HEDNO S.A. SPECIFICATION	Security Seals for LV and MV Metering Devices	ND-388/06.04.2021

Issued by the Metering Branch	Network Department	

Contents

Technical Specification

Security Seals for LV and MV Meter Devices

Subject

This Technical Specification determines the manufacture, tests, acceptance tests, and packaging for transport and delivery to HEDNO warehouses, for Plastic Seals for sealing meter devices for MV and LV customers.

Operating Conditions

1. The seal shall be suitable for installation, either outdoor without covers or indoor.
2. The seal shall be able to operate and be stored under the following conditions:

Maximum altitude	2000m
Minimum ambient temperature	-20°C
Average ambient temperature	20°C
Maximum ambient temperature	50°C
Maximum temperature on outer surfaces due to solar radiation	70°C
Minimum relative humidity	5%
Maximum relative humidity	95%

Standards – Specifications

STANDARD	**STANDARD TITLE**
ISO/IEC 18004:2015	Information technology Automatic identification and data capture techniques QR Code bar code symbology specification.
ISO 178	Plastics – Determination of flexural properties.
ISO 179-1	Plastics – Determination of charpy impact properties Part 1: Non – instrumented impact test.
ISO 179-2	Plastics – Determination of charpy impact properties Part 2: Instrumented impact test.
ISO 527	Plastics – Determination of tensile properties.
ISO 306	Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST).
ISO 75	Plastics – Determination of temperature of deflection under load.
IEC 60695-10-2	Fire hazard testing - Part 10-2: Abnormal heat - Ball pressure test method.
ASTM D256	Impact resistance of plastics and electrical insulating materials.

ASTM D543	Resistance of plastics to chemical reagents.
ASTM D570	Water absorption of plastics.
ASTM D792	Density and specific gravity (relative density) of plastics by displacement.
ASTM D1525	Vicat softening temperature of plastics.
IEC 60068-2-2	Environmental testing - Part 2-2: Tests - Test B: Dry heat.
IEC 60068-2-11	Basic environmental testing procedures - Part 2-11: Tests - Test Ka: Salt mist.
IEC 60068-2-14	Environmental testing - Part 2-14: Tests - Test N: Change of temperature.
IEC 60068-2-30	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 216	Guide for the determination of thermal endurance properties of electrical insulating materials.
EDF HN 33-E-60	Corrosion and climatic ageing of plastic materials.
ISO/IEC 60410	Sampling plans and procedures for inspection by attributes.

3. The seals shall be industrial products manufactured and tested in accordance to International-European regulations, mentioned above and are in force on the date of submission of the tenders.
4. Whenever the requirements of this specification contradict with the above editions of international regulations or any relevant, this HEDNO specification shall prevail.
5. All tests shall be performed in accordance to international regulations (unless otherwise specified) applicable on the date of submission of the tenders.

Description

6. The seal shall be used for sealing of LV and MV meter devices..
7. The seal shall facilitate the identification of unauthorized replacement or tampering with the parts it consists of, by visual and effortless inspection.
8. The seal must have a life span of at least 10 years.
9. The seal shall consist of the following parts:
   - 9.1. The main body.
   - 9.2. The cap.
   - 9.3. The sealing wire.
10. The seal shall be in accordance to the drawings attached to the annex with respect to the essential dimensions. The drawings shall be considered as

manufacturing drawings and be a guide for the final manufacturing. The wire's length for each seal is 15cm.

11. The sealing wire shall have a spiral shape of 1 mm in diameter, suitable of use with the seals, as shown in the Annex, section Drawing 3: Sealing Wire.

12. The sealing wire shall be delivered in spools of length of at least 100 m.

Sealing Procedure

13. The sealing procedure is the following:

    13.1. Insert the two ends of the sealing wire from the outer side of the seal body through its two holes.

    13.2. Twist the two ends of the sealing wire together and place them inside the main body. The loop of the wire shall be as short as possible.

    13.3. Place the cap that has the same numbering as the main body and secure it using pliers.

    13.4. Check for a good fit of the lid on the main body of the seal.

    13.5. Check that no cracking or breakage of the seal has occurred during its securing.

    13.6. Check that the sealing wire is compressed between the body and the cap.

Materials for Main Body and Cap

14. All materials used for the manufacture of the seals shall be of a very good quality appropriate to the intended purpose and operating conditions as specified.

15. The seals manufacturing material shall have the following properties:

    15.1. Resistance to aging in a way that does not show dimensional variation and shape-altering the seal.

    15.2. Sealing must be perfect.

    15.3. High mechanical strength against impact, tension and shear.

    15.4. High resistance to chemicals, common solvents and ultraviolet rays.

    15.5. Practically unbreakable, without the use of tools.

    15.6. Unaffected by temperature, humidity and solar radiation.

    15.7. Low water absorption.

    15.8. High marginal operating temperature.

    15.9. Resistance to heat and fire.

16. All materials used for the seals manufacturing shall withstand the temperature and humidity specified without distortion or destruction and without affecting their mechanical properties beyond the limits specified in the specification.

17. All surfaces must be free from defects, smooth and glossy.
18. The body and the lid of the seal will be of transparent plastic material in order that the sealing wire is visible externally.
19. The seal surfaces shall remain unaffected by solar radiation (color change, peeling) and climatic changes.
20. The seal body and cap shall be made of polycarbonate which must be of sufficient elasticity to facilitate sealing of the seal body with the cap. The polycarbonate must be of industrial material of type LEXAN 163R or XANTAR 18 UR or XANTAR 19 UR.
21. The quantitative requirements relating to the properties of the above plastic material to be used for the manufacture of the seals and the seals themselves are listed in the Annex, section Material Properties and Quantities Testing.
22. After successful sealing, it shall not be possible to extract the wire from the seal without visible marks on it (e.g. breakage).

