TECHCNICAL SPECIFICATION FOR TAMPER PROOF POLYCARBONATE PLASTIC SEALS

SCOPE

The specification covers the design, manufacture, testing at manufacturers works and supplying, delivery of tamper proof polycarbonate plastic seals for sealing electrical installations viz: Meter body of energy meters, terminal cover of energy meters and Metal/SMC Meter Box, CTPT Units etc. and for other similar purpose.

The polycarbonate seals shall be conformed to the DISCOM's specification as under:

1. Material of Plastic Seal

The raw material used for polycarbonate plastic seals shall be of M/s. Dow Caliber Ltd. Switzerland (Grade 201- 15) M/s. GE Plastic, Singapore (Grade 143R), M/s. Dupont, Japan (Grade LV – 20), M/s. Bayer Ltd. (Makrolon 2407) or any other equivalent manufacturer having similar material properties as under:

Sr.No	DESCRIPTION	CHARACTERISTIC
1	Melting temperature	280˚ C to 295˚ C
2	Ductility	Hard
3	Durability	Weather effect resistance
4	Transparency	Fully transparent (long time transparency)
5	Material group	Engineering Plastic

A copy of relevant manufacturers' test certificate related to the manufactured batch shall be furnished to DISCOM engineer during inspection.

2. Colour of Seal

The seals shall be colourless, transparent (see through) type, which shall give complete visualization of its fixing mechanism and shall show clear indication if tampered.

3. Design and Construction of seal.

a. **Design:** The seal shall be anchor type tamper evident with double locking system having male and female part connected with inbuilt sealed wire. On both the sides the secret code and logo of DISCOM should be embossed as per approval of the drawing. Also, there should be provision for inserting seal wire – a hole of 1

mm +/- 0.02 mm should be made. The design other than the approved drawing should got approved before execution of the order.

b. Size of the Seal:

a) Female Part. :The over all size of seal (female part) shall be

20 mm x 20 mm x 8 mm (± 5% maxi. Allowable limit for variation in dimension)

[20 x 20 x 8.0] normal;

[21 x 21 x 8.4] considering +5% tolerance;

[19 x 19 x 7.6] considering - 5% tolerance

The wall thickness of the seal (female part) shall be 0.80 mm to 1.0 mm (i.e. Not more than 1.0 mm).

b) Male Part:

The male part thickness (Anchor thickness) shall be (6.00 ± 5%) i.e. 5.7 mm to 6.3 mm

c. Serial no. of the Seal: Non repeat Seven digits Sr. Nos. with code no. on the seal shall be embossed and it shall not be screen printed and it should be provided on male and female portion i.e. on the top in male part and on the side in female part.

Please note that Sr. No. of seal shall not be embossed after the seal is manufactured. The size of the digit shall be 2 x 3 mm. Both seven digit seal numbers should be visible separately after closing the seal.

d. Monogram: The seal shall have Monogram in 10 mm Circle of DISCOM on front side. The back side of seal shall have month/year of A/T in figure with manufacturer's trademark / symbol.

e. Seal Wire: The seal wire shall be SS 316 grade as per AISI standards. It shall be non corrosive non magnetic Stainless Steel twisted strand wire **(SWG 26(0.457 mm) i.e. over all diameter of seal wire shall be 0.914mm +/- 0.05mm.**

The length of seal wire connecting male and female parts of the seal shall be as under.

(a) Total length to be used 290 mm **(Tolerance+/- 5mm)**

(b) Measured from beginning of the female part to end of the male part 80 mm **(Tolerance+/- 1.5mm).**

The seal wire shall not have affect of magnet i.e. it should not attract to magnet. The seal wire used for the above size of seals shall be inbuilt in connecting male and female part of the seal. The application of the seal wire is to insert through

the hole via female part and insert the male part into female part by applying thumb pressure to lock the seal.

4. General Construction

The seal shall be designed for a single use only and if tampered with the help of plier, knife or any other sharp instruments, the seal shall be damaged and due to its see through property, the sign of internal tampering shall be easily detected. Also, once opened, it cannot be re-used. The seal shall be made in such a way that, it can be easily locked with the help of finger and thumb pressing and no tools shall be required to close the seal in the laboratory or at site. After inserting the seal wire through female part, the cap of the male part shall be fitted in the female part in such a way that it should not leave any space to avoid insertion of any sharp tools for opening of seal body of the female part in hot or cold condition. General arrangement drawing of seal is attached.

The seal shall have also following features.

a) Tamper resistance and reliable.
b) Environmentally safe as it does not contain any lead.
c) Withstand long-term exposure to direct sunlight.
d) Required no tools for installation.
e) Transparent and see through body reveals tampering attempts.
f) Heat resistance.

5. TESTS

i) Visual check- The seal and seal wire shall be checked for workmanship and other features of design, colour & construction including dimensions as mentioned above.

ii) Boiling water test -

A) The seal should be locked with seal wire and then it should be dipped keeping seal suspended in such a way that only female portion should be heated and affected in boiling water **for one hour** and thereafter try to pull out male portion as well as seal wire. The male portion should not come out and if seal wire is pulled out, it should damage the seal, which can be visible as the seal is transparent.

