



SLOVENSKI STANDARD
oSIST prEN 13630-5:2021
01-april-2021

Eksplzivni za civilno uporabo – Detonacijske in počasi goreče vžigalne vrvice – 5. del: Ugotavljanje odpornosti detonacijskih vrvic proti abraziji

Explosives for civil uses - Detonating cords and safety fuses - Part 5: Determination of resistance to abrasion of detonating cords

Explosivstoffe für zivile Zwecke - Sprengschnüre und Sicherheitsanzündschnüre - Teil 5: Bestimmung der Widerstandsfähigkeit von Sprengschnüren gegenüber Abrieb

Explosifs à usage civil - Cordeaux détonants et mèches de sûreté - Partie 5 : Détermination de la résistance à l'abrasion des cordeaux détonants

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

DRAFT
prEN 13630-5

April 2021

ICS 71.100.30

Will supersede EN 13630-5:2003

English Version

Explosives for civil uses - Detonating cords and safety fuses - Part 5: Determination of resistance to abrasion of detonating cords

Explosifs à usage civil - Cordeaux détonants et mèches de sûreté - Partie 5 : Détermination de la résistance à l'abrasion des cordeaux détonants

Explosivstoffe für zivile Zwecke - Sprengschnüre und Sicherheitsanzündschnüre - Teil 5: Bestimmung der Widerstandsfähigkeit von Sprengschnüren gegenüber Abrieb

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

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

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European foreword

This document (prEN 13630-5:2021) 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 to the CEN Enquiry.

This document will supersede EN 13630-5:2003.

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

- a) the normative references have been updated;
- b) in Clause 3, *Terms and definitions*, the terms 3.1 and 3.2 have been added;
- c) Clause 4, *Principle*, has been added;
- d) Annex A, *Range of applicability of the test method*, has been removed and the content has been revised and moved to Clause 1, *Scope*;
- e) Annex C, *Availability of abrasive strips*, has been removed and the content has been revised and moved to a footnote to 5.2.2, *Abrasive strips*;
- f) 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 13630, *Explosives for civil uses — Detonating cords and safety fuses*, is currently composed of the following parts:

- *Part 1: Requirements*
- *Part 2: Determination of thermal stability of detonating cords and safety fuses*
- *Part 3: Determination of sensitiveness to friction of the core of detonating cords*
- *Part 4: Determination of sensitiveness to impact of detonating cords*
- *Part 5: Determination of resistance to abrasion of detonating cords*
- *Part 6: Measurement of resistance to tension of detonating cords*
- *Part 7: Determination of reliability of initiation of detonating cords*
- *Part 8: Determination of resistance to water of detonating cords and safety fuses*
- *Part 9: Determination of transmission of detonation from detonating cord to detonating cord*

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- *Part 10: Determination of initiating capability of detonating cords*
- *Part 11: Determination of velocity of detonation of detonating cords*
- *Part 12: Determination of burning duration of safety fuses*

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1 Scope

This document specifies a method to determine the resistance to abrasion of detonating cords.

Applicability of the test method is ambient laboratory conditions.

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*

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

abrasive strip

strip of steel with a specific grinding pattern on its surface

3.2

explosive core

explosive material in the centre (axis) of the cord

4 Principle

The resistance to abrasion of detonating cord is assessed by subjecting test samples to the wear of an abrasive strip.

