.6 Fabrication

### 6.6.1 Frames

Both the fixed and opening frames shall be constructed of sections which have been cut to length and mitred. The corners of fixed and opening frames shall be welded to form a solid fused welded joint conforming to the requirements given in 6.6.1.1. All frames shall be square and flat. The process of welding adopted shall be flash butt welding or can be any other process as agreed to between the manufacturer and the purchaser which shall fulfil the requirements given in 6.6.1.1 to 6.6.1.4.

#### 6.6.1.1 Visual inspection test

When two opposite corners of the frames are cut, paint removed and inspected, the joint shall conform to the following:

- a) welds shall be made all along the place of meeting the members;
- b) welds shall be properly ground; and
- c) complete cross section of the corner shall be checked up to see that the joint is completely solid and there are no visible cavities.

#### 6.6.1.2 Micro examinations

From the two opposite corners obtained for visual test as in 6.6.1.1, the flanges of the sections shall be cut with the help of a saw. The cut surfaces of the remaining portions shall be polished, etched and examined. The polished and etched faces of the weld and the base metal shall be free from cracks and reasonably free from under cutting, overlaps, gross porosity and entrapped slag.

#### 6.6.1.3 Macro-examinations

Two opposite corners of the frames shall be cut and prepared for macro examination and examined with hand lens of magnification of not less than five. Complete cross section of the corner shall show a joint completely solid and with no visible cavities, under-cutting and overlaps.

#### 6.6.1.4 Fillet weld test

The remaining corner obtained for macro-examination shall be subjected to fillet weld test. The outside flange and inside flange shall be removed by saw cutting and remaining fillet shall be fractured by hammering. The fractured surface shall be free from slag inclusion, porosity, cracks, penetration defects and fusion defects.

All sub-dividing and glazing bars shall be tenoned and riveted into the frames by tenon-riveting machine or any other suitable equipment. No welding shall be permissible in the entire joint including the meeting place of the glazing and subdividing bars as also the rivet-head. The rivet-head shall be free from any weld or slag deposit and should have been formed by riveting of the projection made out of the subdividing/glazing bar itself. All subdividing and glazing bars shall be tenoned and riveted into the frames.

Casements shall be fitted to their frames so as to provide continuous contact for weathering on the inside and outside and shall be secured in closed position by the fittings which shall have been properly checked and adjusted.

Windows and doors may have holes in webs of the bars other than those required during manufacture and fixing.

### 6.6.2 Side hung shutter

#### 6.6.2.1 Hinges

For fixing steel hinges, slots shall be cut in the fixed frame and the hinges inserted inside and welded to the frame at the back. The hinges shall be normally of the projecting type, with wall thickness of not less than 3.15 mm and width not less than 65 mm and not more than 75 mm. The hinge pin and washer shall be of galvanized steel or aluminum alloy 51 S-WP of suitable thickness. The hinge pin shall be of galvanized steel and the washer shall be of brass or stainless steel, of suitable thickness.

Friction hinges may be provided for side hung shutter windows, in which case peg stay as mentioned in 6.6.2.3 may not be required.

Non-projecting type of hinges may also be used if agreed to between the purchaser and the supplier. The flap shall be of mild steel sheet of thickness not less than 3 mm. The hinge pin of diameter not less than 6 mm and washers shall be of electrogalvanized steel or aluminium alloy.

#### 6.6.2.2 Handle

The handle for side hung shutters shall be of pressed brass, cast brass, aluminium or steel protected against rusting and shall be mounted on a steel handle plate. The handle plate with wall thickness of not less than 3 mm shall be riveted to the opening frame.

The handle shall have a two-point nose which shall engage with a brass or aluminium striking plate on the fixed frame in a slightly open position as well as in a fast position. Alternatively handle with one point nose may be used, if agreed to between the purchaser and the supplier. The thickness of the handle shall not be less than 3 mm for mild steel and brass, and 3.5 mm for aluminium. The hinge pin of diameter not less than 6 mm shall be of galvanized steel and washers shall be of brass or stainless steel of suitable thickness.

The height of the handle plate in each type of standard window having horizontal glazing bar shall be at the centre of the second pane from the bottom of the window. This dimension shall remain same for the standard windows having no glazing bars also.

The boss of the handle shall incorporate a friction device to prevent the handle from drooping under its own weight and the assembly shall be so designed that the rotation of the handle may not cause it to unscrew from the pin. The strike plate shall be so designed and fixed in such a position in relation to the handle that with the latter bearing against its stop, there shall be adequate tight fit between the casement and the outer frame. The fixing screw, shake proof washer, plain washer and plain washer fixed with the handle shall be of galvanized steel.