B) The seal shall be emerged in the boiling water for more than one hour and there shall not be any affect on the seal and the seal shall remain in tact condition. Even, with the help of any sharp instrument, pulling with plier i.e. by applying mechanical force, the seal shall not come out from the female part. In case, it comes out, the

same shall damage the seal, so that it cannot be re-used. Also, if seal wire after locking is pulled out it should not come out without damaging the seal.

iii) **Pull out test -** After locking the seal, if the seal is pulled with mechanical force with the help of plier or any other instrument, sharp instrument etc. at normal condition, the seal shall not be unlocked without any damage.
The seal wire of selected seals (duly locked after insertion of seal wire) shall be pulled out of the locked seal by use of external force. The seal wire shall not come out without damaging the seal under test.

iv) **Chemical Test –** The seal shall be kept in the concentrated hydrochloric acid for minimum one hour in locked condition. The same shall remain intact condition. The seal wire shall not come out without damaging the seal under test when pulled out by force.

In short, if the seal is tested for any of the above tests, in no condition the male and female part shall be separated without damaging the seal. In case, if they are separated, the seal shall have sufficient tamper evident. Also, if seal wire is pulled out from the seal in any of the above tests, it shall not come out from the seal without damaging seal.

v) **Melting Point Test** (At temperature 280˚ C to 295˚ C)

vi) **Test for verification of SS 316 grade of seal wire (as per IS:228)**

6. Sampling criteria-/ Acceptance tests :

Minimum 5 samples of seals shall be selected at random as per IS 4905 for testing purpose from the each lot offered for inspection. Before dispatch to site, the seals offered for inspection shall be tested at the manufacturer's works for acceptance tests i) to iv) mentioned at clause no.(5) of technical specifications.
Test certificate for SS 316 grade of seal wire from Govt. approved/ NABL Accredited laboratory shall be furnished to DISCOM engineer during inspection. In the absence of any relevant test certificate being submitted, sample of seal wire shall be submitted by supplier & got tested at a Govt. approved/ NABL Accredited laboratory for confirmation of required chemical and physical properties. The cost of such tests shall be borne by the supplier.
After successful passing in the testing, the lot shall be accepted. The seals used in testing shall be destroyed in the presence of DISCOM's inspecting officer. The seal numbers of seals used in testing shall be recorded in the inspection reports.

DISCOM reserves the right to carry out seal monogram verification by selecting seals from any lot.

7. Type test report :

The bidder shall have to submit type test certificate of offered seal for tests mentioned at clause no.(5) of technical specifications, from the Govt. approved/ NABL Accredited laboratory viz. CPRI, ERTL, ETDC, NPL, ERDA etc. along with bid. The type tests having been conducted on offered seal shall be not older than **7 (seven) years** from the scheduled date of opening of the tender.

8. Supply Schedule

After Placement of order DISCOM will give delivery schedule, Sr. No. of the seal. Please note that the seal shall be manufactured only after receipt of the delivery schedule and as per the delivery schedule unless specifically instructed by the authority.

9. Guarantee

The seal shall be guaranteed for a period of **2 (Two) years.** In case, if any defect in design and manufacturing is noticed within the guarantee period the seals shall be replaced within one month free of cost. The defective seal found in the field viz: RSO/Division Office/ Sub-Division Offices, shall be collected by supplier at their risk and cost and shall be destroyed at suppliers' works in the presence of DISCOM's Engineers. For the replacement of seal, a new Sr. No. shall be provided by the DISCOM.

10. Special feature

The seals are to be manufactured in respect of above aspects. On placement of order from the DISCOM, all the suppliers shall have to make the seal of the same size and shape as per the approval of drawing. Also a secret code shall be given to each supplier on whom the DISCOM places the order. There will be DISCOM's logo, Sr. No., Month and Year of A/T or any other symbol given by the DISCOM shall be embossed. After completion of supply of order, the dyes of the secret code of the seals shall be surrendered to the DISCOM by each supplier on whom the order is placed by the DISCOM. Before commencing the supply, 25 nos. of sample seals shall have to be approved by the DISCOM.

11. Packing and Forwarding.

The supplier shall be responsible for durable packing of seal. The supplier shall have to supply each 100 seals in chronological order i.e. arranging in serially, tide with the steel wire forming a loop and the same shall be packed in polythene bag affixed with a label furnishing details such as manufacturers name, serial No. of seal, date of packing and A/T number.

12. Tender Sample

Each Bidder shall have to enclose 25 nos. sample seals and drawing of seal along with the technical bid. The tender sample seals shall be provided with month/year of A/T in figure with manufacturer's trademark / symbol on backside of the female part of the seal. The seals shall also be provided Sr. No. of seal i.e. 0000001 to 0000025 on top of the male part of the seal as well side of the female part of the seal as per the approved drawing. The offer without samples shall be out rightly rejected and the offer will not be considered.

The sample seals shall be tested as per specification clause No. 5 (I to V), either at DISCOM's NABL laboratory or at third party Govt. approved / NABL laboratory. The tender sample seals not conforming to the specification shall be straight way rejected and accordingly, their offer will not be considered for further evaluation.

13. Stage Inspection.

DISCOM reserves the rights to conduct stage inspection during manufacturing process for material used for seal & seal wire.

DISCOM reserves the rights to verify following test certificates during inspection for material used in manufactured lot.

i. The manufacturer's test certificate for raw material used for polycarbonate Plastic seals
ii. Test certificate of seal wire for SS 316 grade.

In case, any requirement is not fulfilled as per the specifications, the entire lot under process shall be rejected.

14. Form of undertaking.

On placement of order, suppliers shall have to give undertaking as desired by the DISCOM in prescribed formats.

Signature of Tenderer	DISCOM's Round Seal	Date: Place: