



SLOVENSKI STANDARD
oSIST prEN 13631-4:2021
01-april-2021

Eksplzivni za civilno uporabo – Razstreliva – 4. del: Ugotavljanje občutljivosti razstreliv na udarec

Explosives for civil uses - High explosives - Part 4: Determination of sensitiveness to impact of explosives

Explosivstoffe für zivile Zwecke - Sprengstoffe - Teil 4: Bestimmung der Schagempfindlichkeit von Explosivstoffen

Explosifs à usage civil - Explosifs - Partie 4: Détermination de la sensibilité au choc des explosifs

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Ta slovenski standard je istoveten z: prEN 13631-4

ICS:

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

DRAFT
prEN 13631-4

April 2021

ICS 71.100.30

Will supersede EN 13631-4:2002

English Version

Explosives for civil uses - Explosives - Part 4: Determination of sensitiveness to impact of explosives

Explosifs à usage civil - Explosifs - Partie 4:
Détermination de la sensibilité à l'impact des explosifs

Explosivstoffe für zivile Zwecke - Explosivstoffe - Teil
4: Bestimmung der Schagempfindlichkeit 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

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

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European foreword

This document (prEN 13631-4:2021) 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 13631-4:2002.

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

prEN 13631-4:2021 (E)**1 Scope**

This document specifies a method for determining the sensitiveness to impact of explosives.

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 ISO 683-17:2014, *Heat-treated steels, alloy steels and free-cutting steels — Part 17: Ball and roller bearing steels*

EN ISO 4957:2018, *Tool steels (ISO 4957:2018)*

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**drop height**

distance between the uppermost part of the impact device and the lower face of the striking head immediately before the drop

3.2**impact energy**

energy of the drop weight immediately before impact, calculated by multiplying the mass of the drop weight by the drop height and by the acceleration due to gravity

Note 1 to entry: For practical purposes, the acceleration due to gravity is rounded to 10 m/s² so that, for example, with a drop weight of mass 1 kg and a drop height of 500 mm the impact energy is assumed to be 5 J.

4 Principle

A weight of known mass is dropped onto a sample of the explosive which is confined in a way that during the impact of the weight no significant friction is applied to the explosive. The weight of the mass and the drop height are chosen in such steps, that the impact energy is reduced in subsequent trials until the lowest energy at which a reaction is obtained from at least one out of six trials is observed. This energy level is the value of sensitiveness to impact.

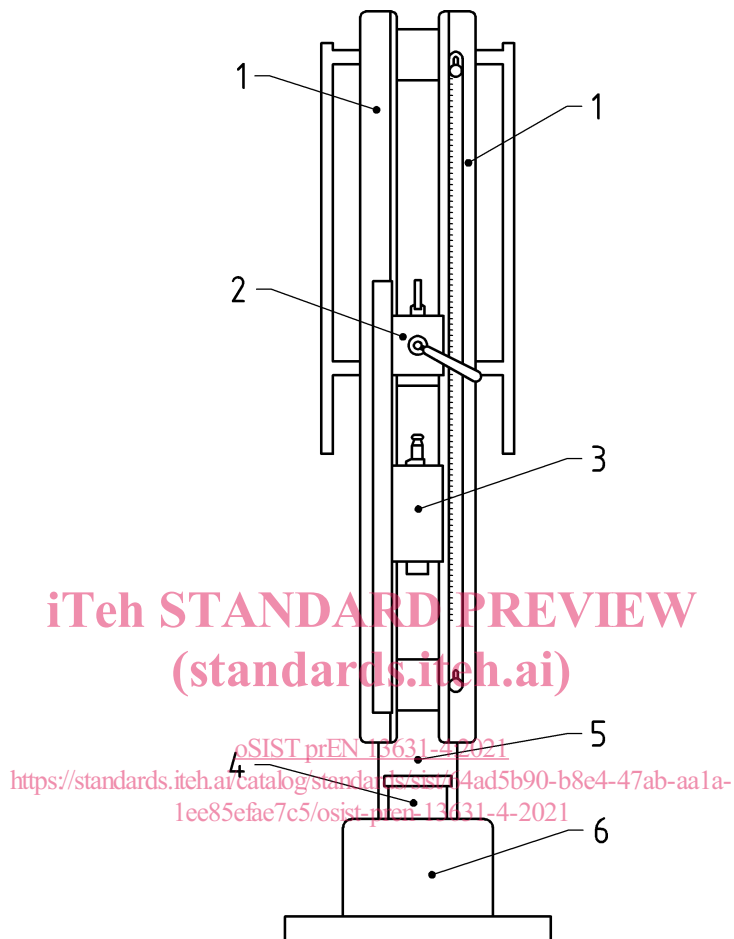
Knowledge of the sensitiveness to impact of explosives is of paramount importance to control risks during handling and to prevent inadvertent ignition.