Sealing Wire Materials

23. The sealing wire must be of galvanized spiral iron.
24. Indicative chemical composition of the additional materials in the wire of the sealing wire: C: 0.08%, Mn: 0.045%, P: 0.035%, S: 0.035%.
25. The galvanizing cover of the sealing wire shall be at least 20 g / m^2.
26. The sealing wire shall have a tensile strength of 300-450 N/mm^2.
27. The diameter of the sealing wire shall be 1mm ± 10%.
28. The sealing wire shall have a weight of about 2.45 gr / m of wire (1 Kg of wire shall correspond to about 400 m length)
29. The core part of the wire shall have a diameter of 0.50 mm, while the spiral wire shall have a diameter of 0.3mm.
30. The wire twist (spiral) shall be 50 twists per 1m of wire.

Features of Tolerance to Tampering

31. Every seal tampering shall leave visible traces.
32. If pressure is applied to the loop of the sealing wire in a secured seal and the direction of the applied force is opposite to the seal main body:
    - 32.1. If the force is less than or equal to the force required to break the wire, then the wire may break, and there may be little damage to the edges of the holes in the seal body.
    - 32.2. If the force is greater than the force required to break the wire, then the wire will break and the edges of the holes of the seal main body shall be damaged.

33. In any attempt to detach the seal lid from its body, there should be visible signs of damage to the edges of the holes of the seal cap or breakage of the cap even in cases where a violent increase in temperature occurs, in which case the deformation of the material shall be visible.

34. The sealing system shall be absolutely tamper proof and the material shall be damaged if tampering is attempted. This will be achieved by providing a suitable slot on both the body and the seal lid so that once the two parts are fitted and only pressed with pliers they lock secure and it is not possible to remove the cap without indicating damage to the material.

35. The final fit of the two covers of the seal shall be such that there is practically no gap between them.

36. Following the sealing, the cap and the edge of the seal main body shall be at the same surface.

37. The seal main body shall have two holes up to 1.5mm in diameter through which it will be straightforward to pass the sealing wire. The position of the holes on the seal main body is determined in Annex, Drawing 1: Seal Main Body.

Marking – Numbering

38. Each seal shall have a unique serial number and with the letter of the series.

39. The range of consecutive unique seal numbers will be defined by HEDNO prior to serial production.

40. HEDNO logo shall be engraved, with an embossment depth of at least 0.3 mm, on the inner side of the seal main body, in order not to impede the automatic visual reading of QR code.

41. The markings shall remain legible throughout the whole life span of the seals.

42. The size of the font used for the markings shall be as big as possible based on the dimensions of the seal main body and the size of QR code, while it is acceptable the serial number to be print in two rows for increased legibility.

43. The main body of the seal shall have the following markings:

    43.1. HEDNO logo.

    43.2. The unique seal serial number.

    43.3. The QR code that corresponds to the unique seal serial number with the letter of the series.

44. The following markings should be on the cap of the seal:

    44.1. The unique seal serial number.

    44.2. The QR code that corresponds to the unique seal serial number with the letter of the series.

45. The QR code shall be readable by handheld devices when the seal is installed and secured.

46. For the easy automatic reading of QR code, both the seal main body and the cap shall have on their inner surface, according to the attached drawing, non-glossy surface of Φ14 in diameter (surface freezing). The remaining seal surfaces will be completely transparent, so that the sealing wire is visible on the outside.

47. The exact dimensions of the markings as well as their specific locations are determined by the drawings in the Annex.

48. All markings on the seals (except HEDNO logo) shall be in indelible black color and will be engraved with laser on the outside of the seal. Engraving shall be identifiable by touch on the surface.

Submission of Samples

49. Tenderers shall deliver with their offer eighteen (18) complete samples of seals for each offered item (of pink color and transparent), same with the requested ones, with the appropriate sealing wires and the requested packaging for inspection and tests that may be required with respect to the fact if the material meets fully the requirements of this technical specification.

50. Tenderers shall, also, deliver with their offer twelve (12) complete samples of seals, same with the requested ones, for each offered item (of pink color and transparent) for the execution of unlocking tests. The samples (main body and cap) shall be prepared to have suitable anchors (wire of 1mm), passed through 2 holes of 1.5mm in diameter (according to the attached drawing). The seal main body will have inside the sealing wire. The samples will be delivered open (the main body and the cap will be sealed by HEDNO).

51. The wire, which will be delivered with the samples, can be on spool or in corresponding units of 15cm. The samples will not be returned.

52. Offers not including samples shall not be acceptable.

53. Before the series production, the required quantity of samples material (full samples) shall be submitted, according to the specified requirements of this specification, for the final sample approval.

Documents for Submission in the Tender

54. In the tender, tenderers shall submit for each offered kind:

    54.1. Manufacture drawings showing the dimensions of the seals offered.

    54.2. Detailed technical description of the offered seals.

    54.3. For each material used in the seals manufacture, precise specification for each material including its properties and characteristics.

    54.4. Instructions for sealing and inspecting of an installed seal.

54.5. Quality assurance certificate according to the ISO 9001 standard for the manufacturing plant, which is in force and its scope proves the ability to produce the required materials or similar plastic material.

