

Explosives for civil uses — Detonators and relays —

Part 6: Determination of resistance to cracking in low temperatures of leading wires

The European Standard EN 13763-6:2003 has the status of a
British Standard

ICS 71.100.30

National foreword

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The UK participation in its preparation was entrusted to Technical Committee CII/61, Explosives for civil uses, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 9 and a back cover.

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English version

Explosives for civil uses - Detonators and relays - Part 6: Determination of resistance to cracking in low temperatures of leading wires

Explosifs à usage civil - Détonateurs et relais - Partie 6:
Détermination de la résistance à la fissuration des fils
d'amorces à basse température

Explosivstoffe für zivile Zwecke - Zünder und
Verzögerungselemente - Teil 6: Bestimmung des
Widerstandes der Isolation von Zünderdrähten gegen
Rissbildung bei niedrigen Temperaturen

This European Standard was approved by CEN on 1 September 2003.

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Foreword

This document (EN 13763-6:2003) has been prepared by Technical Committee CEN/TC 321 "Explosives for civil uses", the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s), see informative annex ZA, which is an integral part of this standard.

This European Standard is one of a series of standards with the generic title *Explosives for civil uses – Detonators and relays*. The other parts of this series are listed below:

prEN 13763-1	Part 1: Requirements
EN 13763-2	Part 2: Determination of thermal stability
EN 13763-3	Part 3: Determination of sensitiveness to impact
EN 13763-4	Part 4: Determination of resistance to abrasion of leading wires and shock tubes
EN 13763-5	Part 5: Determination of resistance to cutting damage of leading wires and shock tubes
EN 13763-7	Part 7: Determination of the mechanical strength of leading wires, shock tubes, connections, crimps and closures
EN 13763-8	Part 8: Determination of resistance to vibration of plain detonators
EN 13763-9	Part 9: Determination of resistance to bending of detonators
EN 13763-11	Part 11: Determination of resistance to damage by dropping of detonators and relays
EN 13763-12	Part 12: Determination of resistance to hydrostatic pressure
prEN 13763-13	Part 13: Determination of resistance of electric detonators against electrostatic discharge
prEN 13763-15	Part 15: Determination of equivalent initiating capability
prEN 13763-16	Part 16: Determination of delay accuracy
prEN 13763-17	Part 17: Determination of no-fire current of electric detonators
prEN 13763-18	Part 18: Determination of series firing current of electric detonators
prEN 13763-19	Part 19: Determination of firing impulse of electric detonators
EN 13763-20	Part 20: Determination of total electrical resistance of electric detonators
prEN 13763-21	Part 21: Determination of flash-over voltage of electric detonators
prEN 13763-22	Part 22: Determination of capacitance, insulation resistance and insulation breakdown of leading wires

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- EN 13763-23 Part 23: Determination of the shockwave velocity of shock tubes
- EN 13763-24 Part 24: Determination of the electrical non-conductivity of shock tubes
- prEN 13763-25 Part 25: Determination of transfer capability of surface connectors and coupling accessories
- prEN 13763-26 Part 26: Definitions, methods and requirements for devices and accessories for reliable and safe function of detonators and relays.
- CEN/TS 13763-27 Part 27: Definitions, methods and requirements for electronic initiation systems

Annex A is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

During usage on site, leading wires of electric detonators can experience conditions which can produce cracking of the insulation, for instance when kinks or loops on insulated leading wires are subjected to a sudden traction under cold conditions. Plastics materials generally become more brittle as temperature decreases. This standard deals with the ability of leading wire insulation to resist the conditions likely to be experienced in normal use.

1 Scope

This European Standard specifies a method for determining the resistance to cracking at low temperatures of leading wire insulation of detonators. This method is only applicable to electric detonators with plastic covered leading wires.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 13857-1:2003; *Explosives for civil uses — Part 1: Terminology*.

EN ISO/IEC 17025; *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13857-1:2003 apply.

4 Test pieces

Select 20 pieces of wire, length (500 ± 50) mm, of each type, composition and dimension of leading wire. The test pieces can be selected from detonators, from which the pieces are cut, or from wires supplied by the manufacturer.

