BRITISH STANDARD

BS EN
14035-7:2004

Fireworks —

Part 7: Bengal matches — Specification and test methods

The European Standard EN 14035-7:2004 has the status of a British Standard

ICS 71.100.30

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 14035-7:2004. This part of BS EN 14035 describes a type of firework that was not included in the three parts of BS 7114. Other parts in the BS EN 14035 series supersede BS 7114-1:1988, BS 7114-2:1988 and BS 7114-3:1988 and the latter three standards have been declared obsolescent.

NOTE BS 7114-1:1988, BS 7114-2:1988 and BS 7114-3:1988 are cited in The Fireworks (Safety) Regulations 1997.

The UK participation in its preparation was entrusted to Technical Committee CII/47, Fireworks, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

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Artifices de divertissement - Partie 7: Allumettes Bengales - Spécifications et méthodes d'essai

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This European Standard was approved by CEN on 14 June 2004.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Contents

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Foreword

This document (EN 14035-7:2004) has been prepared by Technical Committee CEN/TC 212 “Fireworks”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by February 2005, and conflicting national standards shall be withdrawn at the latest by February 2005

This European Standard is one of a series of standards as listed below.

EN 14035-1, *Fireworks - Part 1: Terminology.*

EN 14035-2, *Fireworks - Part 2: Categorisation.*

EN 14035-3, *Fireworks - Part 3: Aerial wheels - Specification and test methods.*

EN 14035-4, *Fireworks - Part 4: Bangers and banger batteries - Specification and test methods.*

prEN 14035-5, *Fireworks - Part 5: Batteries and combinations - Specification and test methods.*

EN 14035-6, *Fireworks - Part 6: Bengal flames - Specification and test methods.*

EN 14035-7, *Fireworks - Part 7: Bengal matches - Specification and test methods.*

EN 14035-8, *Fireworks - Part 8: Bengal sticks - Specification and test methods.*

EN 14035-9, *Fireworks - Part 9: Crackling granules - Specification and test methods.*

EN 14035-10, *Fireworks - Part 10: Double bangers - Specification and test methods.*

EN 14035-12, *Fireworks - Part 12: Flash bangers and flash banger batteries - Specification and test methods.*

EN 14035-13, *Fireworks - Part 13: Flash pellets - Specification and test methods.*

EN 14035-15, *Fireworks - Part 15: Fountains - Specification and test methods.*

EN 14035-17, *Fireworks - Part 17: Ground spinners - Specification and test methods.*

prEN 14035-18, *Fireworks - Part 18: Hand-held fountains - Specification and test methods.*

EN 14035-19, *Fireworks - Part 19: Hand-held sparklers - Specification and test methods.*

prEN 14035-20, *Fireworks - Part 20: Jumping crackers - Specification and test methods.*

prEN 14035-21, *Fireworks - Part 21: Jumping ground spinners - Specification and test methods.*

EN 14035-22, *Fireworks - Part 22: Mines - Specification and test methods.*

EN 14035-23, *Fireworks - Part 23: Non-hand-held sparklers - Specification and test methods.*

EN 14035-24, *Fireworks - Part 24: Novelty matches - Specification and test methods.*

prEN 14035-25, *Fireworks - Part 25: Party poppers - Specification and test methods.*

EN 14035-27, *Fireworks - Part 27: Rockets - Specification and test methods.*

EN 14035-28, *Fireworks - Part 28: Roman candles - Specification and test methods.*

EN 14035-29, *Fireworks - Part 29: Serpents - Specification and test methods.*

prEN 14035-31, *Fireworks - Part 31: Shells - in-mortars - Specification and test methods.*

prEN 14035-32, *Fireworks - Part 32: Snaps - Specification and test methods.*

prEN 14035-33, *Fireworks - Part 33: Spinners - Specification and test methods.*

EN 14035-34, *Fireworks - Part 34: Table bombs - Specification and test methods.*

prEN 14035-35, *Fireworks - Part 35: Throwdowns - Specification and test methods.*

EN 14035-36, *Fireworks - Part 36: Wheels - Specification and test methods.*

prEN 14035-37, *Fireworks - Part 37: Whistlers - Specification and test methods.*

prEN 14035-38, *Fireworks - Part 38: Shot tubes - Specification and test methods.*

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 requirements for the construction, performance, primary packaging and labelling of Bengal matches and the corresponding test methods. It is applicable to fireworks which are classified as Bengal match in category 1 in EN 14035-2 and which are contained in a primary pack.

It is not applicable to Bengal matches containing pyrotechnic composition that includes any of the following substances:

— arsenic or arsenic compounds;

— mixtures containing a mass fraction of chlorates greater than 80 %;

— mixtures of chlorates with metals;

— mixtures of chlorates with red phosphorus;

— mixtures of chlorates with potassium hexacyanoferrate(II);

— mixtures of chlorates with sulfur;

— mixtures of chlorates with sulfides;

— lead or lead compounds;

— mercury compounds;

— white phosphorus;

— picrates or picric acid;

— potassium chlorate with a mass fraction of bromates greater than 0,15 %;

— sulfur with an acidity, expressed in mass fraction of sulphuric acid, greater than 0,002 %;

— zirconium with a particle size of less than 40 μm.

NOTE In EN 14035-2, Bengal matches are classified as follows:

— brief description: short wooden stick partially coated (along one end) with slow-burning pyrotechnic composition, with a dot of friction-sensitive pyrotechnic composition at the tip, and designed to be hold in the hand;

— principal effects: emission of coloured flame and/or sparks.

Schemes for type testing of Bengal matches and batch testing of Bengal matches are specified in annex A and annex B respectively.