54.6. Quality assurance certificate according to the ISO 9001 standard for the suppliers/resellers, in case that they are different from the manufacturer, specialized in the management of secure seals supply chain.

54.7. Declaration of the manufacturing plant according to section Requirements for Statement on Secure Seal Management of this specification.

54.8. Declaration of the supplier as supplier or reseller according to section Requirements for Statement on Secure Seal Management of this specification.

54.9. Data sheet of the raw material used for the manufacture of the seals.

54.10. Test report certificates for the suitability tests and the type tests of this technical specification. In the test reports it shall be clearly demonstrated that the requirements of the specification are met.

Tests

Design Tests

55. The design tests aim to verify the suitability of the seals design.

56. The design tests are the following:

    56.1. Agreement between the seal dimensions with the approved manufacture drawings.

Special Tests

57. The manufacturer shall conduct tests in order to be ascertained that the offered material has the properties described in the Annex, Material Properties and Quantities Testing.

58. Part or even the whole of those tests may be repeated during the series production in the Inspections' judgement and at HEDNO expense. In case of tests failure the expenses shall be borne by the supplier.

59. If, during the course of production, there is ascertained a modification in the material composition, all tests shall be performed on the material.

Suitability Tests

60. The offers shall be accompanied by test certificates of all suitability tests on raw material and on a finished seal, from which it shall be clearly demonstrated that the requirements of the specification are met.

61. Certificates issued by PPC itself or by independent, internationally accredited laboratory certified appropriately for plastic materials will be accepted.

62. The suitability tests are the following:

62.1. Determination of the impact resistance of the plastic materials used for the manufacture of the seals.

The test shall be conducted according to ASTM Standards, issue D256 "*Impact resistance of plastics and electrical insulating materials*".

62.2. Determination of the density of the plastic materials used for the manufacture of the seals.

The test shall be conducted according to ASTM Standards, issue D792 "Density and Specific Gravity (Relative Density) of plastics by displacement".

62.3. Determination of the maximum temperature of continuous operations of plastic materials.

The test shall be conducted according to IEC Standards, issue 216 "Guide for the determination of thermal endurance properties of electrical insulating materials" or the corresponding UL standards.

62.4. Determination of the temperature at which the plastic materials used for the manufacture of the seals begin to soften.

The test shall be conducted according to ASTM Standards, issue D1525 "*Vicat softening temperature of plastics*".

62.5. Determination of water absorption of plastic materials used for the manufacture of the seals.

The test shall be conducted according to ASTM Standards, issue D570 "*Water absorption of plastics*".

62.6. Test to confirm the resistance of the plastic materials used for the manufacture of the seals to acid or alkaline chemical reagents and ordinary solvents.

The test shall be conducted according to ASTM Standards, issue D543 "*Resistance of plastics to chemical reagents*".
The chemical reagents to be used for the test shall be those mentioned in paragraphs 6.3.17, 6.3.23, 6.3.28, 6.3.33, 6.3.42, 6.3.47, 6.3.50 of the relevant ASTM Standards.

62.7. All type tests, which are included in §63.

Type Tests

63. As type tests are regarded the tests described below and in case of executing all or some of them, the order below has to be preserved:

63.1. Confirmation of the seals suitability for use or store under high temperature conditions.

The test shall be conducted as described in IEC Standards issue 60068-2-2 "*Basic environmental testing procedures - Part 2: Tests - Test Bd: Dry heat*".
The test shall be considered successful, if there is no deformation or failure during or after the test, which could limit the material functional capacity.
Moreover, the seals must respond successfully, after the recovery period, to the impact test described in §62.1.

63.2. Test for the effect of temperature change on the seals

The test shall be conducted as described in IEC Standards issue 60068-2-14 "Basic environmental testing procedures - Part 2: Tests - Test Nb: Change of temperature with specified rate of change".
The test shall be considered successful, if there is no deformation or failure during or after the test, which could limit the material functional capacity.
Moreover, the seals must respond successfully, after the recovery period, to the impact test described in §62.1.

63.3. Test for resistance against impact

The test shall be conducted as described in NF (Norme Francaise) issue C20-010, ANNEX Nr. 1.
The impact energy shall be equal to 20 Joule.
The test shall take place at any point of the seal flat surface (fully assembled – secured), but it shall be repeated twice on the same surface of the same sample.
The test shall be considered successful, if there is no indication of failure, which could limit the seal functional capacity.

63.4. Test for protection against humidity.

This test shall include the following particular tests:

- Humidity – temperature test.

The test shall be conducted as described in IEC Standards issue 60068-2-30: "Basic environmental testing procedure - Part 2 : Tests - Test Db and guidance: Damp heat cyclic, 12 + 12 hour cycle".
The seals shall be fastened on to a vertical flat surface. The test shall be conducted on fully assembled seals.
The test shall be considered successful, if there is no indication of cracking, or other failure on plastic parts after its execution, which limits the material functional capacity.
Moreover, the seals must undergo successfully, after the recovery period, to the impact test described in §62.1.

63.5. Corrosion and climatic ageing testing.

The test shall be conducted as described in EDF HN 33–E–60 Standards. The seals shall be tested open, consisting of the body and the cap.
The specimens shall undergo for 6 weeks corrosion of a combined cycle of salt mist – sulfur dioxide and for 6 weeks climatic ageing with radiation (Xenon), thermal impacts, humidity and rain.
The test shall be considered successful if:

- There is no indication of deformation, cracking or other failure on plastic parts after its performance, which limits their functional capacity.
- The color shall remain transparent with a slightly yellow coloring acceptable.
- The markings shall remain legible.

