

**Caribbean
Community
Standard**



**CARICOM STANDARD
SPECIFICATION
FOR
SAFETY MATCHES**

CCS 0045:1999 (Revised 2005)

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Foreword

This CARICOM Regional Standard was prepared by

This standard was developed to

In developing this standard, reference was made to:

- a) British Standard Institution BS 3795: 1990
- b) British Standard Institution BS EN 1783: 1997
- c) Standards Australia AS 3667-1989
- d) Saudi Arabia Standard SSA 260/1981
- e) Thai Industrial Standards Institute RS 2536 (1983)
- f) Tanzania Bureau of Standards TZA 57 : 1980
- g) Jamaica Standard JS 1 Part 1 : 1984 Labelling of Commodities
- h) Jamaica Standard JS 1 Part 20: 1998 Labelling of Pre-packaged Goods

1 Scope

This standard specifies the requirements for the performance, sampling, packaging and labelling of safety matches. It also specifies the requirements for the purchase of match splints from suppliers.

This standard applies to matches packed in boxes for domestic purposes and book matches.

The requirements do not apply to specialty matches for advertising purposes.

2 Term and definitions

For the purposes of this standard, the following terms and definitions shall apply.

2.1

after glow

visible signs of combustion in the match splint after the match has been struck and the flame extinguished

2.2

book match

one or two rows of comb-like matches with each row of splints having its base fixed within a cover

NOTE The striking surface lies on the outer surface of the cover.

2.3

distorted heads

match heads which show pronounced abnormalities in shape or surface

2.4

doubles

match heads linked together by fused ignitable material

2.5

exploding head

an ignited fragment of a match which discharges during ignition

2.6

fractured heads

match heads in which the surface is broken or cracked

2.7

lot

materials of the same brand in a single consignment produced in the same manufacturing unit

2.8

match

product which comprises a splint tipped at one end with a head of ignitable material which will ignite when struck against a friction surface

2.9

match box

container for matches consisting of an outer case having a friction surface on one or both sides and within which slides an inner tray

2.10

package

unit consisting of a specified number of packets

2.11

packet

smaller unit comprised of a specified number of match boxes or book matches

2.12

safety match

match which is designed so that it will not readily ignite unless brought into contact with a friction surface specially designed to cause ignition

2.13

splint

cardboard or wooden stick made of combustible material providing support during ignition of a match and the fuel for its continued burning

3 Requirements

3.1 Visual inspection

3.1.1 General

3.1.1.1 The number of matches with heads in a container shall correspond with the declared contents within a tolerance of ± 3 for individual containers or for the average of all containers examined.

3.1.1.2 All matches shall be completely within the container and no more than 5 % of the match sticks shall be arranged other than in one direction within the inner tray of the box.

3.1.1.3 The contents shall be retained when the closed container is orientated in any direction.

3.1.2 Book matches

The splints shall be in one or two rows wrapped round by a board cover and indented near the base to be detached easily.

3.1.3 Containers

3.1.3.1 Match boxes shall be of good workmanship, free from defects including:

a) damages;

EXAMPLE Crushed, broken or torn boxes

b) loosely-fitted;

c) twisted or swollen; and

d) ill-fitted trays exposing match head.

3.1.3.2 Match boxes shall have a uniformly distributed friction surface, none of which shall be present on the inside where contact with the match heads can occur. The friction surface shall terminate at least 2 mm from each edge of the shorter side of the box.

3.1.3.3 The cover of book matches shall be wide enough to enclose all the matches in the book with an excess of at least 1.5 mm on either side. It shall be long enough so that the cover opening edge can be inserted at least 4 mm beneath the other edge. The friction surface shall be on the back of the cover near the lower part, on the outside.

3.1.4 Matches

3.1.4.1 Splints used for making matches shall be uniform, smooth, well polished and free from bristles, splits, tears, cracks or fractures along the length. They shall not have fungal or bacterial growth.

