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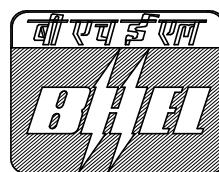
VOLUME – II B
CIVIL, STRUCTURAL & ARCHITECTURAL WORKS

SPECIFICATION NO. PE-TS-999-600-C017

SECTION - D

GENERAL TECHNICAL SPECIFICATION

MISCELLANEOUS METAL



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

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**TECHNICAL SPECIFICATION
FOR
MISCELLANEOUS METAL**

1.0.0 SCOPE

This specification shall generally be read in conjunction with item nos. 6.01 & 6.03.

This shall include supply, fabrication and erection of miscellaneous metal items of light nature in gates, grills, balcony and stair handrails particulars, structural mullions and transoms, ladders hangers masonry anchors, shelf angles, anchor bolts, fasteners, etc. as shown on drawing or as instructed by the Engineer. The above items shall be of fabricated or cast M.S/Aluminium/Brass, cast iron, M.S. and galvanised M.S. Sheets, aluminium sheets, expanded metal, wire mesh etc. as shown on drawings and/or described.

2.0.0 INSTALLATION

2.1.0 Fabrication/Casting

2.1.1 General

All work shall be done according to approved shop drawings. All workmanship shall be equal to the best practice in modern structural or foundry shop.

2.1.2 Shop Connections

- a) All shop connections shall be riveted or welded except when noted otherwise on drawings.
- b) Welding of steel shall be done in accordance with the IS : 816. Use of metal arc welding for general construction in Mild Steel.
- c) Welding of aluminium shall be done in accordance with IS: 2812, Arc welding of Aluminium and Alloys, Special care shall be taken to grind smooth all welded surface that shall remain exposed to view. Welds shall be electrically continuous if so required by the Engineer.

2.1.3 Shop Coat

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<p>Before leaving the shop, all metal work shall be thoroughly cleaned by effective means of all loose mill/ scale, rust and foreign matter. Except where encased in concrete, all steelwork shall be given one coat of approved metal protective paint, applied by brush thoroughly and evenly, well worked into joints and other open spaces. All paint shall be applied to dry surfaces. Steel work shall be galvanised or galvanized and painted with a coat of zinc chromate primer. Aluminium surfaces which shall come in contact with masonry shall be given one coat of zinc chromate primer.</p>			
2.2.0	Erection		
2.2.1	Bracing		
	The Contractor shall provide all necessary temporary guys and braces to ensure alignment and stability of the members and to take care of all loads to which the structure may be subjected including erection of equipment and operation of the same.		
2.2.2	Temporary Bolting-Up		
	As erection proceeds the Contractor shall plumb up and level all members and shall securely bolt up to take care of all dead load, wind load and erection stresses. Wherever piles of materials, erection equipment or other loads are carried during erection, proper provision shall be made to take care of the stresses resulting from the same.		
2.2.3	Turned Bolt		
	For field connections where bolting is specified, holes for the turned bolts may be reamed in the field, if required. All drilling or reaming for turned bolts shall be done after the parts to be connected are assembled.		
2.2.4	Welding		
	Where specified on drawings, welding shall be done in accordance with IS : 816 for steel and IS: 2812 for Aluminium and Alloys.		
2.2.5	Cutting and Fitting		
	No cutting of sections, flanges, webs of angles shall be done without the approval of the Engineer. Where indicated on the drawings, holes, cuttings, etc. shall be provided as required for installation, to the work by the other Contractors. No additional holes or cuttings, than those shown on drawings, shall be made without the approval of the Engineer.		

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2.2.6 **Drifting**

Correction of minor misfits and a reasonable amount of reaming and cutting of excess stock from rivets may be permitted. For this, light drifting may be allowed to draw holes together. Twist drills shall be used to enlarge as necessary to make connections. Reaming that weakens the members or make it impossible to fill the holes properly or to adjust accurately after reaming shall not be allowed.

Any error in shop work which prevents the proper assembling and fitting of parts by moderate use of drift pins or a moderate amount of reaming and slight chipping and cutting shall immediately be called to the attention of the Engineer and approval of the method of correction obtained. The use of cutting torches to enlarge or alter rivet holes shall not be permitted.

2.2.7 **Grouting**

All bearing plates, loose lintels and beams, etc. shall be set to proper grade and level by the Contractor and the Engineer's approval obtained before proceeding with the grouting. Grouting shall be done in 1:1.5:3 or 1:1- 1/2:3 concrete with 6 mm down stone chips.

2.2.8 **Anchor Bolting**

When shown on drawings, the miscellaneous metal items shall be fixed to concrete by case hardened and drawn carbonizing steel expander nut and bolt. The Contractor shall submit the manufacturer's literature showing the average pull out and average shear values for bolts of various sizes. The bolts shall be fixed strictly as per the manufacturer's instructions.

2.2.9 **Pipe Joints**

M.S. Pipes shall be joined by threaded sockets or by welding. Cast iron pipes shall be socket and spigot jointed and caulked with hemp and molten lead.

2.2.10 **Spot Painting**

All field rivets and bolts and also any serious abrasion to shop paint shall be spot painted with the same materials as used for the shop paint.

2.2.11 **Making Good**

All cutting to concrete or masonry shall be made good to the satisfaction of the Engineer.

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3.0.0 ACCEPTANCE CRITERIA

- a) All items shall be of correct shape, size, weight etc. shown on drawings.
- b) For installed items, the tolerances shall be follows :
 - i) Permissible deviation from straightness - 1 in 1000.
 - ii) Seats, stiffener connections etc. shall be as per approved drawings and shall not interfere with architectural clearances.
- c) All castings shall be free from blow holes, cracks and other blemishes.

4.0.0 I.S. CODES

- IS : 226 - Structural Steel (Standard Quality)
- IS:800 - Code of practice for use of structural steel in general building construction.
- IS : 816 - Use of metal arc welding for general construction in mild steel.
- IS : 2812 - Arc welding of Aluminium and Alloys
- IS : 3150 - Hexagonal Wire Netting
- IS : 4948 - Welded steel wire fabric for general use.