

	CORPORATE RESEARCH & DEVELOPMENT: FUEL CELLS & RENEWABLE ENERGY GROUP ITEM: Module Mounting Structures (MMS) for 100 kWp Rooftop SPV Plant	FCR-62-02-2021
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ANNEXURE - 1

TECHNICAL SPECIFICATION **FOR** **Module Mounting Structures (MMS) for 100 kWp Rooftop SPV** **Plant**

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1.0 INTRODUCTION:

BHEL Corp R&D is setting up 100kWp Rooftop Solar PV Plant at their campus in Hyderabad. This document describes the technical specification for the Module Mounting Structures (MMS) that constitute the solar array of the plant. MMS are Galvanised steel structures over which solar PV modules are mounted. The PV plant has approx. 68 structure sets each supporting 5 PV modules at an orientation of 21 degrees facing south.

2.0 SCOPE OF VENDOR:

- Fabrication, Supply and Erection of Module mounting structures (MMS) on Rooftop
- Fixing of Module Mounting structure (MMS) to the rooftop
- Assembly of Solar PV Modules (supplied by BHEL) on MMS. Solar PV Modules of 280 Wp (180 No's) and 310 Wp (160 No's) shall be supplied by BHEL.
- Shifting of all Supplied Items/Materials to Rooftop of the identified building at BHEL R&D Hyderabad

3.0 Fabrication, Supply and Erection of Module Mounting Structures for 100 kWp Rooftop SPV Plant

Module mounting structures are to be fabricated and supplied by vendor as per the drawing no 02-FCR-034-MSS-Rooftop attached. Total 68 no's of tables mounting 5 SPV Modules each. The BOM for the MMS and List of fasteners to be supplied are given below

BILL OF MATERIAL FOR 1 TABLE OF 5 MODULES								
Mark No	Item Description	COLD FORMED / HOT ROLLED	Min Strength / Grade	Lip	QTY	Length	Unit/Wt	Total Weight
				mm	nos	mm	Kg/m	Kg
	Column Post							
CL1	100CS50X2.0	COLD FORMED	FY350	15	2	890	3.61	6.43
CL2	100CS50X2.0	COLD FORMED	FY350	15	2	545	3.61	3.94
	Base Angle							
ISA1	ISA 50X50X3	HOT ROLLED	FY 250		4	200	2.3	1.84
	Rafter							
RF1	80CS40X1.6	COLD FORMED	FY350	15	2	1300	2.39	6.20
	Purlin							
PU1	80CS40X1.6	COLD FORMED	FY350	15	2	5020	2.39	23.96
	Strut Bracing							
ISA2	ISA 25X25X3	HOT ROLLED	FY350		2	1250	1.10	2.75
TOTAL WEIGHT								45.12

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LIST OF FASTENERS REQUIRED FOR 100 kWp ROOFTOP SOLAR PLANT						
Sl. No.	Description	Quantity Per Table	No. of Tables	Total Quantity Reqd.	Material	Place of Fixing
1	M10 x 25 LONG HEX. HD. BOLT WITH NUT & 2 Nos. OF 2 mm THICK FLAT WASHERS	12	68	816	SS 304	Column-Base Angle and Column-Rafter
2	M8 x 25 LONG HEX. HD. BOLT WITH NUT & 2 Nos. OF 1.5/2 mm THICK FLAT WASHERS	8	68	544	SS 304	Purlin-Rafter and Purlin-Sag Angle
3	M6 x 15 LONG HEX. HD. BOLT WITH NUT & 2 Nos. OF 1 mm THICK FLAT WASHERS	20	68	1360	SS 304	Module-Purlin
4	10mm x 50/75 mm Anchor Bolts	8	68	544	Steel	Base angle-Roof

- The structure shall support Solar PV modules at a given orientation, absorb and transfer the mechanical loads to the rooftop properly. There shall be no requirement of welding or complex machinery at site.
- The frames and leg assemblies (i.e. C channels, rafter, purlins & bracings etc.) of the array structures shall be made of hot dip Galvanized steel per ASTM A123/ IS2062 (grade E350 or higher) and IS 4759:1996. Minimum thickness of galvanization shall be at least 80 microns.
- All fasteners shall be of Stainless steel - SS 304 or higher grade. Nut & bolts, supporting structures including module Mounting Structures shall have to be adequately protected against all climatic condition.
- Vendor shall do the erection of the MMS as per approved layout design of BHEL. Required number of nuts and bolts for the erection of Modules shall be supplied by vendors.

4.0 Fixing of Module Mounting structure (MMS) to the rooftop

4.1 Anchor-Bolts —Supply & fixing:

8 No's of anchor bolts for each Table shall be drilled and fixed to the existing rooftop- column Base Angle. These bolts are threaded at the top, for about one inch and the rest of the bolt is smooth which goes inside the existing slab. Diameter of bolt shall be 10mm and TWO nos. nuts each and suitable washers shall be supplied with each bolt.

Note: Anchor bolt shall be made of Galvanized steel and Nuts and washer shall be made of SS304

4.2 Concrete Pedestal

After grouting the anchor bolts, each column has to be covered with a M20 grade concrete pedestal of size 300mm X 300 mm X 200 mm (height). M20 grade Cement Concrete 1:1.5:3 (1 cement, 1.5 coarse sand & 3 graded stone Aggregate 20mm nominal size) shall be mixed to get a compressive strength of 20 N/mm². Cement shall be good ISI Portland cement of reputed make. Cement bags

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shall bear ISI certification mark and date of manufacture. Concrete shall be used within one hour of mixing. Any quantity remaining unused after an hour of mixing will not be allowed to use. The casted pedestals shall be cured minimum for ten days after completion of work.

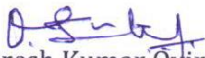
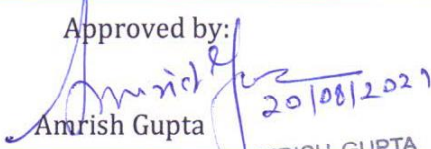
5. Installation of SPV Modules:

Vendor shall do the erection of the SPV module as per approved layout design of BHEL. Required number of nuts and bolts for the erection of Modules shall be supplied by vendors. BHEL SPV Module data sheets and drawings are attached. Satellite images of the identified roof top are attached below for the vendor reference.



6.0 Shifting of Material to Rooftop

Vendor shall arrange for shifting of all supplied items to rooftop of the identified building inside BHEL corporate R&D. Also the shifting of material like cement, aggregate and sand etc., for civil works shall be in vendor scope.

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