Moreover, the seals must undergo successfully, after the recovery period, to the impact test described in §62.1.

63.6. Unlocking Test.

The manufacturer shall prepare the relevant samples with suitable holes and anchors. The samples shall have two holes on the body and the cap. In each of the holes a suitable anchor will be applied, with sufficient contact surface with the inner part of the main body or the cap.
The unlocking tests will only be tensile tests and bending or torsional force shall not be applied. The tests shall be carried out with the seals secured with a sealing wire.
The test shall be conducted on sets of 10 seal samples.

a. On non-aged seals
b. On climatically aged seals
c. On corrosion-exposed seals

The test shall be considered successful, if the average value of the unlocking load in N is greater than 250 N.

63.7. Compression Testing

The test shall be conducted on sets of 10 seal samples.

a. On non-aged seals
b. On climatically aged seals
c. On corrosion-exposed seals

The test shall be considered successful, if the average value of the compression load in N is greater than 5.000 N.

63.8. Test to confirm the resistance of the seals to acid or alkaline chemical reagents and ordinary solvents.

The test of §62.6 will be performed on ready seals. In addition to the requirements of §62.6, the markings shall remain legible.

Acceptance Tests

64. The acceptance tests are the following:

    64.1. Visual examination

    The seals shall be examined visually in order to confirm that:

    - The seals/packages are in accordance to the requirements of this specification.
    - There is no trace of damage or deformation at any point.
    - The external surfaces are smooth and without faults.
    - There are no indications of faulty casting.
    - The marking is correct and in accordance to the requirements of this specification.

    64.2. Smooth function examination

    - A sealing shall be performed, in order to determine the proper function.
    - Dimensions examination.

    64.3. Mechanical strength testing

    - Unlocking test
    - Compression test

    64.4. Execution of the tests of §62.6, §63.3, §63.6, §63.7, §63.8.

Sampling

65. The acceptance tests (§64) shall be performed on a sample, selected by random sampling, out of the batch to be delivered, in accordance with IEC Standards issue 60410 with the following criteria:

    65.1. Test level S-4 (table I, IEC 60410).

    65.2. Simple or double sampling (tables II and III, IEC 60410).

    65.3. Acceptance quality level AQL = 1.0 for each test separately.

66. In case of any acceptance test failure, which implies rejection of a batch or existence of bad experience from previous use of the material, it shall be imperative to perform those suitability tests related to the failure or the bad experience.

67. In that case (§66) the suitability tests shall be performed on three plastic seal samples which will be randomly selected from the next batch prior to its delivery.

68. In case of failure of a plastic seal sample from the three seals sample (§67) even on one point of one test, the suitability tests shall be repeated on a two seals sample.

69. In case of a second failure (§68), the batch shall be rejected.

70. The batches coincide with the partial material deliveries.

Series Tests

71. No series tests are specified.

Warranty

72. For the seals will be given five (5) years warranty from the date of delivery.

Operating Instructions

73. In their tenders, tenderers shall include the manual with the sealing procedure and inspection of installed seals. The inspection aims to identify: a) tampering, b) tampering attempt, c) reassembling of used seals.

Packaging

74. The seals shall be carefully packed per 6 sets (main body, cap) of respective numbers inside suitable packaging of transparent plastic material with specially formed places, according to the Annex, Drawing 4: Seals Packaging.

75. In the abovementioned seals packaging (§74) the number and series of the seals inside the package shall be clearly marked.

76. The above seal packages (§74) shall be packaged with a 100 m sealing wire and a "Usage Instructions" printed matter in a box with a capacity of 200-400 seals.

77. The above seals packages (§74, §75) shall get HEDNO approval before the start of the series production.

78. The boxes shall be placed in EU palettes and shall be delivered as such, so the total weight per palette shall not exceed 550 kg.

79. The boxes shall, on their outside, have engraved or glued indelible:

    79.1. The number and series of the seals,

    79.2. the Contract Number,

    79.3. the Material Code,

    79.4. the manufacturer name or logo.

80. Each delivery (partial or full) shall be accompanied by a certificate from the manufacturer stating the extent and continuity of the unique increasing serial code including their uniqueness.

81. In the case of supplying third party seals by the manufacturer or the supplier, in every way same as the offered types offered to HEDNO (shape or dimensions or logo), which are not engraved or by repeating the unique codes, HEDNO will be able to take legal action to claim damages proportionate to the damage caused.

Requirements for Statement on Secure Seal Management

82. Manufacturers must produce seals with unique seals numbers and will not reuse or copy these unique numbers in the manufacture of other seals.

83. Manufacturers shall not provide to third-party seals according to this HEDNO specification.

84. Manufacturers shall not provide to third-party seals bearing the HEDNO logo or seals of same shape or same dimensions.

85. Manufacturers and distributors / resellers:

    85.1. Must receive random and unannounced inspections at their premises and in the documentation for certification of compliance with current safety practices.

    85.2. Must ensure the safety and integrity of the product against malicious actions.

    85.3. Must control access to production and storage areas and loading docks and store seals in secured facilities.

    85.4. Must promote the awareness of the security of seals to all staff. Security awareness includes the notification of the members of the administration who need to be notified in case of possible security problems.

