PGVCL

TECHNICAL SPECIFICATIONS

11KV FRP "V" Type Cross Arm and Top Hamper

1. SCOPE

This specification covers details of Fiber Glass Reinforced Plastic 'V' cross arms & Top hamper to be used on 11KV overhead lines in distribution system or any other polymer based 'V' cross arm and Top hamper.

2. Service conditions:

The Cross Arm to be supplied against this specification shall be suitable for satisfactory continuous operation under the following service conditions.

a.	Maximum ambient temperature (Degree C).	50
b.	Relative humidity (%).	100
c.	Maximum annual rainfall (mm).	1450
d.	Maximum wind pressure (Kg./Sq.m).	150
e.	Maximum altitude above mean sea level (Meters).	1000
f.	Seismic level (Horizontal acceleration).	0.30
g.	Climatic Conditions: Moderately hot and humid tropical climate conducive to rust and fungus growth.	
h.	Ref. Ambient temperature for temperature rise (Degree C).	50

3. APPLICABLE STANDARDS:

a. FRP 'V' X'arm and Top Hamper.
Unless otherwise mentioned in this specification, the raw materials used shall comply with IS : 13410, IS : 10192 – 1982 and IS : 6746 – 1972 or their latest version of other applicable standards for polymers materials.

b. M.S. steel (M.S. Flat) for clamp.
The standard for M.S. Flat shall be IS: 2062 /1992.

c. M.S. Bolts & Nuts.
The Standard for bolts & Nuts [Hexagonal Nut] shall be as per IS: 1363/84.

d. Hot dip galvanized
Galvanization shall be carried out by hot dip method as per IS: 4826/1979.

4. SHAPE & SIZE:

a. The cross arms and Top Hamper shall be of V Shape having molded flat surfaces with holes for Pin Insulator & Pole Back Clamp fixing. The length shall be suitable for installation of pin insulators @ 1070 mm c/c.

a. The cross arms and Top hamper shall have two holes of 25mm dia for fixing of pin Insulators. The centre-to-centre distance between the holes shall be 1070 mm and holes shall be in the middle of the top width of cross arm.

b. The cross arm and Top hamper shall have wall thickness of min 5 mm excluding ribs / stiffness, tie beams and certain design features like hole etc.

8. GENERAL REQUIREMENTS:

a. The cross arms and Top Hamper shall be made from good quality fiberglass and plastic ingredients conforming to requirements of IS 10192 unless otherwise stated in this specification. It shall be suitable for outdoor application and shall be manufactured by automatic moulding process.

b. The cross arms shall have smooth surface finish and the cut cross-section shall give a homogeneous appearance.

c. The cross arms and Top Hamper shall be of light colour preferably of off white colour so as not to attract birds. It shall not corrode while in contact with steel fittings/fixtures, PSC, Poles and aluminium conductor.

d. Cross arms and Hamper with ultra Violet resistance Poly Urethane coating shall be supplied.

9. MECHANICAL PROPERTIES:

a. The cross arms shall be able to withstand a vertical load of 300 kg applied at each of the two points coinciding with the centre of the pin insulators on both sides as shown in the enclosed drawing. For the purpose of this test, the cross arm shall be mounted on a support with 230 mm centre-to-centre distance between clamp bolts (16 mm dia). With the application of this load, no damage should occur to the cross arm and it should remain serviceable.

b. In the other direction, the cross arm should be able to withstand a load of not less than 100 Kg. applied on both sides as shown in the drawing.

c. For improving the mechanical strength, Tie Beam moulded/bolted to "V" shape shall be provided as shown in drawing. Bolting shall be with M6 size bolts min. 2 nos. per end.

d. Pin Insulators centre & hole position where the cross arm is fixed to the PSC pole as well as overall "V" shape shall invariably remain same as shown in drawing so as to maintain required clearances.

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7. **TESTS:** The cross arms shall be subjected to the following tests as per IS : 10192-1982, IS:6746-1972 and IS:13410-1992.

a. **Type Tests**

The following tests shall constitute the tests:

Sr. No.	Particulars.	Reference Standard		Required Value.
1	Visual Inspection	Free from Cracks and Smooth finish.		
2	Dimensional check	Dimension as per drawing (approved)		
3	Load test	Clause 5.1 & 5.2	X = 300kg Y = 100kg	No Damage
4	Impact Strength	IS:13410		45 KJ/m^2
5	Tensile Strength			50 MPa
6	Comparative Tracking	IS:10192		300V
7	Specific Gravity			1.8
8	Water absorption			0.25%
9	Cross Breaking strength			160 N/mm^2
10	Compressive Strength			200 N/mm^2
11	Insulation Resistance			500 M Ohms.
12	Flammability	As per IS:6746-1972		Self Extinguishing.

b. **Acceptance & Routine tests**

The following tests shall constitute the Acceptance & Routine Tests:-

Sr. No.	Particulars.	Reference Standard		Required Value.
1	Visual Inspection	Free from Cracks and Smooth finish.		
2	Dimensional check	Dimension As per drawing (approved)		
3	Load test	Clause 5.1 & 5.2	X = 300kg Y = 100kg	No Damage
4	Impact Strength	IS:13410		45 KJ/m^2
5	Tensile Strength			50 MPa
6	Comparative Tracking	IS:10192		300V
7	Specific Gravity			1.8
8	Water absorption			0.25%
9	Cross Breaking strength			160 N/mm^2
10	Compressive Strength			200 N/mm^2
11	Insulation Resistance			500 M Ohms.
12	Flammability	As per IS:6746-1972		Self Extinguishing.