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 14035-1:2003, *Fireworks — Part 1: Terminology.*

EN 14035-2, *Fireworks — Part 2: Categorisation.*

EN 20187, *Paper, board and pulps – Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples (ISO 187:1990)*

EN ISO 536, *Paper and board - Determination of grammage (ISO 536:1995).*

EN ISO 845, *Cellular plastics and rubbers — Determination of apparent (bulk) density (ISO 845:1988).*

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003).*

EN ISO 2439, *Flexible cellular polymeric materials - Determination of hardness (indentation technique) (ISO 2439:1997, including Technical Corrigendum 1:1998).*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

ISO 3599, *Vernier callipers, reading to 0,1 and 0,05 mm.*

ISO 6344-3, *Coated abrasives - Grain size analysis - Part 3: Determination of grain size distribution of microgrits P 240 to P 2500.*

ISO 21948, *Coated abrasives – Plain sheets.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14035-1:2003 apply.

4 Construction

4.1 Means of ignition

The means of ignition shall be identified by a friction head.

Conformity to this requirement shall be verified by visual examination.

4.2 Attachment of friction head

The attachment of the friction head to the Bengal match shall be secure when tested in accordance with 8.1.

4.3 Resistance to ignition by an abrasive surface

When tested in accordance with 8.2, the friction head shall not ignite.

4.4 Protection of Bengal match

The Bengal match shall be contained in a primary pack conforming to 6.

Conformity to this requirement shall be verified by visual examination.

4.5 Material of stick

The stick of the Bengal match shall be made of wood.

Conformity to this requirement shall be verified by visual examination.

4.6 Integrity of stick

The wooden stick shall have no splits.

Conformity to this requirement shall be verified by visual examination.

4.7 Net explosive content

When determined in accordance with 8.5, a Bengal match shall have a mean net explosive content of not more than 3,0 g.

4.8 Length of uncoated end of wooden stick (handle)

When measured in accordance with 8.3, the uncoated end of a Bengal match (handle) shall have a length of at least 40 % of the total length of the Bengal match. In case of short Bengal matches the uncoated end (handle) shall have a minimum length of 20 mm.

4.9 Striking surface

The primary pack of Bengal matches shall be fitted with a striking surface for safety matches.

Conformity to this requirement shall be verified by visual examination.

5 Performance

5.1 Friction head

When tested in accordance with 8.4, the friction head shall ignite.

5.2 Principal effects

When tested in accordance with 8.4, the principal effects of the Bengal match, as given in EN 14035-2, shall be the emission of coloured flame and/or sparks.

5.3 Burning matter

When tested in accordance with 8.4, the functioning of a Bengal match shall not cause the test paper to catch fire or any holes to be burnt in the test paper.

When tested in accordance with 8.4, any flames caused by the functioning of the Bengal match shall be extinguished within 5,0 s of the pyrotechnic composition ceasing to burn.

5.4 Burning of pyrotechnic composition

When tested in accordance with 8.4, all the pyrotechnic composition of a Bengal match shall burn off.

5.5 Burning rate of pyrotechnic composition

When tested in accordance with 8.4, the pyrotechnic composition of a Bengal match shall have a burning time of more than 6,0 s for every 1,0 g of pyrotechnic composition.

6 Primary pack

The primary pack shall completely enclose the Bengal match(es) and there shall be no holes or splits in the primary pack.

The striking surface on the pack shall be covered or the pack shall be sealed.

Conformity to these requirements shall be verified by visual examination.

7 Minimum labelling requirements

7.1 General

The primary packs of Bengal matches shall be marked with the information specified in 7.2 to 7.5 and 7.7.

The specified information shall be given in the language(s) of the country in which the Bengal matches contained in the primary packs are offered for retail sale. For each language, it shall be presented as a whole and shall not be interrupted by other text. Additional text given in another language shall not conflict with the specified information.

Conformity to the requirements specified in 7.1 to 7.5, 7.6.1 and 7.7 shall be verified by visual examination.

NOTE Examples of typical labels for bangers, for which many of the marking requirements are similar to those specified for primary packs of Bengal matches in this standard, are given in EN 14035-4.

7.2 Type name and category

The type name shall be marked, in upper case, as 'BENGAL MATCHES'. If a trade name is used in addition to the type name, it shall not conflict with the principal effects of a Bengal match or with the name of another type of firework.

The category shall be marked, in upper case, as 'CATEGORY 1' or 'CAT 1'.

7.3 Safety information

7.3.1 General

Safety information shall be emphasized by use of a heading, or bold type, or similar. If necessary, instructions in addition to those specified in 7.3.2 may be given.

7.3.2 Bengal matches

Labelling shall include at least the following safety information in the order as given:

— 'Ignite on the striking surface';

— 'Use singly';

— 'Use only above non-flammable surface';

— 'Do not carry Bengal matches loose in the pocket'.

7.4 Name, address and telephone number of manufacturer or distributor or importer

Labelling shall include:

— the name or trade mark, the address and the telephone number of the manufacturer; or

— an abbreviation or a code allowing the identification of the manufacturer, and the name or trade mark, the address and the telephone number

— of his authorized distributor; or

— if the manufacturer is not established in a CEN member country, of the importer in a CEN member country.

The address shall comprise at least the town and the country.

7.5 Reference to this standard

A primary pack shall be marked with the words 'Contents conform to EN 14035-7'.

7.6 Printing

7.6.1 Labelling

Labelling shall be clearly visible, easily legible, indelible and on a single-colour background.

NOTE Printing errors which are not misleading should not be classified as faults.

7.6.2 Type size

When measured in accordance with 8.6, the type sizes shall be such that the height of the character 'X' (in upper case) is at least 2,8 mm for the information specified in 7.2, 7.3 and 7.7 and at least 2,1 mm for the other information.