### 6.6.2.3 Peg

In cases where non-friction type hinges are provided, the windows shall be fitted with peg stays which shall be either of pressed brass, cast brass or steel protected against rusting and shall be 300 mm long with steel peg and locking bracket. The peg stay shall have three holes to open the side hung casements in three different angles. The peg stay shall be of minimum 2 mm thickness in case of brass or aluminium and I-25 in case of mild steel. Side hung casements fitted with friction hinges shall not be provided with a peg stay. Steel peg, pin and locking bracket with wall thickness of not less than 3 mm, shall be riveted to the window.

### 6.6.2.4 Removable fly-proof screen

Alternatively, and if specifically required by the purchaser, side hung and top hung shutters may be fitted with an internal removable fly proof screen in a 1.25-mm thick sheet steel frame applied to the outer to allow the screen being readily removed. The windows with removable fly-proof screen shall be fitted with a through-the-screen lever operator at the still to permit the operation of the shutter through an angle of 90° without having to remove the fly-proof screen. The lever shall permit keeping the shutter open in a minimum of three different positions. Top hung windows fitted with removable fly-proof screen shall be fitted with a through-the-screen operator to enable operating and keeping the shutter open in a minimum of three different positions.

### 6.6.3 Top hung ventilator

6.6.3.1 The steel butt hinges for top hung ventilators shall be riveted to the fixed frame or welded to it at the back after cutting a slot in it. Hinges to the opening frame shall be riveted or welded and cleaned off.

6.6.3.2 Top hung casements shall be provided with a peg stay with three holes which when closed shall be held tightly by the locking bracket. The locking bracket shall either be fitted to the fixed frame or to the window.

### 6.6.4 Centre hung windows and ventilators

6.6.4.1 Centre hung windows shall be hung with two pairs of brass or aluminium cup pivots riveted to the inner and outer frames of the windows to permit the window to swing to an angle of approximately 85°. The opening portion of the window shall be so balanced that it remains open at any desired angle under normal weather conditions.

6.6.4.2 A brass or aluminium spring catch shall be fitted in the centre of the top bar of the centre hung window for the operation of the window. This spring catch shall be secured to the frame with MS Screws and shall close into a mild steel or malleable iron catch plate riveted, screwed or welded to the outside of the outer window frame bar.

### 6.6.5 Door

6.6.5.1 Details of construction of the door shall be indicated.

6.6.5.2 The kick panels shall be in double tray construction, and shall be of I-25 mm thick mild steel sheets. The kick panels shall be welded or screwed to the frame and the glazing bar.

6.6.5.3 Steel hinges for doors shall be of the same type as for the windows but of larger size type. The hinges shall be 50 mm projecting. Non-projecting type of hinges and self-aligned type door hinges may also be used. The hinge pins and washers shall be of galvanized steel or aluminium alloy of suitable thickness.

6.6.5.4 A mortice lock with not less than four levers or pins shall be provided for the door. It shall be openable with its key both from the outside as well as from the inside but in addition a bolt shall be provided on the inside so that when the door is locked from the inside and bolted, it cannot be opened from the outside with its key.

**6.6.5.5** In the case of double doors, the first closing leaf shall be at the left hand leaf looking at the door from the push side. The first closing shutter shall have a concealed brass extruded aluminium or steel bolt at top and bottom. The bolt shall be so constructed as not to work loose or droop by its own weight.

**6.6.5.6** Single and double shutter door may be provided with a three-way bolting device. Where this device is provided in the case of double shutter doors, concealed brass or steel bolts may not be provided.

### **6.6.6 Composite units**

Composite units are to be assembled at site using coupling sections.

### **6.6.7 Weather bar**

Where fixed light occurs over external opening shutter, a push fit weather bar shall be provided.

## **7 Ancillary components and fittings**

### **7.1 Ancillary components**

#### **7.1.1 Fixing screws**

7.1.1.1 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. Screw threads of machine screws used in the manufacture of steel doors, windows, ventilators and fixed-lights shall conform to its requirements.

7.1.1.2 Screws shall be supplied with nuts. Fixing lugs shall have a standard slot of 8 mm wide for mild steel screw of 6 mm diameter and 12 mm long with square nuts.

#### **7.1.2 Lugs**

7.1.2.1 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.

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

7.1.2.3 When fixed to the frame or supplied loose, they shall be positioned as follows:

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

7.1.2.4 When supplied loose, enough lugs shall be provided to allow them to be positioned in accordance with 4.4.1.2.3.

### **7.2 Fittings**

#### **7.2.1 Hinges**

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

7.2.1.2 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.

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

## 7.2.2 Locking handle

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

7.2.2.2 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.

7.2.2.3 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.

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

## 8 Glazing and glass panes

### 8.1 Glass thickness

Glass panes shall be at least 3 mm thick.

### 8.2 Glass panes sizes and finish

All glass panes shall have properly squared corners and straight edges. All glass panes shall have properly squared corners and straight edges and shall conform to ISO 21005.

