

TECHNICAL SPECIFICATION FOR TAMPER PROOF QUAD LOCK ANCHOR TYPE POLYCARBONATE PLASTIC SEALS AGAINST TN-2618

(SECTION-III)

1. SCOPE

The specification covers the design, manufacture, testing at manufacturers works, supply and delivery at destination stores of Tamper Proof *Quad Lock Anchor Type* Polycarbonate Plastic Seals for sealing of Meter body and terminal covers of energy meters, Meter Box, CT-PT Units etc. with non-corrosive, non-magnetic stainless steel sealing wire. These seals shall also be used for sealing the meters, metering equipments and inspected materials. The size of the seal shall be 32 x 23 x 5 ± 1 mm. These Seals shall be used for LT, HT Industrial Consumers and in theft prone areas.

2. APPLICABLE STANDARDS

IS: 4905

ISO Certified manufacture (ISO 9000 and ISO 9001)

3. Material of Double Anchor Tamper Evident Poly-carbonate Seals :

The raw material used for Double Anchor Tamper Evident Poly-carbonate 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 IV-20) or any other manufacturer having better properties as under :-

Sr. No.	Properties	Poly-carbonate
1.	Melting temperature	280° C to 295 ^o C
2.	USE	Engineering
3.	Specific gravity	1.20 at 27 ^o C
4.	Softness	Hard
5.	Durability	Weather effect resistance
6.	Transparency	Fully transparent (for whole life span of seal)

4. Service Conditions (Climatic Conditions):

The meters to be supplied against this specification should be capable of performing and maintaining required accuracy under extreme hot, cold, tropical and dusty climate and solar radiation typically existing in state of Rajasthan (India). The meter shall be required to operate satisfactorily and continuously under the following tropical climatic conditions.

S. No.	Properties	Value
1	Maximum ambient air temperature	55 deg.C.
2	Maximum ambient air temperature in shade.	45 deg.C
3	Maximum temperature attainable by the meter exposed to sun.	60 deg.C.
4	Minimum ambient temperature	(-) 5 deg.C.
5	Average daily ambient air temperature	40 deg.C.
6	Maximum relative humidity	95%
7	Number of months of tropical monsoon condition	4 months.
8	Maximum attitude above mean sea level	1000 meters.
9	Average annual rain fall	10-100 cm.
10	Maximum wind pressure.	200 kg/sq.m

5. Color of Seal :

The female portion of the Polycarbonate Seal(s) shall be available in Clear/ Red/Green colour and should be transparent (see through) type, which shall give complete visualization of its fixing mechanism and shall show clear indication if tampered. Male and female portion may have different colour and shall be intimated at the time of P.O. placing.

6.0 General Construction :

The seal shall be capable to withstand temperature upto 147° C without any damage / deformation.

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 transparent property, the sign of internal tampering shall be easily detected. Also once opened, it can not 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 no tools shall be required to close the seal in the laboratory or at site. Both the parts shall be designed in such a way that they can not be separated and the attachment shall be flexible and shall not break. 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. The seal shall have also the 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.
- f) Heat resistance.
- g) Chemical resistant.

7.0 SPECIAL SEVEN LEVEL SECURITY FEATURES.

- 7.1 Quadra locking mechanism with 8 anchors.
- 7.2 Micro text matter/symbol readable with magnifying lens at minimum four places. (Nano text coding)
- 7.3 Special colour codes (weather resistant)
- 7.4 Laser type with contrast colour serial no. at two point's i.e. unique type numbering on anchor and female part positions with special Psychological effect (German technology)
- 7.5 Seven stand lace wire connected with male and female part of seal. (stainless steel 316 grade)
- 7.6 Special encrypted invisible audio detection patch with serial numbers on seals for tractability of duplicate seals.
- 7.7 The voice module should be incorporated in seals to find genuineness of the seal as to avoid manufacturing of duplicate /non authorized seals

8.0 DESIGN

The seal will be anchor type, tamper evident with eight locking system and shall be of different color codes (for e.g. one particular color shall be used by M&P Organization other by the (OP) Wring and 3rd by the purchasing/inspecting agency.

9 SIZE OF THE SEAL

- 9.1 The size of the female part body of the seal shall be 32 x 23 x 5 ± 1 mm.
- 9.2 The size of two wire hole should be sufficient to insert seal wire, but in case, more than 1.0 mm ± 0.1 mm.
- 9.3 Wall thickness should not be less that 0.8 mm.

10 SERIAL NO. OF THE SEAL

Non repeat seven digits numeric Sr.No, on the seal shall be Laser type in contrast color. Its should be provided on anchor flap i.e. on the top of anchor part and on the bottom side of the female part.

11 MONOGRAM

The seal shall have facility for embossed type monogram of COMPANY logo in 10 mm circle on front side and rear side of body of seal.