7.7 Additional information on the primary pack

The primary pack shall be marked with the statement

'Must be sold as packaged'.

This statement shall appear adjacent to the type name or category. For the printing 7.6 applies.

8 Test methods

NOTE Verification of conformity to the requirements in 4.1, 4.4, 4.5, 4.6, 4.9, 6, 7.1 to 7.5, 7.6.1 and 7.7 is by visual examination.

8.1 Attachment of friction head (type test)

8.1.1 Apparatus

Mechanical shock apparatus, complying with A 5.1.1.

8.1.2 Procedure

When tested in accordance with A.5.2, the friction head shall not become loose or damaged. Record whether the friction head becomes loose or damaged. If the friction head becomes loose or damaged do not proceed with further testing of that Bengal match.

8.2 Resistance to ignition by an abrasive surface (type test and batch test)

8.2.1 Apparatus

Abrasive sheet, 93 mm × 230 mm, conforming to ISO 21948, grit P 240, conforming to ISO 6344-3.

8.2.2 Procedure

Strike the friction head of the Bengal match in the test area (8.4.1) on the rough surface of the abrasive sheet (8.2.1). Record whether the friction head ignited.

8.3 Length of uncoated end of wooden stick (type test and batch test)

8.3.1 Apparatus

Callipers, flat faced vernier callipers reading to 0,1 mm, conforming to ISO 3599.

8.3.2 Procedure

Using the callipers (8.3.1), measure and record the total length of the Bengal match and the length of the uncoated end (handle) of the Bengal match.

8.4 Performance (type test and batch test)

8.4.1 Test environment

Test area. The test area shall be a flat, horizontal, non-flammable surface inside a fume cupboard, or similar enclosed space, which is capable of preventing movement of air. A means of extracting fumes shall be provided but this shall be switched off during the test.

8.4.2 Material

Sheet of test paper, 750 mm × 750 mm, conforming to annex C.

8.4.3 Apparatus

8.4.3.1 Timing device, suitable of displaying at least one intermediate time, capable of being read to the nearest 0,1 s.

8.4.3.2 Means of clamping the novelty match in a horizontal plane.

8.4.3.3 Ignition source, red phosphorous containing rough striking surface of the primary pack.

8.4.3.4 Measuring device, capable of measuring a height of 200 mm to the nearest 1 mm.

8.4.4 Procedure

8.4.4.1 Using the measuring device (8.4.3.4), position the Bengal match by means of the clamping device (8.4.3.2) in the test area (8.4.1) in a horizontal plane 200 mm ± 10 mm above a sheet of test paper (8.4.2).

8.4.4.2 Ignite the Bengal match by striking the ignition source (8.4.3.3) at the ignition head. Start the timing device (8.4.3.1) immediately after ignition. If the Bengal match fails to ignite at the first strike try it twice more. Record whether the Bengal match was ignited. If all three attempts failed do not proceed with further testing of that Bengal match. Stop the intermediate time at the moment when all flames caused by the burning of the pyrotechnic composition are extinguished. Stop the timing device when all flames caused by the functioning of the Bengal match are extinguished.

Record the duration of the burning of the pyrotechnic composition.

Record the principal effects produced by the Bengal match.

Record whether any flames caused by the functioning of the pyrotechnic composition have been extinguished within 5,0 s after the pyrotechnic composition has ceased to burn.

Observe and record whether all the pyrotechnic composition of the Bengal match burnt off.

Record for the Bengal match whether the test paper caught fire or has any holes burnt in it.

8.4.4.3 Estimate the burning rate in seconds per gram of the pyrotechnic composition by dividing the measured burning time of the pyrotechnic composition by the mean net explosive content of the Bengal match determined in accordance with 8.5. Record the burning rate.

8.5 Determination of net explosive content (type test)

8.5.1 Material

Acetone or water, whichever is appropriate.

8.5.2 Apparatus

Laboratory balance, capable of weighing to the nearest 0,1 g.

8.5.3 Procedure

Weigh 10 Bengal matches, to the nearest 0,1 g, using the balance (8.5.2). Note the mass. Subsequently place the Bengal matches in water or an appropriate solvent (8.5.1) until all pyrotechnic composition is soaked and easy to remove. Wash the wooden sticks with water until there is no adherent composition and dry them for 1 h at 120° C. Weigh the wooden sticks after a cooling period of 2 h at room temperature to the nearest 0,1 g, using the balance (8.5.2). Note the mass.

Calculate the mean net explosive content of the pyrotechnic composition as the difference between the initial mass and the mass of the Bengal matches without any composition divided by 10. Record the mean net explosive content of the pyrotechnic composition.

8.6 Labelling (type test and batch test)

Check conformity to 7.6.2 and 7.7, for example by comparing the type sizes on the actual label with a transparent copy made from Figure 1 (for the empty frame, use the inside). Record whether the type sizes were correct.

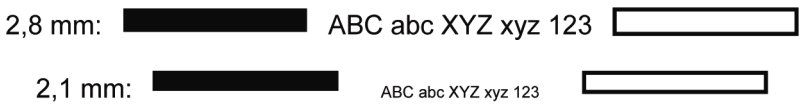


Figure 1 — Type sizes of print

Annex A
(normative)
Type testing

A.1 General

For the purposes of type testing each of the Bengal matches tested, except those used for the determination of net explosive content, shall meet the requirements 4.1 to 4.6, 4.8 5 and 7.

The Bengal matches used for the determination of net explosive content shall each conform to 4.7.

The Bengal matches subjected to mechanical conditioning in accordance with A.5 shall, additionally, conform to A.3.

Each of the primary packs examined shall conform to 4.9, 6, 7 and 8.6.