3.1.4.2 All matches shall have a head of ignitable material uniformly applied to the end of the splint.

3.1.4.3 Matches shall be free from badly distorted heads, fractured heads or doubles.

3.1.5 Dimensions

3.5.1 Match sticks shall have minimum dimensions of:

a) length 40 mm \pm 2 mm; and

b) width 1.9 mm \pm 0.1 mm.

3.5.2 The variation between the lengths of matches within the same box shall not exceed 2 mm.

3.5.3 Book matches shall have splints not less than 35 mm in length without the base and 45 mm with the base. The composite width of 10 splints shall not be less than 30 mm.

3.2 Performance

When tested in accordance with the methods outlined in Annex A and clause 7.3, safety matches shall comply with the following performance requirements.

3.2.1 Match burning properties

3.2.1.1 Matches shall ignite without delay when struck and no more than one shall fail to ignite when struck.

3.2.1.2 No more than 1 % of the match heads shall show fragmentation or detachment of head from splint during ignition.

3.2.1.3 No more than 5 % of the match heads shall explode or drop hot ash during ignition.

3.2.1.4 Following ignition, the flame shall transfer from head to splint to at least $\frac{1}{3}$ of its length.

3.2.1.5 When tested as described in A.6, the flame observed between 3 s and 10 s after striking shall reach a height of at least 10 mm. The flame shall burn for at least 10 s, or if the match is less than 40 mm long, for at least 6 s.

3.2.2 Match splint

3.2.2.1 No more than 5 % of the matches tested shall show breakage or fracture of the splints.

3.2.2.2 No more than 2 % of the matches shall exhibit afterglow other than a pin point glow beneath the head after the flame has been extinguished and a period of 3 s has elapsed (see A.2).

3.2.3 Heat induced ignition

Matches shall not ignite spontaneously when exposed to heated atmosphere.

3.2.4 Friction surface

3.2.4.1 After a drop of water is applied to the friction paint for 20 s, then wrapped with a dry tissue, there shall be no removal of the friction surface sufficient to expose the underlying surface of the box.

3.2.4.2 The friction surface of a match box shall be capable of igniting all of its contents on one side of the box or on the available surface for book matches.

3.3 Ordering information for splints

3.3.1 General

3.3.1.1 Splints for the manufacture of box matches shall be of wood impregnated with chemicals to prevent afterglow when flame is extinguished.

3.3.1.2 Splints for the manufacture of book matches shall be of wood or any suitable material impregnated with chemicals to prevent afterglow when a flame is extinguished.

3.3.2 Dimensions

Splints shall have the following minimum dimensions:

- a) length – 40.0 mm \pm 2.0 mm;
- b) width – 1.9 mm \pm 0.1 mm; and
- c) thickness – 1.9 mm \pm 0.1 mm.

3.3.3 Surface

3.3.3.1 The surface of the splints shall be smooth, well polished and free from fungal or bacterial growth.

3.3.3.2 No more than 2 % of splints examined shall show any splits or cracks along its length.

3.3.4 Strength

No more than 5 % of the splints tested for strength (see A.5) shall break when an impact of 12 mJ is applied.

3.3.5 Afterglow

Splints shall not glow for more than 3 s after the flame is extinguished.

3.4 Labelling

The match box shall be labelled with:

- a) brand name;
- b) name of the product;
- EXAMPLE Safety matches
- c) name and address of manufacturer, importer or distributor;
- d) country of origin;
- e) average number of matches per box or book; and
- f) cautionary warning statement (s) indicating precautions that may need to be taken.

EXAMPLE 'Close box before striking' and 'keep out of reach of children'

4 Testing

4.1 Sampling

4.1.1 The number of packages to be selected from a lot shall depend on the size of the lot and shall be in accordance with Table 1.

Table 1 — Sampling of packages from a lot

Lot size packages	Number of packages selected
3 to 25	3
26 to 50	4
51 to 100	5
101 to 150	6
151 and above	7

4.1.2 The number of packets selected from a package shall depend on the size of the package and shall be in accordance with Table 2.

Table 2 — Sampling of packets from a package

Number of packets in package	Number of packets selected
10	3
50	4
100	5

4.1.3 From each packet, select at random two match boxes or book matches. The total number of boxes or books constitutes a sample.