The routine and acceptance tests should be performed on one sample chosen at random out of every lot.

b. MARKING:

The following information shall be marked on each cross arm:

a. Manufacturer's name or trade mark.
b. Year of manufacture.

c. PACKING:

The FRP cross arms will be packed in quantities of 10 to 20. Each cross arm will be covered with stretch wrapping film. The items so wound will be grouped as per numbers per packet. The information like product quantity should be mentioned on the packets.

10. GI Fixing clamp [Side Clamp]

GI Fixing clamps [Side clamp] of size 50 x 6 mm suitable for fixing of (a) X'arm and (b) Top hamper as 200 KG PSC pole with GI Bolts & Nuts of applicable size.

a) GI fixing clamps shall be suitable for firmly fixing of FRP 'V' X'arm and FRP Top Hamper on the 200 KG PSC poles.

b) Necessary holes shall be duly drilled on the clamps before galvanizing.

c) The galvanized shall be carried by hot dip method or other suitable methods.

d) Galvanizing tests shall be carried out on sample for determining galvanize as per IS : 4826/1979.

e) Electroplated clamps and bolts & Nuts shall not be acceptable.

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Schedule of item to be used in V cross arms

Sr No	Description of material	Unit	Quantity
1	11 KV FRP v cross arm	No	1
2	11 KV FRP Top hamper	No	1
3	GI D clamp for 200KG PSC pole	No	2
4	G.I. Bolts & Nuts 65x16mm with 2 nos of GI washers per bolt	No	2
5	G.I. Bolts & Nuts 115x16mm with 2 nos of GI washers per bolt	No	2
6	G.I. Bolts & Nuts 180x16mm with 2 nos of GI washers per bolt	No	1

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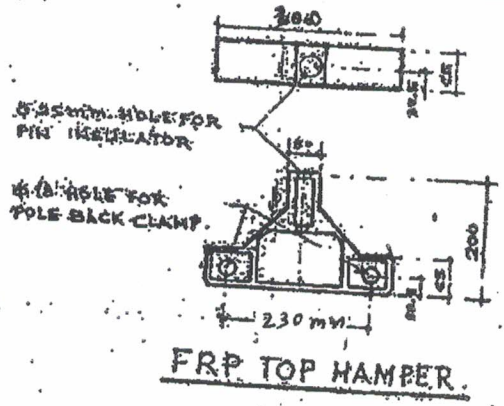
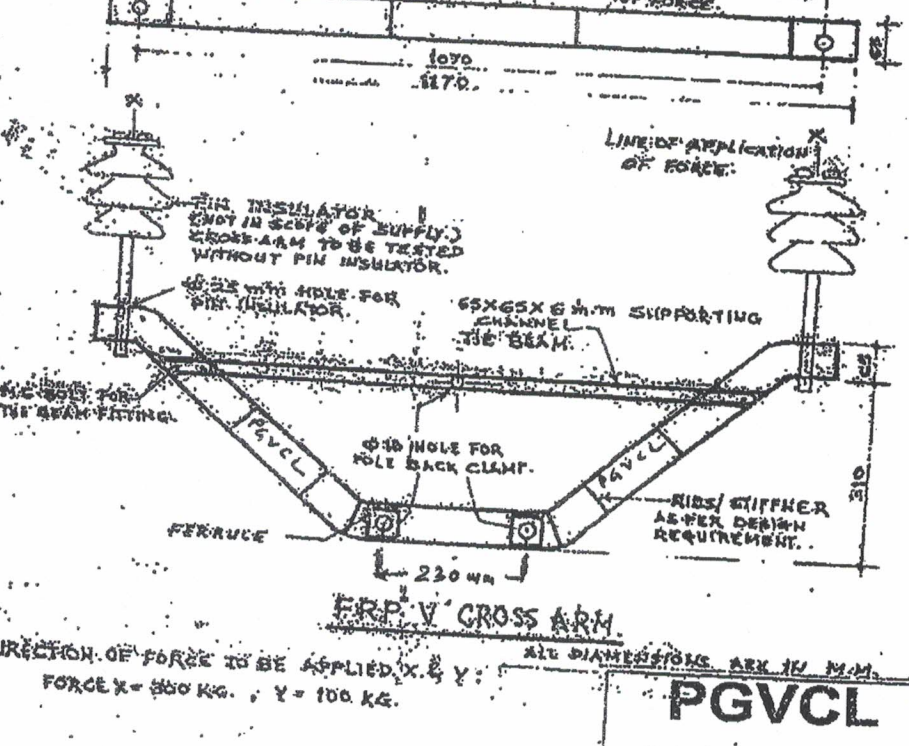
'V' TYPE CROSS ARM & TOP HAMPER FOR 11KV O.H. LINES.



