



SLOVENSKI STANDARD
SIST EN 13938-2:2005
01-februar-2005

9_gd`cn]j]`nUWj]`bc`i dcfUVc`!`Ga cXb]_]`b`fU_YfbU[cf]j U!`&`rXY.`8 c`c Yj Ub`Y
cXdcfbcgh]`dfch]`YY`fcghU] b]`YbYf[]]

Explosives for civil uses - Propellants and rocket propellants - Part 2: Determination of resistance to electrostatic energy

Explosivstoffe für zivile Zwecke - Treibladungspulver und Raketentreibstoffe - Teil 2: Bestimmung der Widerstandsfähigkeit gegen elektrostatische Energie

iTeh STANDARD PREVIEW

Explosifs a usage civil - Poudres ~~(propulsives et propergols)~~ pour fusées - Partie 2 : Détermination de la résistance a l'énergie électrostatique

[SIST EN 13938-2:2005](https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-13705161a0eb/sist-en-13938-2-2005)

Ta slovenski standard je istoveten z: [EN 13938-2:2004](https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-13705161a0eb/sist-en-13938-2-2005)

ICS:

71.100.30

SIST EN 13938-2:2005

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 13938-2:2005

<https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-157b3181a0eb/sist-en-13938-2-2005>

ICS 71.100.30

English version

Explosives for civil uses - Propellants and rocket propellants - Part 2: Determination of resistance to electrostatic energy

Explosif à usage civil - Poudre propulsive et propergol pour
fusée - Partie 2 : Détermination de la résistance à l'énergie
électrostatique

Explosivstoffe für zivile Zwecke - Treibladungspulver und
Raketentreibstoffe - Teil 2: Bestimmung der
Widerstandsfähigkeit gegen elektrostatische Energie

This European Standard was approved by CEN on 23 August 2004.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 13938-2:2005](https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-157b3181a0eb/sist-en-13938-2-2005)

<https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-157b3181a0eb/sist-en-13938-2-2005>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions.....	4
4 Apparatus	4
5 Preparation of test sample.....	5
6 Procedure	5
7 Test report	5
Annex A (informative) Range of applicability of the test method.....	8
Annex B (normative) Sieving method.....	9
Annex C (normative) Calibrating procedure for electrostatic discharge generator	10
C.1 General.....	10
C.2 Device to be tested	10
C.3 Apparatus	10
C.4 Procedure	11
C.4.1 Voltage and capacitor calibration	11
C.4.2 Discharge circuit calibration	11
C.4.3 Additional calibration in case of an additional series resistance.....	12
C.5 Requirements for the generator	13
Annex D (normative) Screening method for electrostatic discharge generator	14
D.1 Material	14
D.2 Procedure	14
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.....	15

iTech STANDARD PREVIEW

(standards.itech.ai)

SIST EN 13938-2:2005

https://standards.itech.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-

157b3181a0eb/sist-en-13938-2-2005

Foreword

This document (EN 13938-2) has been prepared by Technical Committee CEN/TC 321 "Explosives for Civil Uses", the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This European Standard is one of a series of standards with the generic title *Explosives for civil uses - Propellants and Rocket Propellants*. The other parts of this series are listed below:

- EN13938-1 *Part 1: Requirements.*
- EN13938-3 *Part 3: Determination of deflagration to detonation transition.*
- EN13938-4 *Part 4: Determination of burning rate under ambient conditions.*
- EN13938-5 *Part 5: Solid rocket propellants. Determination of voids and fissures*
- EN13938-6 *Part 6: Solid rocket propellants. Guide for the determination of integrity of inhibitor coatings.*
- EN13938-7 *Part 7: Determination of properties of black powder.*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies a method for the determination of resistance to electrostatic energy for propellants containing a mass fraction of at least 5 % of particles which pass through a 1 mm sieve. This method does not apply to black powder.

NOTE: If the mass fraction of particles smaller than 1 mm size is less than 5 % the propellant is considered to be insensitive to electrostatic energy and this test is not performed.

2 Normative references

The following referenced documents are indispensable for the application 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

EN 13857-1:2003, *Explosives for civil uses — Part 1: Terminology*.

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)*.

ISO 565, *Test sieves; Metal wire cloth, perforated metal plate and electroformed sheet - Nominal sizes of openings*

iTeh STANDARD PREVIEW

3 Terms and definitions

(standards.iteh.ai)

For the purposes of this document, the terms and definitions given in EN 13857-1:2003 and the following apply.