5 Apparatus

5.1 Drop Hammer, (see Figure 1) consisting of a cast steel block with base, an anvil, a column, guides, drop weights with release device, and an impact device. The column is made from a seamless drawn steel tube. The support into which the column is fixed is bolted to the back of the steel block. The dimensions of the anvil (5.2) and the intermediate anvil are given in Figure 2, which shows the arrangement of the lower parts. The two guides which are fixed to the column by means of three cross-

pieces are fitted with a toothed rack to limit the re-bounce of the drop weight (5.3) and a moveable graduated scale for adjusting the drop height.

NOTE An example of drop hammer is the BAM drop-hammer¹⁾. This method is known under this name in the “UN Manual of Test and Criteria and in the Annex A.14 of EC Regulation 440/2008”.



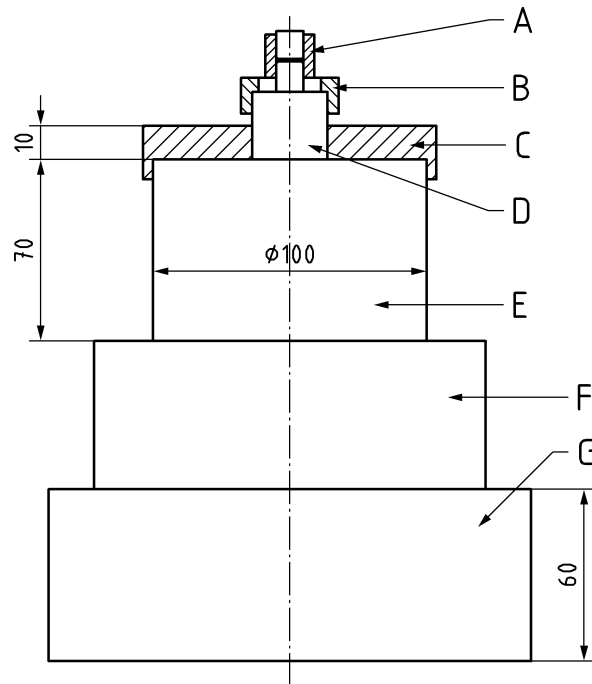
Key

- 1 guides
- 2 release device
- 3 drop weight
- 4 anvil
- 5 column
- 6 steel block

Figure 1 — General arrangement of the Drop Hammer

¹⁾ BAM fall-hammer is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of this product.

Dimension in millimetres

**Key**

- A impact device
- B locating ring
- C locating plate
- D intermediate anvil
- E anvil
- F steel block
- G base

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Figure 2 — Lower part of the Drop Hammer

The drop height shall be accurate to within $\pm 0,5$ cm. The drop weight release mechanism is adjustable between the guides and is clamped to them by the operation of a lever nut on two jaws. The apparatus shall be firmly secured to a concrete block, with minimum dimensions of $0,6\text{ m} \times 0,6\text{ m} \times 0,6\text{ m}$, by means of four anchoring bolts. The guides shall be vertical. A wooden protective box with inner protective lining and a window for observation surrounds the apparatus up to the level of the bottom crossbar.

5.2 Steel anvil, screwed onto the steel block and cast base. The steel used for the anvil is of type 90 MnCrV 8 (EN ISO 4957:2018, HRC hardness of 60).

