SLOVENSKI STANDARD
oSIST prEN 13631-3:2021

01-april-2021

Eksplozivi za civilno uporabo – Razstreliva – 3. del: Ugotavljanje občutljivosti razstreliv na trenje

Explosives for civil uses - High explosives - Part 3: Determination of sensitiveness to friction of explosives

Explosivstoffe für zivile Zwecke - Sprengstoffe - Teil 3: Bestimmung der Reibempfindlichkeit von Explosivstoffen

Explosifs à usage civil - Explosifs - Partie 3 : Détermination de la sensibilité au frottement des explosifs

Ta slovenski standard je istoveten z: **prEN 13631-3**

ICS:

71.100.30	Eksplozivi. Pirotehnika in ognjemeti	Explosives. Pyrotechnics and fireworks

oSIST prEN 13631-3:2021 **en**

EUROPEAN STANDARD

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EUROPÄISCHE NORM

DRAFT prEN 13631-3

April 2021

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Will supersede EN 13631-3:2004

English Version

Explosives for civil uses - Explosives - Part 3: Determination of sensitiveness to friction of explosives

Explosifs à usage civil - Explosifs - Partie 3 : Détermination de la sensibilité au frottement des explosifs

Explosivstoffe für zivile Zwecke - Explosivstoffe - Teil 3: Bestimmung der Reibempfindlichkeit 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.

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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 13631-3:2021) 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 13631-3:2005.

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*

1 Scope

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

This method is not applicable to liquid 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 60672-3:1997, *Ceramic and glass-insulating materials - Part 3: Specifications for individual materials*

3 Terms and definitions

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

4 Principle

A small amount of the explosive is placed on a porcelain plate and a porcelain peg is pressed onto the sample under a specified load. The plate is moved to apply a friction stimulus to the sample. The load is reduced for subsequent trials until the lowest load at which a reaction is obtained from at least one out of six trials is reached. This load level is the level of sensitiveness to friction.

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

5 Preparation of test samples

5.1 Solid substances which are easily broken up or in powdered form

Granular substances shall be passed through a sieve with a nominal aperture size of 0,5 mm.

Substances which have been compressed, cast or otherwise consolidated shall be broken into small pieces before sieving. The fraction which passes through the sieve shall be used for the test.

For substances which contain more than one constituent, the sieve fraction used for the test shall be representative of the original sample.

Take a sample of the prepared substance with a cylindrical measure of 10 mm^3 capacity (2,3 mm diameter by 2,4 mm length) and place it in the friction apparatus.

5.2 Plastic-bonded substances and other solids which are not easily broken up

These substances shall be tested in the form of discs or chips of 10 mm^3 and a minimum diameter of 4 mm.

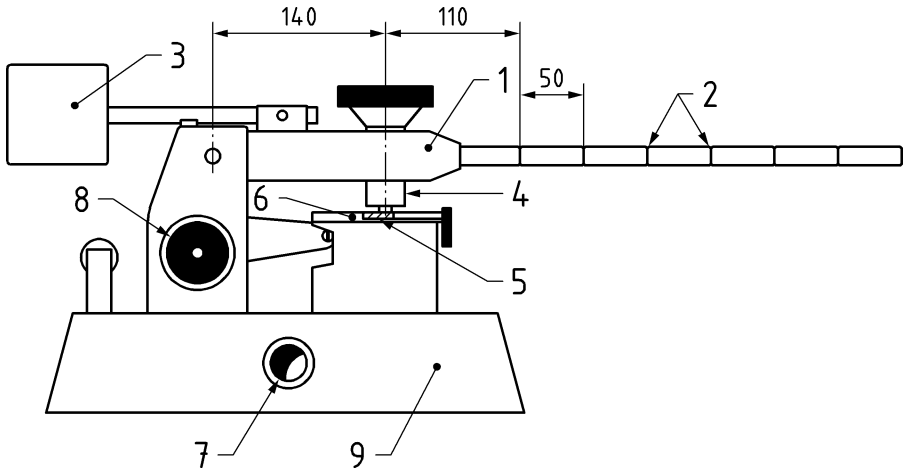
5.3 Paste-like and gel-type substances

For these substances fill a rectangular 0,5 mm thick gauge with a 2 mm × 10 mm window with the substance, place it the apparatus and remove the gauge carefully.