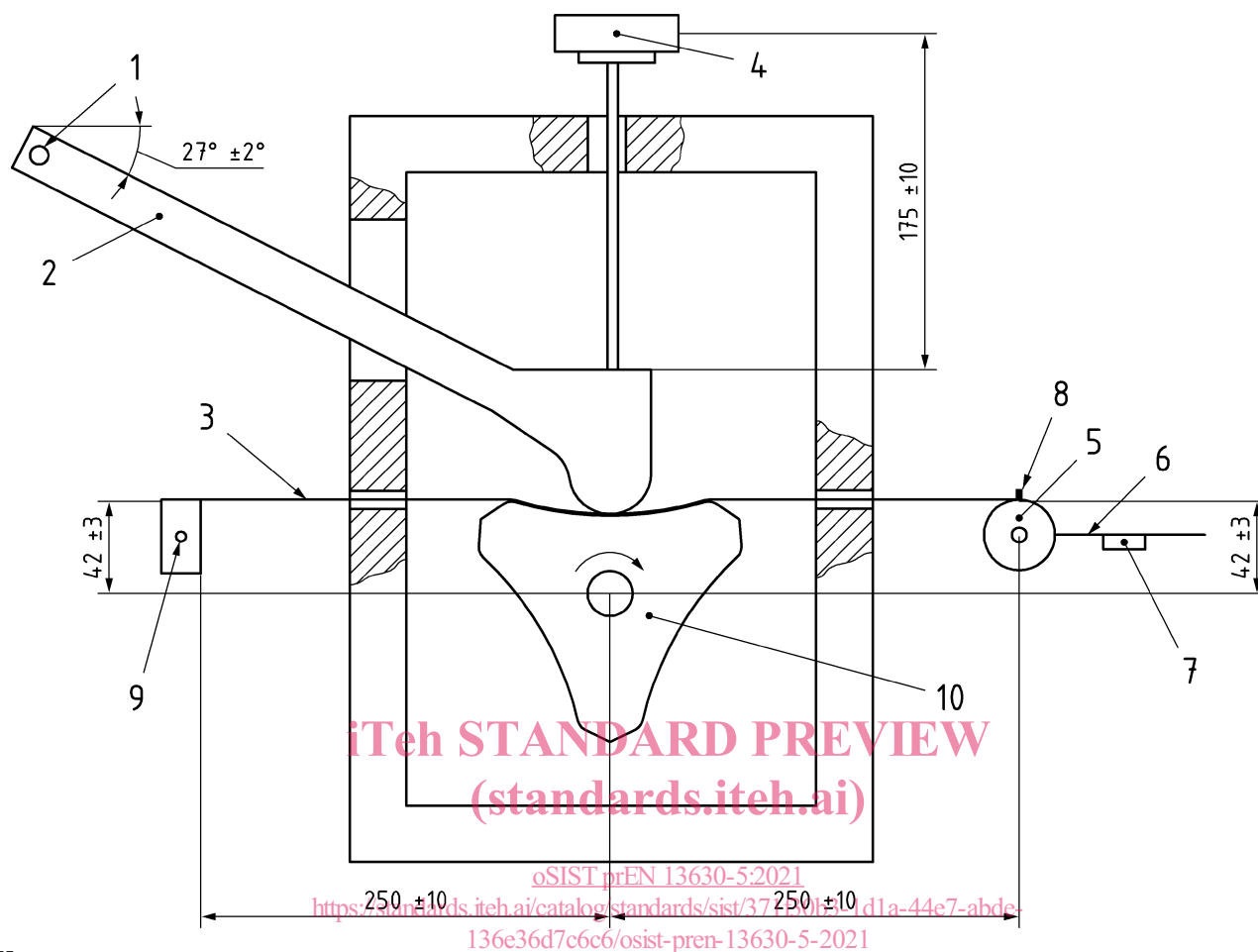
5 Apparatus

5.1 Digital timer with relay output, capable of:

- being set to a predetermined time in the range of (0 to 10) s \pm 0,01 s;
- being started (triggered) when the hinged arm is lifted by the test piece;
- automatically stopping the rotor when the predetermined time has elapsed.

5.2 Abrasion test apparatus, as shown in Figure 1, comprising the following main components.

Dimensions in millimetres

**Key**

- 1 pivot
- 2 hinged arm
- 3 detonating cord
- 4 weight
- 5 pulley
- 6 rod
- 7 weight
- 8 clamp screw for attaching the test piece
- 9 clamp for attaching the test piece
- 10 rotor