A.2 Number of Bengal matches to be tested

A total of 30 Bengal matches, selected at random from at least 5 primary packs, and 20 Bengal matches, contained in the appropriate number of complete primary packs, shall be tested, in accordance with Table A.1.

Table A.1 − Number of Bengal matches to be tested

Number of Bengal matches and primary packs to be tested	**Condition**	**Tests**
10	'As received'	- Visual examination - 8.3 - 8.4 - 8.6
10		- 8.2
10 matches in complete unopened primary pack(s)	After thermal conditioning in accordance with A.4	- Visual examination - 8.4
10 matches in complete unopened primary pack(s)	After mechanical conditioning in accordance with A.5	- Visual examination - 8.1 - 8.4
10	'As received'	- 8.5

A.3 Loose pyrotechnic composition

The mass of any loose pyrotechnic composition collected after mechanical conditioning in accordance with A.5 shall not exceed 100 mg.

There shall be no friction head collected after mechanical conditioning in accordance with A.5.

A.4 Thermal conditioning

Store the Bengal matches in complete unopened primary packs for four weeks at a temperature of (50,0 ± 2,5) °C and then for at least two days at room temperature before testing.

A.5 Mechanical conditioning

A.5.1 Apparatus

A.5.1.1 Mechanical shock apparatus, as illustrated in Figures A.1 to A.3, comprising the following components:

a) **a flat horizontal platform made of steel**, 800 mm × 600 mm, 2 mm to 3 mm thick, with a 3 mm thick rim having a height of 15 mm; the platform is reinforced with eight steel ribs, 5 mm thick with a height of 30 mm, which are welded to the underside and run from the centre to each of the four corners and to the middle of each edge;

b) **a 20 mm thick plate of fibreboard**, firmly attached to the platform by screws;

c) **a cylindrical steel boss**, diameter 125 mm and height 35 mm, located under the centre of the platform;

d) **a 284 mm long shaft**, with diameter of 20 mm, fixed to the centre of the boss;

e) **a restraining peg**, to prevent the platform from rotating; the mass of the platform assembly (items a) to e)) shall be (23 ± 1) kg;

f) **an annular, elastomeric pressure spring**, with a Shore A hardness, when determined in accordance with EN ISO 868, of 68, outside diameter 125 mm, inside diameter 27 mm and height 32 mm, on which the cylindrical boss will rest;

g) **a shallow steel cylinder**, inside diameter 126 mm, wall thickness 5 mm, outside height 30 mm, with a base 8 mm thick which has a 25 mm diameter hole drilled through the centre, to contain the elastomeric spring;

h) **a supporting steel cylinder**, outside diameter 80 mm, inside diameter 60,1 mm and height 92,4 mm, to which the shallow cylinder is screwed;

i) **a PVC liner**, outside diameter 60 mm, inside diameter 20,2 mm and height 92,4 mm, located inside the supporting cylinder and attached by a screw;

j) **a steel mounting plate**, thickness 12 mm, with a 25 mm hole drilled through the centre, to which the supporting steel cylinder is screwed;

k) **a steel base plate**, thickness 12 mm;

l) **four supporting pillars**, height 260 mm and diameter 32 mm, screwed to the mounting plate and to the base plate;

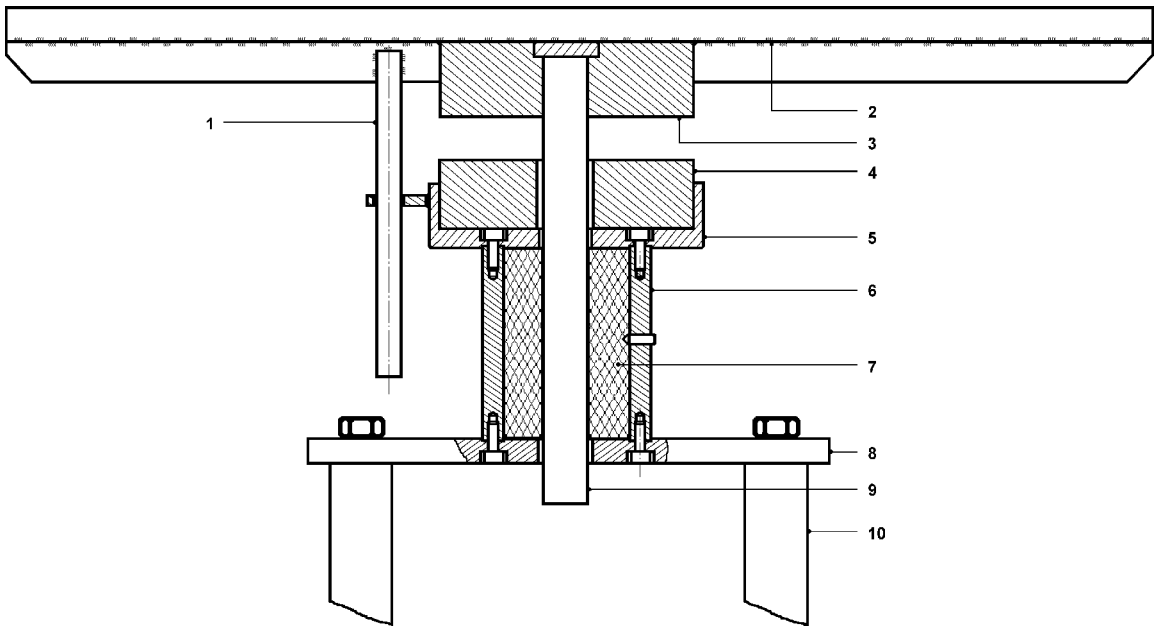
m) **a framework** to support the base plate so that the complete assembly is at a convenient working height;

n) **an attachment to the shaft**, allowing adjustment to the overall length, fitted with a cam wheel, outside diameter 30,0 mm, with a contact surface 8,0 mm wide;

o) **a cylindrical cam**, outside diameter 120 mm, inside diameter 100 mm, wall thickness 10 mm, with a 'vertical drop' of 50,0 mm between the high point and the low point;

p) **a collar**, outside diameter 50 mm, height 4,0 mm;

q) **an electric motor and suitable gearing**, to rotate the cam at a rotational frequency of 1 Hz.