12 SEAL WIRE

Seal wire should be molded 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 316 grade, seven twisted wires, each of 0.23 ± 0.01 mm dia with over all diameter of wire 0.68 ± 0.05 mm, so that it can easily insert into the female portion where the diameter of two hole shall be 1.00 ± 0.1 mm. Total seal wire length should be of 300 mm +/- 5 mm. (open wire length after molded)

13. Testing :

The seals shall be inspected / tested as a acceptance test at the manufacture's works before dispatch in presence of authorized representative of purchaser for the following tests:

- i) **Physical Dimensional Check-up :** The seals shall be subjected to visual check-up for verification of workmanship and other features as mentioned above including shape / design / dimensions as per approved drawing / samples.
- ii) **Boiling Water Test:** The seal when emerged in the boiling water for two hours there shall not be any affect on the seal and it shall remain intact condition i.e. the seal should not become soft, but instead should turn out to trail and easily break thus showing easily the tampering signs if it eventually happens. Even, with the help of any sharp instrument, pulling with plier i.e. by applying mechanical force, the male portion shall not come out from the female part (body seal). In case, it comes out, the same shall damage the seal, so that it can not be re-used.
- iii) **Pull Out Test:** After locking the seal, if the male part / insert is pulled with mechanical force with the help of plier or any other instrument, sharp instrument etc. at normal condition, the seal should not get unlocked without any damage and when such condition occurs, it should leave traces of tampering.
- iv) **Seal Wire :** In case, if someone tries to pull the seal wire and in any of the tests as mentioned above at (ii) & (iii) in that case the male / female portion of the seal should be damaged and the same can be seen visually being a transparent one.
- v) **Chemical Test:** The seals shall be kept in the concentrated acid for minimum one hour in locked condition. The same shall remain in tact condition and if try to unlock the seal, the same shall be damaged.
- vi) **Temperature withstand test:** The seal should be tested for 30 minutes at 147 degree C. temperature without damage/ deformation.

In short, if the seal is tested for any of the above tests, in no condition the male and female part shall be separated out without affecting / 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.

14. TEST

The seals shall be inspected / tested as a acceptance test at the manufacture's works before dispatch in presence of authorized representative of purchaser for the following tests:

- 14.1 **VISUAL CHECK:** Workmanship and other feature as specification.
- 14.2 **DIMENSIONAL CHECK:** As per supplier drawing.
- 14.3 **BOILING WATER TEST:** The seal shall be dipped in the boiling water for more than one hour and there shall not be any effect of any type on the seal.
- 14.4 **PULLED OUT TEST**
- 14.5 **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 pulling with puller or by applying mechanical force. The seal shall become defective in such a way that it can not be reused, in case seal gets unlocked when pulled.
- 14.6 **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 any sharp instrument like pulling with puller such a way that it can not be reused, in case seal gets unlocked when pulled.
- 14.7 **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 shall not come out without damage the seal under test.
- 14.8 **CHEMICAL TEST:** The seal shall not get damaged/deformed when kept in the Hydrochloric Acid (34% concentrated) for one hour.
- 14.9 **Temperature withstand test:** The seal should be tested for 30 minutes at 147 degree C. temperature without damage/ deformation.

In short, if the seal is tested for any of the above tests, in no condition the male and female part shall be separated out without affecting / 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.

- 14.10 **AUDIO DETECTION TEST :** Seals should be tested after boiling water test for audio detection and audio should be clearly indicate even after both the tests.
- 15.0 **SAMPLING CRITERIA:** As per IS 4905. The seals, used in testing, shall be destroyed in the presence of inspecting officer.
The seals used in testing shall be destroyed in the presence of Nigam's Inspecting Officer.

16.0 Random Testing:

As per the sampling criteria the random testing of the material in MST,CPH, Jaipur Discom, Lab., Jaipur after receipt in the stores irrespective of the fact whether or not it was inspected before dispatch will be carried out and in case of any failure, the entire lot shall be rejected at the risk & cost of the supplier.

17.0 Guarantee :

The seals shall be guaranteed for a minimum period of 66 months. In case, if any defect in design and manufacturing is noticed within the guarantee period, the seals shall be replaced within 45 days free of cost. The defective seal found in the field viz. STORES/FIELD OFFICERS shall be collected by the supplier at their risk and cost and shall be destroyed at their works in the presence of purchaser's representative. For the replacement of seals, revised Sr. No. shall be provided by the purchaser.

18.0 Replacement of rejected seals:

In case material are found not in accordance with the prescribed specification/approved drawings and/ or the approved samples the same will be rejected and supplier shall replace the rejected material free of cost within one month from the date of intimation. The lot(s) of replaced seals will also have to be got inspected from purchaser's representative.

19.0 Test Certificate(s):

The bidder shall have to submit test certificates for the type of offered seals from NABL/Govt. approved Laboratory . The supplier shall not dispatch the materials unless and until test certificate(s) are approved by the purchaser.

20.0 Packing and Forwarding :

The bidder shall be responsible for suitable packing of seals, circle wise. The supplier shall have to supply each 100 seals in chronological order i.e. arranging in serially, tied with the steel wire forming a loop and the same shall be packed in polythene bag with labels furnishing Sr. No. of seals and name of the circle and further in cardboard boxes.

