**TECHNICAL SPECIFICATION FOR SMC (SHEET MOULDING COMPOUND) METERING CUBICLE**

1. **SCOPE:** 
   1. This specification covers the design, manufacture and testing of anti-corrosive, dust proof, rust proof, shock proof, vermin and water proof, U.V. stabilized and pilfer resistant meter boxes suitable for installing L.T. TVM, made of Glass reinforced, polyester sheet moulding compound (SMC) confirming to IS: 13410:1992 (with latest amendment thereof) with 4 Nos. single core single ratio C.T.’s installed in C.T. chamber.
   2. (i) The CT’s are to be properly installed in the C.T. chamber with pedestal mounting.

(ii) The secondary wiring, with color code/ferrules, is also to be done by the bidder, for which bidder has to use 1.5 Sq. mm. copper flexible multi strand PVC insulated conductor with proper arrangement from C.T. chamber to meter chamber.

(iii) The ratio of C.T’s. shall be 50/5 A to 1600/5A depending upon the requirement.

1. **CONSTRUCTIONS:** 
   1. Meter Box shall be made of minimum 2.5 mm. thick Glass reinforced Polyester sheet moulding compound (SMC) conforming to IS: 13410:1992 with latest amendments thereof. It shall contain two portions; the upper chamber to house the three-phase energy meter, the lower chamber of the box is intended for housing 04 nos. CTs and appropriate size of cables. Upper portion (Meter chamber door) of box shall be opened first. If Upper portion (Meter Chamber) is closed it shall not be possible to open other portion (CT Chamber). It shall be moulded in a single piece forming the body of the Meter Box and CT chamber with SMC lid/shed fitted with the base by two nos. concealed Stainless steel strip hinge. The two nos. cover shall rest on the collar (Minimum ½” wide) of the Meter Box body base in such a way that no access from outside to the meter is possible. The concealed SS Strip hinges shall be fitted with the meter Box body base and the cover rigidly in such a way that the same are neither visible nor accessible from outside, thereby making the Meter Box pilfer proof. The door/cover in closed position should house properly within collar of meter box body base, which shall also house the edges of the lid/cover so that no direct entry or access is possible. The box should have a front door opening with a window provided with toughened glass of minimum 2.0 mm. thickness for viewing and taking meter reading as shown in the enclosed drawing.

There should be an arrangement for nine pin disconnector which shall be brought at the front opening door of the box which shall be sealable, for interface between meter and CMRI. The Meter Box shall be of moulded type without any fabrication joint made by the process of hot press compression moulding.

The Body of the Meter Box shall have such construction that while installing on the grouted bolts of base-wall, the top surfaces of the box shall have little tapering towards base side of the meter box so that easy flow of rainwater etc. is facilitated. The Meter Box should be anti-corrosive, rust-proof, dust-proof, vermin-proof, water-proof, U.V, stabilized and pilfer resistant. The meter Box becomes completely closed by providing locking arrangement in the shape of two nos. clamps of 2 ½” length made of Stainless steel of minimum 1 mm. thickness which is attached by means of a rivet with the collar of the Meter Box body base and tightens the meter box body base and lid/cover when pressed. A hole of 6 mm dia shall also be provided on this locking clamp drilled across the sheet of the clamp as well as lid and collar of meter box body base which will be utilized for providing external lock. Clamp shall have separate holes of 1 mm. dia. each across the meter box body base as well as covers for both chambers separately shall also be provided in such a way that the hole is drilled 1” below the rivet of the clamp for two independent sealing arrangements.

2.2 The meter shall be mounted on a SMC sheet of 4mm thickness with suitable metallic screws which shall not be protrude outside of the box. The meter base supports inside the box are raised by about 10 mm in the box for ease of wiring. The meter box shall have four wall mounting bracket with proper screws to fix with the bottom base and provision for Four nos. holes each of 6 mm. dia. enforced with MS washers shall be provided on the rear wall of the meter box for its safe mounting on a pole with suitable screws / clamps. The fixing shall not be complex and shall be easily approachable for connections when the door (s) in open condition and is completely tamper proof once it is sealed.

2.3 The meter box should neither melt nor become soft or distort when tested up to temperatures 250 deg. cel. (Tested as per IS 13360 part 6 sec 10 1992 method 'A' capillary tube method). The thickness of these box shall not be less than 2.5 mm on all sides including door. The box shall have 4 mm thickness on the tongue and groove area. The meter box cover shall have a groove to hold minimum of 2.5 mm rubber gasket. The tongue of the base shall ensure tongue, Groove and sealing arrangement against rainwater and dust entering inside the box. The box shall have its roof tapering base side for easy flow of water.

