PVVNL-MT/COM/02(s)/22-23

**TECHNICAL SPECIFICATION OF POLYCARBONATE METERING SEALS**

1. The seal made of tamper proof, fire retardant polycarbonate are to be used for security of energy meters, pilfer proof boxes, transformers etc and or the purpose to be decided by the PVVNL.
2. Seals should be made of high quality polycarbonate and should not be affected by boiling water, muriatic acid etc. The seal shall be able to withstand harsh environment in direct sunlight exposure. The seals should withstand heat resistance test at least for 1 hour at 147 deg. Celsius.
3. The seal body should be color less, transparent clear which shall give complete visualization of its fixing mechanism and shall show clear indications if tampered with. The seal anchor should be of different color like, blue, yellow etc as informed by PVVNL Meerut at the time of order.
4. The seal should be of one-piece polycarbonate body consisting of capsule and locking anchor (double lock mechanism) with 4 anchors quadra locking mechanism integrated nonmagnetic non –corrosive stainless steel sealing wire/ Seal with Unidirectional Roto Twist mechanism. Sealing wire should be properly embedded firmly in the body of seal and cap deeply and full breath so that it is not all possible to take out the sealing wire by pulling it
5. Ultra violet numbering in semi-circular shape along with electronics signatures, thermo lesser printing type (not screen printed) visible only by UV light torch i.e. UV readable number and logo inside of the anchor part of seal. The expected life of UV numbering is guaranteed for 5 years in any conditions.
6. **For Quadra locking Seal**, the size of the female part body of the seal shall be 32x23x5+0.5 mm. The size of two wire hole should be sufficient to insert seal wire, but in case, more than 1.0 mm +0.1 mm. Wall thickness should 0.8 mm+/-0.1 mm but for Seal with Unidirectional Roto Twist mechanism the size of seal shall be 26.7 mm x 14 mm x 14.7 mm Diameter.
7. **For Quadra locking Seal**, every seal should have 300 mm long minimum seven-strand stainless steel wire permanently fixed to the seal body. Seal wire should be moulded in seal in such way that it should be connecting male female part of the seal and remaining open wire will be used for sealing. The non-corrosive non-magnetic stainless steel 304 grade, seven twisted wires, each of 0.23+0.01 mm dia with over all diameter of wire 0.7+0.05mm, so that it can easily insert into the female portion where the diameter of two hole shall be 1.00 mm+0.1mm

**For Seal with Unidirectional Roto Twist mechanism**, every seal should have 300 mm long minimum seven-strand stainless steel wire permanently fixed to the seal body. Seal wire should be pre-assembled in seal in such way that it should be connected to the rotating part of the seal and remaining open wire will be used for sealing. The non-corrosive non-magnetic stainless steel 304 grade, seven twisted wires, each of 0.23+0.01 mm dia with over all diameter of wire 0.7+0.05mm, so that it can easily insert into the holes where the diameter of two hole shall be 1.00 mm+0.1mm.

1. Logo of PVVNL must be embossed on female part of seal in 10 mm circle. Following sequential laser type serial numbers must be present on top of the male part and bottom of female part (**Serial No. of Seal shall be intimated at the time of order).**

Under no circumstances seal bearing duplicate number shall be manufactured and necessary provision be made in the computer software for numbering for preventing duplicity. Seals taken out for inspection at the time of pre dispatch inspection shall be damaged and destroyed in presence of inspecting officers. A certificate to the fact jointly signed by testing engineer of the firm & inspecting authority of PVVNL shall be enclosed with inspection report.

1. The sealing arrangement should be designed in such a way that its original position cannot restored after any effort of tamper or breaking of the seal. In case of attempt of opening the cap of the seal it will break and its internal part will remain inside.
2. The sealing mechanism should be designed in such a way that it can be sealed without using any pliers or tools. The sealing procedure must be foolproof and there should not be any scope of pre tampering/malpractice with sealing wire while sealing.
3. **PACKING:** Seals should be supplied in packet of 100 seals. Each packet shall be labeled for following information:

* **Client name**
* Consignee
* P.O. No.
* Serial Number Range.
* Quantity.

1. **OTHERS**: The successful bidder should have the capacity to supply minimum 2(two) lacs seals per month.
2. **SAMPLES:**

20 (Twenty) nos. samples are to be submitted within 7 days from the date of opening of Part-1 & Part-2 of the tender.

1. **TEST CERTIFICATE**:
   1. Seals should be tested for the following plastic properties from ERDA. Vadodra or any of the NABL. Approved labs as per relevant ISS.
      1. Heat resistance at 147 degree Celsius.
      2. BREAKING STRENGTHS**:** Seals shall be able to withstand a force of at least 15.0 kgf.
      3. Salt spray test.
   2. The strand steel wires shall also be tested as per relevant ISS by any of the NABL approved labs.

The above two test reports shall be submitted along with offer.

1. **TEST**: The seal shall be subjected to following tests:-

(A) **Physical/dimensional check**: The seal should be checked as per size specified above.

(B) **Boiling water test**: The seal shall be dipped in the boiling water for more than one hour and there shall not be any affect of any type on the seal.

(C) **Pulled out test**:

**Male Part:** The seal shall not get unlocked without any damage and remain intact even when male part of the seal is pulled with the help of any sharp instrument like puling with puller or by applying mechanical force. The seal shall become defective in such a way that cannot , in case seal gets unlocked when pulled.

**Female Part:** The seal shall not get unlocked without any damage and remain intact even when female part of the seal is pulled with the help of nay sharp instrument like puling with puller such a way that it cannot be re-used, in case seal gets unlocked when pulled.

**(D) Seal wire:** The seal shall not get unlocked without any damage and get damaged when seal wire is pulled with the help of puller i.e. by applying mechanical force. The seal shall become defective in such a way that it cannot be re-used in case the seal get unlocked i.e. seal wire should not be restored to its original position without damage the seal under test.

**(E) Chemical Test:** The seal shall not get damaged/deformed when kept in hydrochloric acid (34% concentrated) for an hour.

**(F) Temperature withstands test:** The seal shall be heated at 147 degree Celsius (min) for one hour. The same shall not get damaged or deform.

1. **SAMPLING CRITERIA**: As per IS 4905, the seals used in testing shall be destroyed in the presence of inspecting officer.
2. **GUARANTEE**: The designed life of the seals shall be 5 years. However, the seal shall be guaranteed for a period of 60 months from the date of supply. The seals, found defective, within guarantee period shall be replaced within 45 days from the date receipt on intimation.