3.1

reaction

occurrence of report, crackling, sparking and/or flame

SIST EN 13938-2:2005

[https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-](https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-157b3181a0eb/sist-en-13938-2-2005)

[157b3181a0eb/sist-en-13938-2-2005](https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-157b3181a0eb/sist-en-13938-2-2005)

3.2

partial reaction

change of colour, opening of the cell or heat traces at the surface of the cell

4 Apparatus

4.1 Cells and covers (see Figure 1).

The cell consists of:

- a plastics disc, e.g. polyvinylchloride, thickness $(3,0 \pm 0,1)$ mm, diameter (32 ± 1) mm, with a centred drilled hole, diameter $(6,3 \pm 0,1)$ mm;
- a copper disc, thickness approximately 1 mm, diameter (19 ± 1) mm, which forms the cell base.

The plastics disc is fixed to the copper disc by means of a bead of adhesive around the outer edge.

The cover consists of a copper disc, thickness approximately 0,1 mm, diameter (16 ± 1) mm which is fixed to the upper part of the plastics disc by means of a double-sided adhesive tape.

4.2 Electrostatic energy supply (see Figure 2)

The electrostatic energy supply consists of:

- generator capable of applying a 10 kV continuous voltage;
- three capacitors: capacitance 0,001 μF , 0,01 μF and 0,1 μF , each with a relative tolerance of $\pm 10\%$;
- coaxial cable, length 1,85 m, characteristic impedance 50 Ω , capacitance 100 pF/m, attenuation 95×10^{-3} dB/m at 200 MHz;
- two brass electrodes.

and, if necessary:

- selector switch;
- change-over relay (in vacuum).

5 Preparation of test sample

Take a 100 g sample and sieve it according to the sieving method given in annex B. The fraction which passes through the 1,0 mm sieve shall be used for the test, when this fraction is greater than or equal to 5 g. If not, the test shall not be performed. The test sample shall be conditioned at $(20 \pm 5)^\circ\text{C}$ and $(60 \pm 10)\%$ relative humidity for 24 h.

6 Procedure

Calibrate the generator according to the procedure given in annex C. Alternatively, the screening procedure described in annex D can be used.

Fill the cell, i.e. the hole in the plastics disc, with a portion of the test sample, ensuring that the cover will be in contact with the propellant and without tamping. Close the cell with the cover, using double-sided adhesive tape, and maintain it at $(20 \pm 5)^\circ\text{C}$ and $(30 \pm 10)\%$ relative humidity.

Place the cell onto the lower electrode. Then bring the upper electrode in contact with the cover of the cell. Select a capacitor and charge it by applying the 10 kV voltage. Then discharge the capacitor through the electrodes.

During testing and when recovering the remainder of the test portion, observe whether reaction or partial reaction occurs, i.e. a positive event.

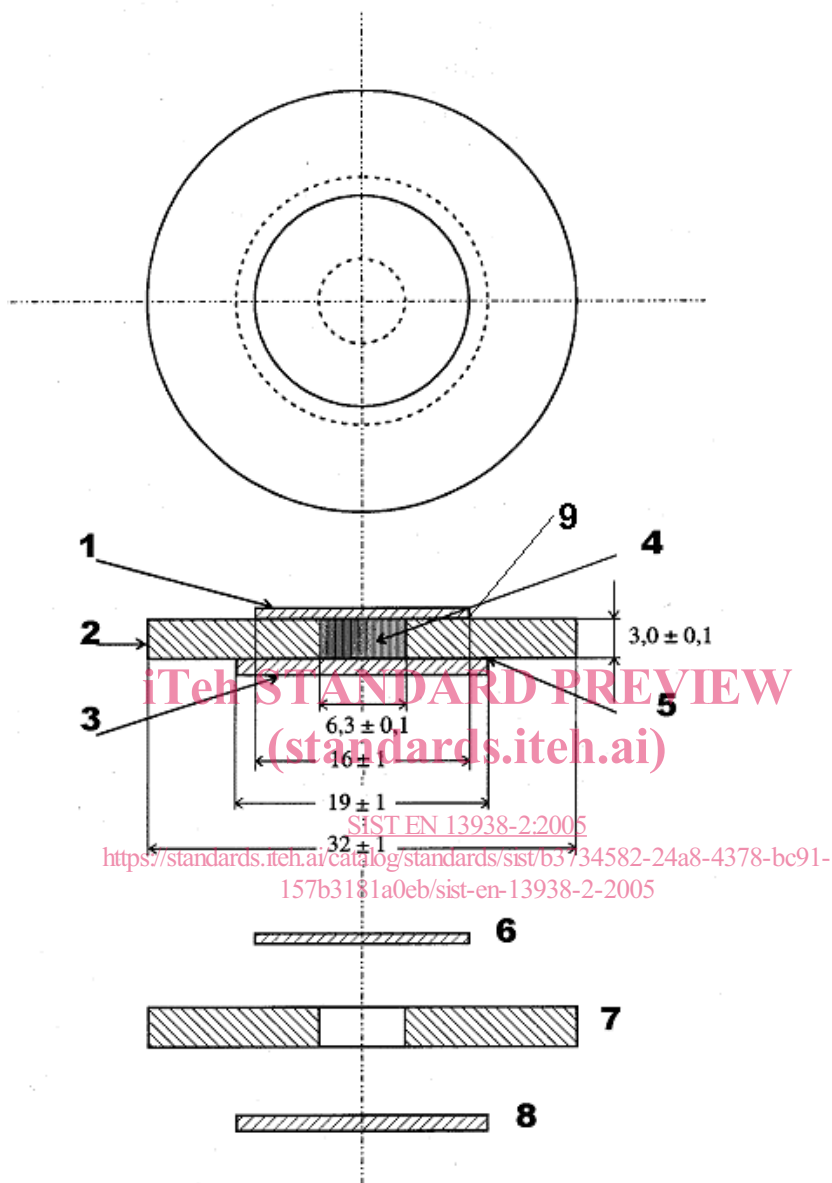
Carry out a series of test runs by using a new cell for each run. Start with a 5 J energy level (capacitance 0,1 μF). Test 20 test portions with the 5 J energy level. If a reaction or partial reaction occurs stop the test and proceed with a 0,5 J energy level (capacitance 0,01 μF) for the next 20 runs. If there is a reaction or partial reaction continue with a 0,05 J energy level (capacitance 0,001 μF) for another 20 runs unless a reaction or partial reaction occurs.