2.4 The boxes shall generally comply with the provision of IS: 14772:2000. The boxes shall be suitable for outdoor / indoor application. The box shall be with good workmanship. There should be a minimum of 50 mm clearance on all sides and 25 mm clearance on the front and 10 mm clearance on the back of the meter.

2.5 The meter box body base shall be provided with 1” wide brass earthing strip of two 2 mm. (minimum) thickness. Its two ends shall be connected with the two sides of meter box body base by two nos. brass earthing bolts of M6 × 20 mm. size each having two nos. Nuts & washers for provisions of earthing on both sides as shown in enclosed diagram.

2.6 One no. MS Zinc passivated screw M6 × 20 mm. size for hanging the energy meter should be provided in the middle of earthing strip, to be fitted comfortably in the screw hole through meter hanging attachment.

2.7 **Inlet & outlet**: Suitable number of Plastic Collapsible cable glands should be provided on the sides walls of C.T. chamber for cable / wire entry. The size of the holes shall be suitably modified depending on the size of the cable used for connections

(i) For CT ratio 50/5 A to 400/5 A- gland should not be less than 25 mm. ----Total 8 nos. gland (4 nos. on each side of CT chamber)

(ii) For CT ratio 600/5 A ---- Gland should not be less than 35 mm. Total 8 nos. gland (4 nos. on each side of CT chamber)

(iii) For CT ratio from 800/5 A to 1600/5A ---- Gland should not be less than 50 mm. Total 16 nos. gland (8 nos. on each side of CT chamber)

High resistant, high grade, Plastic Collapsible cable glands fixed to the box on both sides by check nuts to be provided.

2.8 Sufficient space should be available inside the meter box for making out-going connections of the leads with the terminal block of the meter.

2.9 All the corners of the meter box should be round and not pointed ones.

1. **MATERIAL OF CUBICLE** 
   1. Material of meter Box shall be GLASS REINFORCED POLYESTER SHEET MOULDING COMPOUND (SMC) as per IS: 13410:1992 Grade S-1 with latest amendment thereof.
   2. The material of meter box should be anti corrosive, rust proof, water proof, shock proof and U.V stabilized.
   3. Material of meter box should not get soften on heating. (Heat distortion temperature should be above 170º C.)
   4. The material of Meter Box should be self-extinguishing as per IS: 4249 with latest amendment thereof.
2. **MARKING:**

4.1 Manufacture’s nameplate is to be provided on each meter box giving following information:

|  |
| --- |
| 1. Name of Manufacturer  2. Type of Meter Box  3. Year of manufacturing  4. C.T. Ratio  This Meter Box is property of PVVNL |

4.2 **The words PVVNL shall be printed on top of the door.**

1. **TESTING:** 
   1. The Meter Boxes shall be subject to type tests, routine tests and acceptance tests conforming to IS: 13410: 1992 read with IS: 13411, IS: 5133 and IS: 4249 with intent amendment thereof. as per details given in pare 5.3 follows.
   2. Certificate regarding type tests as defined above shall be submitted by the tenderers with part-I of the tender documents.
   3. Tests for SMC Meter Boxes:

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Particulars of Tests** | **Relevant ISS** |
| **(A)** | **Type Tests (To be performed at Govt. approved Laboratory)** | IS: 13410: 1992 |
| **1.** | Glass content percent test by mass | - do - |
| **2.** | Water Absorption Test | - do - |
| **3.** | Izod impact strength test | - do - |
| **4.** | Heat distortion temp test | - do - |
| **5.** | Mould shrinkage test | IS: 13410:1992 |
| **6.** | Melting point test up to 250 deg. cel. | Ref: IS: 13360 part 6 Section method 'A' capillary tube method. |
| **7.** | Post shrinkage test | IS: 13410:1992 |
| **8.** | Test for checking of non-ignitable property of SMC (carbon Arc Test) | IS: 4249: 1967 |
| **9.** | Test for dimensions | IS: 14772 : 2000 |
| **10.** | Test for mechanical strength | - do - |
| **11.** | Test for stability at high temperature | - do - |
| **12** | Test for water absorption | - do - |

**(B) Acceptance Tests:**

|  |  |  |
| --- | --- | --- |
| **1.** | Flow Test of SMC | IS: 13410: 1992 |
| **2.** | Spirit Burner Test | IS: 4249: 1967 |
| **3.** | Test for dimensions | IS: 14772: 2000 |
| **4.** | Tests for Mechanical strength | IS: 14772 : 2000 |

* 1. Sampling for tests prescribed at para 5.3 above shall be done as per norms defined in relevant ISS.

