



TECHNICAL SPECIFICATION FOR
METAL DOORS, WINDOWS,
VENTILATORS, LOUVRES, ETC.

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 1 OF 9

VOLUME – II B

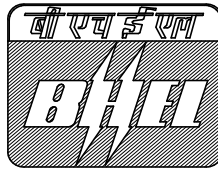
CIVIL, STRUCTURAL & ARCHITECTURAL WORKS

SPECIFICATION NO. PE-TS-999-600-C014

SECTION - D

GENERAL TECHNICAL SPECIFICATION

**METAL DOORS, WINDOWS, VENTILATORS,
LAUVRES, ETC.**



Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301



**TECHNICAL SPECIFICATION FOR
METAL DOORS, WINDOWS,
VENTILATORS, LOUVRES, ETC.**

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION – C14

REV.NO. 00

SHEET 2 OF 9

TABLE OF CONTENT

CLAUSE NO.	DESCRIPTION	PAGE NO.
1.0.0	SCOPE	3
2.0.0	INSTALLATION	3
3.0.0	ACCEPTANCE CRITERIA	8
4.0.0	I.S. CODES	9



**TECHNICAL SPECIFICATION FOR
METAL DOORS, WINDOWS,
VENTILATORS, LOUVRES, ETC.**

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 3 OF 9

**TECHNICAL SPECIFICATION
FOR
METAL DOORS, WINDOWS, VENTILATORS, LOUVRES, ETC.**

1.0.0 SCOPE

The work in general shall consist of supplying and/or erecting and installing of all metal doors, windows, ventilators, louvers, glazed partitions, etc. as shown on drawings with all materials complete excluding supply of glass and glazing. The scope of work shall also include the assembly and erection of all doors, windows, louvres, glazed partitions, etc. for which fabricated materials shall be supplied by the Owner from the store at site. Supplying and/or fixing of all door and window accessories and hardware is also included in the scope.

2.0.0 INSTALLATION

2.1.0 Materials

Steel sections used for fabrication of doors, windows etc. shall be standard rolled steel sections specified in IS:1038 and IS:1361 or as specified in drawing and schedules.

Steel sheets for frames, shutters, louver blades etc. shall be of gauge mentioned in drawings.

Aluminium sections for fabricating doors, windows, partitions etc. shall be extruded sections conforming to IS:1948 and 1949 or as manufactured by Indian Aluminium Company Limited. The alloy used shall conform to IS Designation HE 9-WP of IS:733.

Hardware and fixtures shall be as specified in "Schedule of Fixtures" and the best quality from approved manufacturers shall only be used. The Tenderer shall specifically state the particular manufacturer's materials he proposes to use. "Schedule of Fixtures" is for the purpose of stating the minimum requirement and improper alignment or faulty operation due to inadequate strength of hardware or fixture shall entirely be the Contractor's responsibility.

All hardware and fixtures shall be able to withstand repeated use. Door closures shall conform to IS:3564 and shall be suitable for doors weighing 61-80 Kg. unless otherwise stated in schedule. Each closer shall be guaranteed against manufacturing defect for one year and any defect found within this period shall be rectified or the closer replaced.

Concealed door closers shall be either floor mounted or transom mounted, suitable for installation with metal doors. It shall conform to the performance requirements and endurance test stated in IS:3564 - Appendix A.



**TECHNICAL SPECIFICATION FOR
METAL DOORS, WINDOWS,
VENTILATORS, LOUVRES, ETC.**

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 4 OF 9

The Contractor shall submit samples of each type of hardware to the Engineer. The approved samples shall be retained by the Engineer for comparison of bulk supply. The samples shall be returned to the Contractor towards the end for incorporation in the job.

The mastic for caulking shall be of best quality from a manufacturer approved by the Engineer. In general, the mastic for fixing of metal frames shall be as per IS:1081 and/or as approved by the Engineer.

