SLOVENSKI STANDARD
oSIST prEN 13763-8:2021

01-april-2021

Eksplozivi za civilno uporabo - Detonatorji in zakasnilniki - 8. del: Ugotavljanje odpornosti nepopolnih detonatorjev proti tresljajem

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

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

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

Ta slovenski standard je istoveten z: **prEN 13763-8**

ICS:

71.100.30	Eksplozivi. Pirotehnika in ognjemeti	Explosives. Pyrotechnics and fireworks

oSIST prEN 13763-8:2021 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 13763-8

April 2021

ICS 71.100.30

Will supersede EN 13763-8:2003

English Version

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

Explosifs à usage civil - Détonateurs et relais pour cordeau détonant - Partie 8: Détermination de la résistance aux vibrations

Explosivstoffe für zivile Zwecke - Zünder und Sprengschnurverbinder - Teil 8: Bestimmung des Widerstandes gegen Erschütterung

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (prEN 13763-8:2021) 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 13763-8:2003

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

a) Clause 1, *Scope*, has been revised:

   1) semi-finished detonators have been included;

   2) it has been added that the document applies to explosives for civil uses;

b) the normative references have been updated;

c) in Clause 3, *Terms and definitions*, the term 3.1 has been added;

d) Clause 4, *Principle*, has been added;

e) in Clause 6, *Preparation and handling of test samples and test pieces*, has been revised;

f) Clause 8, *Expression of results*, has been added;

g) Annex A, *Range of applicability of the test method*, has been removed;

h) 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*

— *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*

— *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

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

1 Scope

This document specifies a method for determination the ability of the explosive content of plain detonators and semi-finished detonators to withstand vibration it could be exposed to during use, handling and transport. Plain detonators are instantaneous detonators supplied without means of activation. Semi-finished detonators are detonators supplied without means of activation.

This document applies to explosives for civil uses.

NOTE Plain detonators and semi-finished detonators are normally activated by means of detonating cord, safety fuse, pyrotechnic igniter or shock tube.

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*

EN 60068-2-6:2008, *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)*

3 Terms and definitions

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

3.1
semi-finished detonator
detonator supplied without means of activation

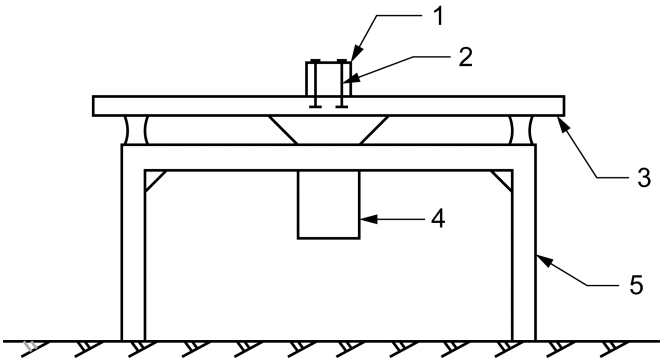
4 Principle

The test piece is subjected to a bending force by fixing one end in a steel block and attaching a weight to the other end. Two types of tests are performed, one where the test piece is supported at the base and one where the test piece is supported at the top. It is recorded whether the detonator explodes during the test and if cracking or breaking of the shell occurs. After being subjected to the bending force the test piece is initiated according to the manufacturer's specification. It is recorded whether the test piece is exploded or not.

5 Apparatus

The apparatus shall consist of a vibrating table, a detonating holder, spacers and a scale.

5.1 Vibrating table, in accordance with EN 60068-2-6:2008, 4.1, 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.

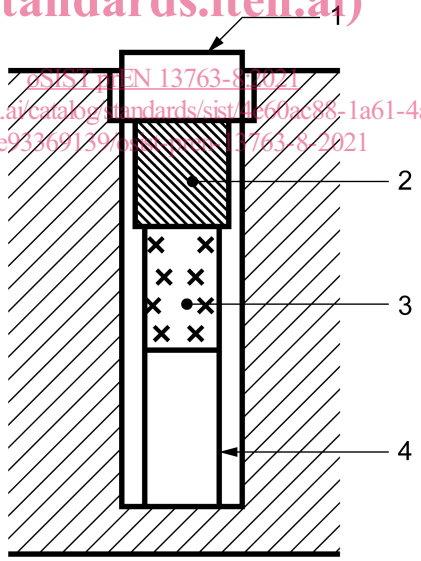


Key

1 detonator holder
2 detonator holder anchorage
3 vibrating plate
4 vibrator
5 base

Figure 1 — Example of vibration table

5.2 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 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 steel block
2 detonator (shown as an electric detonator)
3 ring
4 weight

Figure 2 — Example of detonator holder pocket

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

5.4 Scale, capable of weighing to an accuracy of ± 1 mg.

6 Preparation and handling of test samples and test pieces[1)]

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

Select 25 plain or semi-finished detonators of the same type, with the same design, composition and loading configuration according to the manufacturer's specification.

7 Procedure

7.1 General

Condition the 25 detonators plain 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.

7.2 Weighing of the detonators

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

7.3 Insertion of detonators

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

Place a spacer on the base of the detonator to maintain the detonator in its position in the pocket after the pocket has been closed.

Close the pocket using the screw-in plug.

7.4 Vibration of detonators

Secure the detonator holder 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_1 in milligrams (mg).

Collect any composition and explosive deposited in the bottom of the pockets.

8 Expression of results

Determine the loss in mass m_L (if any), expressed in milligrams (mg), for each detonator using Formula (1).

$$m_{\mathrm{L}} = m_0 - m_1 \qquad (1)$$

where

m_{L} is loss in mass;

[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.