SLOVENSKI STANDARD
oSIST prEN 13631-1:2021

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Eksplozivi za civilno uporabo - Razstreliva - 1. del: Zahteve

Explosives for civil uses - High explosives - Part 1: Requirements

Explosivstoffe für zivile Zwecke - Sprengstoffe - Teil 1: Anforderungen

Explosifs à usage civil - Explosifs - Partie 1 : Exigences

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Explosives for civil uses - Explosives - Part 1: Requirements

Explosifs à usage civil - Explosifs - Partie 1 : Exigences

Explosivstoffe für zivile Zwecke - Explosivstoffe - Teil 1: Anforderungen

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 13631-1:2021) 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 13631-1:2005.

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) black powder has been included in Clause 1, *Scope*;

c) Clause 1, *Scope*, now states that the Essential Safety Requirements II.1.(h) and II.3.1.(c) are not addressed in this document;

d) the normative references have been updated;

e) the specifications from 4.7, *Safety at loading*, have been moved to 4.2, *Sensitiveness to friction*, and 4.3, *Sensitiveness to impact*;

f) 4.12, *Thermodynamic properties*, has been removed;

g) 4.11, *Chemical purity*, 4.12, *Environmentally friendly disposal*, 4.13, *Suitable instructions*, 4.14, *'use by' date*, and 4.15, *Burning rate of black powder*, have been added;

h) Clause 5, *Other tests*, including 5.1, *Toxic gases*, and 5.2, *Explosives for use in hazardous environments*, have been removed.

i) 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 to water*

— *Part 6: Determination of resistance to hydrostatic pressure*

— *Part 7: Determination of safety and reliability at extreme temperatures*

— *Part 10: Method for the verification of the means of initiation*

— *Part 11: Determination of the transmission of detonation of explosives*

— *Part 13: Determination of density*

— *Part 14: Determination of velocity of detonation of explosives*

1 Scope

This document specifies the requirements for explosives for civil uses, including black powder.

The Essential Safety Requirements (ESR) II.1.(h) and II.3.1.(c) of the Directive 2014/28/EU, Annex II are not addressed in this document.

NOTE 1 ESR II.1.(h) addresses the "suitability of the explosive for use in hazardous environments". The conditions and the type of hazards of "hazardous environments" depend on the field in which an explosive is to be used and are different in different countries. Since there is no universal approach to address safety under such a broad range of conditions, it is not possible to address this ESR by a verification done only with the explosive. It is common practice that national or even local provisions address very specifically the hazards found in a specific mining environment.

NOTE 2 ESR II.3.1.(c) addresses the toxicity of "fumes produced by blasting explosives intended for underground use". The health of workers can only be protected by providing strong ventilation and avoiding any contact of people with fumes produced by explosives. The conditions and efficiency of ventilation, and the applicable threshold levels are unknown during the phase of testing or design of an explosive and therefore cannot be addressed by a verification applied to the explosive alone.

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 13631-2:2021, *Explosives for civil uses — Explosives — Part 2: Determination of thermal stability of explosives*

prEN 13631-3:2021, *Explosives for civil uses — Explosives — Part 3: Determination of sensitiveness to friction of explosives*

prEN 13631-4:2021, *Explosives for civil uses — Explosives — Part 4: Determination of sensitiveness to impact of explosives*

prEN 13631-5:2021, *Explosives for civil uses — Explosives — Part 5: Determination of resistance to water*

prEN 13631-6:2021, *Explosives for civil uses — Explosives — Part 6: Determination of resistance to hydrostatic pressure*

prEN 13631-7:2021, *Explosives for civil uses — Explosives — Part 7: Determination of safety and reliability at extreme temperatures*

prEN 13631-10:2021, *Explosives for civil uses — Explosives — Part 10: Method of the verification of the means of initiation*

prEN 13631-11:2021, *Explosives for civil uses — Explosives — Part 11: Determination of the transmission of detonation of explosives*

prEN 13631-13:2021, *Explosives for civil uses — Explosives — Part 13: Determination of density*

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

prEN 13938-4:2021, *Explosives for civil uses — Propellants and rocket propellants — Part 4: Determination of burning rate under ambient conditions*

prEN 13938-7:2021, *Explosives for civil uses — Propellants and rocket propellants— Part 7: Determination of safe and reliable ignition and complete deflagration of black powder*

prEN 13857-1:2021, *Explosives for civil uses — Part 1: Terminology*

EN 13857-3:2002, *Explosives for civil uses - Part 3: Information to be provided by the manufacturer or his authorised representative to the user*

3 Terms and definitions

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

4 Requirements for detonating cords

4.1 Thermal stability

When tested in accordance with prEN 13631-2:2021, Clauses 6 and 7, the result shall be “no reaction” according to prEN 13631-2:2021, 7.2.