    85.5. Must monitor the physical identifiers of all seals and related products they produce or have produced for them or have supplied.

    85.6. Must record, for the seals, the number and the identifier, the final production date, the date of the order and the date of delivery to HEDNO.

    85.7. Shall keep the above information for at least five years in a manner that makes it readily available on request by the HEDNO.

    85.8. Must separate and make any problematic production of sealing products inoperative before they are rejected.

Annex

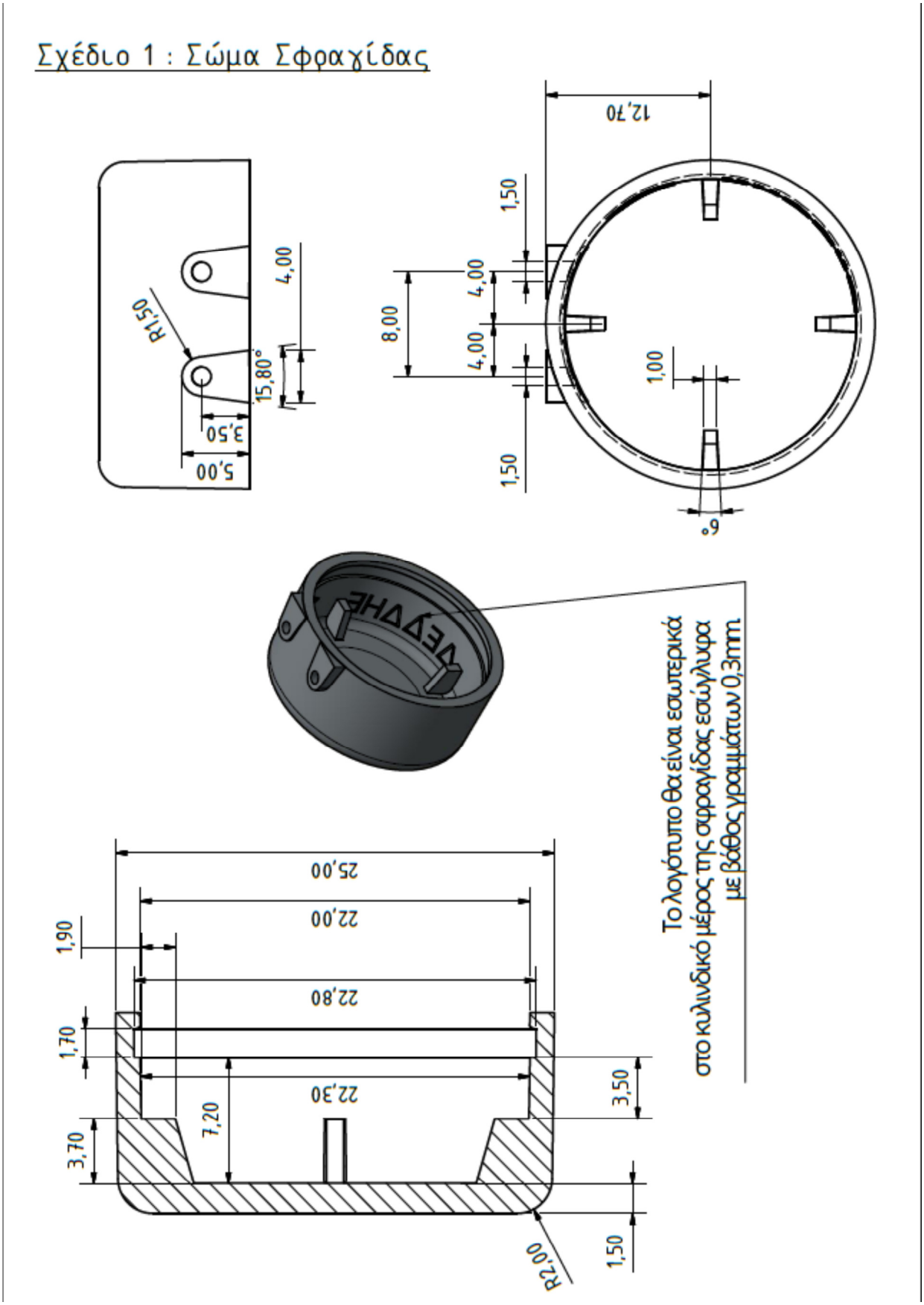
Material Properties and Quantities Testing

LEXAN 163R material properties:

