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**Komunikacijski kabli - 2-37. del: Skupna pravila načrtovanja in konstrukcija -  
Polietilenska izolacija za koaksialne kable**

Communication cables - Part 2-37: Common design rules and construction -  
Polyethylene insulation for coaxial cables

Kommunikationskabel - Teil 2-37: Gemeinsame Regeln für Entwicklung und Konstruktion  
- Polyethylen-Isoliermischungen für Koaxialkabel

Câbles de communication - Partie 2-37: Règles de conception communes et construction  
- Polyéthylène pour enveloppes isolantes pour câbles coaxiaux

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## Contents

|  |    |
|--|----|
| European foreword .....                              | 3  |
| 1 Scope .....  | 4  |
| 2 Normative references .....                         | 4  |
| 3 Raw material requirements .....                    | 5  |
| 4 Cable test requirements .....                      | 5  |
| 5 Health, safety and environmental regulations ..... | 5  |
| Bibliography.....                                    | 10 |

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## European foreword

This document (EN 50290-2-37:2016) has been prepared by CLC/TC 46X "Communication cables".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-03-14
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2019-03-14

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## 1 Scope

This Part 2-37 of EN 50290 gives specific requirements for Polyethylene (PE) compounds to be used for the insulation of coaxial cables. The standard includes Low Density (LD), Medium Density (MD) and High Density (HD) Polyethylene compounds.

It is to be read in conjunction with EN 50290-2-20, EN 50117 and other applicable product standards.

Using raw material and type test data as outlined in this standard, the raw material supplier will have sufficient data to demonstrate compliance and warrant that the material is suitable for the specified application.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50289-3-9, *Communication cables - Specifications for test methods - Part 3-9: Mechanical test methods - Bending tests*

EN 50289-3-17, *Communication cables - Specifications for test methods - Part 3-17: Mechanical test methods - Adhesion of dielectric and sheath*

EN 60811-401, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 401: Miscellaneous tests - Thermal ageing methods - Ageing in an air oven (IEC 60811-401)*

EN 60811-501, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 501: Mechanical tests - Tests for determining the mechanical properties of insulating and sheathing compounds (IEC 60811-501)*

EN 60811-502, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 502: Mechanical tests - Shrinkage test for insulations (IEC 60811-502)*

EN 60754-2, *Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity (IEC 60745-2)*

EN 60216 (all parts), *Electrical insulating materials – Thermal endurance properties (IEC 60216)*

EN ISO 527 (all parts), *Plastics – Determination of tensile properties (ISO 527)*

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

EN ISO 1133 (all parts), *Plastics – Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133)*

EN ISO 1183 (all parts), *Plastics – Methods for determining the density of non-cellular plastics (ISO 1183)*

EN ISO 11357-6, *Plastics - Differential scanning calorimetry (DSC) - Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO 11357-6)*

ISO 974, *Plastics — Determination of the brittleness temperature by impact*

### 3 Raw material requirements

The tests are to be carried out on granules or moulded plaques produced from granules of compound. This data are to be provided by the compound supplier. For compounds intended for foam application the properties shall be measured on unexpanded compound or the base polymer without blowing agent. Relevant test methods, requirements and limits shall be included in any supply specification of the raw material.

Specific requirements are shown (Table 1, Table 2 and Table 3). In the case of special applications, additional requirements could be specified.

### 4 Cable test requirements

The anticipated performance assumes standard cable design and conventional process technology and is specified (Table 4). Using type test data the raw material supplier is expected to demonstrate compliance and warrant that the material is suitable for the specified application.

In the case of special applications, additional requirements could be specified.

### 5 Health, safety and environmental regulations

The materials are subject to Health, Safety and Environment (HSE) requirements as defined in EN 50290-2-20. Any deviations or compliance failures shall be identified by the raw material supplier and necessary corrective actions to be undertaken agreed with the cable maker.

