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Eksplzivni za civilno uporabo - Detonatorji in zakasnilniki - 1. del: Zahteve

Explosives for civil uses - Detonators and relays - Part 1: Requirements

Explosivstoffe für zivile Zwecke - Zünder und Verzögerungselemente - Teil 1:
Anforderungen

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Explosifs à usage civil - Détonateurs et relais - Partie 1. Exigences

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Explosives for civil uses - Detonators and detonating cord relays - Part 1: Requirements

Explosifs à usage civil - Détonateurs et relais - Partie 1 :
Exigences

Explosivstoffe für zivile Zwecke - Zünder und
Verzögerungselemente - Teil 1: Anforderungen

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.

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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.

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

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European foreword

This document (prEN 13763-1:2021) 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 13763-1:2004.

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

- a) Clause 1 Scope, these products have been specified: electric detonators, non-electric detonators, plain detonators, electronic detonators, electronic initiation systems, leading wires and coupling accessories. The scope also includes the classification for electric detonators;
- b) Clause 2 Normative references, was updated;
- c) Clause 4 Requirements, each subclause contain subclauses for each product. Requirements are given for each product in the scope including the different types of detonators;
- d) Clause 4.1 Requirement general, has been added. It contains a table showing what tests are required for each product specified in the scope;
- e) Clause 4.2 Thermal stability, 4.2.1 Electric detonators, non-electric detonators, electronic detonators, plain detonators, surface connectors and detonating cord relays, the requirement has been changed from “no detonation” to “no explosion or evidence of reaction, visible or audible”; “Evidence of reaction” is defined in prEN 13857-1:2021;
- f) Clause 4.2 Thermal stability, 4.2.2 Shock tubes, the requirement has been changed from “no visible evidence of reaction” to “no initiation or evidence of reaction, visible or audible”; “Evidence of reaction” is defined in prEN 13857-1:2021;
- g) Clause 4.4 Resistance to abrasion, the requirement contains a clarification of the relationship with the categories in Table 2;
- h) Clause 4.7 Mechanical strength, the requirements have been listed for these two subclauses 4.7.1 Electric detonators and electronic detonators with leading wires and 4.7.2 Non-electric detonators and electronic detonators with shock tube;
- i) Clause 4.8 Resistance to vibration, the following requirement has been added: “during the vibration test no plain detonators or semi-finished detonators shall explode”;
- j) Clause 4.9 Resistance to bending, the requirement includes electronic detonators and has been changed from “no detonator shall initiate” to “no detonator shall explode”. The following requirement has been added: “in the functional test all detonators shall detonate”;
- k) Clause 4.10 Resistance to damage by dropping, the requirement has changed from “detonate” to “explode” and from “fire to “detonate”;
- l) Clause 4.11 Resistance to hydrostatic pressure, requirements for electronic detonators have been added;
- m) Clause 4.13 Equivalent initiating capability, the requirements for mean shock energy has been replaced with requirements for mean peak pressure and requirement for mean pressure per time;

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- n) Clause 4.14 Delay accuracy, the requirement has changed from “all detonators shall fire” to “all detonators shall detonate”;
- o) Clause 4.19 Flash over voltage, the requirement has changed from “no detonator shall be initiated” to “no detonator shall explode”;
- p) Clause 4.23 Transfer capability, the receptors have been divided into two types, shock tubes and detonating cord relays;
- q) Clause 4.24 Requirement for risk analysis electronic initiation systems, new requirement has been added. There was no requirement for risk analysis in the previous edition of the document;
- r) Clause 4.25 Resistance against electrostatic discharge, new requirement has been added. There was no requirement for resistance against electrostatic discharge in the previous edition of the document;
- s) Clause 4.26 Determination of resistance to overvoltage, new requirement has been added. There was no requirement for resistance to overvoltage in the previous edition of the document;
- t) Clause 4.27 Determination or resistance to dynamic pressure, new requirement has been added. There was no requirement for resistance to dynamic pressure in the previous edition of the document;
- u) Clause 4.28 Insulation resistance between exposed conducting parts, new requirement has been added. There was no requirement for insulation resistance in the previous edition of the document;
- v) Clause 4.29 Insulation resistance between exposed conducting parts, new requirement has been added. There was no requirement for insulation resistance in the previous edition of the document;
- w) Clause 4.30 Slow temperature change, new requirement has been added. There was no requirement for slow temperature change in the previous edition of the document;
- x) Clause 4.31 Rapid temperature change, new requirement has been added. There was no requirement for rapid temperature change in the previous edition of the document;
- y) Clause 4.32 Determination of delay accuracy, new requirement has been added. There was no requirement for delay accuracy in the previous edition of the document;
- z) Clause 4.33 Determination of electromagnetic compatibility, new requirement has been added. There was no requirement for electromagnetic compatibility in the previous edition of the document;
- aa) Clause 4.34 Climatic and mechanical, new requirements have been added for electronic initiation systems. There were no climatic and mechanical requirements in the previous edition of the document;
- bb) Clause 4.35 Resistance to corrosion, new requirement has been added. There was no requirement for resistance to corrosion in the previous edition of the document;
- cc) Annex A, Range of applicability of the test method has been removed because each test method specifies temperatures;
- dd) Annex C, PROBIT TEST (PBBS test) contained some mistakes in Table C.1 and Clause C.6 which have been corrected, these are the mistakes mentioned in the standardization request;

ee) Annex ZA, Relationship between this European Standard and the essential safety requirements of Directive 2014/28/EU relating to the making available on the market and supervision of explosives for civil uses aimed to be covered has been added. It contains explanations on links to Essential Safety requirements in the directive.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports Essential Safety requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), 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 at high temperatures;*
- *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 resistance to damage by dropping 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;*

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- *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 detonating cord relays;*
- *Part 27: Risk analysis and test methods for electronic initiation systems.*

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1 Scope

This document specifies the requirements for electric detonators, non-electric detonators, plain detonators, electronic detonators, electronic initiation systems, surface connectors, leading wires, shock tubes, coupling accessories and detonating cord relays.