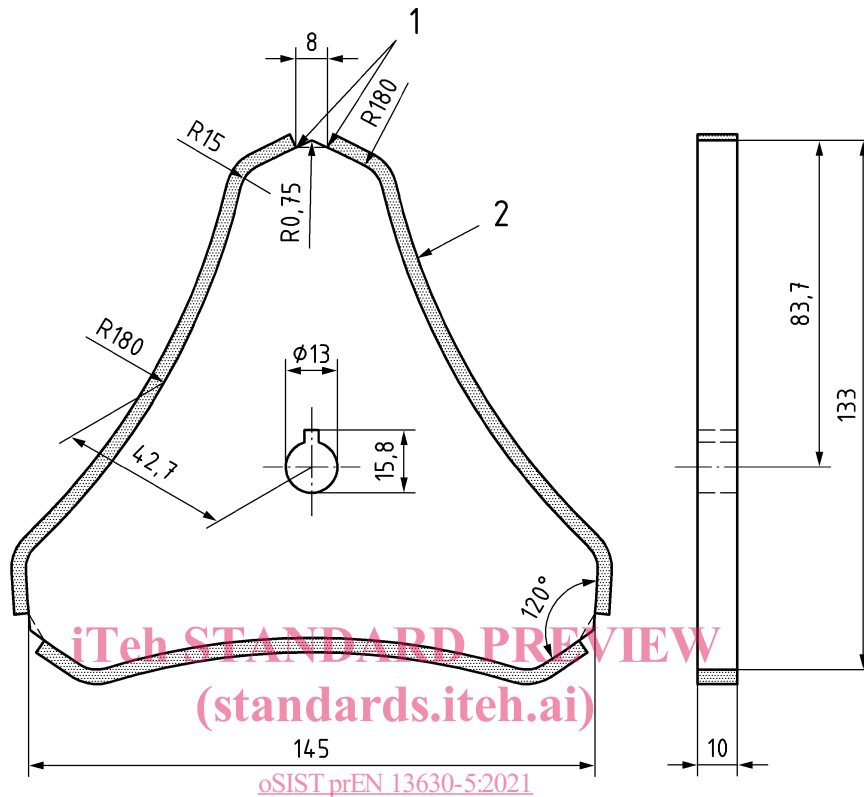
Figure 1 — Abrasion test apparatus with rotor in starting position

The weight on the rod to the right of the pulley (diameter $70 \text{ mm} \pm 1 \text{ mm}$) may hang down the right side of the pulley.

5.2.1 Steel or brass rotor, as shown in Figure 2, with a perimeter of $(453 \pm 2) \text{ mm}$ to which three abrasive strips (5.2.2) are attached by means of glue or double-sided adhesive tape. It shall be ensured that electrical contact between the abrasive strips and the rotor is made, e.g. at the slits on the rotor where the ends of the abrasive strips are inserted (see Figure 2). The rotor shall rotate at a speed of $(9,96 \pm 0,18) \text{ rpm}$, producing a mean peripheral speed of $(0,075 \pm 0,001) \text{ m/s}$.

NOTE Depending on attachment principle (glue or tape) of the abrasive strip to the rotor, the abrasive strip may have to be bent carefully using a suitable tool in order to fit properly against the surface of the rotor.