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

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

8.2.3 The glass pane shall be free from any cracks.

### 8.3 Glazing

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

8.3.2 Glazing clips for putty glazing shall be provided and the method of fixing glazing clips shall be as given in 8.3.3.

8.3.3 The portion 'A' of the glazing clip shall be fitted into the slot in the window frame leaving the clip to rest on the glass. The portion 'B' shall then be pressed along the glass towards the frame until it springs into position in the clearance between the edge of the glass and the steel frame. Glazing clips shall be used for all sizes of glass panes.

NOTE 1 Glazing clips usually not provided for normal size glass panes, where large size glass panes are required to be used or where the casement of the window is located in heavily exposed situation, holes for glazing clips will have to be drilled during fabrication.

NOTE 2 Where the glass pane size does not exceed 600 mm x 300 mm, glazing clips not considered necessary (for inside glazed windows for special use only two spring glazing clips per pane should be provided). In case of doors, windows and ventilators without horizontal glazing bars, through glazing clips may be spaced according to the slots in the vertical members, provided the spacing does not exceed 300 mm.

8.3.4 Windows may also be prepared for brad glazing made from either, 9.5 mm x 9.5 mm, aluminum channel of 1 mm thickness or 9.5 mm x 9.5 mm pressed steel channel of minimum 0.45 mm thick galvanized sheet.

8.3.5 Self tapping screws shall be used for fixing bead or alternatively bead fixing can be done with concealed screws. Back putty or 'V' shaped rubber channel wall shall be provided for glazing. No spring glazing clip shall be required for bead glazing.

## **9 Finish and Workmanship**

### **9.1 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.

### **9.2 Hot dipped galvanizing**

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

### **9.3 Phosphating and painting**

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

9.3.2 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.

9.3.3 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.

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

9.3.4 After pretreatment of the surfaces, the units shall be dipped in phosphating solution in accordance with the requirements laid down. This shall be allowed by one coat of paint which shall be air-dried or stove-dried after applying.

9.3.5 Paint shall be applied on the units by any of the following methods:

- a) brushing using ready mixed paints;
- b) spraying with suitable primers; or
- c) dipping the complete unit in bath of suitable primer paint, such as red oxide zinc chrome primer and then air drying.

### **9.4 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; and
- c) irregularities such as burrs or weld fins shall be removed from hidden surfaces but need not be ground smooth.

## **10 Sampling and criteria for conformity**

The sampling and criteria for conformity for steel doors, windows, ventilators and fixed-lights shall be as given in Annex B.

## 11 Marking

All doors, windows, ventilators and fixed-lights shall carry:

- a) identification of the manufacturer or trade-mark, if any;
- b) process of welding adopted; and
- c) standard number.

## 12 Supply

All doors, windows and ventilators shall be dispatched with the opening parts suitably secured to preserve alignment when fixing and glazing. Fixing lugs, couplings, fittings and all hardware shall be dispatched separately. Composite windows shall be dispatched uncoupled.

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**Annex A**  
**(Informative)**

**Information to be supplied by the purchaser while placing the order**

The purchaser shall furnish information to the manufacturer or the supplier in regard to the following points:

- a) type and size of door, window or composite unit quoting the designation
- 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, et cetera;
- 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.

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**Annex B**  
**(Normative)**

**Scale of sampling and criteria for conformity for steel doors, windows, ventilators and fixed-lights**

**B.1** In any consignment all the doors/windows/ventilators/fixed lights of similar raw-materials under relevantly uniform conditions of manufacture shall be grouped together to constitute a lot.

**B.2** Sample shall be selected and inspected for each lot separately for ascertaining its conformity or otherwise to the requirements of the specification.

**B.3** The number of doors/windows/ventilators/fixed-lights selected from a lot to constitute the sample shall depend upon the size of the lot and shall be in accordance with column 1 and column 2 of Table B.1.

**Table B.1 — Scale of sampling**

Lot size (No. of doors/windows/ventilators/fixed-lights in the lot)	Sample size of doors/windows/ventilators/fixed-lights to be selected in the sample	Permissible no. of defectives	Sub-sample size	Possible no. of defectives in the sub sample
1	2	3	4	5
up to 50	5	0	2	0
51 – 150	8	0	3	0
151 – 300	13	1	5	0
301 - 500	20	2	8	0
501 – 1 000	32	3	13	1
1 001 – 3 000	50	5	20	2

**B.4** In order to ensure the randomness of selection of the sample procedures is strictly followed, the doors/windows/ventilators/fixed-lights for the sample shall be selected at random from the lot.