4.2 Conditioning

Samples shall be maintained at a temperature of $27\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and a relative humidity of $65\% \pm 2\%$ for not less than 24 h prior to testing.

4.3 Testing

4.3.1 General

Tests shall be conducted as outlined in Annex A.

4.3.2 Test specimens

The recommended number of specimens required for each test is given in Table 3.

Table 3 — Selection of test specimens

Test method	Minimum number of specimen
Match burning properties	200 matches
Afterglow	100 matches
Heat induced ignition	20 matches
Friction paint surface	4 match boxes
Average count	12 match boxes
Visual examination	200 matches
Splint strength	250 matches
Flame height	10 matches

4.3.3 Test conditions

4.3.3.1 General

Testing shall be conducted in a draught free atmosphere. Protective clothing should be worn by the operator during all tests that require the striking of matches.

4.3.3.2 Method of striking matches

4.3.3.2.1 The box shall be held so that the friction surface is at right angles to the body (see Figure 1).

4.3.3.2.2 The match shall be positioned at a connecting angle of approximately 30° to the horizontal surface of the friction point.

4.3.3.2.3 The match shall be struck along the friction surface in a direction away from the body and with an upward sweep, using the minimum pressure necessary to secure ignition.

4.3.3.2.4 For observation of match burning performance, splints shall be held in a horizontal position after striking and allowed to burn at least $\frac{2}{3}$ its length.