Dimensions in millimetres



Key

- 1 slit for the end of the abrasive strip
2 abrasive strip

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Figure 2 — Rotor

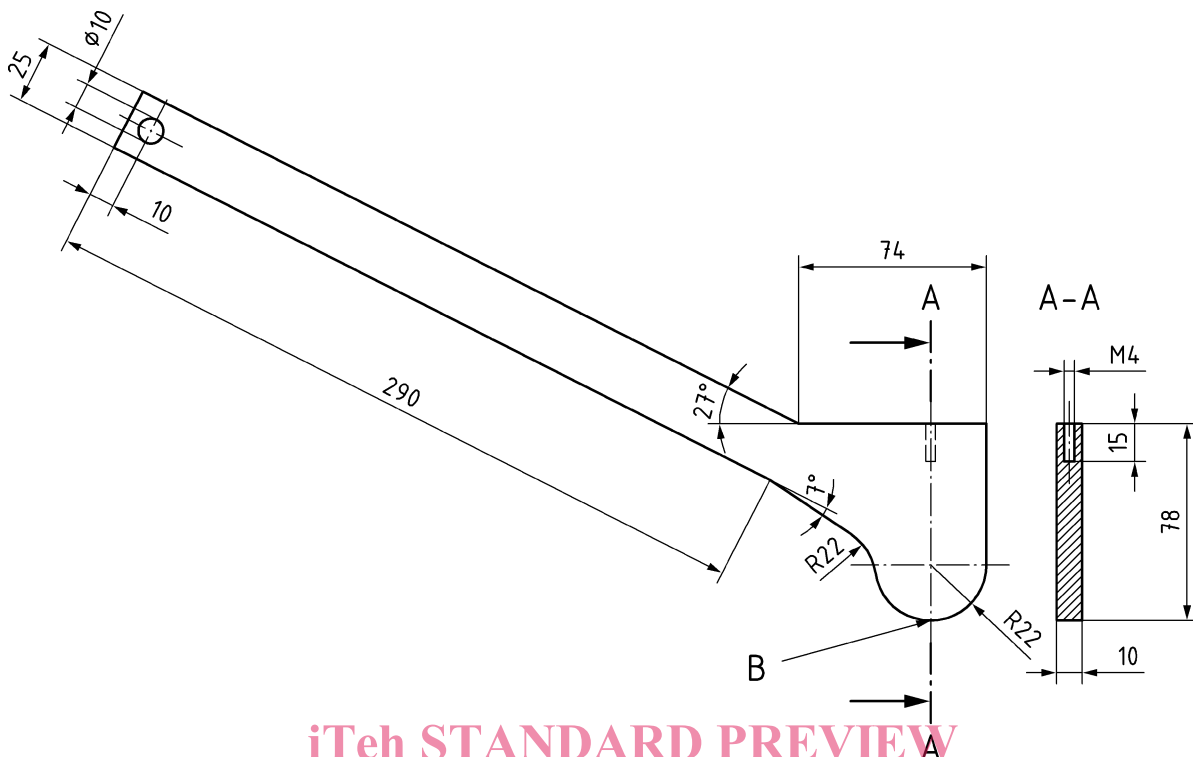
5.2.2 Abrasive strips¹, three pieces of approximately 10 mm × 145 mm each, made of grinding steel as specified in Annex A.

5.2.3 Load, to be applied to the test piece through the hinged arm (see 5.2.4).

5.2.4 Hinged arm, made of steel or brass as shown in Figure 3. In the starting position, the hinged arm shall apply a load of (8,35 ± 0,05) N to the test piece.

¹ Abrasive strips are available, for example, at: SP – Swedish National Testing and Research Institute, Department of Electronics, Box 857, S-501 15 Borås, Sweden, Tel.: +46 33 16 50 00, Fax: +46 33 13 55 02, Email: info@sp.se. This information is given for the convenience of the user of this European Standard and does not constitute an endorsement by CEN of this provider.

Dimensions in millimetres



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 Figure 3 — Hinged arm

5.2.5 Pulley, diameter (70 ± 1) mm, for applying a tensile load of $(8,1 \pm 0,5)$ N to the test piece, by means of a rod and a weight.

5.2.6 Motor, capable of maintaining a constant speed of rotation whatever load is applied to the rotor.

NOTE 1 A DC motor with an output power of at least 500 W and with a separate speed control can be used.

The rotor shall reach its specified speed of rotation 0,6 s after starting.

NOTE 2 This requirement can be verified by two electrodes about 20 mm apart, each adjusted to give electrical contact to the tips of the rotor during rotation. The electrodes are connected to a digital counter, counting elapsed time between the pulses from the two electrodes when they are touching the tips of the rotor. Comparison is made between the elapsed time during a continuous run at the specified speed and the elapsed time 0,6 s after start. First the rotor is rotated manually to an appropriate position in order for a tip of the rotor to reach the second electrode after 0,6 s.

The electrodes can also be used for calibrating the specified speed of rotation, e.g. by measuring the time for one revolution. In this case only one electrode is required.

5.3 Conditioning chamber, capable of maintaining the highest temperature ± 2 °C claimed by the manufacturer.