6 Apparatus

6.1 Friction apparatus, consisting of a cast steel base on which the friction device is securely mounted, as shown in Figure 1.

Dimension in millimetres



Key

1 pivoted lever
2 notches
3 counterweight
4 holder for porcelain peg
5 porcelain plate
6 movable carriage for porcelain plate
7 operating switch
8 wheel for manual adjustment
9 cast steel base

Figure 1 — Friction apparatus

6.2 Loading device, consisting of a pivoted lever with six notches on one side, a counterweight on the other side and a holder for a porcelain peg.

By adjusting the counterweight at one end of the lever the zero-load condition is set. When the loading device is lowered onto the porcelain plate the longitudinal axis of the porcelain peg is perpendicular to the plate. The notches on the loading device are located at distances of (110 ± 2) mm, (160 ± 2) mm, (210 ± 2) mm, (260 ± 2) mm, (310 ± 2) mm, and (360 ± 2) mm from the axis of the porcelain peg and are numbered from 1 (110 mm) to 6 (360 mm). A weight is hung from a notch by means of a ring and hook. The same ring and hook are used for all weights. There are nine different weights of 0,28 kg, 0,56 kg, 1,12 kg, 1,68 kg, 2,24 kg, 3,36 kg, 4,48 kg, 6,72 kg, and 10,08 kg, numbered from 1 to 9. All specified masses include the weight of the ring and hook.

A range of applied loads, as listed in Table 1, is achieved by the use of different weights in different notches. Loads are given in Newtons (N).

NOTE The listed values are approximate because some basic values for the calculation are rounded to obtain integer numbers as results. The actual loads do not differ by more than 2 %.

The cylindrical porcelain pegs are made from technical white porcelain and their roughened ends are rounded. The dimensions are given in Figure 2.

Dimension in millimetres

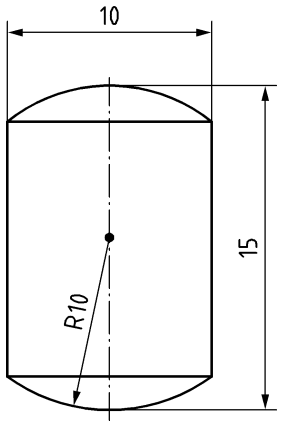


Figure 2 — Porcelain peg

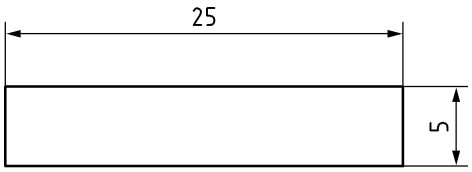
Table 1 — Possible loads for the loading device (in Newtons)

Weight no.	Notch no.					
	1	2	3	4	5	6
1	5	6	7	8	9	10
2	10	12	14	16	18	20
3	20	24	28	32	36	40
4	30	36	42	48	54	60
5	40	48	56	64	72	80
6	60	72	84	96	108	120
7	80	96	112	128	144	160
8	120	144	168	192	216	240
9	180	216	252	288	324	360

6.3 Movable carriage, running in two guides and supports a porcelain plate on which the substance under test is located.

6.4 Porcelain plates, made from technical white porcelain conforming to EN 60672-3:1997, subgroup C 111 and, before being fired in an oven, both rubbing surfaces are thoroughly roughened by being rubbed with a sponge. The dimensions are given in Figure 3.

Dimension in millimetres



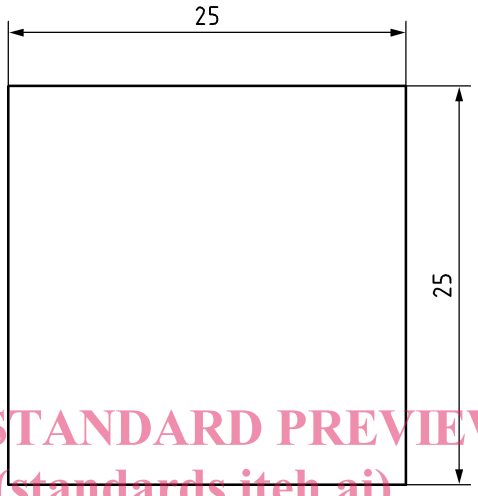


Figure 3 — Porcelain plate

The roughness measurement shall be performed with the following parameters: traverse length l_t = 15 mm, individual sampling length l_r = 2,5 mm, total sampling length $l_n = 5 \times l_r$. The direction of measurements shall be perpendicular to the traces of the sponge. The roughness R_a is measured six times on 10 plates (each side three times). The mean of these measurements shall be in the range of R_a = 6 µm to 15 µm with no individual readings less than 5 µm or greater than 19 µm.