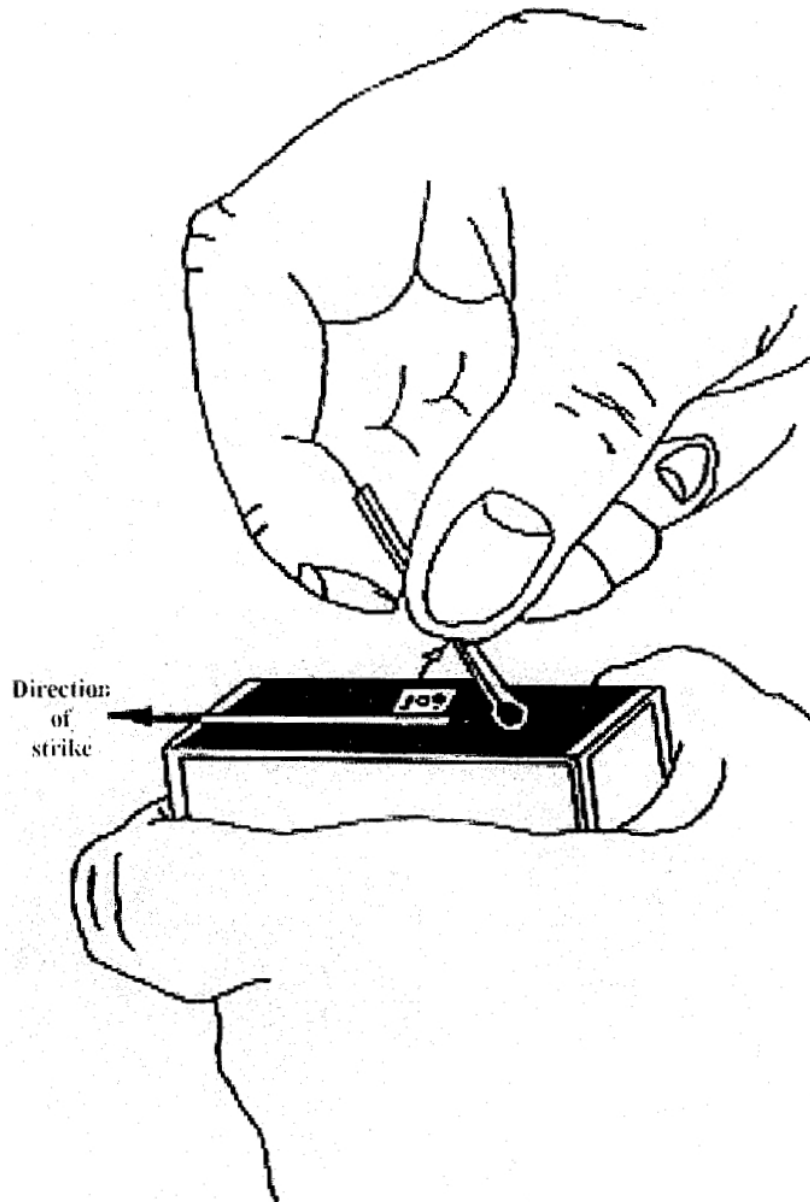


Figure 1 — Method of striking matches

4.3.4 Criteria for conformity

The batch shall be considered satisfactory if the sample satisfies the requirements as stated in Table 4.

Table 4 — Criteria for conformity

Test	Maximum acceptable defectives %
Non-ignition/delayed ignition	2
Fragmented/detached heads	1
Exploding heads/hot ash	5
Transfer of flame	5
Flame height	5
Splints which break when struck	5
Afterglow	2
Heat induced ignition	0
Friction paint wearing	0
Friction paint ignition	0
Splint - splits/cracks	2

Annex A (normative)

Methods for testing matches and match splints

A.1 Striking performance

A.1.1 Aim

To determine any dangerous burning properties and splint breakage during striking.

A.1.2 Apparatus

Clean sheet of white paper and stopwatch which is accurate to 1 s.

A.1.3 Procedure

A.1.3.1 Select sufficient match boxes from the conditioned sample to provide a test specimen of not less than 200 matches, taking no more than 5 matches from each box.

A.1.3.2 Place the sheet of white paper on the surface over which the matches are to be struck.

A.1.3.3 Using the method of striking matches in 4.3.3.2, strike all matches, observe and record any of the following defects:

- a) delay in ignition or non-ignition;
- b) fragmentation or detachment of head;
- c) explosion of match head;
- d) dropping of hot ash;
- e) transfer of flame from head to splint; and
- f) splints which break or fracture.

NOTE Splints which break during striking should be replaced by the same number of matches to ensure a specimen of 200 matches for the test burning property.

A.1.4 Book matches

For book matches, ensure that the match is struck in the orientation most likely to cause failure.

A.2 Afterglow test

A.2.1 Aim

To determine if splints have been properly treated to prevent afterglow.

A.2.2 Apparatus

Perforated metal plate (see Figure 2).