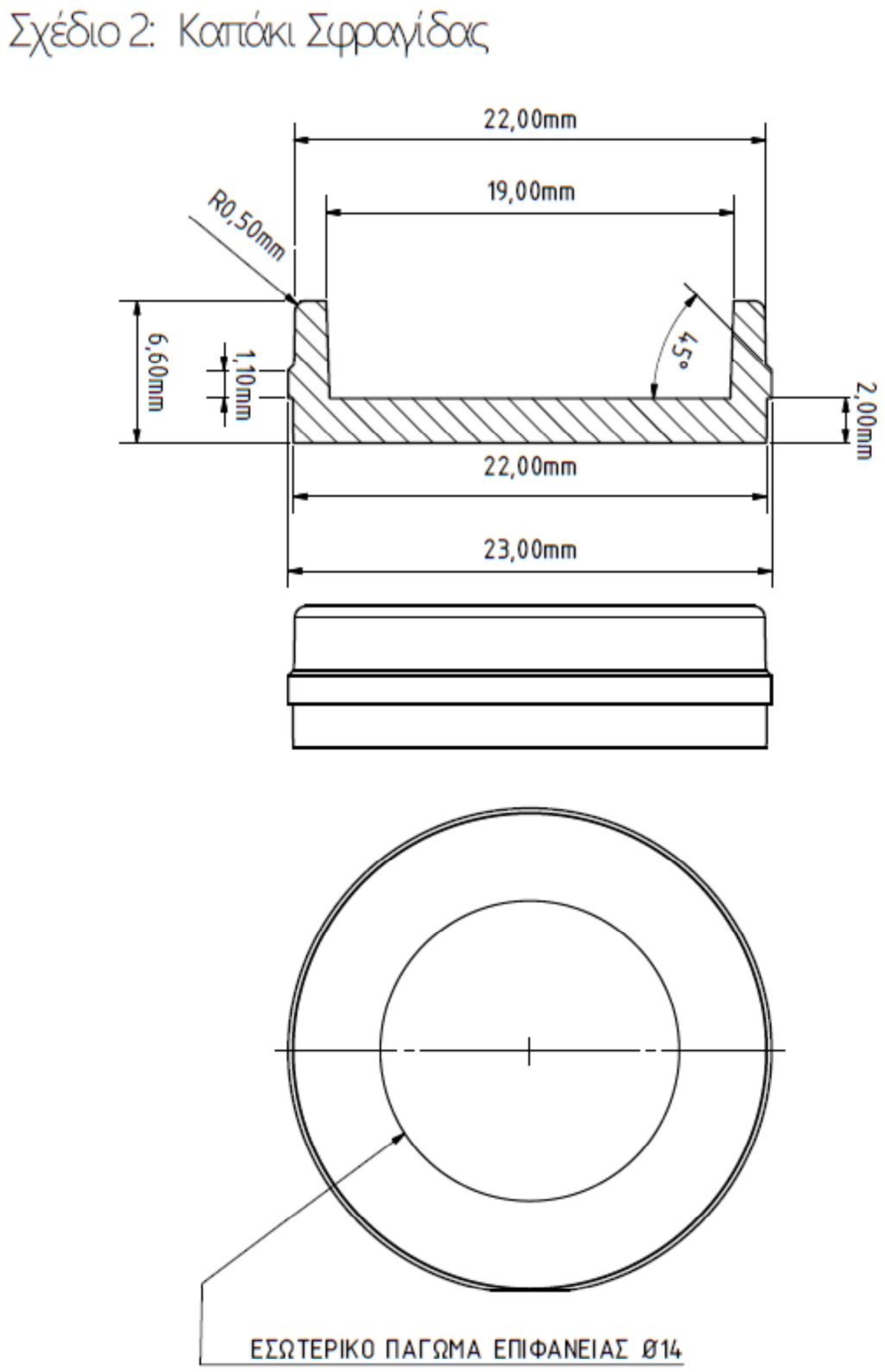
TYPICAL PROPERTIES[1)]		TYPICAL VALUE	UNIT	STANDARD
MECHANICAL				
Taber Abrasion, CS-17, 1 kg		10	mg/1000cy	GE
Tensile Stress at yield,	50 mm/min	63	MPa	ISO 527
Tensile Stress at break,	50 mm/min	70	MPa	ISO 527
Tensile Strain at yield,	50 mm/min	6.0	%	ISO 527
Tensile Strain at break,	50 mm/min	120	%	ISO 527
Tensile Modulus,	1 mm/min	2350	MPa	ISO 527
Flexural Strength at yield,	2 mm/min	90	MPa	ISO 178
Flexural Modulus,	2 mm/min	2300	MPa	ISO 178
Hardness, H358/30		95	MPa	ISO 2039/1
IMPACT				
Izod Impact, unnotched 80*10*4	+23 °C	NB	kJ/m²	ISO 180/1U
Izod Impact, unnotched 80*10*4	- 30 °C	NB	kJ/m²	ISO 180/1U
Izod Impact, notched 80*10*4	+23 °C	60	kJ/m²	ISO 180/1A
Izod Impact, notched 80*10*4	- 30 °C	10	kJ/m²	ISO 180/1A
Charpy Impact, notched	+23 °C	35	kJ/m²	ISO 179/2C
Charpy Unnotched edgew. 80*10*4 s=62 mm, +23 °C		NB	kJ/m²	ISO 179/1eU
Charpy Unnotched edgew. 80*10*4 s=62 mm, -30 °C		NB	kJ/m²	ISO 179/1eU
THERMAL				
Thermal Conductivity		0.20	W/m °C	ISO 8302
Coeff. of Lin. Therm. Exp. flow	23 + 80 °C	7E-5	1/°C	ISO 11359-2
Ball Pressure Test,	125 °C ± 2 °C	PASSES	-	IEC 60695-10-2
Ball Pressure Test, approx. maximum		140	°C	IEC 60695-10-2
Vicat B/50		143	°C	ISO 306
Vicat B/120		145	°C	ISO 306
HDT/Be, 0.45 MPa edgew. 120*10*4/e=100 mm		138	°C	ISO 75/Be
HDT/Ae, 1.8 MPa edgew. 120*10*4/e=100 mm		127	°C	ISO 75/Ae
Thermal Index, Electrical properties		130	°C	UL 746B
Thermal Index, Mech. prop. with impact		125	°C	UL 746B
Thermal Index, Mech. prop. w/o impact		125	°C	UL 746B
FLAMMABILITY				
94HB Flame Class Rating 3)		0.75	mm	UL 94
94HB Flame Class Rating 2nd value 3)		3.00	mm	UL 94
Glow Wire Test, 850 °C, Passes at		1.0	mm	IEC 60695-2-12
Oxygen Index 3)		25	%	ISO 4589
ELECTRICAL				
Arc Resistance, Tungsten		119	sec.	ASTM D495
Volume Resistivity		>1E15	Ohm-m	IEC 60093
Surface Resistivity, ROA		>1E15	Ohm	IEC 60093
Dielectric Strength, in oil, 3.2 mm		17.0	kV/mm	IEC 60243
Relative Permittivity,	50 Hz	2.7	-	IEC 60250
Relative Permittivity,	1 MHz	2.7	-	IEC 60250
Dissipation Factor,	50 Hz	0.0010	-	IEC 60250
Dissipation Factor,	1 MHz	0.0100	-	IEC 60250
OPTICAL				
Light Transmission		88-90	%	ASTM D1003
Haze		<0.8	%	ASTM D1003