5.5 **The tenderer shall submit one sample alongwith the tender. A copy of test certificates of all tests viz. Type Tests routine tests and acceptance tests performed for those samples shall also be submitted alongwith the sample. Tender Bid-Part-II (Price Bid) of only those tenderers shall be opened whose samples shall be found in accordance with the technical specifications**.

**SPECIFICATION FOR RESIN CAST WPL/RING TYPE CURRENT TRANSFORMERS**

1. **CURRENT TRANSFORMERS**:

There shall be 4 Nos. Single Core Single ratio dry epoxy resin cast type current Transformers as per IS: 2705:1992 (Latest revisions thereof and as per details mentioned below, for use in conjunction with (-/5) A. LT TVM being supplied and are to be installed in a moulded box. The internal diameter of CTs shall be so designed to accommodate the cables of appropriate size.

**TYPE Dry type epoxy Resin Cast wpl/ring type L.T. CTs.**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Particulars** | **Desired Parameters** |
| **a)** | CT Rating | 50/5 to 100 WPL & 200 to 1600/5A\* Ring Type |
| **b)** | Rated System Voltage | 440 V |
| **c)** | No. of cores | One |
| **d)** | Rated VA Output | 5 VA |
| **e)** | Rated continuous Thermal Current temperature rise over ambient. | As per IS: 2705: 1992 (Latest amendment thereof) |
| **f)** | One minute with stand Power frequency voltage (for primary and secondary) | As per ISS |
| g) | Class of accuracy | 0.5 |

**\*** The C.T. ratios shall be intimated lot wise depending upon the requirement.

1.1 **MATERIAL**

|  |  |  |
| --- | --- | --- |
| **i)** | Core | High grade non-ageing electrical low loss core of superior CRGO silicon sheet steel |
| **ii)** | Conductor | Super enamel copper wire |
| **iii)** | Insulation | Resin cast |
| **iv)** | Base | MS Hot dip galvanized |
| **v)** | Secondary Termination | Firm and effective termination S1 & S2 shall be clearly marked |
| **vi)** | Fault level | 3.6 KA for 1 Sec |

The inner Diameter of CT should be such that core of power cable suitable for primary current passes through it. For CTs 50/5A to 100/5A shall be WPL inner dia not required, 200/5A to 600/5A inner dia should not be less than 45 mm , for 800/5A inner dia should not be less than 40 x 70 mm. & for above 800/5A dia should not be less than 50x105 mm.

1.2 The current transformer shall be type tested (to be performed at Govt. approved Laboratory) and routine tested as per IS: 2705/1992. The type test report of CT’s has to be submitted necessarily along with the bid offer and it should be conducted within 3 years from the date of tender.

1. **TESTS:**

2.1 **ROUTINE TEST:**

a) Verification of terminal markings and polarity.

b) High Voltages power frequency test on primary windings.

c) High Voltage power frequency test on secondary windings.

d) Over Voltage inter turn test.

e) Determination of error according to the requirements of appropriate accuracy class.

2.2 **ACCEPTANCE TEST:**

a) Verification of terminal markings and polarity.

b) High Voltage power frequency test on primary windings.

c) High Voltage power frequency test on secondary windings.

d) Over Voltage inter turn test.

e) Determination of error according to the requirements of appropriate accuracy class.

f) Temperature rise test

2.3 **TYPE TEST:** (As per IS: 2705/92 or its latest amendment)

a) Determination of error according to the requirements of accuracy class.

b) Short time current test.

c) Temperature rise test.

d) Impulse Voltage test.

1. **RATING PLATE:**

Each C.T. should have self adhesive, laminated printed label having following details:

a) Ratio, Burden

b) Type of C.T. & serial no.

c) Line Voltage, freq.

d) Applicable standard

e) Insulation level

f) Manufacturer's name

g) Manufacturing month & year

4. **MAKE OF CT’s:**

The CT’s to be supplied with metering cubicle should be of any of the following make or any other reputed make of high precision and quality.

1. Meltek

2. Precise

3. AE

4. Gilbert Maxwell

5. Ashmore