SLOVENSKI STANDARD
oSIST prEN 13763-2:2021

01-april-2021

Eksplozivi za civilno uporabo - Detonatorji in zakasnilniki - 2. del: Ugotavljanje toplotne stabilnosti

Explosives for civil uses - Detonators and relays - Part 2: Determination of thermal stability

Explosivstoffe für zivile Zwecke - Zünder und Verzögerungselemente - Teil 2: Bestimmung der thermischen Stabilität

Explosifs à usage civil - Détonateurs et relais - Partie 2: Détermination de la stabilité thermique

Ta slovenski standard je istoveten z: **prEN 13763-2**

ICS:

71.100.30	Eksplozivi. Pirotehnika in ognjemeti	Explosives. Pyrotechnics and fireworks

oSIST prEN 13763-2:2021 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 13763-2

April 2021

ICS 71.100.30

Will supersede EN 13763-2:2002

English Version

Explosives for civil uses - Detonators and detonating cord relays - Part 2: Verification of thermal stability at high temperatures

Explosifs à usage civil - Détonateurs et relais pour cordeau détonant - Partie 2: Vérification de la stabilité thermique à hautes températures

Explosivstoffe für zivile Zwecke - Zünder und Sprengschnurverbinder - Teil 2: Überprüfung der thermischen Stabilität bei hohen 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.

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 13763-2:2021) 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 13763-2:2002

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

a) the title of this part of EN 13763 has been changed from *Determination of thermal stability* to *Verification of thermal stability*;

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

   1) plain detonators and electronic detonators have been included and "relays" have been clarified to "detonating cord relays";

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

   3) a paragraph has been added to explain why this method does not include temperatures lower than (75 ± 2) °C;

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

d) Clause 6, *Preparation and handling of test samples and test pieces*, has been revised:

   1) 6.1, *Handling of test samples*, has been added;

   2) It is now specified that detonators, detonating cord relays, surface connectors and shock tubes shall have the same design and composition according to the manufacturer's specification;

e) Clause 7, *Procedure*, has been further detailed and clarified;

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

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*

— *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, surface connectors and detonating cord relays can be subjected to high temperatures during transport and/or storage. This test method assesses its ability to withstand high temperatures without exploding.

1 Scope

This document specifies a method for verification of the thermal stability of electric detonators, non-electric detonators, plain detonators, electronic detonators, surface connectors, detonating cord relays and shock tubes for use with electronic and non-electric detonators.

This document applies to explosives for civil uses.

Explosives become more stable in low temperatures and therefore this method does not include temperatures lower than (75 ± 2) °C.

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

The test piece is subjected to elevated thermal conditions for 48 h by heating in a conditioning chamber to the temperature higher than the highest operating temperature stated by the manufacturer, but at least (7 ± 2) °C. During and after the test any explosion or visible evidence of reactions are recorded.

5 Apparatus

5.1 Conditioning chamber which can maintain a prescribed temperature ± 2 °C.

5.2 Time measuring device, with an accuracy of ± 1 min.

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

6.1 Handling of test samples

Test samples for detonators, detonating cord relays, surface connectors and shock tubes should be handled according to EN ISO 17025:2017, 7.4.

6.2 Detonators

6.2.1 Electric detonators

Select 25 detonators of the same type, with the same design, compositions and loading configuration according to the manufacturer's specification, whose fuse head has the same design and chemical composition. If the detonators form part of a series with different delay times, select 25 detonators with delay times as evenly distributed throughout the series as possible.

[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.

6.2.2 Non-electric detonators

Select 25 detonators of the same type, with the same design, compositions and loading configuration according to the manufacturer's specification. If the detonators form part of a series with different delay times, select 25 detonators with delay times as evenly distributed throughout the series as possible.

6.2.3 Electronic detonators

Select 25 detonators of a specific type, having the same circuitry and the same design, composition and loading configuration according to the manufacturer's specification, whose fuse head has the same design and composition.

6.2.4 Plain detonators

Select 25 detonators of the same type, with the same design, compositions and loading configuration according to the manufacturer's specification.

6.3 Detonating cord relays and surface connectors

Select 25 detonating cord relays or surface connectors of the same type, with the same design, dimensions, materials of construction, compositions and loading configuration according to the manufacturer's specification. If the detonating cord relays or surface connectors form part of a series with different delay times, select 25 detonating cord relays or surface connectors with delay times as evenly distributed throughout the series as possible.

6.4 Shock tubes

Select 25 shock tubes of a specific type having the same dimensions, materials of construction and chemical composition according to the manufacturer's specification, each with a length of (1,00 ± 0,05) m.

7 Procedure

7.1 Detonators and surface connectors

12 of the test pieces shall be placed in a rack with the base upwards and the other 13 in a rack with the base downwards. Store all test pieces in the conditioning chamber for a period of at a temperature of (25 ± 2) °C higher than the highest operating temperature (or storage temperature if higher) stated by the manufacturer, but at least (75 ± 2) °C.

Record any explosion or visible or audible evidence of reaction during the test. Remove the test pieces from the conditioning chamber and let them cool down. Examine the test pieces and record any explosion or evidence of reaction that occurred during the test.

7.2 Shock tubes and detonating cord relays

Store all test pieces in the conditioning chamber for a period of at a temperature of (25 ± 2) °C higher than the highest operating temperature (or storage temperature if higher) stated by the manufacturer, but at least (75 ± 2) °C.

For detonating cord relays record any detonation or evidence of reaction, visible or audible during the test. For shock tubes record any evidence of reaction, visible or audible during the test.

Remove the test pieces from the conditioning chamber and let them cool down.

Examine the test pieces of detonating cord relays and record any detonation or evidence of reaction that occurred. Examine the test pieces of shock tubes and record any evidence of reaction that occurred.

8 Expression of results

Record the number of detonators, surface connectors and detonating cord relays where an explosion or evidence of reaction, visible or audible have occurred.

Record the number of shock tubes where an evidence of reaction, visible or audible have occurred.

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) for detonators, surface connectors and detonating cord relays the result of the test stated as explosion or evidence of reaction;

b) for shock tubes the result of the test stated as evidence of reaction;

c) the temperature in the conditioning chamber during the test;

d) the time the test pieces have been stored in the conditioning chamber.