2.2.0 Fabrication

2.2.1 Steel Doors, Windows, Ventilators, Louvres etc.

a) Door Frames

Frames shall be fabricated from 16 g sheets. They shall be mortised, reinforced, drilled and tapped for hinges and lock and bolt strikes. Where necessary, frames shall be reinforced for door closers. Welded construction with mitred corners shall be used. Rubber door silencers shall be furnished for the striking jamb. Loose "T" masonry anchors shall be provided. Frames shall finish flush with floor and adjustable floor anchors shall be supplied. Frames shall be brought to site with floor ties/weather bars installed in place.

b) Double Plate Flush Door Shutters

Door shutters shall be 45 mm. thick, completely flush design and shall comprise of two outer sheets or 18 G steel sheets, rigidly connected and reinforced inside with continuous vertical 20 G stiffeners, spot welded in position at not more than 150 mm on centres.

Both edges of doors shall be joined and reinforced full height by steel channels placed immediately inside and welded to the door faces. Top and bottom of doors shall be reinforced horizontally as shown on drawing by steel channels running full width of door. Doors shall not have more than 2.5 mm clearance at jambs and heads, shall have proper level on lock stiles and rails to operate without binding, and shall be reinforced at corners to prevent sagging or twisting. Pairs or double doors shall have meeting-stile edges bevelled or rebated. Where shown on drawing, the doors shall be sound-deadened by filling the inside voids with mineral wool or other suitable approved materials.

Doors shall be mortised, reinforced, drilled and tapped in shop for hinges, locks and bolts. They shall also be reinforced for closers, push-plates and other surface hardware where necessary. Any drilling and tapping required for surface hardware shall be done at site. Where shown on drawing, provision shall be made for fixing glazing, vision panels, louvres etc. glazing moldings shall be of 18 G steel or extruded aluminium sections with profiles shown on drawing and suitable for fixing 6 mm. glass. Louvres blades shall be V or Z shaped and made out of 16 G sheets.



**TECHNICAL SPECIFICATION FOR
METAL DOORS, WINDOWS,
VENTILATORS, LOUVRES, ETC.**

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 5 OF 9

c) Single Sheet Door Shutters

Single sheet doors shall be made from best quality 18 G mild steel sheets, and shall present a flush surface on the outside. The inside shall be stiffened with semi tubular edge and central stiffening rail, which shall convey the lock and other furniture. The frames shall be made from best quality 16 G mild steel sheets.

Wherever required as shown on drawings, provisions for fixing glass panes, louvres etc. shall be made.

The manufacturing shall be done as specified in 2.2.1.b. "Double Plate Flush Door Shutters".

d) Sliding Doors

Sliding doors shall be either double plate or single plate construction as called for in drawings made out of 18 gauge steel sheets with adequate stiffeners. The Contractor shall specify the weight of the door in his shop and submit the manufacturer's catalogue of the sliding gear he proposes to use. Where shown on drawings, the Contractor shall make provision for openings to the door for mono-rail beams. Doors shall close positively to exclude rain water from seeping in. When called for in schedule, sliding doors shall withstand specified wind loads without buckling or jamming. The door shall slide freely under all ambient conditions.

e) Fire resistant door

Fire proof door shall conform to I.S.3614(part I & II) and shall have fire rating as indicated elsewhere and where TAC approval will be required fire door shall also conform to TAC regulations

Door shall be double or single leaf and shall of fully metal insulated box section frame and fully insulated shutter faced with steel sheet on both faces. door shall be procured from manufacturer specialised in fire door manufacturing.

f) Door Threshold

Door threshold shall be provided as shown on drawing. Doors without threshold shall have bottom tie of approved type.

g) Steel Windows, Sashes, Ventilators etc.

These shall conform in all respects to IS:1038 and IS:1361 latest editions and as shown on drawings. The details as called for in the above codes shall be applicable for coupling mullions, transoms, weather bars, pivot arrangements for ventilators, etc. or as shown on drawings.



TECHNICAL SPECIFICATION FOR METAL DOORS, WINDOWS, VENTILATORS, LOUVRES, ETC.