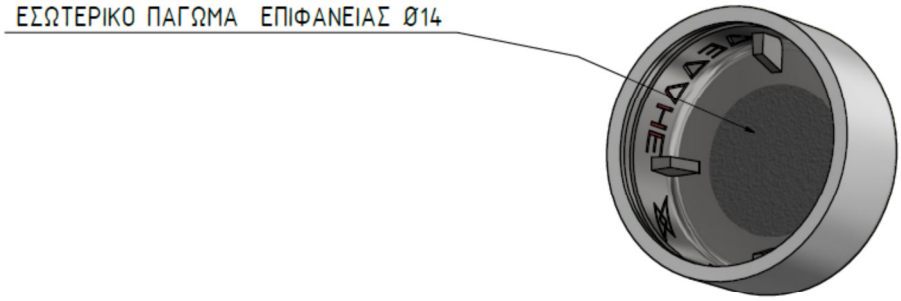
Drawings

Drawing 1: Seal Main Body

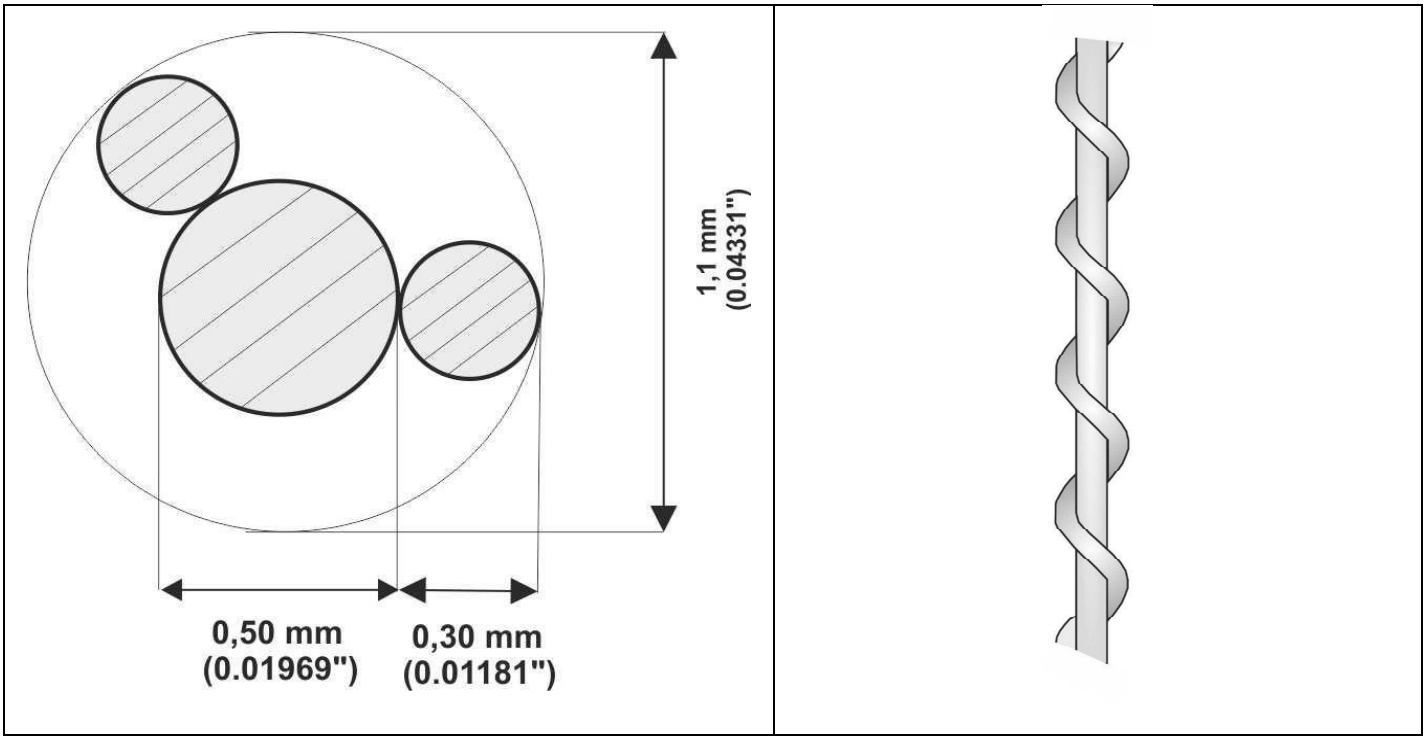


Drawing 2: Seal Cap

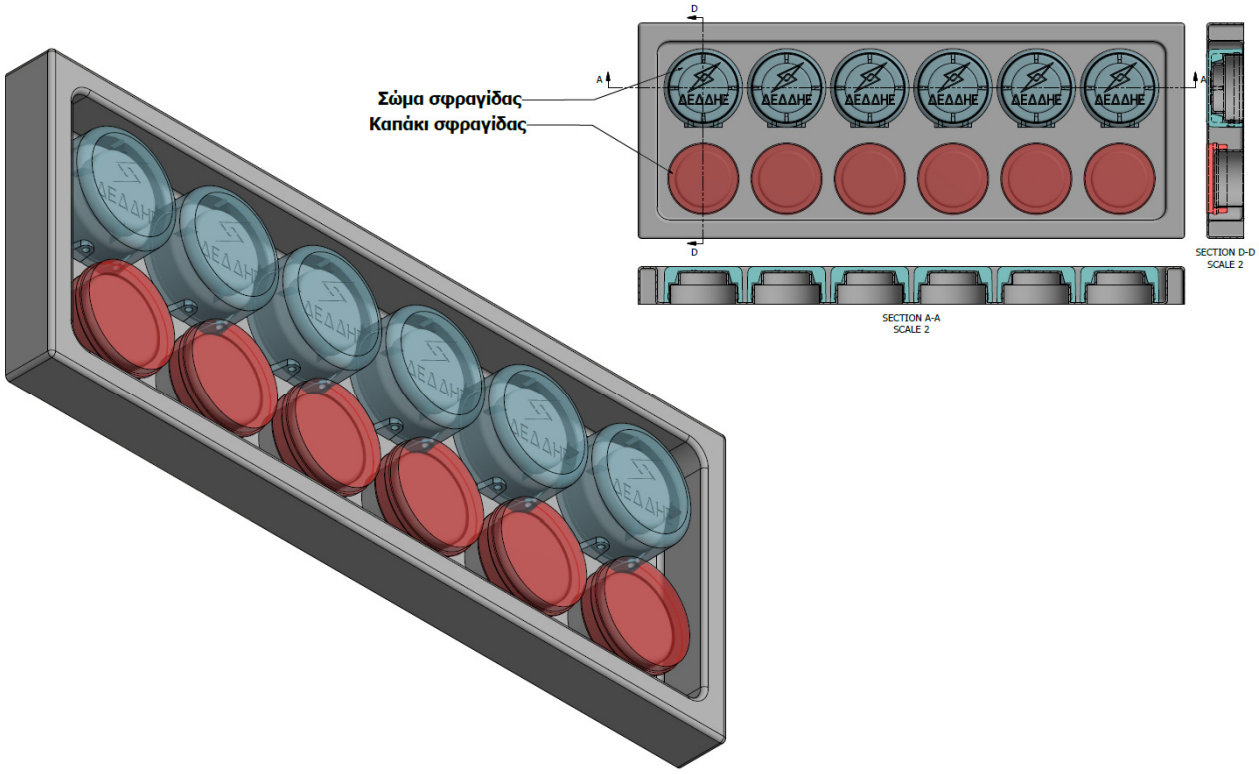




