



SLOVENSKI STANDARD

SIST EN 13763-9:2004

01-januar-2004

Eksplzivni za civilno uporabo – Detonatorji in zakasnilniki – 9. del: Ugotavljanje odpornosti detonatorjev proti upogibu

Explosives for civil uses - Detonators and relays - Part 9: Determination of resistance to bending of detonators

Explosivstoffe für zivile Zwecke - Zünder und Verzögerungselemente - Teil 9: Bestimmung des Widerstandes von Zündern gegen Biegespannung

Explosifs a usage civil - Détonateurs et relais - Partie 9: Détermination de la résistance a la flexion des détonateurs

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71.100.30 Eksplozivi. Pirotehnika Explosives. Pyrotechnics

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13763-9

November 2003

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English version

Explosives for civil uses - Detonators and relays - Part 9: Determination of resistance to bending of detonators

Explosifs à usage civil - Détonateurs et relais - Partie 9:
Détermination de la résistance à la flexion des détonateurs

Explosivstoffe für zivile Zwecke - Zünder und
Verzögerungselemente - Teil 9: Bestimmung des
Widertandes von Zündern gegen Biegespannung

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

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 13763-9:2003) 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 document.

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 13763-6 Part 6: *Determination of resistance to cracking at low temperatures of leading wires*.
- 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 13763-11 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*.

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- prEN 13763-22 Part 22: *Determination of capacitance, insulation resistance and insulation breakdown of leading wires.*
- EN 13763-23 Part 23: *Determination of the shock-wave velocity of shock tube.*
- 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 system.*

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.

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Introduction

During use on site, detonators shells can be subjected to bending during the loading of boreholes. This test assesses the ability of detonators to resist the bending forces likely to be experienced in normal use.

1 Scope

This European Standard specifies a method for determining the resistance of the detonator shell to bending. This standard does not apply to surface connectors.

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 17025:1999)*.

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3 Terms and definitions

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

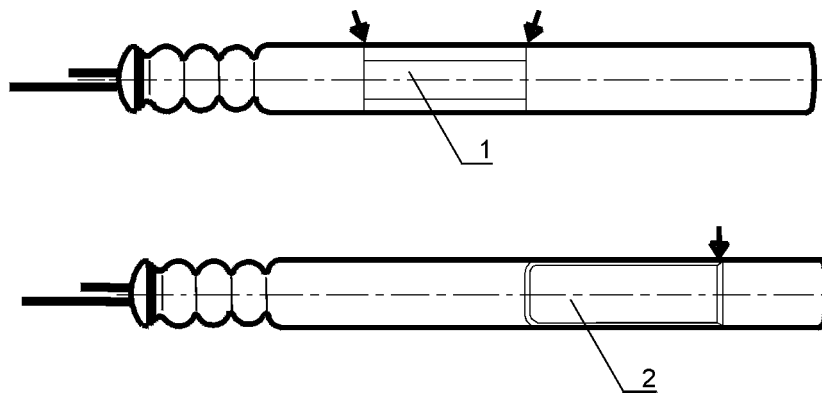
3.1

weakest point of the detonator

point from where the outer shell will break when subjected to a 90 degree angle pulling force

NOTE The principle for finding the weakest point is shown in Figure 1

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**Key**

- 1 Delay element
- 2 Primary charge cup
- ▼ The weakest points

Figure 1 – Principle of finding weakest points of the detonator

4 Apparatus

4.1 Steel block (Figure 2), with a hole (A) of at least 30 mm in length. The diameter of the hole shall not exceed the diameter of the detonator by more than 0,1 mm. The radius for the edge of the hole shall be $(2 \pm 0,1)$ mm.