This document specifies classification for electric detonators.

This document does not cover devices and accessories for reliable and safe function of detonators and relays; for this, see EN 13763-26:2004.

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*

prEN 13857-3:2021, *Explosives for civil uses — Part 3: Information to be provided by the manufacturer or his authorized representative to the user*

prEN 13763-2:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 2: Verification of thermal stability at high temperatures*

prEN 13763-3:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 3: Determination of sensitiveness to impact*

prEN 13763-4:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 4: Determination of resistance to abrasion*

prEN 13763-5:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 5: Determination of resistance to cutting damage*

prEN 13763-6:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 6: Determination of resistance to cracking in low temperatures*

prEN 13763-7:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 7: Determination of the mechanical strength*

prEN 13763-8:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 8: Determination of resistance to vibration*

prEN 13763-9:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 9: Determination of resistance to bending*

prEN 13763-11:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 11: Determination of resistance to damage by dropping*

prEN 13763-12:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 12: Determination of resistance to hydrostatic pressure*

prEN 13763-13:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 13: Determination of resistance to electrostatic discharge*

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prEN 13763-15:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 15: Determination of equivalent initiating capability*

prEN 13763-16:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 16: Determination of delay accuracy*

prEN 13763-17:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 17: Determination of no-fire current*

prEN 13763-18:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 18: Determination of series firing current*

prEN 13763-19:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 19: Determination of firing impulse*

prEN 13763-20:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 20: Determination of total electrical resistance*

prEN 13763-21:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 21: Determination of flash-over voltage*

prEN 13763-22:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 22: Determination of capacitance, insulation resistance, and insulation breakdown*

prEN 13763-23:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 23: Determination of the shock-wave velocity*

prEN 13763-24:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 24: Determination of the electrical non-conductivity*

prEN 13763-25:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 25: Determination of transfer capacity*

prEN 13763-27:2021, *Explosives for civil uses — Detonators and detonating cord relays — Part 27: Risk analysis and test methods for electronic initiation systems*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

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

4 Requirements

4.1 General

Table 1 gives an overview of which tests shall be performed for the products covered in this document. Annex D gives information on classification of defects and guidance for sampling size.

Table 1 — Overview of tests for products

Tests	Electric detonators	Non-electric detonators	Plain detonators	Electronic detonators	Electronic initiation systems	Leading wires	Shock tubes	Detonating cord relays	Coupling accessories	Surface connectors	Semi-finished detonators
Thermal stability at elevated temperatures	X	X	X	X			X	X		X	
Sensitiveness to impact	X	X	X	X			X	X		X	
Resistance to abrasion						X	X				
Resistance to cutting damage						X	X				
Resistance to cracking of insulation in low temperatures						X					
Mechanical strength	X	X									
Resistance to vibration			X								X
Resistance to bending	X	X	X	X							
Resistance to damage by dropping	X	X	X	X				X		X	
Resistance to hydrostatic pressure	X	X		X				X		X	
Resistance to electrostatic discharge	X										
Equivalent initiating capability	X	X		X							
Delay accuracy	X	X						X		X	

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Tests	Electric detonators	Non-electric detonators	Plain detonators	Electronic detonators	Electronic initiation systems	Leading wires	Shock tubes	Detonating cord relays	Coupling accessories	Surface connectors	Semi-finished detonators
No-fire current	X										
Series firing current	X										
Firing impulse	X										
Total electrical resistance	X										
Flash-over voltage	X										
Capacitance, insulation resistance and insulation breakdown						X					
Shock wave velocity							X				
Electrical non-conductivity											
Transfer capability								X	X	X	
Risk analysis					X						
Resistance against electrostatic discharge	X										
Resistance to overvoltage				X							
Resistance to dynamic pressure				X							
Insulation resistance between exposed conducting parts					X ^b						
Insulation resistance between					X ^c						

Tests	Electric detonators	Non-electric detonators	Plain detonators	Electronic detonators	Electronic initiation systems	Leading wires	Shock tubes	Detonating cord relays	Coupling accessories	Surface connectors	Semi-finished detonators
exposed conducting parts											
Slow temperature change					X						
Rapid temperature change					X						
Delay accuracy					X						
Electromagnetic compatibility					X						
Climatic and mechanical tests					X ^{b,c}						
Resistance to corrosion					X						
<p>iTeh STANDARD PREVIEW (standards.iteh.ai)</p> <p>https://standards.iteh.ai/catalog/standards/sist/e00d8ac6-840a-4815-8c64-88787aa72378/osist-pren-13763-1-2021</p> <p>oSIST prEN 13763-1:2021</p> <p>^a with leading wires and/or shock tubes. ^b blasting machines. ^c field circuit testers.</p>											