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 6 OF 9

All welds shall be dressed flush on all exposed and contact surfaces.

Where composite unit openings are shown on drawings, the individual window units shall be joined together with requisite transoms and mullions as shown on drawings. All windows shall be outside glazed, fixed with putty or metal glazing beads as shown on the drawings and/or specified under Schedule of Items. Where aluminium glazing beads are specified, they shall be extruded aluminium channel 9.5 mm x 9.5 mm x 1.6 mm (Indal Section No. 2209) unless otherwise shown on drawings. Aluminium beads shall be given one coat of zinc chromate primer before fixing to windows.

2.2.2

Aluminium Door, Windows and Frames

Extruded sections shall have a minimum 3 mm wall thickness unless otherwise approved in samples by the architect/engineer. All sections shall be approved by the Architect/Engineer before fabrication is taken up. Doors, frames, mullions, transom etc. shall be anodized in a bath of sulphuric acid to provide a clear coating of minimum 0.6 mm thickness. The anodized materials shall then be sealed by immersing in bailing water for 15 minutes. A protective transparent coating shall be applied to the sections before shipment from the factory. Unless otherwise specified all aluminium doors and windows shall be anodised with 20 micron thick.

All work shall be fitted and shop assembled to a first class job, and ready for erection. Shop joints shall be made to hair lines and then welded or braced by such method as will produce an uniform colour throughout the work. Work on the above, other than described, shall be carefully fitted and assembled with neat joints with concealed fasteners. Wherever possible, joints shall be made in concealed locations and on edges of doors. Field connections of all work may be made with concealed screws or other approved type of fasteners. Glazing beads shall be snap fit type without visible screws and shall be of sizes to accommodate 6 mm thick glazing or as specified in schedule of items. All work shall be adequately braced and reinforced as necessary for strength and rigidity.

2.3.0

Shop Coat or Paint

The shop paint for steel doors, windows etc. shall be best lead or zinc chromate primer paint from approved manufacturer. All surfaces shall be thoroughly cleaned of rust, grease, loose mill scales etc. and given one coat of shop paint. Portions like mullions, transoms etc. which will be inaccessible after assembly of units shall be given an extra coat of paint before assembly.

All steel doors, windows, etc. shall be hot dip galvanised to give a coating weight of 1-1/2 - 2 oz. per sft. One coat zinc chromate primer coat shall then be applied as shop paint.

Portions of aluminium frame which come in contact with masonry construction, shall, before shipment from workshop, be protected with a heavy coat of alkali paint. Aluminium coming in contact with other incompatible metals shall be coated with zinc chromate primer.



TECHNICAL SPECIFICATION FOR METAL DOORS, WINDOWS, VENTILATORS, LOUVRES, ETC.

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 7 OF 9

2.4.0

Handling & Storage of Fabricated Material

All metal doors, windows, etc. shall be packed and crated properly before despatch, to ensure that there will be no damage to the fabricated materials. Loading into wagons and trucks shall be done with all care to ensure safe arrival of materials at site in undamaged condition.

When taking delivery of items supplied by Owner, the Contractor shall satisfy himself that the items supplied are upto the specified standard. Any defect detected shall promptly be brought to the notice of the Engineer.

All metal doors, windows etc. shall be stored under cover in a way to prevent damage or distortion. Special care shall be taken to prevent staining of aluminium products by rust, mortar etc.

2.5.0

Assembly & Erection at Site

In general, the fixing of steel doors, windows, ventilators, louvres, etc. shall conform to IS:1081 and as shown on drawings. The Contractor shall assemble and install all steel doors, windows, sashes, fixed metal louvres, etc. including transoms and mullions for composite units in respective places as shown on drawing, keeping proper lines and levels, and in approved workmanlike manner, to give trouble free and leak-proof installations. The installation shall be done according to the instructions of the manufacturer, and/or as approved by the Engineer. If required by the Engineer, the installation shall have to be carried out under the supervision of the manufacturer's staff. The Contractor shall take every precaution against damage of the components during installation. Necessary holes, chases, etc. required for fixing shall be made by the Contractor and made good again as per original, after installation.