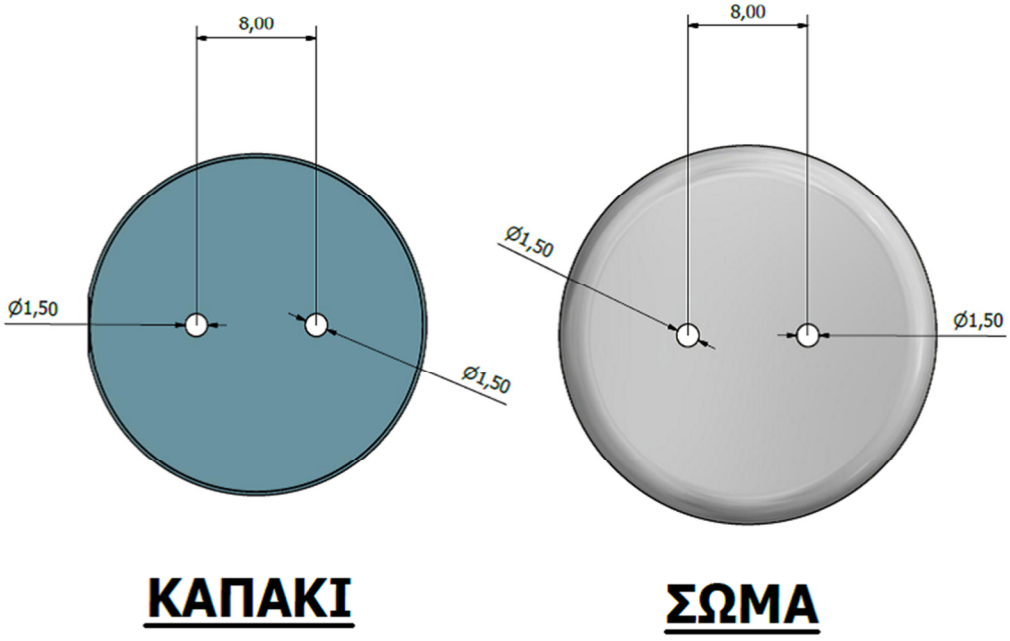
Drawing 3: Sealing Wire



Drawing 4: Seals Packaging



Drawing 5: Samples preparation for Seals unlocking test

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