Key

1 Restraining peg

2 Platform

3 Boss

4 Pressure spring

5 Cup

6 Supporting cylinder

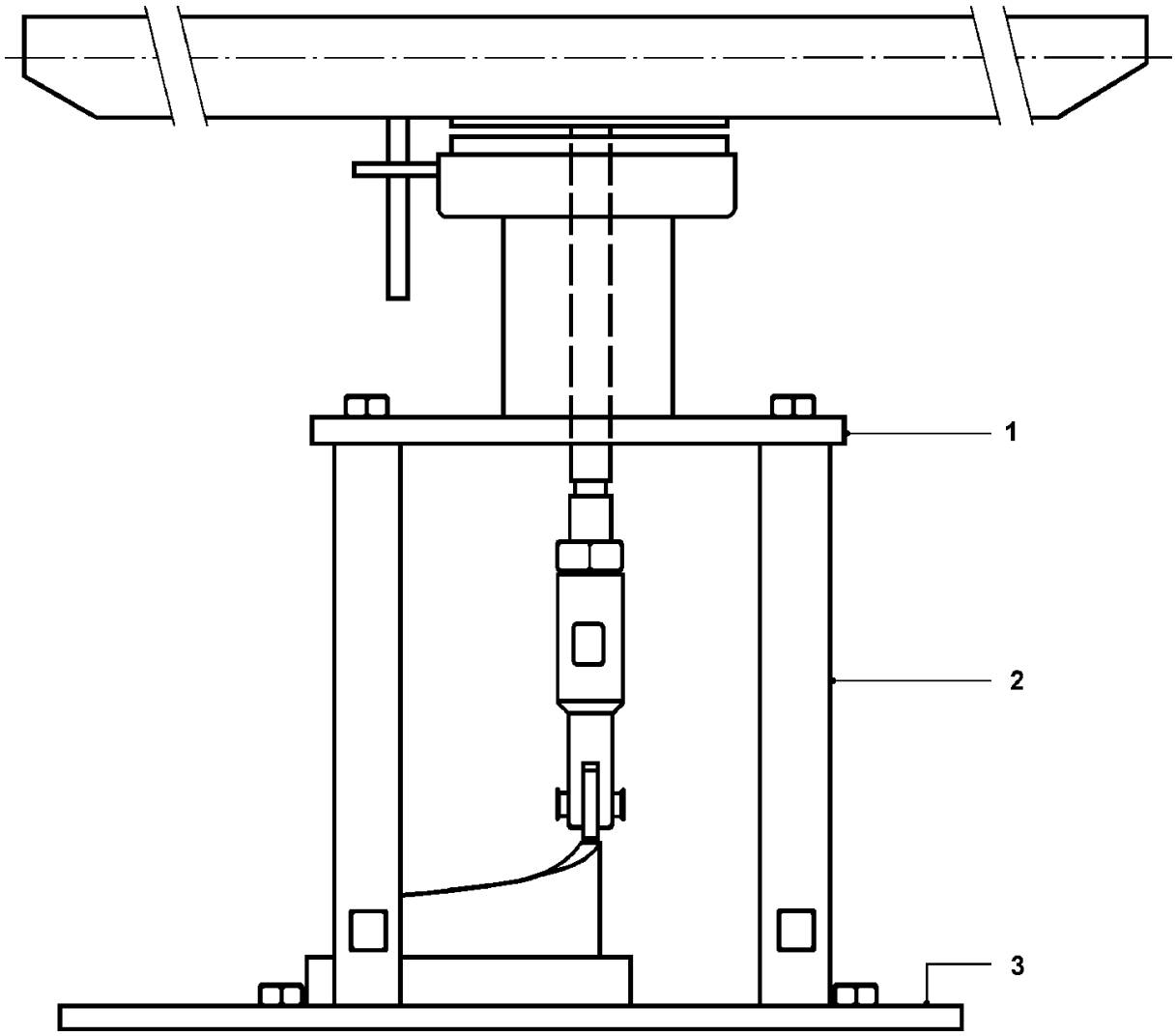
7 PVC liner

8 Mounting plate

9 Shaft

10 Supporting pillar

Figure A.1 — Detail of top section of mechanical shock apparatus



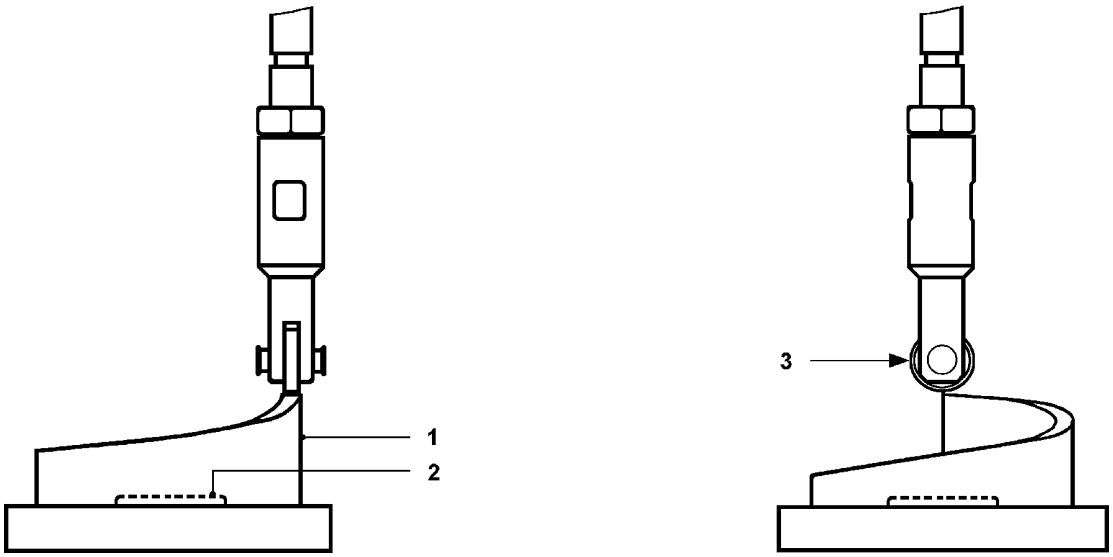
Key

1 Mounting plate

2 Supporting pillar

3 Base plate

Figure A.2 — General assembly of mechanical shock apparatus



Key

1 Cam

2 Collar

3 Cam wheel

Figure A.3 — Detail of shaft attachment and cam assembly of mechanical shock apparatus

A.5.1.2 Cellular rubber sheet, 100 mm thick. The material used shall have an apparent density, when determined in accordance with EN ISO 845, of 35 kg/m^3 and an indentation hardness check, when determined in accordance with EN ISO 2439, of 215 N.

A.5.1.3 Laboratory balance, capable of weighing to the nearest 1 mg.

A.5.2 Procedure

A.5.2.1 Conditioning. Place a sheet of paper on the platform of the mechanical shock apparatus (A.5.1.1) and place the appropriate number of complete, unopened primary packs on top of the sheet of paper. Cover the packs with the cellular rubber sheet (A.5.1.2) and secure it to the platform around its edges. Start the machine so that the platform is raised and dropped onto the elastomeric spring, having adjusted the drop height (to about 25 mm) so that the maximum deceleration of each shock is 490 m/s^2 and the duration of each shock impulse is about 60 ms. Continue running the machine for 1 h.

A.5.2.2 Collection of loose pyrotechnic composition. At the end of the 1 h period stop the machine and remove the packs. Carefully open the primary packs, remove the Bengal matches and empty any loose material on to the sheet of paper. Separate any pyrotechnic composition from the other loose material and weigh this pyrotechnic composition to the nearest 1 mg using the balance (A.5.1.3). Record whether the mass of the pyrotechnic composition exceeds 100 mg. Record whether any friction head becomes loose or damaged.

A.6 Number of primary packs to be examined

Examine at least five primary packs to assess conformity to 4.9, 6, 7 and 8.6. The packs to be examined shall include all those whose contents are used for the tests described in 8.

A.7 Test report

The test report shall include at least the following information, with items n) to v) being given for each Bengal match tested:

a)	*	a reference to this standard, i.e. EN 14035-7;
b)	*	complete identification of the sample under test;
c)	*	date of completion of the testing;
d)	*	whether the means of ignition is identified by a friction head;
e)	*	the means by which the Bengal match is protected;
f)		whether the friction head ignited when struck on the abrasive surface;
