



SLOVENSKI STANDARD
SIST EN 13631-11:2004
01-januar-2004

Eksplozivi za civilno uporabo – Razstreliva – 11. del: Ugotavljanje prenosa detonacije

Explosives for civil uses - High explosives - Part 11: Determination of transmission of detonation

Explosivstoffe für zivile Zwecke - Sprengstoffe - Teil 11: Bestimmung der Detonationsweiterleitung

Explosifs a usage civil - Explosifs - Partie 11: Détermination de la transmission de la détonation

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ICS 71.100.30

English version

Explosives for civil uses - High explosives - Part 11: Determination of transmission of detonation

Explosifs à usage civil - Explosifs - Partie 11: Détermination
de la transmission de la détonation

Explosivstoffe für zivile Zwecke - Sprengstoffe - Teil 11:
Bestimmung der Detonationsweiterleitung

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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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13631-11:2003) 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of an identical text or by endorsement, at the latest by May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.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 relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This European Standard is one of a series of standards on *Explosives for civil uses – High explosives*. The other parts of this series are:

- prEN 13631-1 Part 1: *Requirements*.
- EN 13631-2 Part 2: *Determination of thermal stability of explosives*.
- prEN 13631-3 Part 3: *Determination of sensitiveness to friction of explosives*.
- EN 13631-4 Part 4: *Determination of sensitiveness to impact of explosives*.
- EN 13631-5 Part 5: *Determination of resistance to water*.
- EN 13631-6 Part 6: *Determination of resistance to hydrostatic pressure*.
- EN 13631-7 Part 7: *Determination of safety and reliability at extreme temperatures*.
- EN 13631-10 Part 10: *Verification of the means of initiation*.
- prEN 13631-12 Part 12: *Specification of booster with different capability*.
- EN 13631-13 Part 13: *Determination of density*.
- EN 13631-14 Part 14: *Determination of velocity of detonation*.
- prEN 13631-15 Part 15: *Calculation of thermodynamic properties*.
- prEN 13631-16 Part 16: *Detection and measurement of toxic gases*.

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 a method for the determination of the ability of cartridged explosives to transmit detonation.

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 13631-10:2003, *Explosives for civil uses – High Explosives – Part 10: Verification of the means of initiation.*

EN 13631-14, *Explosives for civil uses – High Explosives – Part 14: Determination of velocity of detonation.*

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

EN 10025, *Hot rolled products of non-alloy structural steels– Technical delivery conditions.*

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

ISO 4200:1991, *Plain end steel tubes, welded and seamless -- General tables of dimensions and masses per unit length.*

3 Terms and definitions

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

3.1

cap-sensitive explosive

explosive which can be initiated by a single detonator

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4 Principle

The transmission of detonation is determined by the ability to transmit the detonation between two unconfined and coaxially suspended cartridges having the same diameter and separated by an air gap.

When the manufacturer claims that the explosive will need confinement in order to properly function, the transmission of detonation is determined by the ability to transmit the detonation between two cartridges having the same diameter and separated by an air gap, confined in a steel tube.

5 Apparatus

5.1 Support, for holding the cartridges, comprising a thin wooden or metal rod or other device which will not affect the velocity of detonation. When confinement of the explosive is required, the support shall hold the cartridges inside a steel tube.

5.2 Steel tube, with dimensions in accordance with ISO 4200:1991, Table 1, range of preferred thickness E.

Table 1 shows some of the listed thicknesses in range E and their corresponding internal diameters, derived from ISO 4200:1991, Table 1.

Table 1 – Dimensions of steel tubes

| Internal diameter (mm) | Wall thickness (mm) |
|---------------------------|------------------------|
| 17,3 | 2,0 |
| 22,9 | 2,0 |
| 29,1 | 2,3 |
| 37,2 | 2,6 |
| 43,1 | 2,6 |
| 54,5 | 2,9 |
| 70,3 | 2,9 |
| 82,5 | 3,2 |
| 107,1 | 3,6 |
| 131,7 | 4,0 |
| 159,3 | 4,5 |
| 206,5 | 6,3 |
| 260,4 | 6,3 |
| 309,7 | 7,1 |

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The steel quality shall be S 235 in accordance with EN 10025

The internal diameter of the steel tube shall be such that the cartridge can be inserted into it without leaving an unnecessarily large annular space between the cartridge and the tube, in order to avoid the channel effect.

5.3 Means of initiation, as specified by the explosives manufacturer in terms of initiating capability according to EN 13631-10:2003, 5.1.

6 Test pieces

The test pieces, donor and acceptor, shall be commercial cartridges of the same diameter and having the smallest diameter placed on the market.

In order to ensure that a stable detonation can be obtained, the length of the donor cartridge shall be at least five times its diameter.

The length of the acceptor cartridge shall be at least five times its diameter (d). This length shall be increased as required if the measurement of velocity of detonation, as described in EN 13631-14, is used to detect proper detonation of the acceptor cartridge.

When the length of the supplied cartridge(s) is less than that required to satisfy the above, a charge shall be prepared by joining two (or more) cartridges. In the case of round-ended cartridges, the end portion of two cartridges shall be cut off and the cartridges joined by butting together and tapping securely.

7 Procedure

Separate the cartridges by a given gap. The length (D) of this gap is measured between the ends of flat-ended cartridges (see Figure 1). For cartridges having rounded ends, the following method shall be used: place the ends of the cartridges in contact, without pressure. Then move one cartridge to the required distance (see Figure 2).

