



SLOVENSKI STANDARD
oSIST prEN 13631-5:2021
01-april-2021

Eksplzivni za civilno uporabo – Razstreliva – 5. del: Ugotavljanje odpornosti proti vodi

Explosives for civil uses - High explosives - Part 5: Determination of resistance to water

Explosivstoffe für zivile Zwecke - Sprengstoffe - Teil 5: Bestimmung der Wasserfestigkeit

Installation solaires thermiques et leur composants - Installations préfabriquées en usine - Partie 1 : Exigence générale

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ICS:

71.100.30	Eksplzivni. Pirotehnika in ognjemeti	Explosives. Pyrotechnics and fireworks
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 13631-5

April 2021

ICS 71.100.30

Will supersede EN 13631-5:2002

English Version

Explosives for civil uses - Explosives - Part 5: Determination of the resistance to water of explosives

Explosifs à usage civil - Explosifs - Partie 5 :
Détermination de la résistance à l'eau

Explosivstoffe für zivile Zwecke - Explosivstoffe - Teil
5: Bestimmung der Wasserfestigkeit von
Explosivstoffen

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.

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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 13631-5:2021) 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 for the CEN Enquiry.

This document will supersede EN 13631-5:2002.

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

- a) the main element of the document’s title has been changed from “High explosives” to “Explosives”;
- b) the normative references have been updated;
- c) a new method for measuring the velocity of detonation by means of a continuous wire probe has been added;
- d) the description of the preparatory steps and for performing the test have been clearly separated;
- e) the concept of “water resistance” has been clarified by addressing with this part only shallow water up to a water depth of 20 cm, including general humidity and spray water;
- f) Annex A, *Range of applicability of the test method*, has been removed;
- 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 13631, *Explosives for civil uses — Explosives*, is currently composed with the following parts:

- *Part 1: Requirements*
- *Part 2: Determination of thermal stability of explosives*
- *Part 3: Determination of sensitiveness to friction of explosives*
- *Part 4: Determination of sensitiveness to impact of explosives*
- *Part 5: Determination of resistance of explosives to water*
- *Part 6: Determination of resistance of explosives to hydrostatic pressure*
- *Part 7: Determination of safety and reliability of explosives at extreme temperatures*
- *Part 10: Method for the verification of the means of initiation of explosives*

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- *Part 11: Determination of transmission of detonation of explosives*
- *Part 13: Determination of density of explosives*
- *Part 14: Determination of velocity of detonation of explosives*

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1 Scope

This document specifies a test method of determining the resistance to water of boosters, cartridge or bulk explosives, which are designed to be used for blasting operations in wet conditions.

This test method does not apply to black powder.

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 13630-7:2021, *Explosives for civil uses - Detonating cords and safety fuses - Part 7: Determination of reliability of initiation of detonating cords*

prEN 13631-14:2021, *Explosives for civil uses — Explosives — Part 14: Determination of the velocity of detonation of explosives*

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 method addresses potential negative effects of water penetration into the explosive.

The testing distinguishes between explosives, where a cover material (in case of cartridge explosives) is necessary to guarantee water resistance and other explosives, which are water resistant even without the cover material. In the latter case the cover material is cut prior to testing, in order to enable contact of the explosive with the water.

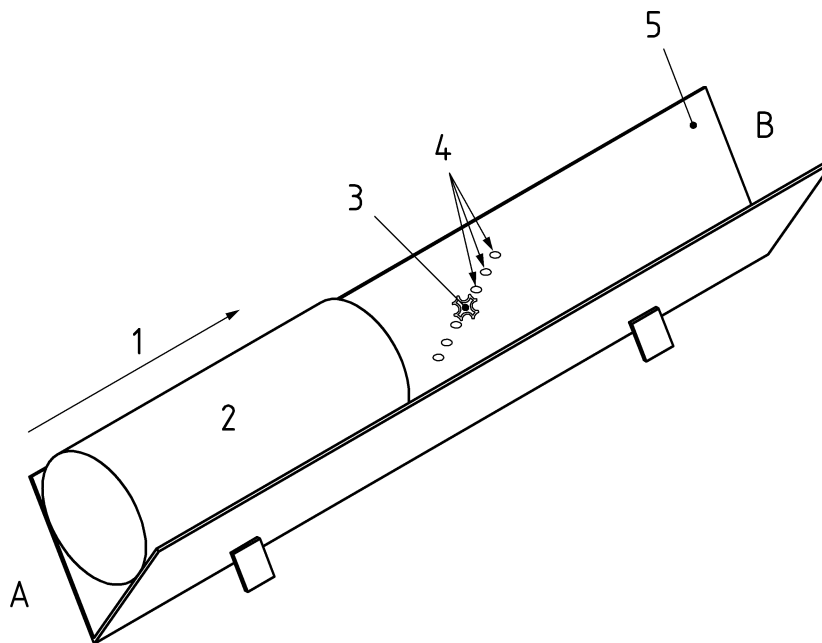
NOTE 1 Knowledge on water resistance is necessary to guarantee reliable functioning, if the manufacturer foresees use under wet conditions.

NOTE 2 The test does not address the ability of explosives to detonate under applied hydrostatic pressure.

5 Apparatus

5.1 V-shaped guide, made from aluminium or similar material, of length at least 500 mm longer than the length of the cartridge under test (see Figure 1). The guide shall have a series of holes, spaced 2 mm apart in the direction at right angles to the axis of the guide, for the pin (see 5.2). The holes shall be located approximately 500 mm from end 'B' of the guide and at least the length of the cartridge from end 'A'.

