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IS 13227 (1991): Fireworks whistles [CHD 26: Explosives and Pyrotechnics]



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भारतीय मानक

आतिशबाजी सीटी — विशिष्ट

*Indian Standard*

**FIREWORKS WHISTLE — SPECIFICATION**

UDC 662.111.5

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**BUREAU OF INDIAN STANDARDS**  
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## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Explosives and Pyrotechnics Sectional Committee had been approved by the Chemical Division Council.

A fireworks whistle is a cylindrical shell of paper charged with a limited amount of pyrotechnic materials in the lower portion with its top portion remaining empty. It is generally used for the purpose of entertainment. The fireworks whistles are also popularly known as 'SIREN'. The fireworks whistles are safe to use when operating under the conditions of well controlled emission of showers of sparks accompanying the whistling sound. The mass and composition of pyrotechnic charge, the quick match and the construction of the shell of fireworks whistles are required to be approved by the Chief Controller of Explosives.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( *revised* )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# Indian Standard

## FIREWORKS WHISTLE — SPECIFICATION

### 1 SCOPE

This standard prescribes the requirements and methods of sampling and test for fireworks whistles.

### 2 REFERENCES

The Indian Standards listed below are the necessary adjuncts to this standard:

IS No.	Title
301 : 1982	Potassium nitrate for explosive and pyrotechnic compositions ( <i>second revision</i> )
1070 : 1977	Water for general laboratory use ( <i>second revision</i> )
4396 : 1981	Barium nitrate for explosive and pyrotechnic compositions ( <i>first revision</i> )
4905 : 1968	Methods for random sampling
12276 : 1988	Dextrin for explosives and pyrotechnic industry

### 3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

#### 3.1 Quick Match

The quick match shall be soft in nature and shall consist of strands of cotton or jute yarn dipped and covered with a pyrotechnic composition approved by the Chief Controller of Explosives.

#### 3.2 Fireworks Whistle

A fireworks whistle shall consist of a cylindrical shell of paper charged with a limited amount of pyrotechnic materials in the lower portion with its top portion remaining empty. There shall be a number of holes in the top empty portion of the shell to produce a whistling sound. A 'quick match' shall also be fitted at the centre of the shell for ignition. The composition of pyrotechnic charges shall be approved by the Chief Controller of Explosives.

### 4 TYPE

The fireworks whistles shall be of the following two types depending on their physical parameters:

Type A	Big
Type B	Small

### 5 REQUIREMENTS

**5.1** The fireworks whistle of both the types shall emit showers of stars and streamers on ignition. The emission shall be accompanied by a hissing or whistling sound. The emission shall be only through the mouth and in no case, through the walls or the bottom of the shell of fireworks whistles.

**5.2** The fireworks whistle shall not burst or crack at any instance. It shall not form projections, or tip over emitting showers along the horizontal direction.

#### 5.3 Quick Match

The length of quick match and rate of burning shall be so appropriated as to provide 10 to 15 seconds for Type A and 4 to 6 seconds for Type B fireworks whistles before the emission starts. Test shall be conducted according to the method prescribed in Annex A.

**5.4** The fireworks whistles shall also pass the tilting-over test when tested in accordance with the method prescribed in Annex B.

**5.5** The mass of the pyrotechnic composition ( *see Annex C* ), the duration of emission ( *see Annex D* ), and the height of the emitting showers of stars for Type A and Type B fireworks whistles shall be as given below:

	Type A	Type B
Mass of pyrotechnic composition, g	4.5 to 6.0	2.5 to 3.0
Duration of emission, seconds	$60 \pm 5$	$15 \pm 2$
Height of emission showers of stars, m	7 to 10	6 to 8

### 6 PHYSICAL PARAMETERS

**6.1** The shell of the fireworks whistles shall be made of paper or paper board or of any other material approved by the Chief Controller of Explosives. The fireworks whistles shall be free from any splits, dents or bungs. The quick match fitted in the fireworks whistle shall not be loose ( *see Annex E* ) or missing. The intensity of the whistling sound should be sharp and duration of emission of sound shall not be more than 15 seconds for Type A and not more than 30 seconds for Type B fireworks whistles.

**6.2** Other physical parameters of both the Types, Type A and Type B fireworks whistles shall be as given below:

	Type A	Type B
Length of the fireworks whistle shell, cm	$24.0 \pm 1.0$	$12.0 \pm 0.5$
Diameter of the fireworks whistle shell, cm	$3.0 \pm 0.5$	$1.5 \pm 0.5$
Length of the empty chamber of the fireworks whistle shell, cm	$12.0 \pm 1.0$	$6.0 \pm 0.5$
Number of holes in the empty chamber of the fireworks whistle shell, Min	12	6
Length of the fuse (Quick match), cm	$20.0 \pm 1.0$	$18.0 \pm 0.5$

### 6.3 Composition of Pyrotechnic Charges

**6.3.1** The fireworks whistle shall contain a mass of a mixture of pyrotechnic material approved by the statutory authority. The mixture shall consist of following chemicals:

- Barium nitrate (see IS 4396 : 1981).
- Potassium nitrate (see IS 301 : 1982).
- Aluminium powder.
- Aluminium-Magnesium alloy powder.