After installation of steel doors, windows, etc. all abrasions to shop-coat of paint shall be retouched and made good with the same quality of paint used in shop- coat.

All coupling mullions, transoms, frames, etc. in contact with adjacent steel and other members, shall be well bedded in mastic. The Contractor shall bring to the site the mastic cement in original sealed containers of manufacturer and shall apply it as per the instructions. For all frames supplied by either the Owner or the Contractor, mastic shall be supplied by the Contractor and caulking done properly as per drawings, specifications and as per instructions of the Engineer.

Door shutters, partitions hardware fixtures etc. shall be fixed only after major equipments have been installed in rooms.

Wherever required, nylon cords of approved quality shall be supplied along with pivoted sashes and shall be of adequate length to terminate one metres



**TECHNICAL SPECIFICATION FOR
METAL DOORS, WINDOWS,
VENTILATORS, LOUVRES, ETC.**

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 8 OF 9

from the floor. Loose ends of cords shall end in metal or plastic pull as approved by the Engineer.

3.0.0 ACCEPTANCE CRITERIA

3.1.0 For Fabricated Items

- a) Overall dimensions shall be within ± 1.5 mm of the size shown on drawings.
- b) Mullions, transoms etc. shall be in one length and permissible deviations from straightness shall be limited to ± 1.5 mm from the axis of the member.
- c) Door and window shutters shall operate without jamming. The clearance at head and jamb for door shutters shall not exceed 1.5 mm. For double leaf doors, the gap at the meeting stiles shall not be more than 1.5 mm.
- d) Door leaves shall be undercut where shown on drawings.
- e) Doors, windows, frames, etc. shall be on a true planes, free from warp or buckle.
- f) All welds shall be dressed flush on exposed and contact surfaces.
- g) Correctness of location and smoothness of operations of all shop installed hardware and fixtures.
- h) Provision for hardware and fixtures to be installed at site.
- i) Glazing beads shall be cut with mitred corners.
- j) Glazing clips, fixing devices etc. shall be supplied in adequate numbers.
- k) Shop coats shall be properly applied.
- l) Exposed aluminium surfaces shall be free from scratches, stains and discolouration. Anodised surfaces shall present a uniform and pleasing look.

3.2.0 For Installed Items

- a) Installations shall be at correct location, elevation and in general, on a true vertical plane.
- b) Fixing details shall be strictly as shown on drawings.
- c) Assembly of composite units shall be strictly as per drawings with mastic caulking of transoms and mullions, gaskets, weather strips etc.



TECHNICAL SPECIFICATION FOR METAL DOORS, WINDOWS, VENTILATORS, LOUVRES, ETC.

SPECIFICATION NO. PE-TS-999-600-C014

VOLUME - II B

SECTION - D | SUB-SECTION - C14

REV.NO. 00

SHEET 9 OF 9

complete.

- d) All frames on external walls shall be mastic caulked to prevent leakage through joint between frames and masonry.
- e) All openable section shall operate smoothly without jamming.
- f) Locks, fasteners etc. shall engage positively. Keys shall be non-interchangeable.
- g) Cutting to concrete or masonry shall be made good and all abrasions to shop paint shall be touched up with paint of same quality as shop paint.
- h) Aluminium doors, windows, etc. shall be free from scratches stain or discolouration.

4.0.0

I.S. CODES

Following are some of the important I.S. Codes as relevant to this section :

Steel doors, windows and ventilators	-	IS:1038
Steel windows for industrial buildings	-	IS:1361
Aluminium doors windows and ventilators	-	IS:1948
Aluminium windows for industrial buildings	-	IS:1949
Steel door frames	-	IS:4351
Code of practice for fixing and glazing of metal (steel and aluminium) doors, windows, and ventilators	-	IS:1081