g)	*	for each primary pack examined, whether the pack completely enclosed the Bengal match(es) and whether there were any holes or splits in the pack;
h)	*	whether the primary pack is fitted with a striking surface and whether the striking surface on the pack is covered or the pack is sealed;
i)		mean net explosive contents of the Bengal matches tested for that purpose, in grams and whether the mean net explosive content of each Bengal match tested for that purpose exceeds 3,0 g;
j)	*	for each primary pack examined, whether the type name, category, safety information, name and address and telephone number of the manufacturer[1)] or distributor[1)] or importer[1)] and the reference to this standard were correctly stated on the pack;
k)	*	for each primary pack examined, whether the statement 'Must be sold as packaged' was correctly stated on the pack;
l)	*	for each primary pack examined, whether the specified information on the pack was clearly visible, easily legible, indelible, on a single-colour background and whether the type sizes were correct;
m)		whether the mass of any loose pyrotechnic composition collected after mechanical conditioning exceeded 100 mg and whether there was any loose friction head collected after mechanical conditioning;
n)	*	materials of the stick and whether it was wooden;
o)	*	whether there were any splits in the wooden stick;
p)	*	length of the uncoated end of the wooden stick and whether the length was at least 40 % of the total length of the Bengal match or for short Bengal matches at least 20 mm;
q)	*	whether the friction head ignited in one of three attempts;
r)	*	whether the Bengal match produced its principal effects;
s)	*	whether the test paper caught fire or has any holes in it;
t)	*	whether all the pyrotechnic composition burnt off;
u)	*	if applicable, whether any flames caused by the functioning of the Bengal match were extinguished within 5,0 s of the Bengal match ceasing to function;
v)	*	burning time of the pyrotechnic composition and whether the burning time was not more than 6,0 s for every 1,0 g of pyrotechnic composition.

NOTE The asterisks in the above list are referred to in B.5.

[1)] Whichever applies.

Annex B
(normative)
Batch testing

B.1 General

For the purposes of batch testing, acceptance sampling in accordance with B.2 to B.6 shall be applied.

B.2 Sampling plans

Sampling shall be in accordance with ISO 2859-1 using double sampling plans and applying the switching procedures for normal, tightened and reduced inspection. Inspection level S-4 shall apply.

B.3 Unit of product

For Bengal matches which are supplied in primary packs, the unit of product for the purpose of sampling to assess compliance with the requirements for the Bengal match shall be an individual Bengal match and the sample shall comprise the contents of the appropriate number of primary packs.