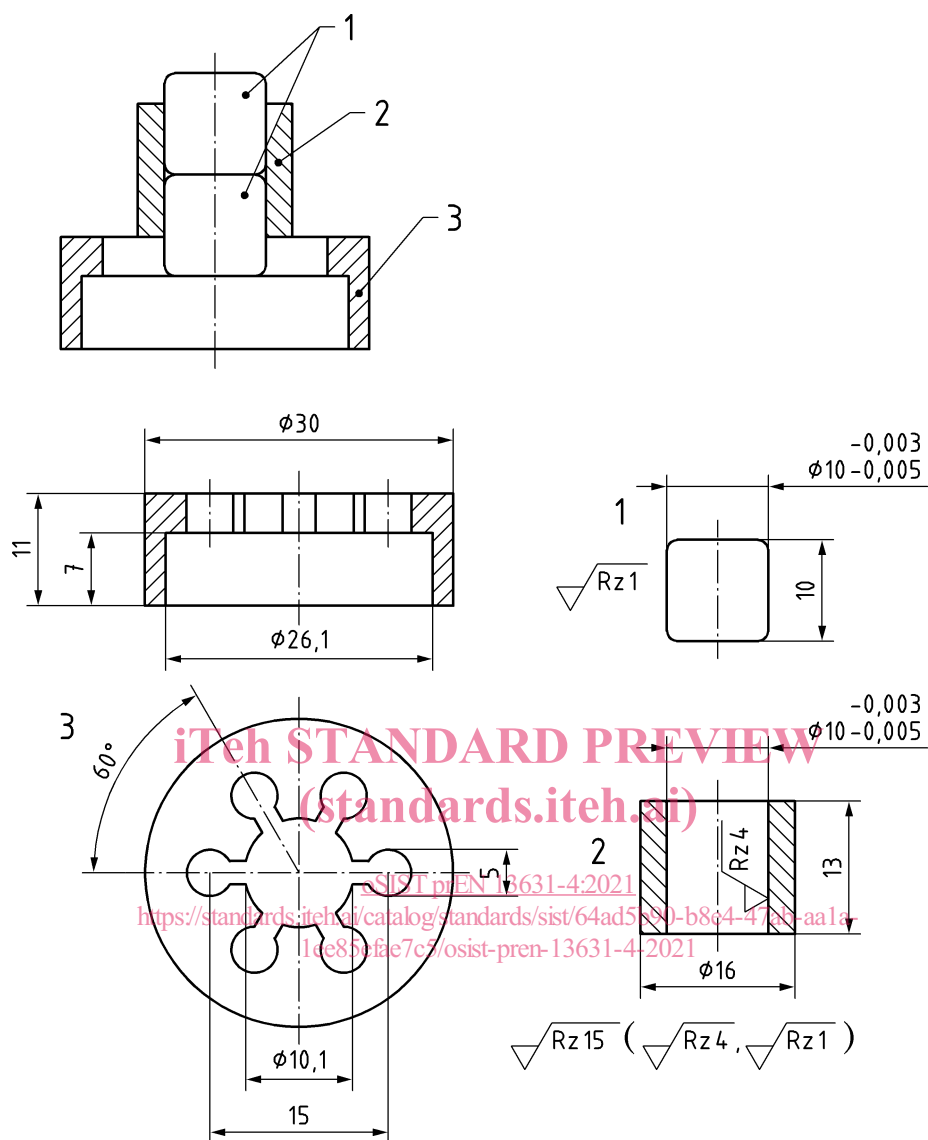
5.3 Three drop weights of mass 1 kg, 5 kg and 10 kg. Each drop weight is provided with two locating grooves to hold it between the guides as it drops. A suspension spigot, a removable cylindrical striking head and a rebound catch are screwed onto the drop weight. The striking head is made from hardened steel of the same type as the anvil (see 5.2) with a minimum diameter of 25 mm. It has a shoulder to prevent it from being forced into the drop weight by the impact. The drop weights are used in conjunction with particular drop heights to produce the impact energies as given in Table 1. The mass of each drop weight shall be within $\pm 0,1$ % of its specified mass.

Table 1 — Combinations of drop height, mass of drop weight and the resulting impact energies

Drop height [cm]	Mass of drop weight [kg]	Impact energy [J]
10	1	1
20	1	2
30	1	3
40	1	4
50	1	5
15	5	7,5
20	5	10
30	5	15
40	5	20
50	5	25
60	5	30
35	10	35
40	10	40
50	10	50

5.4 Impact device, consisting of two coaxial steel cylinders, one above the other in a hollow cylindrical steel guide ring. The cylinders are steel rollers from roller bearings with polished surfaces and rounded edges. Both the ring and the steel rollers are made of steel 100Cr6 as specified in EN ISO 683-17:2014 (HRC-Hardness 58 to 65). The dimensions of the cylinders and the ring are given in Figure 3. The impact device is placed on an intermediate anvil and centred by a locating ring with a ring of vent-holes to permit the escape of gases.

Dimension in millimetres

**Key**

- 1 steel cylinders
- 2 guide collar
- 3 locating ring

Figure 3 — Parts of the impact device and their dimensions