

**ΠΡΟΔΙΑΓΡΑΦΗ ΕΞΑΡΤΗΜΑΤΩΝ ΑΠΟΜΟΝΩΣΗΣ
ΑΚΡΩΝ ΤΩΝ ΣΩΛΗΝΩΝ ΟΔΗΓΩΝ
ΔΙΚΤΥΟΥ ΟΠΤΙΚΩΝ ΙΝΩΝ**

ΣΥΝΤΑΞΗ:

**ΔΙΕΥΘΥΝΣΗ ΤΕΧΝΙΚΗΣ
ΥΠΟΣΤΗΡΙΞΗΣ**

ΕΛΕΓΧΟΣ:

**ΕΠΙΤΡΟΠΗ ΠΡΟΔΙΑΓΡΑΦΩΝ
ΕΔΑ ΑΤΤΙΚΗΣ**

ΕΓΚΡΙΣΗ:

ΤΕΧΝΙΚΟΣ ΔΙΕΥΘΥΝΤΗΣ

**ΔΙΕΥΘΥΝΤΗΣ ΜΕΛΕΤΩΝ &
ΚΑΤΑΣΚΕΥΩΝ**

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1. INTRODUCTION

This Technical Description governs the technical characteristics and functional performance of devices for closing empty conduits and conduits carrying cables.

The closing devices, for smooth PE (polyethylene) and corrugated conduits, are designed to hermetically seal the ends of conduits which are either occupied or not occupied by cables. For each of the two cases, there are the corresponding specifications below.

2. PURPOSE

The purpose of this Technical Description is to determine the characteristics of the closing devices provided by suppliers.

3. CHARACTERISTICS OF CLOSING DEVICES

3.1 Functional characteristics

The function of the closing devices is to seal the smooth conduits (single channel and 3channel) and corrugated conduits described in the corresponding Technical Specifications, in order to prevent the entry of liquid and/or foreign bodies inside the conduits.

The elements forming the closing device used to seal empty conduits are (Figure 1):

- a flange;
- packing;
- a threaded collar;
- a threaded pin with an eye measuring not less than 6 mm on the end for securing the drawing cord;
- a two-position clamping lever equipped with a slot for the insertion of a flat screwdriver or similar tool, secured to the threaded pin with a metal pin.

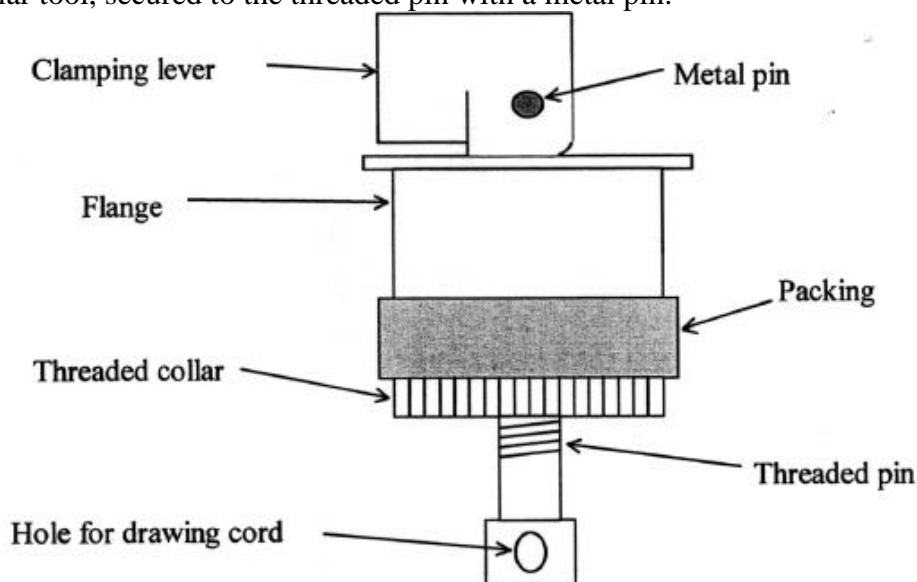


Figure 1: Drawing of the closing device used for empty conduits

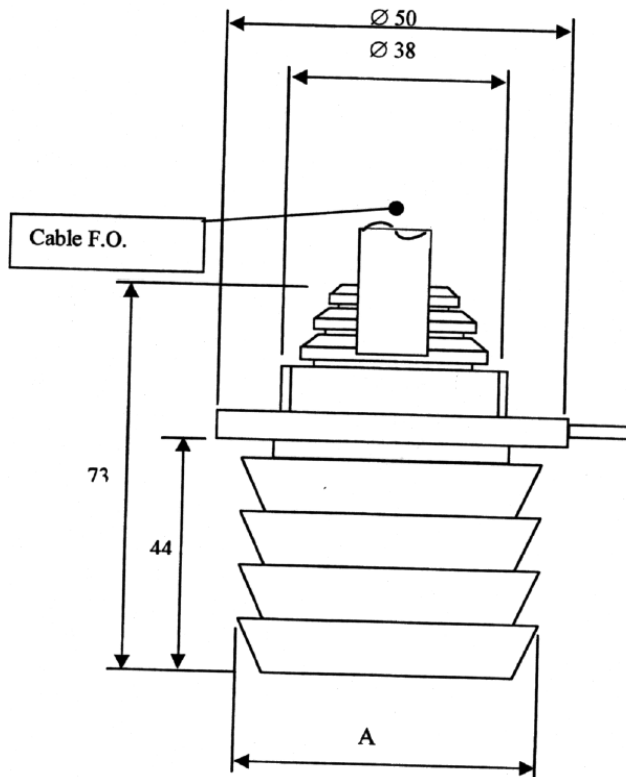


Figure 2.: Drawing of the closing device used for cable occupied conduits

The closing/opening operation shall be repeatable without any part of the device becoming detached or the functional characteristics altered.