5 Apparatus

5.1 Temperature-controlled chamber, capable of maintaining a specified temperature to $\pm 2\text{ }^{\circ}\text{C}$, deep enough to allow the wire to be fully extended.

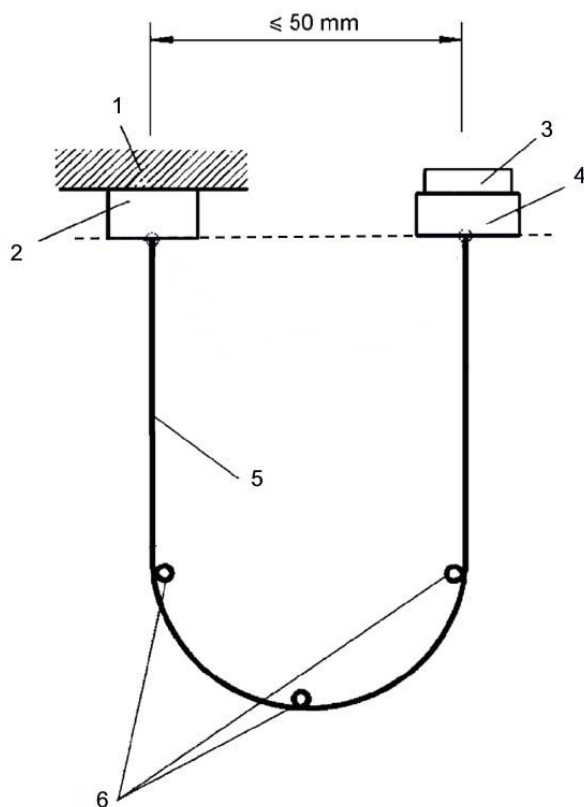
5.2 Rigid frame, for fixing the wires.

5.3 Mass of $(500 \pm 10)\text{ g}$.

5.4 Release system, for the weight (for example electro-magnetically operated).

6 Procedure

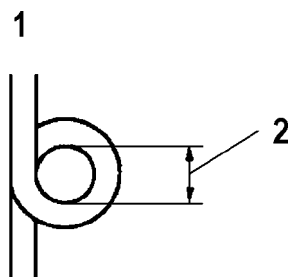
Mark a length of $(300 \pm 10)\text{ mm}$ on the test piece about 100 mm from the ends of the test piece. Make three kinks in the test piece, each with an inner diameter between one and two times the outer diameter of the insulated wire: one in the middle of the marked length (150 ± 10) mm from the marked points and the others 50 mm to 60 mm from the kink in the middle of the test piece, as shown in Figure 1 and Figure 2. If the detonator leading wires are the twin extruded type, both wires shall be tested together.



Key

- 1 Frame
- 2 Attachment to frame
- 3 Release system
- 4 Weight
- 5 Leading wire
- 6 Kinks

Figure 1 – Schematic diagram of testing arrangement

**Key**

- 1 Leading wire
2 Inner diameter of the kink

Figure 2 – Detail of a kink

Make a 300 mm loop by fixing one marked end of the test piece to the frame and the other end to the weight.

Condition the test pieces for and least 1 h at a temperature not greater than the lowest temperature claimed by the manufacturer. Maintain this temperature within ± 2 °C for the duration of the test.

Release the weight and allow it to fall freely.

Determine whether any through cracking of the insulation has occurred by visual examination.

7 Test report

The test report shall conform to EN ISO/IEC 17025. In addition the following information shall be given:

- a) the number of test pieces with cracks;
- b) the temperature during testing.

Annex A
(informative)

Range of applicability of the test method

Range of applicability of the test method: applicable down to - 30 °C.

Annex ZA (informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.

This European standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive 93/15/EEC.

WARNING : Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The clauses of this standard are likely to support requirements I.1, I.2, II.1.(g), II.1.(j) and II.2.C.(f) of Directive 93/15/EEC.

Compliance with this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

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