The primary pack shall be the unit of product for the purpose of sampling to assess compliance with the requirements for the actual packs themselves and the appropriate number of primary packs shall be sampled separately and examined for faults.

B.4 Nonconformities

Nonconformities shall be classed in accordance with Table B.1.

Table B.1 − Summary of requirements and types of nonconformity for batch testing

Ref.	Property	Requirement	Test method	Type of nonconformity [a]
4.1	Identification of means of ignition	Friction head	Visual	Major
4.3	Resistance to ignition by an abrasive surface	Shall not ignite	8.2	Major
4.4	Protection of Bengal match	Shall be contained in a primary pack	Visual	Minor
4.5	Material of stick	Wood	Visual	Critical
4.6	Integrity of stick	No splits	Visual	Major
4.8	Length of uncoated end of stick	See 4.8	8.3	Minor
4.9	Striking surface	See 4.9	Visual	Minor
5.1	Friction head	Shall ignite	8.4	Major
5.2	Principal effects	Emission of coloured flames and/or sparks	8.4	Minor
5.3	Burning matter	Test paper shall not catch fire or have any holes	8.4	Major
5.3	Extinguishing of any flames	≤ 5,0 s after the pyrotechnic composition ceases to burn	8.4	Minor
5.4	Burning of pyrotechnic composition	All the pyrotechnic composition shall burn off	8.4	Major
5.5	Burning rate of pyrotechnic composition	≥ 6,0 s for 1,0 g	8.4	Major
6	Integrity of primary pack	Pack shall completely enclose the Bengal match and shall have no holes or splits	Visual	Major
6	Protection of striking surface or sealing of pack	Striking surface shall be covered or pack shall be sealed	Visual	Minor
7	Labelling of pack	Shall be correctly stated and legible and on a single colour background	Visual	Minor
7	Type sizes	See 7.6.2 and 7.7	8.6	Minor
[a] See 3.32, 3.33 and 3.34 in EN 14035-1:2003.				

B.5 Test report

The test report shall include at least the items marked with an asterisks in A.7 (with items n) to v) being given for each Bengal match tested).

B.6 Acceptance or rejection of a batch

B.6.1 General

The acceptance criteria in B.6.2 to B.6.5 shall be applied separately to the actual Bengal match and to the primary packs (see B.3).

B.6.2 Nonconforming units

Acceptance or rejection of the batch shall be determined by the number of nonconforming units of each type, in accordance with B.6.3 to B.6.5.

NOTE Acceptance or rejection of the batch is determined by the number of nonconforming units of each type and not necessarily by the number of nonconformities found.

B.6.3 Critical nonconforming units

For critical nonconforming units an Acceptance Quality Limit (AQL) of 0,65 % shall apply. If the batch fails to meet this criterion, it shall be rejected. Any critical nonconforming units shall not also be counted as major nonconforming units or minor nonconforming units.

B.6.4 Major nonconforming units

For major nonconforming units an AQL of 2,5 % shall apply. If the batch fails to meet this criterion, it shall be rejected. Any major nonconforming units shall not also be counted as minor nonconforming units.

B.6.5 Minor nonconforming units

For minor nonconforming units an AQL of 10 % shall apply. If the batch fails to meet this criterion, it shall be rejected.

Annex C
(normative)

Specification for test paper

C.1 Requirements

When determined in accordance with EN ISO 536, after conditioning as specified in EN 20187, the grammage of the paper shall be (70± 5) g/m^2.

The test paper shall be subjected to the scorch test described in C.2 immediately prior to use. The highest sheet in the stack which shows no sign of discoloration after being subjected to the scorch test shall be sheet '6', '7', '8', '9' or '10'.

C.2 Scorch test

C.2.1 Material

Cigarette(s), untipped, of length (70 ± 4) mm, diameter (8,0 ± 0,5) mm and mass (1,0 ± 0,1) g, and having a smouldering rate of (9,5 ± 3,0) min over 40 mm distance when determined in accordance with annex D.

C.2.2 Apparatus

Metal plate, mass (225 ± 1) g, dimensions as shown in Figure C.1, with a rectangular hole cut in the centre (as shown). The mass of the plate shall be reduced to 225 g by drilling holes symmetrically around the plate as necessary.

NOTE The four holes in Figure C.1 are shown as an example only.

C.2.3 Test specimen

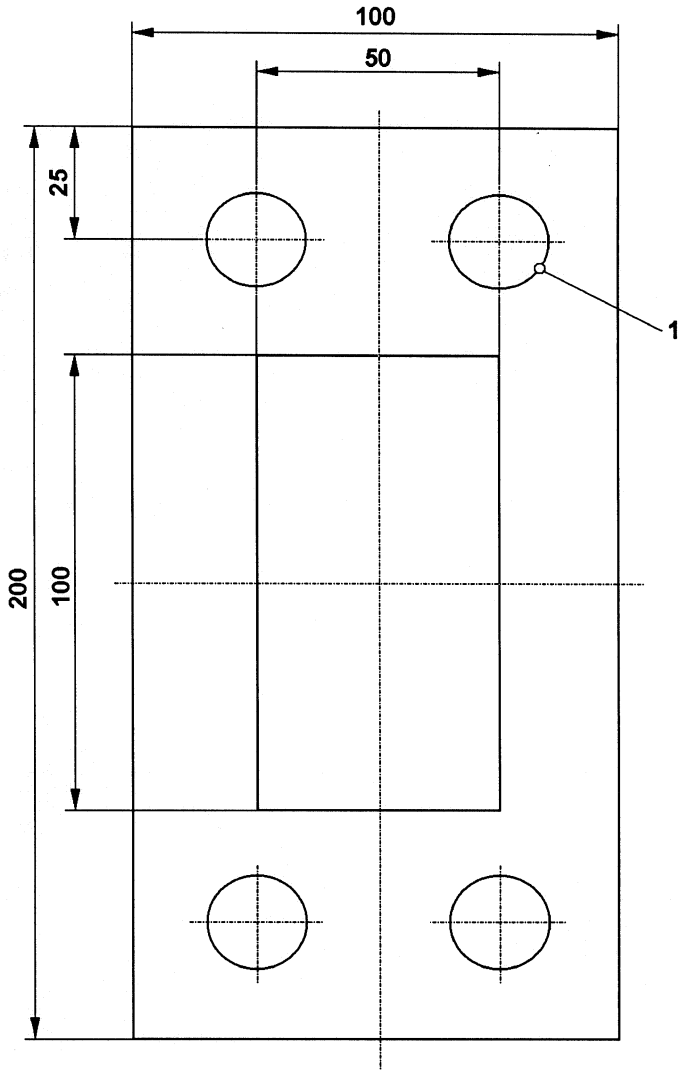
Take twelve sheets of the paper, each at least 205 mm × 105 mm, number them consecutively (for identification) and assemble them in a stack, with the matt surfaces (if any) uppermost and sheet '1' on the top.

