



SLOVENSKI STANDARD
oSIST prEN 13763-6:2021
01-april-2021

Eksplzivni za civilno uporabo - Detonatorji in zakasnilniki - 6. del: Ugotavljanje odpornosti vodnikov proti razpokanju pri nizkih temperaturah

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

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

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

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Ta slovenski standard je istoveten z: prEN 13763-6

ICS:

71.100.30	Eksplzivni. Pirotehnika in ognjemeti	Explosives. Pyrotechnics and fireworks
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 13763-6

April 2021

ICS 71.100.30

Will supersede EN 13763-6:2003

English Version

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

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

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 321.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 13763-6:2021) has been prepared by Technical Committee CEN/TC 321 “Explosives for civil uses”, the secretariat of which is held by UNE.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13763-6:2003.

In comparison with the previous edition, the following technical modifications have been made:

- a) Clause 1, *Scope*, has been revised:
 - 1) leading wires to electronic detonators have been included;
 - 2) it is now specified that the document is applicable to explosives for civil uses;
- b) Clause 4, *Principle*, has been added;
- c) Clause 6, *Preparation and handling of test samples and test pieces*, has been revised:
 - 3) it is now specified that detonators shall have the same dimension and composition according to the manufacturer’s specification;
 - 4) the following text has been added: “Test samples for detonators should be handled according to EN ISO/IEC 17025:2017, 7.4”;
- d) in Clause 7, *Procedure*, the conditioning temperature has been changed to the lowest operation temperature claimed by the manufacturer;
- e) Clause 8, *Expression of results*, has been added.
- f) Annex A, *Range of applicability of the test method*, has been removed;
- g) Annex ZA has been updated.

This document has been prepared under a Standardization Request (M/562) annexed to the Commission Implementing Decision C(2019)6634 final as regards Explosives for civil uses given to CEN by the European Commission and the European Free Trade Association, and supports Essential Safety requirements of Directive 2014/28/EU.

For relationship with Directive 2014/28/EU, see informative Annex ZA, which is an integral part of this document.

EN 13763, *Explosives for civil uses — Detonators and detonating cord relays*, is currently composed with the following parts:

- *Part 1: Requirements*
- *Part 2: Verification of thermal stability*
- *Part 3: Determination of sensitiveness to impact*

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- *Part 4: Determination of resistance to abrasion of leading wires and shock tubes*
- *Part 5: Determination of resistance to cutting damage of leading wires and shock tubes*
- *Part 6: Determination of resistance to cracking in low temperatures of leading wires*
- *Part 7: Determination of the mechanical strength of leading wires, shock tubes, connections, crimps and closures*
- *Part 8: Determination of resistance to vibration of plain detonators*
- *Part 9: Determination of resistance to bending of detonators*
- *Part 11: Determination of drop resistance of detonators and relays*
- *Part 12: Determination of resistance to hydrostatic pressure*
- *Part 13: Determination of resistance of electric detonator to electrostatic discharge*
- *Part 15: Determination of equivalent initiating capability*
- *Part 16: Determination of delay accuracy*
- *Part 17: Determination of no-fire current of electric detonators*
- *Part 18: Determination of series firing current of electric detonators*
- *Part 19: Determination of firing pulse of electric detonators*
- *Part 20: Determination of total resistance of electric detonators*
- *Part 21: Determination of flash-over voltage of electric detonators*
- *Part 22: Determination of capacitance, insulation resistance and insulation breakdown of leading wires*
- *Part 23: Determination of the shock-wave velocity of shock tube*
- *Part 24: Determination of the non-conductivity of shock tube*
- *Part 25: Determination of transfer capacity of relay and coupling accessories*
- *Part 26: Definitions, methods and requirements for devices and accessories for reliable and safe function of detonators and relays*
- *Part 27: Definitions, methods and requirements for electronic initiation system*

Introduction

During usage on site, leading wires of electric detonators and electronic 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 document deals with the ability of leading wire plastic insulation to resist the conditions likely to be experienced in normal use.

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prEN 13763-6:2021 (E)**1 Scope**

This document specifies a method for determining the resistance to cracking at low temperatures of the leading wire plastic insulation of electric detonators and electronic detonators.

This document is applicable to explosives for civil uses.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 13857-1:2021, *Explosives for civil uses — Part 1: Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 13857-1:2021 apply.

4 Principle

Three kinks are made on the leading wire test piece. After being conditioned at low temperature, the test pieces are subjected to a traction and a visual inspection is done to record any through cracks on the kinks.

