

## **Technical specifications – Prefab Steel Canopy**

### **Canopy Structure:**

Design fabrication and installation of pre-engineered / pre-fabricated steel canopy as per the following specification:

The canopy steel structures to be designed considering roof live load of 50 kg per Sq.m in addition to the dead weight of the steel and roof sheeting + false ceiling weight. Also additional 300 kg point load to be considered at all canopy corner locations & weight of fascia @ 20kg/m may also be considered for designing. The canopy should be designed to withstand the wind speed of 180 km / hour or as per IS:875, whichever is higher. The design should be safe against bending, twisting, deflection, overturning etc. as per IS:800. The canopy column should be rectangular box section of 400mm x 200mm x 6mm. Alternatively, the column can be built using ISMC 200 channels welded with 6mm plates so as to give the finished rectangular columns of 400mm x 200mm x 6mm. All steel structure should conform to IS : 2062. Only branded steel like TISCO, SAIL, ESSAR, Lloyds, JINDAL Steel, VIZAG Steel, BHUSHAN Steel to be used. Angles and Flats below the size of 50mm x 50 mm for bracing fascia frame which are not manufactured by the mentioned companies should conform to IS2062:2006. The manufacturer certificate of the same should be provided. The depth of the roof canopy structure will be so designed so as to receive fascia of 800 mm size all around. The canopy beam structure steel to comprise of built up plate I section / hot rolled I beam / angle truss SHS / RHS tubes as per design and all secondary purlins should be cold formed galvanized Z sections OR galvanized C-section with 275 GSM galvanization total both sides & yield strength of minimum 345 mpa only. Alternatively TATA tube with 275 gsm galvanization total both sides may be used for purlins. The spacing of purlin should be maximum 1.2 m. Purlins at extreme ends of the canopy is mandatory in order to provide end support to roofing/false ceiling.

All the primary and secondary connection bolts shall be grade 8.8 both the primary and secondary connection bolts shall be electro - galvanized of precision fasteners Unbrako, Laxmi Precision, GKW, TVS make only. Necessary roof bracing , wind girders and other forms of bracing to be considered for the overall stability of the structure and the transmission of lateral loads to the column and to stabilize the canopy movement as well as strengthen the cantilever.

Height of the canopy will be **4.5 m** (approximate) meters from the finished driveway level to the bottom of false ceiling

Note:

(i) While designing the canopy, weight of the canopy should be **minimum 53 kg** per sq.m. This includes weight of columns with base plates, trusses, fascia frame along with blind fascia, purlins but excluding the weight of roofing, false ceiling, false ceiling runners, cleats, gutter and nuts & bolts.

(ii) In certain cyclone prone areas, swirling speed should be taken into account while designing the canopy.

**Anchor Bolts:** (This is not in scope of canopy Vendor)

The bolt materials shall conform to IS 2062 with minimum yield strength of 240 mpa. The lower end of the anchor bolt should be bent with a minimum radius of curvature of 3d (diameter of the bolts ) The upper exposed portion of the bolt should have min threaded portion of 115 mm (min) with one hexagonal nut followed one hexagonal lock nut. Suitable Plate washers should be provided along with the anchor bolts.

**Painting:**

Painting of the steel structure with two coats of Zinc chromate primer and of column with additional two coats of white enamel paint of approved make should be done.

**Roofing:**

Trapezoidal roofing profile made out of 0.55 mm TCT with high tensile bare Galvalum sheet of 275 mpa min yield strength of grade AZ-150 (55% Aluminum, 43.5% Zinc and 1.5% Silicon) with aluzinc coating of 150 GSM . The roofing should be Klippon Type. Approved Makes of Rerollers

– M/s Interarch, M/s Speco Tech, M/s M.G. Industries, M/s Yash Fabtech, M/s Akanksha Sales Promoters India Pvt. Limited , M/s Swathi Colour Roof or any other equivalent as approved by RHQ. The re-rollers shall confirm to the approved makes of base Metal i.e. JSW, TATA, Bhushan Steel or any other equivalent as approved by RHQ.

**Flashing:**

Ridge flashing shall be trapezoidal matching the roof profile and bent to the ridge angle. All the other flashing to be manufactured out of the same material and thickness as that of roofing, Wherever the flashing interface with trapezoidal profile roofing, filler blocks should be provided in the gaps and sealed with silicon sealant for leak proof performance. After the installation the roof should be cleared of all the metal wastes, screws, nails etc. Necessary profiled filler should be provided at the higher level of roof sheeting & also at the valley gutter in order to ensure

water tightness in the profile gaps. All external flashing in the roof all around excluding gutter are to be of the same material and thickness as roof sheeting.

