SLOVENSKI STANDARD
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Eksplozivi za civilno uporabo - Detonatorji in zakasnilniki - 12. del: Ugotavljanje odpornosti proti hidrostatičnemu tlaku

Explosives for civil uses - Detonators and relays - Part 12:Determination of resistance to hydrostatic pressure

Explosivstoffe für zivile Zwecke - Zünder und Verzögerungselemente - Teil 12: Bestimmung der Widerstandsfähigkeit gegen hydrostatischen Druck

Explosifs a usage civil - Détonateurs et relais - Partie 12: Détermination de la résistance a la pression

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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 13763-12:2003) 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of an identical text or by endorsement, at the latest by May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.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 13763-6	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 13763-9	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
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

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.

1 Scope

This European Standard specifies the methods for the determination of resistance to hydrostatic pressure of electric and non-electric detonators, surface connectors and relays.

Some detonating cord relays, stated by the manufacturer to be used in dry conditions, are excluded.

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).

prEN 13763-16; *Explosives for civil uses – Detonators and relays – Part 16: Determination of delay accuracy.*

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

EN ISO 3696; *Water for analytical laboratory use – Specification and test methods (ISO 3696:1987).*

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 Reagent

4.1 Water, conforming to grade 3 of EN ISO 3696.

5 Apparatus

5.1 Detonators intended for use down shot holes

5.1.1 pressure vessel, capable of maintaining water at a pressure of 0,3 MPa and a temperature equal to the test temperature ± 2 °C. The materials from which the pressure vessel is constructed shall be such that they do not cause galvanic corrosion of the detonator shell during testing.

5.2 Detonators intended for use on the surface only and relays.

5.2.1 water tank, capable of holding a water level of 0,5 m depth with a water temperature equal to the test temperature ± 2 °C. The materials from which the water tank is constructed shall be such that they do not cause galvanic corrosion of the detonator shell during testing.

6 Test pieces

6.1 Detonators intended for use down shot holes

Select 50 detonators of a specific type, with the same design and construction. The testing shall be performed with the shortest standard length of shock tube or leading wire specified by the manufacturer. If the detonators form part of a series with different delay times, use 50 detonators with at least five different delay times distributed as evenly as possible and including the longest delay time in the series.

6.2 Detonators intended for use on the surface only and relays

Select 50 detonators or relays of a specific type, with the same design and construction. The testing shall be performed with the shortest standard length of shock tube or leading wire specified by the manufacturer. If the detonators or relays form part of a series with different delay times, use 50 detonators or relays with at least five different delay times distributed as evenly as possible and including the longest delay time in the series.

7 Procedure

7.1 Detonators intended for use down shot holes

Immerse the detonators in water at a temperature of (T ± 2) °C, close the vessel and apply a pressure of (0,30 ± 0,01) MPa where:

- T = 20 °C if the manufacturer does not claim the product can be used at temperatures exceeding 40 °C. Keep the detonators in the pressure vessel for 48 h.

- T= highest temperature specified by the manufacturer if the product is to be used at temperatures exceeding 40 °C. The cooling rate of the water shall be such that the water temperature reaches 30 °C within 5 h but not before 3 h. The total test time for the detonators is 48 h calculated from when the specified pressure has been reached.

Place the shock tube, if present, in such a way that the open end of the shock tube is never exposed to pressurised air, either by leading the shock tube end from the water inside the tank to the outside of the tank through a pressure-safe sealing or by totally immersing the detonator assembly in water using properly sealed shock tube ends according to the manufacturer’s specification.

Unless otherwise specified by the manufacturer, ensure that the free ends of the leading wires remain below the surface of the water during pressure testing phase.

After pressure testing, fire the detonators and measure the delay times of the detonators in accordance with prEN 13763-16.

The detonators shall be fired within 2 h.

7.2 Detonators intended for use on the surface only and relays

Immerse the detonators or relays in the water tank for 48 h in water at a depth of (0,50 ± 0,01) m and at a temperature equal to the highest temperature specified by the manufacturer ± 2 °C.

Unless otherwise specified by the manufacturer, ensure that the free ends of the leading wires or shock tubes remain below the surface of the water during pressure testing phase.

After pressure testing, fire the detonators and measure the delay times of the detonators in accordance with prEN 13763-16.

The detonators shall be fired within 2 h.

8 Test report

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

a) the individual results of the delay times and, if appropriate, the shock wave velocity;

b) whether the free ends of the leading wires were held above or under the water surface;

c) the number of detonators that did not detonate.