5.2 Pin made of stainless steel with a cone angle of 45° and a height of 5 mm (see Figure 2).



Key

- 1 direction of pushing
- 2 explosive cartridge
- 3 pin in position
- 4 holes for the pin
- 5 guide

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Figure 1 — V-shaped guide and cartridge

Dimensions in millimetres

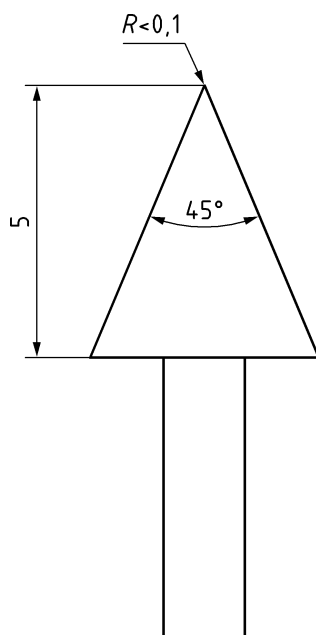


Figure 2 — Steel pin

5.3 Means of initiation, as specified by the explosives' manufacturer.

5.4 Water tank, which allows easy and complete immersion of the test pieces in water. The height of the water tank shall be sufficient to hold water to a depth of at least 200 mm plus the diameter of the test piece. In the case of a tubular water tank its diameter shall be at least twice the diameter of the test piece. It shall be at least 200 mm longer than the test piece.

5.5 Means of assessing complete detonation, equipment for measuring velocity of detonation as specified in prEN 13631-14:2021, or detonating cord and witness plate as specified in prEN 13630-7:2021, 5.3.

5.6 Support (only for cartridges shorter than 0,5 m), for holding the cartridges, comprising a thin wooden or metal rod having the same length as the test piece.

5.7 Plastic liner (for bulk explosives only), made of a thin plastic film. The liner shall have the smallest diameter intended for use of the explosive as stated by the manufacturer.

5.8 Plastic pipe (for bulk explosives only), with an inner diameter of at least twice the diameter of the plastic liner (see 5.7). The plastic pipe shall be at least 200 mm longer than the plastic liner.

6 Test pieces

6.1 Cartridged Explosives

Unless the manufacturer claims that the explosive composition is inherently water resistant, the cover material shall be subjected to the preliminary test.

If the manufacturer of cartridged explosives claims that the explosive composition is inherently water resistant, then notches shall be cut into all cartridges of the test piece as described in 6.3.

Each test piece consists of one or more cartridges with a total length of ten times its diameter, but at least 0,5 m. The diameter and length of the cartridge(s) shall be the minimum dimensions of products placed on the market.

6.2 Bulk explosive

Each test piece consists of a representative sample of the explosive, which shall be loaded into a plastic liner. The length of the test piece shall be at least ten times its diameter. Notches shall be cut into the plastic liner of the test piece as described in 6.3.

6.3 Cutting notches

Each notch shall be approximately 20 mm long, 0,5 mm wide and 5 mm deep. The number of notches shall be such that there is one notch per 30 cm² of surface. The notches shall be uniformly distributed over the circumference.

If the test piece consists of two or more cartridges, fix the cartridges along a support. There shall be no visible gap between them.

7 Procedure

7.1 Preliminary test for cartridge explosives

This test method is applied at ambient laboratory conditions, when it is known that within the given temperature range for use the explosive (or parts of it) does not undergo any change of physical state. If a change of physical state occurs within the given temperature range for use, the test shall be in addition applied at the lowest and highest use temperatures.

Place the guide horizontally on a table.

Place a cartridge in the guide so that one end is in line with end 'A' of the guide.

According to the diameter of the cartridge place the pin in one of the holes so that it is in line with the area of the cartridge touching the guide.

Push the cartridge through the guide to end 'B'. Do not apply any vertical force.

Rotate the cartridge 90° and repeat the test until there are four traces of the pin.

Do this with a total of three cartridges.

Inspect the traces very carefully and determine whether any perforation is visible. If there is no perforation of the cover it is assumed to be an integral part of the water resistance of the product. In this case the water resistance of the explosive shall be determined using the cartridges as supplied.

If there is, on the other hand, any perforation of the cover it is not assumed to be an integral part of the water resistance of the explosive. In this case the water resistance of the explosive shall be determined using test pieces comprising cartridges (modified by cutting notches as described in 6.3).

Do not use cartridges subjected to this preliminary test for further testing.

7.2 Test set-up and testing of cartridge explosives

Prepare the test piece for initiation with the means of initiation as described in 5.3.

Immerse the test piece in water at 20 °C to 30 °C to a water depth of 200 mm (see Figure 3). After 5 h remove the test piece, apply the foreseen means of assessing complete detonation and fire by its foreseen means of initiation as prepared previously.

If the cartridges are too big for the test method described, a plastic tubular tank can be used as container. Insert the test piece into the vertically oriented tubular tank, prepare it for initiation with the means of initiation as described in 5.3 and fill the tube with water at 20 °C to 30 °C until the uppermost cartridge is covered by at least 200 mm of water. After 5 h remove the test piece, apply the foreseen means of assessing complete detonation and fire by its foreseen means of initiation as prepared previously.

The test is performed three times unless a failure occurs, in which case the test is discontinued.