3.2 Materials

The supplier shall make a statement of all the materials used and the type of manufacturing process used for the product described in these Technical Specifications. The closing devices for smooth or corrugated conduits shall be produced with materials ensuring minimal environmental impact during the entire lifecycle of the product, as stated in the following standards:

- ISO guide 64.2, Guide for the inclusion of environmental aspects in product standard, draft 9/96;
- IEC guide 109, Environmental aspects – Inclusion in electro technical product standard, 1st edition 1995/08.

Use of materials complying with recycling procedures is therefore recommended.

3.3 Marking

The following indications shall be shown on the visible side of each closing device:

- Supplier's mark;
- Month and year of manufacture (mm/yy).

3.4 Colour

The closing devices shall be black - RAL 9004.

3.5 Maximum size

In the case of closing device for empty tubes, with the clamping lever in the closed position, the device shall be . 10 cm long.

4. TESTS AND REQUIREMENTS

This part describes the tests for the materials and finished product, required for type approval and for acceptance of the lots supplied. These tests refer to closing devices for empty tubes only.

4.1 Tests on materials

Samples for tests on the material forming the closing devices will be derived from material used for production and under the same conditions of environmental pressure and temperature.

4.1.1 Composition

Identification of raw materials declared by the supplier shall be performed by applying the corresponding standards in force. The plastic materials used for producing closing devices shall be identified by IR (infrared) analysis.

For metallic materials, the supplier shall submit a certification of composition.

4.2 Tests on the finished product

4.2.1 Sight inspection

The state of the surfaces and finishing of the closing devices shall be checked; checks on the condition of surfaces and finishing shall be made by sight inspection.

4.2.2 Verification of marking

The marking on samples shall be verified to ensure compliance as per paragraph 3.3.

4.2.3 Verification of sizes

The size of samples shall be verified to ensure compliance as per paragraph 3.5.

4.2.4 Resistance to separation

The closing device shall be attached to a piece of conduit 20 ± 1 cm long.

The free end of the conduit shall be suitably secured to one clamp of a dynamometer clamp, with the closing device secured to the other clamp.

A separation speed of 1 mm/min shall be applied to the dynamometer clamps up to a force of .50N, maintained for a time of 60 s.

During or after this period of time the closing device shall not become detached from the conduit.

4.2.5 Closing and opening cycles

The closing device shall remain functionally unaltered for .50 opening-closing cycles.

The test shall be performed on the device attached to a piece of conduit with a diameter suitable for the device being tested.

Checks shall be made, repeating the “resistance to separation” test described in paragraph 4.2.4, at the 1st, 25th and 50th opening/closing cycle.

4.2.6 Thermal cycles under load

The test shall be performed on the closing devices at the two ends of a piece of conduit (length 30 . 50 cm) for both the corrugated and smooth types, and with a diameter suitable for the closing device being tested. The devices shall be subjected to 10 thermal cycles with temperatures ranging from -10 °C a +60 °C, with a scale of 1 °C per minute and a period of 2 hours at the extremes of the temperature range.

At the end of thermal conditioning, the closing devices shall not show damage, breakage or deformation prejudicing their functioning and shall be subjected to the “waterproofing test” described in paragraph 4.2.7.

4.2.7 Waterproofing test

The test entails immersing the samples previously subjected to the “Thermal cycles under load” test described in paragraph 4.2.6 in a horizontal position in a suitable hermetically sealed recipient containing water with a pressure higher than atmospheric pressure of 40 KPa (.0.4 atm).

After 72 hours of testing the samples in the pressurised test container, no water should be observed inside the conduits.

4.2.8 Aggressive environment tests

The test entails immersing the devices in five containers for 120 hours at room temperature, each containing one of the following five liquids:

- saline solution (35g/l) of NaCl;
- 3% weight H₂SO₄ water solution;
- 3% NaOH weight water solution;
- gasoline for vehicles;
- fuel oil (ASTM D396 No. 3).

At the end of the test the devices shall be subjected to sight inspection, verifying the integrity of the product and the absence of performance-affecting deformation or alteration.

4.2.9 Quality level

The lots supplied shall be tested in compliance with standard UNI ISO 2859, part one, or equivalent.

A minimum AQL shall be guaranteed, detected with a double sampling plan for special testing level S3.

4.3 Test tables

There follows the table with the list of tests, where X indicates whether the test is necessary for type approval and /or acceptance of the lot supplied, with the paragraph describing the test and the reference standard.

		Approval type	Acceptance lot	Paragraph	Standard
Tests on the material					
1	Composition	X		4.1.1	UNI EN 21 or equivalent
Tests on the finished product					
5	Sight inspection	X	X	4.2.1	UNI ISO 4582 or equivalent
6	Verification of marking	X	X	4.2.2	
7	Verification of sizes	X	X	4.2.3	
8	Resistance to separation	X	X	4.2.4	
9	Closing and opening cycles	X	X	4.2.5	
10	Thermal cycles under load	X	X	4.2.6	
11	Waterproofing test	X	X	4.2.7	
12	Aggressive environment tests	X	X	4.2.8	