Cartridged explosives which the manufacturer claims that will detonate without confinement, shall be assembled as shown in Figure 3 for non-cap-sensitive explosives in round-ended cartridge, or as shown in Figure 4 for cap-sensitive explosives in flat-ended cartridges.

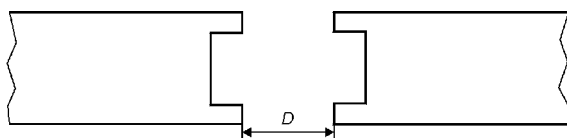
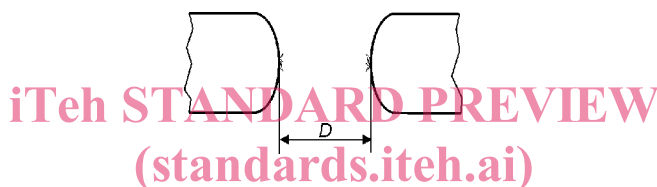
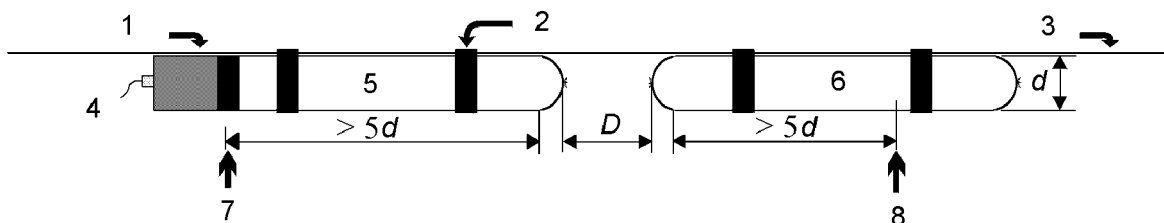


Figure 1 – Gap measurement for flat-end cartridges



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 Figure 2 – Gap measurement for round-ended cartridges



Key

- 1 Booster
- 2 Adhesive tape
- 3 Support
- 4 Detonator
- 5 Donor
- 6 Acceptor
- 7 Contact between the booster and a flat-cut of the cartridge
- 8 Starting point of detonation velocity measurement

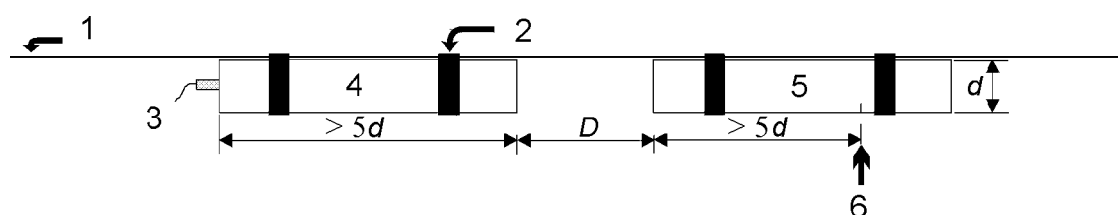
Figure 3 – Test arrangement with non-cap-sensitive explosives in round-ended cartridges without confinement

Cartridged explosives for which the manufacturer claims that confinement is required, shall be assembled as shown in Figure 5 for non-cap-sensitive explosives in rounded-ended cartridges, or as shown in Figure 6 for cap-sensitive explosives in flat-ended cartridges.

Measure the temperature of the test piece.

Fasten the cartridges coaxially to the support with adhesive tape or rope. When the test is carried out without confinement, suspend the assembly freely above the ground as shown in Figures 3 and 4.

Prime the explosive with a detonator or a booster of the strength specified by the manufacturer in terms of initiating capability according to EN 13631-10:2003, 5.1.



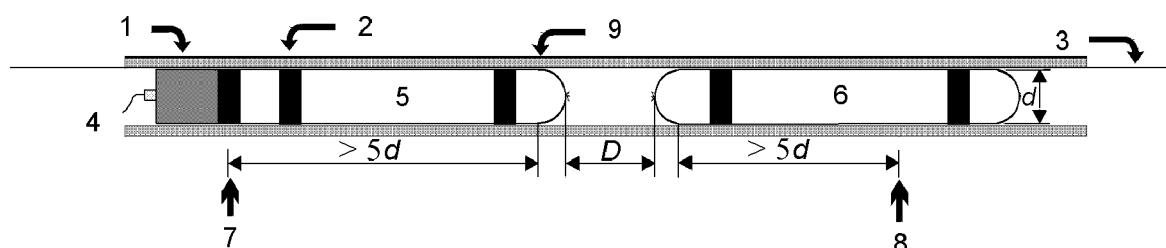
Key

- 1 Support
- 2 Adhesive tape
- 3 Detonator
- 4 Donor
- 5 Acceptor
- 6 Starting point of detonation velocity measurement

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Figure 4 – Test arrangement with cap-sensitive and flat-ended cartridged explosives without confinement



Key

- 1 Booster
- 2 Adhesive tape
- 3 Support
- 4 Detonator
- 5 Donor
- 6 Acceptor
- 7 Contact between the booster and a flat-cut of the cartridge
- 8 Starting point of detonation velocity measurement
- 9 Steel tube

Figure 5 – Test arrangement with non-cap-sensitive explosives in round-ended cartridges with confinement