6.5 Motor and gearing. The motor is connected via an eccentric cam and a suitable gearing to the movable carriage. It is operated by a switch located on the front of the apparatus. The gearing allows the carriage to move forward and back for a distance of (10,0 ± 0,2) mm in each direction. A single trial consists of one movement in each direction. A single operation of the switch causes the carriage to move once in each direction. Motor and gearing shall be adjusted in such a way that the carriage moves (140 ± 3) times per minute forward and back when the switch is held in the operating position.

7 Procedure

Trials with high friction loads can result in sparking even when no substance is placed on the porcelain plate. Because of this effect such trials should be observed with great care.

Applicability of the test method is ambient laboratory conditions.

The porcelain plate shall be fixed on the carriage so that the grooves of the sponge marks run transversely to the direction of movement. Attach the porcelain peg to the holder in the loading device. Place the substance to be tested on the plate and place the peg on the sample as shown in Figure 4. The peg shall rest on one end of the sample such that when the plate moves the sample travels underneath the peg. Attach the appropriate weights to the loading device.

Operate the switch once and observe the behaviour of the substance under test. Classify the observation as one of the following:

a) reaction

b) no reaction

The test shall be commenced with a load of 360 N. If in this trial a reaction is observed continue the test with stepwise lower loads until no reaction is observed. Repeat the trial at this friction load a further five times provided no reaction occurs. Otherwise the test shall be repeated with stepwise reduction of friction loads until the load is achieved at which no reaction occurs in six trials.

If in the first trial at 360 N no reaction is observed, repeat the trial five times. If in all six trials no reaction occurs the substance shall be deemed to be insensitive to friction. If a reaction is obtained reduce the load as described above.

Each part of the surface of the plate and peg shall be used only once. The two ends of the peg can be used for one trial each and the two friction surfaces of the plate can be used for three trials each.

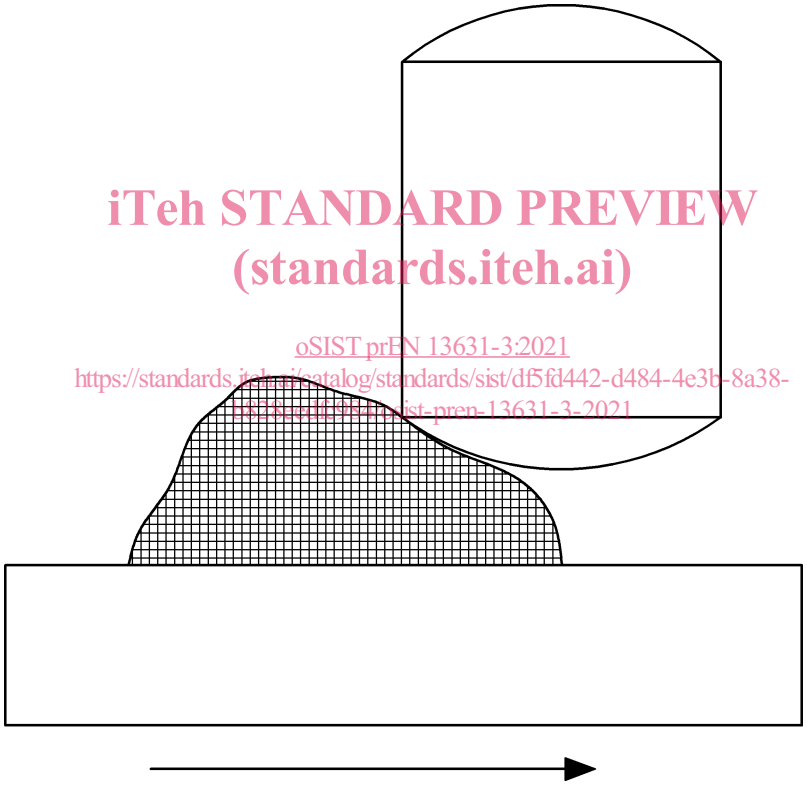


Figure 4 — Direction of porcelain peg before start of motor