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Table 1 — Insulation compound - physical properties of granules

| Characteristics <sup>1)</sup>  |   | Test method    | Unit              | Solid          | Foam                         |
|--|---|----------------|-------------------|----------------|------------------------------|
| 1  | Density <sup>2)</sup>                           | EN ISO 1183    | g/cm <sup>3</sup> | ≤ 0,960        | To be recorded               |
| 2a   | Melt flow index <sup>3)</sup> (190 °C/2,16 kg)  | EN ISO 1133    | g/10 min          | To be recorded | To be recorded <sup>4)</sup> |
| 2b   | Melt flow index <sup>3)</sup> (140 °C/5,0 kg)   | EN ISO 1133    | g/10 min          |                | To be recorded <sup>5)</sup> |
| 3  | Hardness Shore D <sup>6)</sup> (1 s)            | EN ISO 868     | [-]               | > 42           | > 42                         |
| 4  | Low Temperature brittleness                     | ISO 974        | °C                | < -76          | < -76                        |
| 5  | Mechanical characteristics                      | EN ISO 527     |                   |                |                              |
| 5.1  | Tensile strength - median, min.                 |                | MPa               | 12             | 10                           |
| 5.2  | Elongation at break - median, min.              |                | %                 | 300            | 200                          |
| 6  | Oxidative Induction Time <sup>7)</sup> (200 °C) | EN ISO 11357-6 | min               | To be recorded | To be recorded               |
| <p>1) All values of Table 1 shall be provided by the compound supplier, see Clause 3.</p> <p>2) Median; value limits ± 0,003 g/cm<sup>3</sup>.</p> <p>3) Median; value limits ± 25 %.</p> <p>4) PE (non nucleated or passive nucleant).</p> <p>5) PE (active nucleant).</p> <p>6) Median value to be specified by supplier. Specification limits ± 3[-].</p> <p>7) If a blend of polymer is used, the OIT shall be performed on the blend and not the individual components.</p> |   |                |                   |                |                              |



Table 2 — Insulation compound - dielectric properties

| Characteristics <sup>1)</sup> |   | Test method               | Unit | Solid      |                | Foam <sup>2)</sup> |                |
|-------------------------------|---|---------------------------|------|------------|----------------|--------------------|----------------|
|                               |   |                           |      | ≤ 1GHz     | > 1GHz         | ≤ 1GHz             | > 1GHz         |
| 1                             | Dielectric constant (f1), 1MHz <sup>3)</sup>      | IEC 60250                 | [-]  | ≤ 2,35     | ≤ 2,35         | ≤ 2,35             | ≤ 2,35         |
| 2                             | Dissipation factor (f1), 1MHz <sup>4, 5)</sup>    | IEC 60250                 | [-]  | < 0,000 12 | < 0,000 08     | < 0,000 25         | < 0,000 12     |
| 3                             | Dielectric constant (f2), 1,9GHz <sup>3, 6)</sup> | IEC 60250 or<br>IEC 62562 | [-]  | -          | TBD            | -                  | TBD            |
| 4                             | Dissipation factor (f2), 1,9GHz <sup>4, 6)</sup>  | IEC 60250 or<br>IEC 62562 | [-]  | -          | < 0,000 22     | -                  | < 0,000 3      |
| 5                             | Gradient of Dissipation Factor <sup>7)</sup>      |                           | [-]  | -          | To be recorded | -                  | To be recorded |

1) All values of Table 2 shall be provided by the compound supplier, see Clause 3.  
2) Compounds not containing active nucleant or chemical blowing agent should be tested as solid insulations.  
3) Median value to be specified by supplier. Specification limits ± 0,02.  
4) Median value to be specified by supplier. Specification limits ± 10 %.  
5) Alternative frequencies may be used. Lower frequency (f1) should be in range 1 – 10 MHz.  
6) Alternative frequencies may be used Upper frequency (f2) should be in range 1–10 GHz.  
7) Calculation: Gradient = (Tan delta (f2) [-] – Tan delta (f1) [-]) / (log (f2) – log (f1)).

Table 3 — Insulation compound - combustion properties

| Characteristics <sup>1,2)</sup> |                               | Test method         | Unit         | Values     |
|---------------------------------|-------------------------------|---------------------|--------------|------------|
| 1                               | Acidity<br>pH<br>Conductivity | EN 60754–2          | [-]<br>μS/mm | > 4,3 < 10 |
| 2                               | Toxicity                      | Under consideration |              |            |

1) All values of Table 3 shall be provided by the compound supplier, see Clause 3.  
2) Only to be performed if specified in the relevant product standard.