**Gutter and Downpipe:**

Gutter shall be manufactured out of 0.91 mm thick Plain aluminum sheets in lengths of 2.5 - 3 m min.(Longer lengths preferred). All the gutter joints shall be fixed by bulb tight rivets and silicon sealant shall be applied all over the joint for leak proof performance. The gutter end caps shall be provided at either ends and duly sealed with silicon sealant. The opening shall be made in the gutter for down spot position with sleeves fixed on the gutter and connecting the down take pipe. Silicon sealant to be applied all over the joints to ensure water tightness. The gutter slope shall be in such a way that the water collected from the roof move on the down take pipe smoothly without stagnation of water at any point of the gutter. Size & Shape of the gutter will be trapezoidal section of min. 400mm x 300mm with min. 200 mm depth for effective drainage of the storm water depending upon the rainfall to be designed by the supplier and approved by BPCL. The Gutter openings at the top of the water down pipe should be provided with suitable MS wire mesh to prevent the entry of foreign materials like dry leaves, polythene bags etc. and choke the water down pipe/drains. For effective drainage of storm water, the down pipe will be heavy duty PVC drain pipe (100-150 mm depending on design) running inside columns. Cost of clamp, brackets and accessories etc. to be included in the cost. Please note no structural member to be used as a gutter. Gutter to be tested with water filled for 24.hrs to ensure it is water tight.

**Fascia:**

Provision to be made for fixing 800mm wide fascia to be provided all along with the canopy sides. MS Fascia sheet of 2mm to be fixed along with the frame on all sides. The weight of the fascia on the front, rear and sides to be considered while designing canopy.

**False Ceiling:**

The Scope of this specification covers the design, manufacture, prefabrication, transportation, installation and commissioning of the complete false ceiling system.

A. Materials of Panel:

A1: Cold rolled steel conforming to IS 513 having yield strength of 240 mpa (minimum).

A2: Base metal thickness should not be less than 0.55 mm.

**B. Design criteria:**

B1: Ceiling system to be designed to withstand wind velocity of 180 Kmph and relevant seismic factor to the specific location where the false ceiling is to be installed or wind load as per IS 875 Part III whichever is higher.

B2: System to be designed as fixed system in which false ceiling panels are fixed to the false ceiling runner by suitable designed GI cleat system.

B3: The flashing, capping and trims shall be manufactured from the same materials and color as the ceiling materials. These are fixed with aluminum rivets or stainless pins

B4: Maximum deflection of sheets (panels) is limited to L/325 maximum as per IS 800 deflection criteria.

**C. Panel specifications:**

C1: Rolled formed ceiling panels of 150 F/200 F including suitable designs of tongue and groove interlocking should be coated with Zinc in a minimum thickness of 175 GSM on both sides. The panel should be finished with 15 to 18 micron polyester top coat 10 micron thickness. The total coated (TCT) should be minimum 0.58 mm. Color of the panel shall be white matt finish.

Scope includes:

1. False Ceiling Runners of suitable section to be cold rolled formed Z section made out of GI coils with 275 GSM galvanized and yield strength of 345 mpa or galvanized tube section/ equivalent structural members.
2. The spacing of runner should be maximum 1.2 m.
3. The false ceiling runners to be fixed to main structure by cleats with adjustable holes for level adjustments to be located in the rafters.
4. The canopy supplier would liaise with the site engineer and make arrangement for cutting of false ceiling for installing electrical fittings/fixture as directed.

NOTE : Supplier has to visit the site before supply of materials at site and get familiarized with the wind velocity, seismic (earthquake) factor and accordingly design of false ceiling to be done and submit the design calculation and drawing details to BPCL. After completion of work, supplier has to submit warranty certificate from manufacturer of panels to BPCL.

**DOCUMENTS:**

The canopy supplier should provide the following documents:-

1. Column reactions on foundation.
2. General Arrangement (GA) drawing for the proposed canopy.
3. Erection Drawing - 2 Sets.
4. As built drawing - 2 sets.
5. Structural stability certificate for canopy structure along with design calculation, connection

design, base plate etc. from Structural Engineer/Consultant.

6. Test certificates of structural steel, fasteners, roofing, false ceiling materials.
7. Total Weight Calculation of the Canopy Structure meeting norms of minimum 35Kg/m<sup>2</sup>.
8. Gutter water test certificate from T.E./C.G/PMC/Dealer.
9. Guarantee/warranty of false ceiling/roofing materials OR proof of make / manufacturer's specification mentioning strength as specified.