**Annex C**  
**(Normative)**  
**Strength of welded joints**

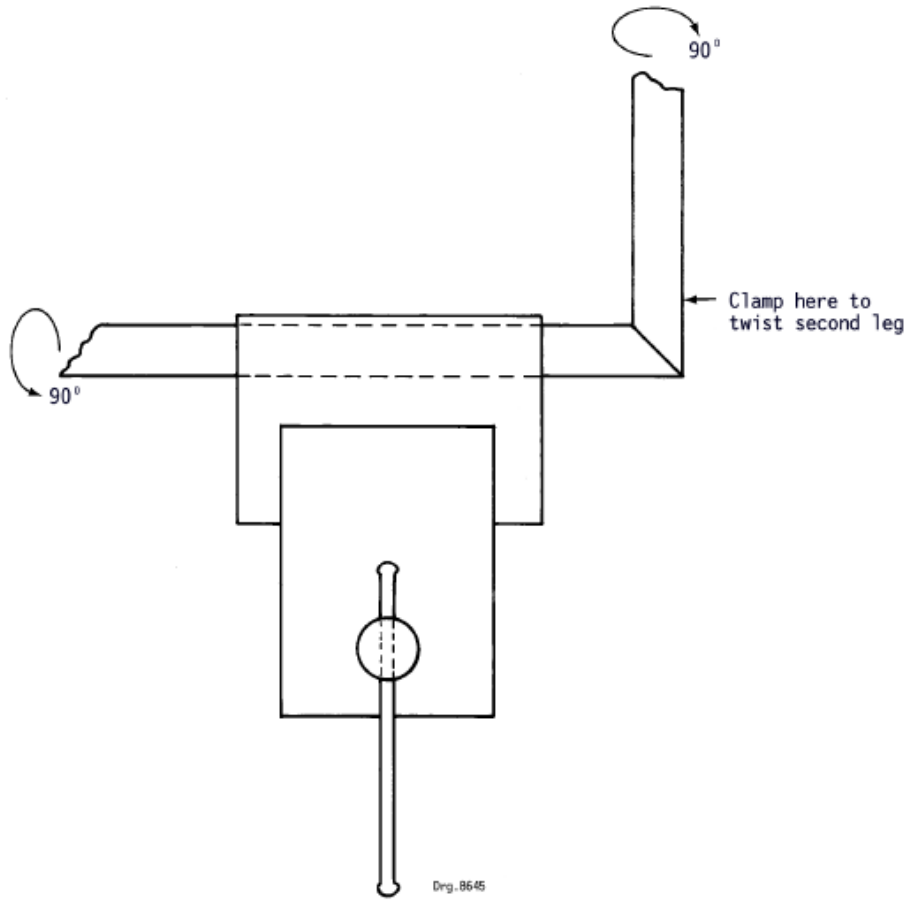
**C.1 Strength of welded corners**

**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  $75 \pm 5$  mm.

**C.1.2** Twist the free leg through  $90^\circ$  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 examines the corner for compliance with the requirements of Annex C.1.4 (see also figure 3). 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.



**Figure 3** – Method of test for strength of welded corners

## **Annex D**

### **(Informative)**

#### **Optional fittings**

##### **D.1 Sliding stay**

**D.1.1** 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.

**D.1.2** 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.

**D.1.3** 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.

**D.1.4** The thumb screw shall be secured effectively to prevent it from being screwed out of the box.

##### **D.2 Peg stay (to be made optional)**

**D.2.1** 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.

**D.2.2** The construction of peg stays shall be such that the ventilator can be locked securely in an acceptable manner.

##### **D.3 Spring catch**

**D.3.1** A spring catch shall be of brass or other corrosion-resistant material and, if so specified by the purchaser, shall be chromium plated.

**D.3.2** 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  $15 \pm 5$  N.

**D.3.3** 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.

**D.3.4** 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.

##### **D.4 Sliding bolt (to be made optional)**

**D.4.1** 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.

**D.4.2** If a striking plate is provided, it shall be of either brass or steel.

**D.4.3** Unless a positive locked position is provided, a friction device to prevent the bolt from moving under its own weight shall be incorporated.

**D.4.4** The force required to open or to close the bolt shall be 20-50 N.

##### **D.5 Pivots (to be made optional)**

**D.5.1** Pivots for horizontal and vertical pivot-hung ventilators shall be cup pivots and shall be of brass or other acceptable corrosion-resistant material.

**D.5.2** The outside diameter of the pivots shall be at least 40 mm, and the width shall be at least 11 mm.

**D.5.3** 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.

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## Bibliography

- 1) US 2247:2020, Windows and doors made from rolled mild steel sections — Specification
- 2) RS 462:2021, Windows and doors made from rolled mild steel sections — Specifications
- 3) SANS 727:2003, Windows and doors made from rolled mild steel sections
- 4) IS 1038:1983, Specification for steel doors, windows and ventilators
- 5) BS 6510:2010, Steel-framed windows and glazed doors – Specification

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