4.2 Sensitiveness to friction

When tested in accordance with prEN 13631-3:2021, Clause 7, the sensitiveness to friction shall be not less than 80 N.

If the instructions (4.14) from the manufacturer for the explosive only allow further processing to a different explosive, the explosive may have a friction sensitivity below 80 N.

If the instructions (4.14) from the manufacturer allow mechanical loading of the explosive, the sensitiveness to friction shall be greater than 160 N.

4.3 Sensitiveness to impact

When tested in accordance with prEN 13631-4:2021, Clause 7 the sensitiveness to impact shall be greater than 2 J.

Explosives designed and defined by the manufacturer only for further processing to a different explosive may exhibit an impact sensitivity of 2 J or lower.

If the instructions (4.14) from the manufacturer allow mechanical loading of the explosive, the sensitiveness to impact shall be greater than 30 J.

4.4 Resistance to water and wet conditions

For explosives designed to be used in water no deeper than 20 cm these shall be tested according to prEN 13631-5:2021, Clause 7. All samples shall show complete detonation according to prEN 13631-5:2021, 7.2.

Black powder as a substance cannot be used in water since humidity fully eliminates its ignitability. As a consequence, this requirement is not applicable to black powder.

4.5 Resistance to hydrostatic pressure

For explosives designed to be used under a hydrostatic pressure greater than 0,002 MPa, these shall be tested according to prEN 13631-6:2021, Clause 7 under the maximum hydrostatic pressure for use as foreseen by the manufacturer. All samples shall show complete detonation according to prEN 13631-6:2021, Clause 7.

NOTE Hydrostatic pressure, which could have a negative effect on the explosives' performance, is considered to be present when the explosive is in water deeper than 20 cm, which corresponds to 0,002 Mpa.

Black powder as a substance cannot be used in water since humidity eliminates fully its ignitability. As a consequence, this requirement is not applicable to black powder.

4.6 Safety and reliability at extreme temperatures

Explosives designed to be used in temperatures below −40 °C or above 80 °C shall be tested in accordance with prEN 13631-7:2021, 5.1 to 5.3 and all samples shall show complete detonation.

NOTE The limits for extreme temperatures of −40 °C and 80 °C are in accordance with the definition in the terminology of prEN 13857-1:2021.

4.7 Verification of the means of initiation

Explosives other than black powders, when tested in accordance with prEN 13631-10:2021, Clause 7, shall show complete detonation for all means of initiation foreseen by the manufacturer.

For black powders when tested in accordance with prEN 13938-7:2021, Clause 7, the distance over which transmission of deflagration occurs shall not be less than 400 mm.

4.8 Transmission of detonation

Explosives, other than black powder, in cartridges shall be tested in accordance with prEN 13631-11:2021, Clause 7 and successful transmission of the detonation shall be demonstrated in accordance with prEN 13631-11:2021, Clause 7.

4.9 Density

When tested in accordance with prEN 13631-13:2021, Clause 7 all density values shall be within the limits given in the specification by the manufacturer (EN 13857-3:2002, 5.3.7).

4.10 Velocity of detonation

Explosives other than black powder, when tested in accordance with prEN 13631-14:2021, Clause 7 the velocity of detonation shall be at least 90 % the value given in the specification by the manufacturer, in accordance with EN 13857-3:2002, 5.3.7.

4.11 Chemical purity

Explosives, which are a single chemical compound and with a foreseen use as substance, shall be tested by the analytical method as specified by the manufacturer in accordance with EN 13857-3:2002, 4.1 and the result shall conform with the information given by the manufacturer in accordance with EN 13857-3:2002, 5.3.8.

Chemical analysis may be performed with analytical methods different from the specification according EN 13857-3:2002, 4.1, if these are scientifically regarded to be equivalent or better.

4.12 Environmentally friendly disposal

The explosive shall be accompanied by information from the manufacturer detailing:

1) the selection of inert materials:

   a) for use as casing or used to contain the explosive;

   b) to ensure the correct functioning of the explosive;

2) the selection of the explosive substances for the foreseen purpose.

For each of the materials and explosives addressed in the above paragraph the manufacturer shall draw up information on how to dispose of these in a manner which minimize effects on the environment, taking into account the relevant economic and technical viable conditions.

NOTE This information is assessed in relation to state-of-the-art knowledge for explosives of the same kind. Suitable references to scientific work can be given to support the explanations provided.

4.13 Suitable instructions

The instructions for use, given by the manufacturer to the user, shall conform with EN 13857-3:2002, Clause 5.

4.14 'use by' date

The 'use by' date shall be provided by the manufacturer in accordance with EN 13857-3:2002, Clause 4.

4.15 Burning rate of black powder

For black powder when tested in accordance with prEN 13938-4:2021, Clause 7 each determination of the burning rate shall be within ± 20 % of that claimed by the manufacturer.