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5 Apparatus

5.1 Conditioning chamber, capable of maintaining a specified temperature to ± 2 °C, deep enough to allow the leading wire to be fully extended.

5.2 Rigid frame, for fixing the leading wires.

5.3 Weight of (500 ± 10) g.

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

6 Preparation and handling of test samples and test pieces¹⁾

Test samples for detonators should be handled according to EN ISO/IEC 17025:2017, 7.4.

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

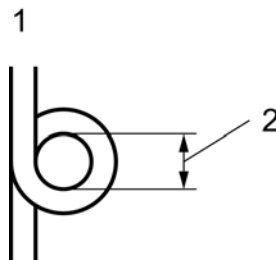
7 Procedure

Mark a length of (300 ± 10) mm on the test piece about 100 mm from the ends of the test piece.

Make three kinks on the test piece, each with an inner diameter between one and two times the outer diameter of the leading wire, see Figure 1.

¹⁾ The choice of sample size is based on acceptable failure rate for the kind of defects that have to be avoided. The defects have been classified according to ISO 2859-1, ISO 2859-2, ISO 2859-3, ISO 2859-4 and ISO 2859-5.

Make one kink in the middle of the marked length (150 + 10) mm from the marked points and the other two kinks 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 leading wires are the twin extruded type, both leading wires shall be tested together.



Key

- 1 leading wire
- 2 inner diameter of the kink

Figure 1 — Detail of a kink

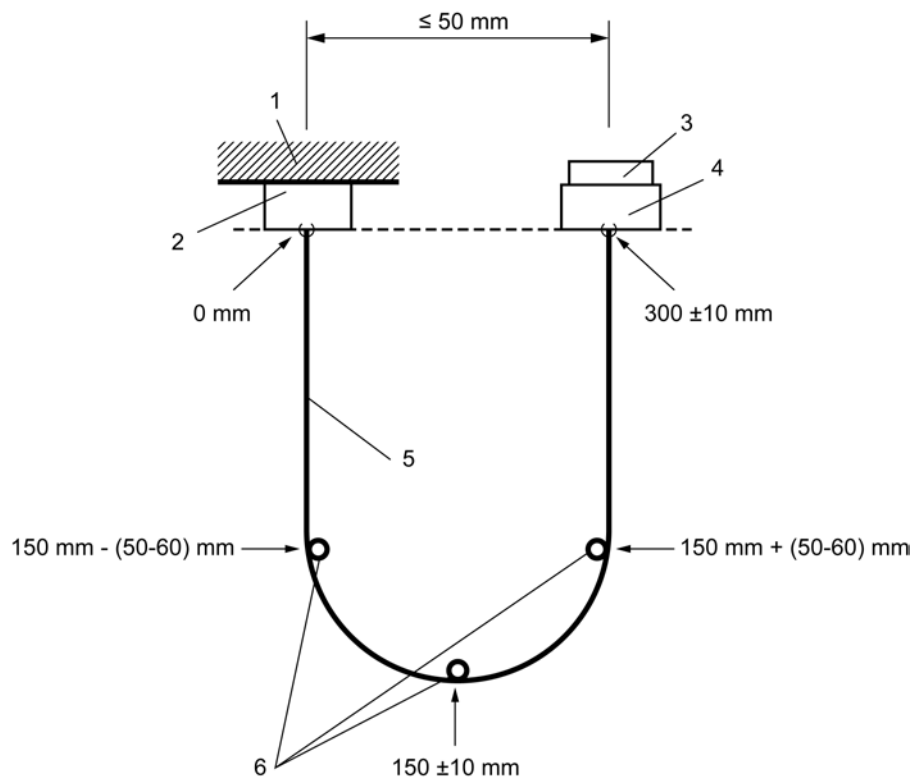
Make a 300 mm loop by fixing one marked end of the test piece to the frame and the other end to the weight, see Figure 2.

Condition the test pieces in the conditioning chamber for at least 1 h at a temperature not greater than the lowest operation 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.

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Key

- 1 frame
- 2 attachment to frame
- 3 release system
- 4 weight
- 5 leading wire
- 6 kinks

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Figure 2 — Schematic diagram of testing arrangement

8 Expression of results

Record the number of test pieces with cracks through the insulation.

9 Test report

The test report should conform to EN ISO/IEC 17025:2017, 7.8. In addition, the following information shall be given:

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