C.2.4 Procedure

C.2.4.1 Place the test specimen (C.2.3) on a flat, smooth, wooden surface and place the metal plate (C.2.2) on top of the stack (i.e. on top of sheet '1') so that the paper projects out around the edges. Light a cigarette (C.2.1) and allow it to burn at least 10 mm along its length.

C.2.4.2 Place the burning cigarette on the exposed paper in a position which is at least 10 mm from any edge of the rectangular hole in the metal plate, and so that it will burn inwards, and then remove the cigarette after 60 s.

Dimensions in millimetres



Key

1 Mass adjustment, holes to be kept symmetrical

Thickness: 2,45 mm

Mass: (225 ± 1) g

Figure C.1 – Metal plate for scorch test

C.2.4.3 Repeat the operations described in C.2.4.2 a further four times, each time selecting a different position which is at least 10 mm from any edge and at least 10 mm from any scorch mark. If the cigarette has burnt more than 40 mm along its length, light a new cigarette, allow it to burn 10 mm and then use it for the next position.

C.2.4.4 Examine each sheet of paper and determine which is the highest sheet (i.e. that with the lowest number) which shows no sign of discoloration.

Annex D
(normative)

Method for determination of smouldering rate of cigarette

Condition the cigarette for at least 16 h, immediately before the test, at a temperature of (23 ± 2) °C and at (50 ± 5) % relative humidity.

Mark the cigarette at 10 mm and 50 mm from the end to be lit. Ignite the cigarette and draw air through it until the tip glows brightly. Not less than 5 mm and not more than 8 mm of the cigarette shall be consumed in this operation. In draught-free air, impale the cigarette horizontally on a horizontal spike inserted not more than 13 mm from the unlit end. Record the time taken for the cigarette to smoulder from the 10 mm mark to the 50 mm mark.

Annex E
(informative)
A-Deviations

A-Deviation: National deviations due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC members.

This European Standard does not fall under any Directive of the EC.

In the relevant CEN/CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

France

In France, the following regulations are binding in relation to the content of this standard

Subclause	Deviation
A.4	(Arrêté du 1er juillet 1991 portant approbation du Recueil des épreuves d'agrément des artifices de divertissement publié au J.O.R.F. du 20 juillet 1991). The duration of the test for the thermal conditioning shall be 72 h.

8.6.1 Ireland

Subclause	Deviation
Whole standard	On safety and security grounds, the sale of consumer fireworks (of any category) to the general public, is not permitted under current Government policy. Importation licences can be issued, but only for fireworks used for organised displays, conducted by professional competent operators. This policy is referenced in the “Guidance Document on Organised Fireworks Displays July 2003” issued by the Irish Government Department of Justice, Equality and Law Reform.

Netherlands

Subclause	Deviation
4.6	In Appendix I article 5 of 'Regeling nader eisen aan vuurwerk' the maximum amount explosive content shall not be more than 2,5 gram.

Spain

Subclause	Deviation
A.5	RD 230/1998 (16.02.1998) Reglamento de Explosivos - Explosives Regulation ITC nº 8 Catalogación de artificios pirotécnicos - Fireworks cataloguing Compulsory for every item being catalogued mechanical conditioning (2 hours)

Switzerland

In der Schweiz ist das "Zulassungsverfahren und die technischen Anforderungen für pyrotechnische Gegenstände (Feuerwerk)" und die "Provisorische Liste der pyrotechnischen Spielwaren" zum Bundesgesetz vom 25. März 1977 über explosionsgefährliche Stoffe (Sprengstoffgesetz) und dessen Verordnung vom 27. November 2000(Sprengstoffverordnung) für den Inhalt dieser Norm bindend.

Subclause	Deviation
4.4	Ein brennendes Streichholz wird sofort nach dem Anreiben flach auf die von der Ursprungsverpackung geschützte Anzündstelle gelegt und bis zum Erlöschen dort gelassen. Eine brennende Zigarette wird flach auf die von der Ursprungsverpackung geschützte Anzündstelle gelegt und dort 3 Minuten liegen gelassen. Der Gegenstand darf nicht angezündet werden.
7.1 – 7.4	Zusätzlich sind auf der Ursprungsverpackung anzugeben: das Jahr der Herstellung·und die dem Produkt zugewiesene CH-Zulassungsnummer·und das Bruttogewicht Hinweise: Nur im Freien verwenden Wenn erforderlich:· "Gebrauchsanweisung auf der Verpackung / dem beigelegten Packzettel."

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