

SCHEDULE - II

DETAILED SPECIFICATION AND TECHNICAL PARTICULARS FOR STRAIN HARDWARE FITTINGS FOR 11 KV & 33 KV LINES SUITABLE FOR USE WITH TONGUE & CLEVIS DISC INSULATORS (CONVENTIONAL TYPE FITTINGS)

1. SCOPE:-

This specification provides for manufacture, the testing before despatch and delivery of materials listed in schedule-I at the specified destinations.

2. (i) TEST CERTIFICATE:-

The following shall constitute the type tests for clamps:-

- (a) Visual examination.
- (b) Verification of dimensions.
- (c) Slip strength tests.
- (d) Ultimate strength tests.
- (e) Galvanizing/Electroplating tests.

The type tests are intended to prove the general qualities and design of a given type of insulator fittings. These tests should have not been conducted earlier than 5 years from the date of opening of tender. One copy of same should be submitted along with the offer otherwise the offer is liable to be rejected.

(ii) ACCEPTANCE TESTS:-

The following shall constitute the acceptance tests:-

- (a) Visual examination tests.
- (b) Verification of dimensions.
- (c) Galvanizing/electroplating test.
- (d) Mechanical Tests.
- (e) Ultimate Strength test.

The acceptance tests shall be carried out on all the samples taken from a lot for the purpose of acceptance of lot.

(iii) ROUTINE TESTS:-

The following shall constitute the routine tests:-

- a. Visual examination tests.
- b. Mechanical routine tests on Conductor Tension clamp only.

The routine tests will be carried out on each of insulator fittings to check requirement which are likely vary during production.

All the above three tests have been described in IS:2486 (Part-I) 1993. Galvanizing tests for Hot Dip ferrous material shall be carried out in accordance with IS-2633/ 1986 & satisfy the requirements in IS:4759/1984. Electro galvanized ferrous fittings shall be checked in accordance with IS: 1573/1986. However one sample from each lot will be tested as per IS:4759/1984.

3. **11 KV STRAIN HARDWARE FITTINGS (T&C) TYPE:-**

Each Hardware fittings of the Strain insulators shall comprise of:-

- (i) Hot dip galvanized cross arms & straps properly profiled suitable for use on 75/100 mm channel cross arms with 16mm dia, hot dip galvanized Bolts, Nuts, spring washers, Plain washer and 4mm dia split pin as per figures 26 of IS:2486 (Part-II) 1984 and its latest amendment :-
- (ii) Snail type clamp with clevis eye suitable for 11 KV System for following sizes of Conductors:-

(A) ACSR

S. No.	Item	Stranding and Wire dia meter(Aluminium + Steel)	Nominal Aluminium Area
(i)	ACSR Conductor (Squirrel)	(6+1/2.11 mm)	20mm ²
(ii)	ACSR Conductor(Weasel)	(6+1/2.59 mm)	30mm ²
(iii)	ACSR Conductor (Rabbit)	(6+1/3.35 mm)	50mm ²

(B) AAAC

S. No.	Item	Stranding and Wire dia of A.A. Alloy	Actual Area
(i)	AAA Conductor (Squirrel)	(7/2.00mm)	22mm ²
(ii)	AAA Conductor (Weasel)	(7/3.15mm)	34mm ²
(iii)	AAA Conductor (Rabbit)	(7/2.00mm)	55mm ²

The ultimate strength of the clamp should not be less than 3000 Kg. The clamp shall be made by process of Die casting. The clamp with process of sand casting shall not be accepted.

All dimensions of clevis and tongue connections shall be as per figure-25 of the IS:2486 (Part-II) 1989 and its latest amendments.

4. **33 KV STRAIN HARDWARE FITTINGS (T&C) TYPE:-**

- (i) Each hardware fittings of the strain insulators shall comprise of (i) Hot dip galvanized cross arms & straps, properly profiled and suitable for use on 75/100mm channel cross arms with 16mm dia Hot Dip galvanized bolt, Nut, Spring Washer, Plain washer and 4mm dia, Split pin as per figure-26 of IS: 2486 (Part-II) 1989 and its latest amendment.

- (ii) Clevis eye of Hot Dip galvanized malleable cast iron (IS:2107-1977 and IS:2108-1977) with a bolt (Cotter Pin) and necessary split pin for fastening it to the tongue of the insulator on one side and fastening to the strain clamp on the other side.
- (iii) 33 KV clamp strain Bolted type Tension clamps of High Strength Aluminium Alloy (Conforming to IS:6051 :1970) double 'U' bolt suitable for following sizes of the conductor:-

S. No.	Item	Stranding and Wire dia Material (Aluminium Steel)	Nominal Aluminium Area
(i)	ACSR Conductor (Raccoon)	6+1/4.09mm)	80mm ²
(ii)	AAA Conductor (Raccoon)	(7/3.81mm)	80mm ²
(i)	ACSR Conductor (Dog)	(6/4.72mm+7/1.57mm	100mm ²
(ii)	AAA Conductor (Dog)	(7/4.26mm)	100mm ²

The minimum length of 'U' bolts shall be 60 mm and shall have threads of minimum length of 38mm. The ultimate strength of the clamp should not be less than 4500 Kg. The clamp shall be made by process of Die casting. The clamp with process of sand casting shall not be accepted.

All dimensions of clevis and tongue connections should be as per figure -25 of the IS:2486 (Part-II) 1989 and its latest amendments.

5. GENERAL REQUIREMENTS:

- (a) All fittings of same type and design manufactured under similar conditions of production.
- (b) All forging and castings shall be of good finish and free from flaws and other defects. The edges on the outside of fittings, such as the eye, clevis and holes, shall be rounded. The clamp shall be manufactured by the process of die casting or pressure die casting and shall be free from blow holes and other defects.
- (c) All ferrous fittings and the part other than those of stainless steel shall be galvanized by the Hot Dip process. Only small fittings like, plain & spring washers, nuts may be electroplated galvanized.
- (d) The nuts shall conform to property 4.8 of IS:1367 (Part-VI)/1980.
- (e) The cotter pins shall be provided with Galvanized Mild Steel Flat Washers in addition to split pins.
- (f) The split pin to be used on the cotter pin shall be of phosphor bronze conforming to IS:7814/1975 or Stainless Steel Conforming to IS:5577/1992 or brass conforming to IS:410/1977 with a minimum hardness of 160HV.

6. MARKING ON CLAMPS:-

The clamps shall have the following markings for their identification as per IS :-

- (i) Trade Mark of manufacturer.

Please note that the marking should be legible and permanent (preferable die casted)

7. PACKING:-

Strain clamps and related hardware shall be packed in double gunny bags or wooden cases if deemed necessary. The gross weight of the packing shall not exceed 50 Kg. Different fittings shall be packed in different bags or cases and shall be complete with minor accessories fitted in place. All the nuts shall be hand tightened over the bolt and screwed up to the farthest point with split pin in position. The packing shall be fit to withstand rough handling during transit and storage at destinations.

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