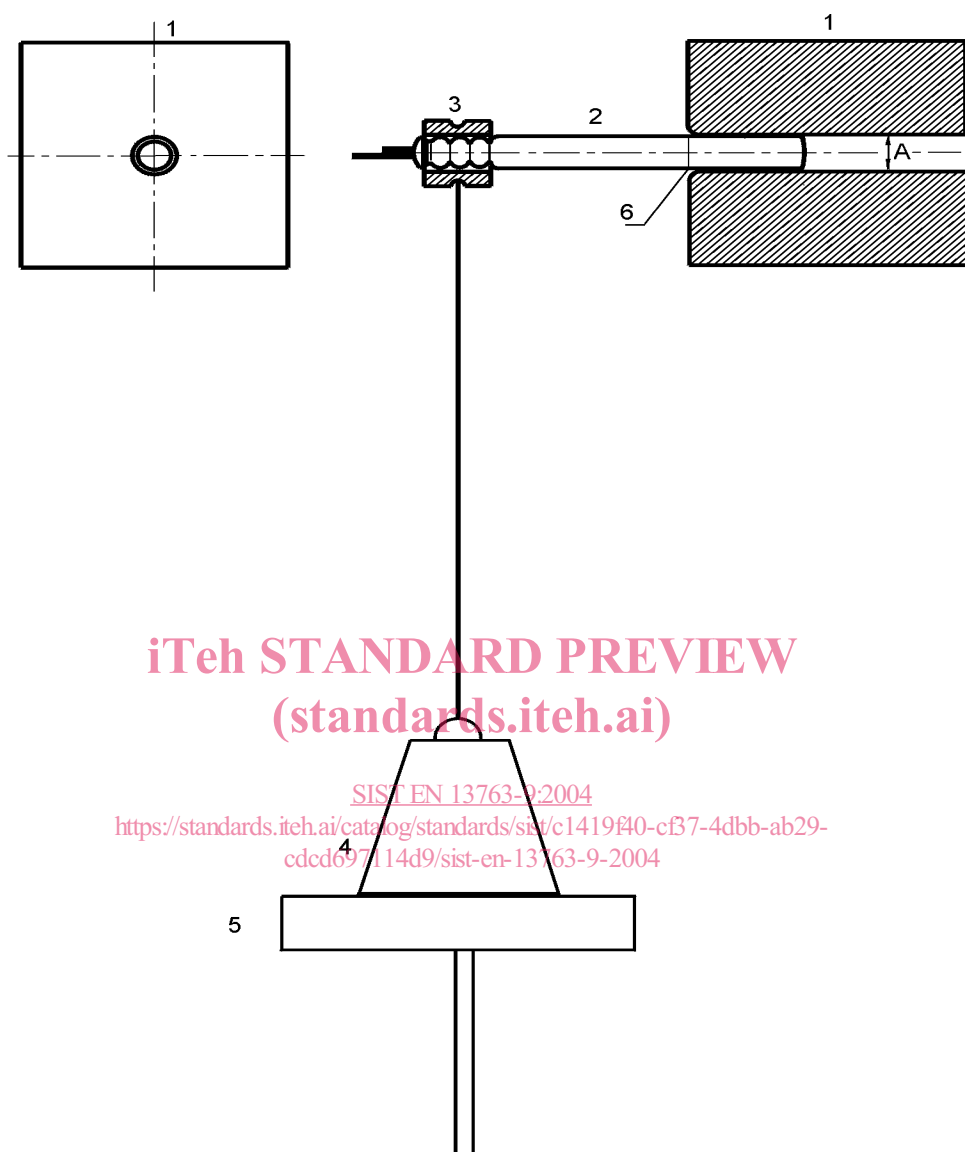
**Key**

- A The diameter of the hole
- L The length of the hole minimum 30 mm

Figure 2 – Steel block

4.2 **Weights**, capable of applying $(50 \pm 0,1)$ N, with wire attachment.

4.3 **Removable support table**, for supporting the weights as shown in Figure 3 and Figure 4.



Key

- 1 Steel block
- 2 Detonator (shown as an electric detonator)
- 3 Ring
- 4 Weight
- 5 Support table
- 6 Approx. position of the end of the delay element or the base charge
- A Diameter of the hole

Figure 3 – Assembly with detonator supported at the base