Report the test result as the limiting energy, i.e. the maximum energy level without reaction or partial reaction in a series of 20 runs. For example: if a reaction or partial reaction is obtained at the 0,05 J energy level, express the limiting energy as < 0.05 J.

7 Test report

The test report shall conform to EN ISO/IEC 17025. In addition the following information shall be given:

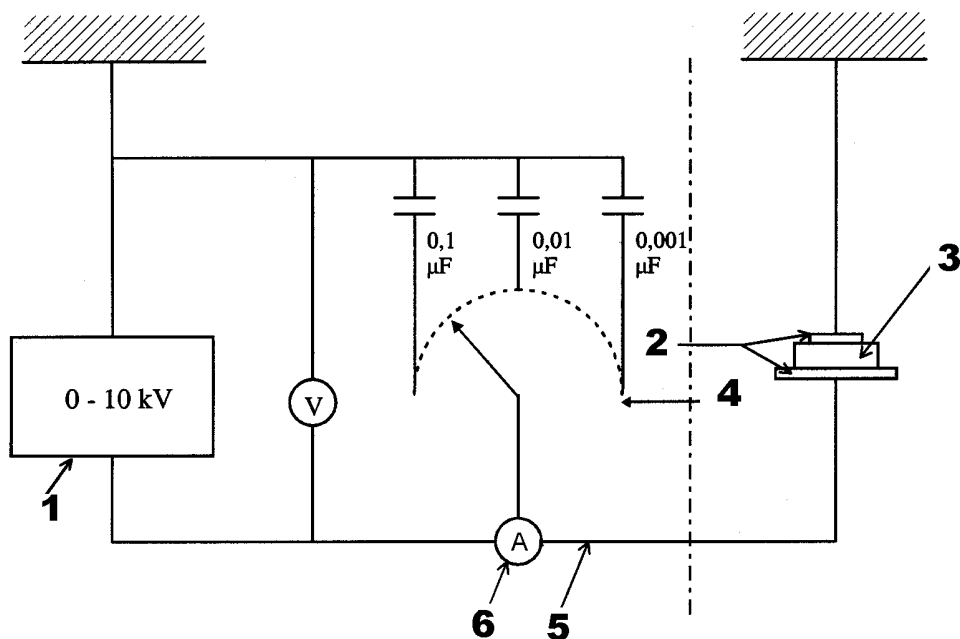
- a) reference to this standard;
- b) complete identification of the substance under test, including grain size distribution;
- c) individual test results, as: 'no reaction', 'partial reaction' or 'reaction';
- d) limiting energy.



Key

- 1 Upper copper disc
- 2 Plastics disc
- 3 Lower copper disc
- 4 Substance under test
- 5 Adhesive bead
- 6 Upper copper disc (cover)
- 7 Plastics disc
- 8 Lower copper disc (base)
- 9 Double-sided adhesive tape

Figure 1 - Cell and cover



Key

- 1 Generator
- 2 Electrodes
- 3 Cell and cover
- 4 Selector switch
- 5 Coaxial cable
- 6 Discharge switch

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 13938-2:2005
<https://standards.iteh.ai/catalog/standards/sist/b3734582-24a8-4378-bc91-157b3181a0eb/sist-en-13938-2-2005>

Figure 2 - Electrostatic energy supply