FRP TOP HAMPER.



FRP 'V' CROSS ARM.

DIRECTION OF FORCE TO BE APPLIED X & Y :
FORCE X = 800 KG. , Y = 100 KG.

ALL DIMENSIONS ARE IN M.M.

Exec
Compo

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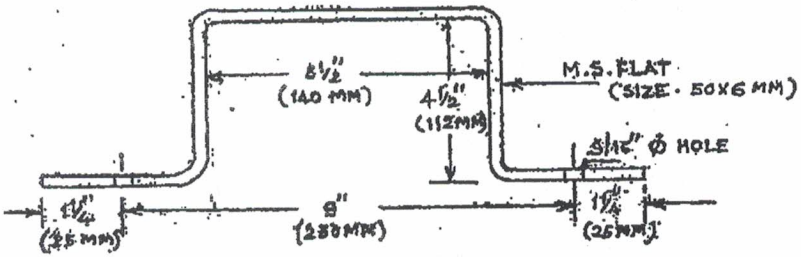
B CLAMP FOR P.S.C. POLE. (HOT DIP GALVANIZE)



Approved

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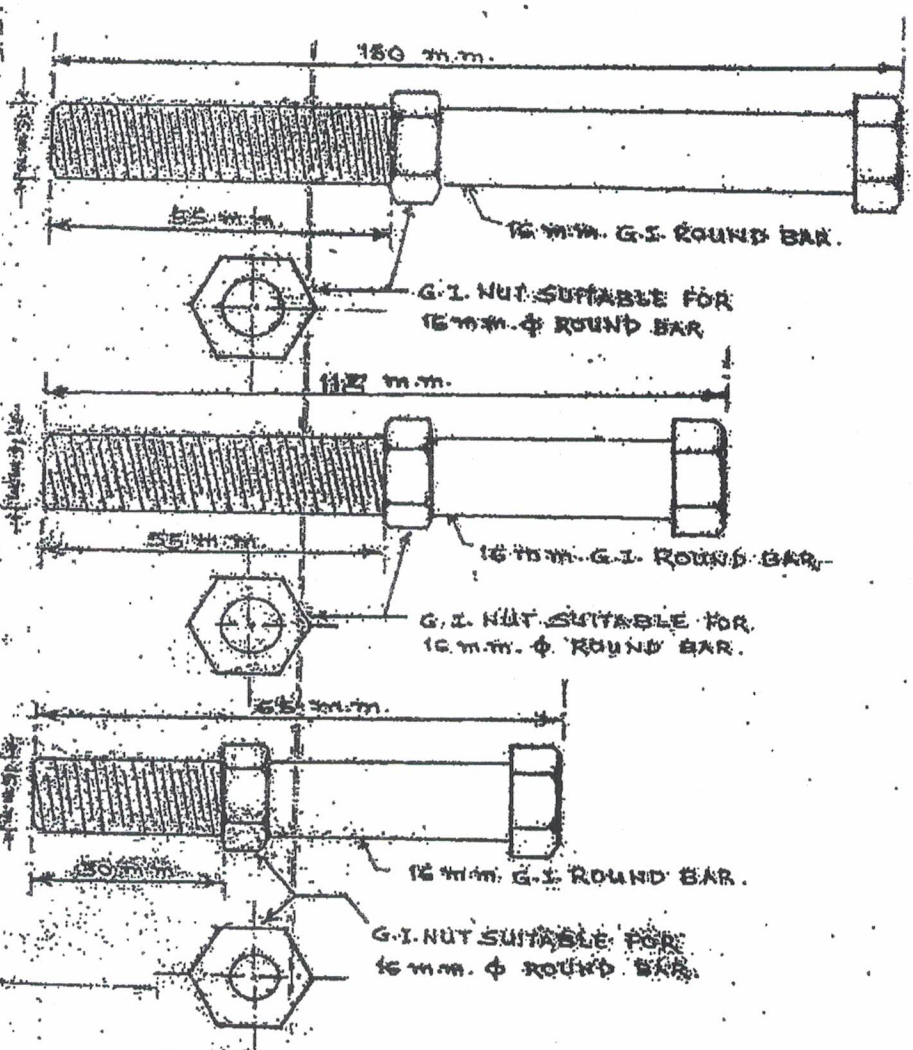
SIZE:



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