#### 6.3.2 Quick Match

The quick match shall contain a mass of a mixture of pyrotechnic material approved by the Chief Controller of Explosives.

The mixture shall consist of the following chemicals:

- Potassium nitrate (see IS 301 : 1982).
- Charcoal powder.
- Dextrin (see IS 12276 : 1988).

**6.3.3** The material shall not show presence of chlorate or sulphur when tested according to the method prescribed in Annex F.

## 7 CONSTRUCTION

### 7.1 Shell

The shell shall be rolled from cardboard into cylinder or shall be moulded from cardboard pulp.

### 7.2 Seal

The bottom and centre of fireworks whistle shell shall be closed with cardboard and then a

mixture of fine sand dust, any suitable sealing component and gum may be applied for final sealing of the bottom, so as to allow no seepage of the composition.

### 7.3 Quick Match

The centre seal shall have a hole for inserting a quick match and to allow for the emission of showers of stars and streamers.

### 7.4 Base

The fireworks whistle shall be provided with a base of wooden or any other suitable material having a hole at the centre. The fireworks whistle shall be exactly fitted in the base hole.

## 8 STABILITY DUE TO SPONTANEOUS COMBUSTION

The explosives composition used in the manufacture of fireworks whistle shall pass the stability test at  $100 \pm 2^\circ\text{C}$  for 2 hours when tested according to the method prescribed in Annex G.

## 9 PACKING AND MARKING

### 9.1 Packing

The fireworks whistle shall be placed on their sides well inside the suitable cardboard boxes. They shall fit tightly into the boxes. While packing both types of fireworks whistles the regulations and provisions of the *Weights and Measures and Package Commodity Rules* shall be followed. Further for the sake of easy marketability the fireworks whistles may be packed in numbers of one, fives or tens in a single box. Ten such boxes shall be packed in packets.

### 9.2 Marking

Each box and packet shall be legibly marked with the following information:

- Name and type of the material;
- Indication of the source of manufacture; and
- Batch number in code or otherwise to enable the lot of manufacture to be traced from records.

**9.2.1** In addition to the above, the following cautionary note shall also appear on the label and a small caution slip with the same information shall be placed inside the smallest box:

**WARNING, FLAMMABLE. FOR OUT-DOOR USE ONLY. USE ONLY UNDER ADULT SUPERVISION: EMITS SHOWERS OF STAR AND STREAMERS ACCOMPANYING WHISTLING SOUND. DO NOT HOLD IN HAND. PLACE THE BOTTOM END IN THE WOODEN STAND FIRMLY. PLACE ON LEVEL OPEN SURFACE. LIGHT FUSE AND GET AWAY.**

## 10 TEST METHODS

**10.1** The test for the requirements laid down in 5.3, 5.4, 5.5, 6.1, 6.3.3 and 8 shall be carried out as prescribed in Annex A to G of this Standard.

## 10.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water ( see IS 1070 : 1977 ) shall be used in the tests.

NOTE—'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

## 11 SAMPLING

Representative sample of the material shall be drawn and conformity of the material to the requirements of this specification shall be determined according to the procedure prescribed in Annex H.

# ANNEX A

( Clause 5.3 )

## DETERMINATION OF TIME OF BURNING OF QUICKMATCHES

### A-1 PROCEDURE

Carefully take out the quick match from the fireworks whistle shell. Place the quick match

on an asbestos sheet and ignite at one end. Observe and record the time it takes to burn completely. Repeat the test for five samples.

# ANNEX B

( Clause 5.4 )

## TEST FOR THE TILTING OVER OF THE FIREWORK WHISTLE

### B-1 PROCEDURE

The fireworks whistle alongwith its base is placed on the tilting test device ( see Fig. 1 ). The inclined surface is covered with a grit

paper to prevent sliding down of the fireworks whistle. The unlit fireworks whistle when placed on the test device shall not tip-over up to 10° angle of inclination.



FIG. 1 TILT TEST DEVICE



## ANNEX C

( Clause 5.5 )

### DETERMINATION OF THE MASS OF THE CHARGE

#### C-1 PROCEDURE

The mass of the explosive and pyrotechnic composition ( charge ) contained in the shell of the fireworks whistle shall be determined by carefully cutting open, first, the outer paper layer and then, the shell and collecting the charge and weighing it on a tared disc or

glazed paper. The cutting shall be done with a non-ferrous, non-spark producing knife or shear.

