BRITISH STANDARD

BS EN
13763-8:2003

Explosives for civil uses — Detonators and relays —

Part 8: Determination of the resistance to vibration of plain detonators

The European Standard EN 13763-8:2003 has the status of a British Standard

ICS 71.100.30

National foreword

This British Standard is the official English language version of EN 13763-8:2003.

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;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

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This British Standard, was published under the authority of the Standards Policy and Strategy Committee on 19 November 2003

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 10, an inside back cover and a back cover.

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EN 13763-8

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English version

Explosives for civil uses - Detonators and relays - Part 8: Determination of the resistance to vibration of plain detonators

Explosifs à usage civil - Détonateurs et relais - Partie 8: Détermination de la résistance aux vibrations de la charge de détonateur

Explosivstoffe für zivile Zwecke - Zünder und Verzögerungselemente - Teil 8: Bestimmung des Widerstandes von Sprengkapseln gegen Erschütterung

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.

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Foreword

This document (EN 13763-8:2003) 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 13763-9	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

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

Detonators can be subjected to many forces, including vibration, during use and handling. This could cause material from the primary charge to become loose creating a risk of inadvertent initiation because of friction or other stimuli on the loose explosive.

1 Scope

This European Standard specifies a method for assessing the ability of the explosive content of plain detonators to withstand the vibration likely to be experienced in normal use and handling.

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 60068-2-6; *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum 1995).*

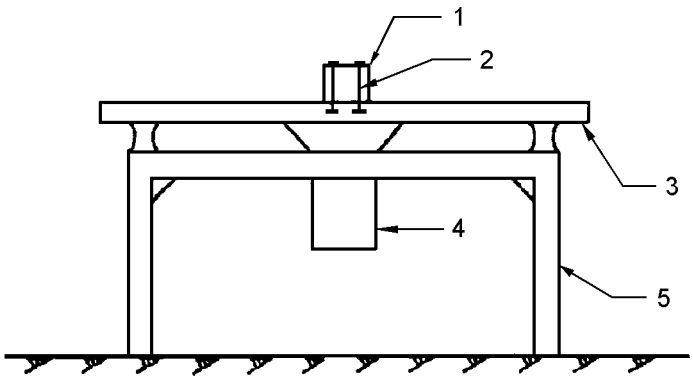
EN ISO/IEC 17025; *General requirements for the competence of testing and calibration laboratories. (ISO/IEC 17025:1999)*

3 Terms and definitions

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

4 Apparatus

4.1 Vibrating table, in accordance with EN 60068-2-6, with a horizontal vibrating plate and a vibrator (e.g. electromagnetic vibrator) designed, when unloaded, to produce at all points on its top surface vertical sinusoidal vibrations at a frequency of 50 Hz and of identical amplitude. An example of a vibrating table is shown in Figure 1.

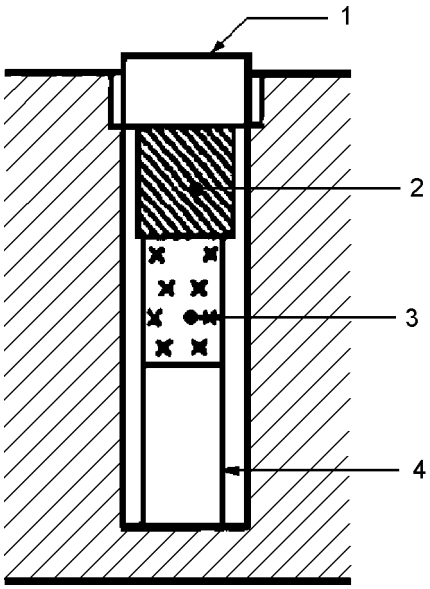


Key

1 Detonator holder
2 Detonator holder anchorage
3 Vibrating plate
4 Vibrator
5 Base

Figure 1 – Example of vibration table

4.2 Detonator holder made of metal and/or hard plastics, designed to be fixed securely in the centre of the vibrating plate and incorporating vertical detonator holder pockets of dimensions suitable for holding the detonator(s) under test. These pockets shall be capable of being closed by screw-in plugs, as shown in Figure 2.



Key

1 Screw-in plug
2 Spacer
3 Detonator charge
4 Detonator shell

Figure 2 – Example of pocket in detonator holder

4.3 Spacers, a set of spacers of different heights to secure the detonators in place in the detonator holder pockets.

4.4 Weighing machine, capable of weighing to an accuracy of ± 1 mg.

5 Test pieces

Select 25 detonators of the same type, with the same design and composition of charge and the same loading configuration of charge.

6 Procedure

6.1 General

Condition the twenty-five detonators for 2 h at (20 ± 2) °C and relative humidity not greater than 50 % prior to testing.

The overall test run comprises 25 determinations as described below.

6.2 Weighing of the detonators

Weigh each detonator and record its mass m_0 in milligrams (mg).

6.3 Insertion of detonators

Place each detonator, base uppermost, into an empty pocket in the detonator holder (see Figure 2).

Place a spacer of suitable dimensions on the base of the detonator to maintain it in position in the pocket after this has been closed.

Close the pocket using the screw-in plug.

6.4 Vibration of detonators

Perform the test according to EN 60068-2-6 with the following procedure:

With the 25 detonators in position in the pockets of the detonator holder, secure the latter firmly in place in the centre of the vibrating table.

Set the maximum vibration amplitude (zero to peak) to 0,25 mm.

Start the vibrator.

Stop the vibrator after 60 min.

After the test, remove each detonator from its pocket, weigh it and record its final mass m in milligrams (mg).

Collect with care any active material deposited in the bottom of the pockets.

6.5 Calculation of results

Determine the loss in mass m_L (if any), expressed in milligrams (mg), for each detonator using the following equation:

$$m_L = m_0 - m$$

7 Test report

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

- any individual mass loss (expressed in milligrams).

Annex A
(informative)

Range of applicability of the test method

Range of applicability of the test method: - 30°C to + 80°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, II.1.(b) and II.1.(i) 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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