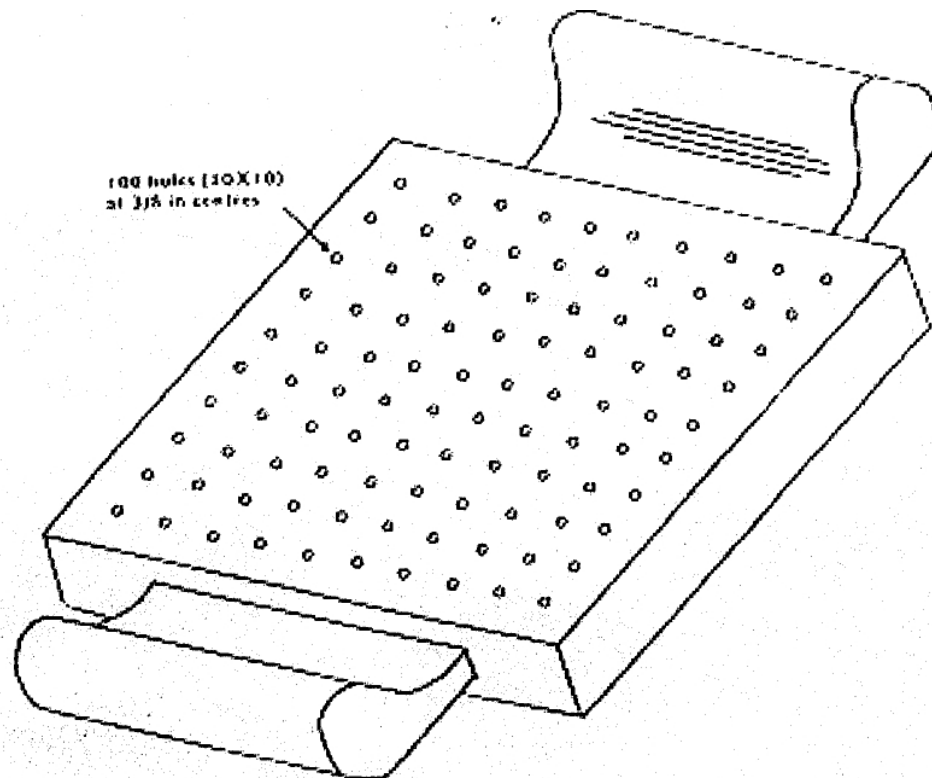


Figure 2 — Perforated metal plate

A.2.3 Procedure

A.2.3.1 Insert the bases of 100 matches, randomly selected from the conditioned samples, into the holes of the metal plate.

A.2.3.2 Ignite the taper and apply the flame to the outside row of the matches.

A.2.3.3 Tilt the plate so as to ignite all the matches as quickly as possible.

A.2.3.4 Allow the splints to burn completely until the flame dies out.

A.2.3.5 Start the stopwatch simultaneously and after 3 s, record any afterglow, ignoring any pinpoint glow immediately beneath the head.

A.3 Heat induced ignition

A.3.1 Aim

To determine whether matches will ignite spontaneously in a heated atmosphere.

A.3.2 Apparatus

Metal plate to hold matches vertically 10 mm apart and an air circulating oven.

A.3.3 Procedure

A.3.3.1 Insert 20 matches randomly selected in the metal plate with heads pointing upwards.

A.3.3.2 For book matches, a length of comb containing 12 matches shall be suitably supported at its base.

A.3.3.3 Place in the oven maintained at $120\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and leave for 15 min.

A.3.3.4 After the time has elapsed, remove from the oven and record the number of matches, if any, which ignited.

A.4 Friction paint testing

A.4.1 Aim

To determine the efficiency of the striking surface and the likelihood of ignition during striking.

A.4.2 Procedure

A.4.2.1 Select four full match boxes from the conditioned sample.

A.4.2.2 Using the method of striking matches in 4.3.3.2, strike all the matches in each box on only one side of the box.

A.4.2.3 Observe and record whether all the matches were successfully ignited. Also report whether any of the friction surfaces ignited during striking.

A.5 Test for splint strength

A.5.1 Aim

To assess the strength of splints supplied for the production of matches.

A.5.2 Procedure

A.5.2.1 Using a suitable mechanical strength tester based on the falling weight method, randomly select 100 matches from the batch and subject to an impact of 12 mJ.

A.5.2.2 Observe and record the number of splints which fracture or break during this procedure.

A.6 Test for flame height

A.6.1 Aim

To assess flame height achieved during the burning of match splints.

A.6.2 Procedure

A.6.2.1 Hold the match in position by inserting the stem 5 mm into a metal tube clamped in the horizontal position.

A.6.2.2 Position the match 25 mm \pm 3 mm away from a vertical plane mirrored plate scribed with two horizontal lines separated by 10 mm.

A.6.2.3 Adjust the height of the plate so that the upper surface of the match splint, its mirror image and the lower line are all coincident.

A.6.2.4 Ignite the match by touching the tip of the head with a heated soldering iron. At the same time start a stop watch.

A.6.2.5 Observe the flame carefully during the period between 3 s and 10 s from ignition and record whether the flame does not exceed 10 mm in height. This is indicated if the tip of the flame does not cross the upper of the two lines scribed on the mirrored plate.

A.6.2.6 At all times during the observation of the flame ensure that the stem, its mirror image and the bottom line remain coincident in order to prevent parallax errors.

A.6.2.7 Record whether the flame does not remain alight for 10 s. If the match is less than 40 mm in length, record whether the flame does not remain alight for 6 s.

NOTE Alternative arrangements for measurement of flame height are acceptable, provided adequate arrangements to prevent parallax errors are incorporated.

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