NOTE — This test shall be carried out at a safe enough distance from naked flames and also bare and live electric conductors.

## ANNEX D

( Clause 5.5 )

### DETERMINATION OF TIME OF EMISSION

#### D-1 PROCEDURE

Place the fireworks whistle firmly in its base. Place it, then, on an open level surface and ensure that the fireworks whistle is vertical. Straighten the initial quick match, ignite it and start the turning device immediately after

the ignition of the main composition. Observe and record the time of burning and the height of the showers. Repeat the test for five test samples and take the average of the values obtained for the duration of emission and the height of the emitting showers as the final result.

## ANNEX E

( Clause 6.1 )

### VISUAL EXAMINATION OF FIREWORKS

#### E-1 PROCEDURE

Examine the fireworks visually and determine whether there are any holes, splits, dents or bungles, bulges in the outer tube and whether

the initial fuse is loose or missing. If any such fault is found, record the fact and do not proceed with the performance testing. Measure its outside diameter and height. Check that initial fuse is properly fitted.

## ANNEX F

( Clause 6.3.3 )

### TEST FOR DETERMINATION OF CHLORATE

#### F-1 REAGENTS

##### F-1.1 Aniline Hydro-chloride

Dissolve 18 g of redistilled aniline in 375 ml of concentrated hydrochloric acid and make up the volume to 500 ml with water. Add 2 drops of saturated potassium chlorate solution, shake and allow to stand overnight. Filter off the blue sediment, store the reagent in a glass stoppered bottle in the dark.

##### F-1.2 Hydrochloric Acid

#### F-2 PROCEDURE

To 5 g of the sample taken in a spot plate, add few drops of aniline hydrochloride in hydrochloric acid. The material shall be considered chlorate free if there is no bluish green precipitation or colouration.

**ANNEX G**

( Item 8 )

**TEST FOR STABILITY DUE TO SPONTANEOUS COMBUSTION****G-1 PROCEDURE**

Heat slowly 0.5 g of the composition mixture in a dish on a sand bath to a temperature of

$100 \pm 2^{\circ}\text{C}$  for 2 hours. Moisten the mixture with water and again dry. The material shall be considered to have passed the test if it does not ignite spontaneously.

**ANNEX H**

( Item 11 )

**SAMPLING OF FIREWORKS WHISTLE****H-1 SAMPLING****H-1.1 Lot**

**H-1.1.1** All the boxes of fireworks whistle belonging to the same batch of manufacture shall constitute a lot.

**H-1.1.2** For ascertaining the conformity of the material with the requirements of the specification, sample shall be tested from each lot separately. The number of packets to be selected from a lot shall depend on the size of the lot and shall be according to Table 1.

**H-1.1.3** The packets from the lot and also the boxes from the selected packets shall be selected at random. In order to ensure randomness of selection, procedures given in IS 4905 : 1968 may be followed.

**H-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY**

**H-2.1** The packets selected in accordance with col 2 of Table 1 and the boxes in them

shall be examined for packing and marking the requirements as well as precautionary label. All the packets and boxes shall fulfil these requirements.

**H-2.2** The number of boxes as per col 3 shall be selected at random from each of the sample packets for all other requirements. The required number of fireworks whistle in col 4 shall be selected approximately in equal numbers from each of the boxes. These fireworks whistle shall be individually tested for requirements given in 5.3, 5.4, 5.5 and 6. Any item failing in one or more of the requirements shall be termed as defective. The number of defective fireworks whistle shall not be more than the permissible number of defectives as given in col 5 of Table 1, if the lot is to be accepted under this clause.

**H-2.2.1** The lot shall be finally considered to be conforming to the requirements of the specification if the criteria for conformity given in H-2.1 and H-2.2 are satisfied.

**Table 1 Scale of Sampling**

( Clauses H-1.1.2 and H-2.2 )

No. of Packets in the Lot	No. of Packets to be Selected	No. of Boxes to be Selected	No. of Fireworks Whistle to be Selected	Permissible No. of Defectives	Sample Size for testing Chlorate
(1)	(2)	(3)	(4)	(5)	(6)
Up to 50	2	5	13	1	1
51 to 100	3	8	20	2	2
101 to 300	5	13	32	3	3
301 to 500	7	20	60	5	4
501 and above	10	32	80	7	5

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**AMENDMENT NO. 1 DECEMBER 1995  
TO  
IS 13227 : 1991 FIREWORKS WHISTLE —  
SPECIFICATION**

*( Page 2, clause 6.3.1 ):*

- a) *Line 3* — Substitute 'Chief Controller of Explosives' for 'statutory authority'.
- b) *Line 4* — 'may' for 'shall'.

*( Page 2, clause 6.3.2, line 4 )* — Substitute 'may' for 'shall.'

( CHD 026 )

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