21.0 SAMPLE:

The samples of each item offered shall be submitted before the due date and time of submission of tender. The sample(s) submitted shall be strictly conforming to the specification and drawing of the material offered. If the sample is found to be not as per specification/drawing the offer will not be considered and no correspondence from the tenderer for accepting supplies to the Nigam's requirement will be entertained. The tenderer shall have to submit fifteen (15) Nos. of each type of offered seals. The tender without samples shall be rejected and not considered. The sample seals shall be tested as per specification/drawing/relevant standards.

15 Nos of sample shall be submitted before the start of supply as Pre-Commencement sample. The bulk supply shall only start after approval of Pre-Commencement sample.

22. Submission of drawing:

The tenderer shall submit their drawing for approval along with copy of tender document wherever the Nigam's drawing is not specified and attached with the specifications. The drawing submitted shall be strictly conforming to the sample and to the specifications.

23. Quality of Supplies :

All materials supplied shall be strictly as per specification laid down and in strict accordance with and as per the approved standard samples.

24. Sample before commencing bulk supplies :

- a) Before taking up the manufacture of the bulk supply, the successful bidder(s) will have to submit samples for approval to the purchaser within 7 days from receipt of the detailed order.
- b) No bulk supply should be made unless the sample is approved by the purchaser.

25. Form of undertaking :

On placement of order, bidders shall have to give undertaking as desired by the Jaipur Vidyut Vitran Nigam Limited.

26. Audio Detector Device

Audio detector device. capable of detecting genuineness of the seals should be supplied 1 Nos for every 5000 Nos of seals supplied free of cost to the Nigam with the supply of seals.

27. Delivery Schedule:

The bidder is required to quote monthly delivery. The delivery of quoted quantity should be completed in 1 month period from the date of approval of Pre-Commencement sample and allotment of circle & signature voice whichever is later. Firm shall furnish Pre-Commencement sample within 15 days from the receipt of Purchase Order/signature voice whichever is later. In case ordered quantity is different than quoted quantity then monthly delivery shall be adjusted proportionately. Tenders in which monthly delivery schedule is not indicated shall be ignored.

28. ADDITIONAL ORDER

Repeat orders for additional quantities, up to a maximum of 50% of original ordered quantities, may be placed by the Nigam, on the same rates, terms and conditions given in the contract.

SCHEDULE-'A'

**GUARANTEED TECHNICAL PARTICULARS FOR TAMPER PROOF
POLYCARBONATE PLASTIC SEALS (QUAD LOCK ANCHOR TYPE) AGAINST
TN-2618**

Sl. No.	Description	Technical Particulars Offered
1.	NAME & ADDRESS OF MANUFACTURER	
2.	WORK'S ADDRESS	
3.	RAW MATERIAL OF POLYCARBONATE SEALS.	
4.	PROPERTIES OF MATERIAL.	
i)	USE	
ii)	SOFTNESS	
iii)	DURABILITY	
iv)	TRANSPARENCY	
5.	COLOUR OF THE SEALS.	
6.	Whether Design & Construction of Seal is as per specification (Give Details)(locking type)	
7.	Whether the seal is quad lock type (8 anchor)	
8.	THICKNESS OF SEAL	
9.	SIZE OF SEAL	
10.	DIAMETER OF SEAL WIRE	
11.	LENGTH OF SEAL WIRE	
12.	Whether Etching / Embossing of Serial no. is as per specification.	
13.	WHETHER PRINTING OF MONOGRAM IS AS PER SPECIFICATION.	
14.	MAXIMUM WITHSTAND TEMPERATURE (UPTO 147 DEG. C)	
15.	WHETHER SEAL HAVE FOLLOWING PROVISIONS.	
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	
f)	HEAT RESISTANCE	
g)	AUDIO DETECTION (Even after boiling water test/chemical test/temperature withstand test)	
16.	GUARANTEE OF SEAL (MIN. 66 months.)	
17.	WHETHER SEAL WIRE IS PROVIDED IN THE SEALS AS PER SPECIFICATION.	
18.	MICRO TEXT MATTER/SYMBOL READABLE WITH MAGNIFYING LENS AT MINIMUM FOUR PLACES. (Nano text coding)	
19.	LASER TYPE WITH CONTRAST COLOUR SERIAL NO. AT	

	TWO POINT'S I.E. UNIQUE TYPE NUMBERING ON ANCHOR AND FEMALE PART POSITIONS WITH SPECIAL PSYCHOLOGICAL EFFECT (German technology)	
20.	SEVEN STAND LACE WIRE CONNECTED WITH MALE AND FEMALE PART OF SEAL. (STAINLESS STEEL 316 GRADE)	
21.	SPECIAL ENCRYPTED INVISIBLE AUDIO DETECTION PATCH WITH SERIAL NUMBERS ON SEALS FOR TRACTABILITY OF DUPLICATE SEALS.	
22.	WHETHER SEAL WIRE IS OF NON-MAGNETIC TYPE	
23.	WHETHER SUITABLE PACKAGING IS PROVIDED (CONTAINING 100 SEALS TOGETHER IN EACH SEPARATE BAG)	