SRI LANKA STANDARD 777 : 2009
UDC 667.56

SPECIFICATION FOR
CRAYONS AND PASTELS
(Second Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
SPECIFICATION FOR CRAYONS AND PASTELS
(Second Revision)

SLS 777 : 2009

Gr. 11

SRI LANKA STANDARDS INSTITUTION
No. 17, Victoria Place,
Elvitigala Mawatha,
Colombo - 08.
SRI LANKA.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
SPECIFICATION FOR CRAYONS AND PASTELS
(Second Revision)

FOREWORD

This standard was approved by the Sectoral Committee on Chemical and Polymer Technology and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2009-07-23.

Crayons and pastels are two widely used items intended for drawing. This specification was first published in 1987 and first revised in 2001. This is the Second Revision to SLS 777 for crayons and pastels. In this Second Revision, the requirements for additional colours other than basic colours have been excluded when a container contains more than 6 sticks. A general exclusion list for dyes and colourants of crayon and pastels has been included. The limits for toxic substances content and transverse breaking force have been altered.

For the purpose of deciding whether a particular requirement of this specification is complied with, the final value, observed or calculated, expressing the results of a test or analysis, shall be rounded off in accordance with **SLS 102**. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this specification.

In the preparation of this specification, the assistance derived form the following publications is gratefully acknowledged:

ISO	8124 - 3 : 1997	International Standard for Safety of toys Part 3 : Migration of certain elements
JIS S	6026 : 2001	Japanese Industrial Standard for Crayons and oil pastels
KS G	2613 : 1979	Korean Industrial Standard - Crayon and Oil Pastels
SANS	223 : 2006	South African National Standard - Writing equipment- Coloured chalks and pastels

Munsell book of colour; glossary finish collections, 1976 edition

1 SCOPE

1.1 This specification prescribes requirements, methods of sampling and tests for crayons and pastels used for drawing purposes.

1.2 The crayons and pastels used for marking on timber and fabrics are not covered by this specification.

1.3 Pastel pencils and water-soluble pastels are not covered by this specification.

2 REFERENCES

ISO 8124 Safety of toys
Part 3 : Migration of certain elements
SLS 102 Rules for rounding off numerical values
SLS 428 Random sampling method

3 TYPES

3.1 crayon : It consists of a mixture of wax, filler and pigments. Wax content of crayons is higher than that of pastels.

3.2 pastel : In addition to the ingredients used for crayons, the oil content is higher than that of crayons.

4 REQUIREMENTS

4.1 General requirements

4.1.1 Crayons and pastels shall be circular, square or hexagonal in cross-section.

4.1.2 Crayons and pastels shall have an acceptably smooth finish and shall show no evidence of grit, flint, sandy particles and blowholes.

4.1.3 Whenever it is necessary, each stick of crayons and pastels shall be securely wrapped with a suitable paper material to prevent damages to stick and colour penetration from sticks to users.

4.2 Colour

4.2.1 A container shall contain minimum of 6 sticks with one stick from each basic colour specified in Table **1** (See Note). Colour shall be determined by the method prescribed in Appendix **B**.

NOTE : *These colours have been prescribed as basic colours applicable to crayons and pastels.*

4.2.2 When a container contains more than 6 sticks the additional colours shall be as agreed to between the purchaser and the supplier.

4.2.3 The general exclusion list for crayon and pastel colourants given in Appendix **G.**

TABLE 1 Requirements for basic colours of crayons and pastels

Sl. No.	Colour	Requirements		
		Hue (H)	Value (V)	Chroma(C)
(1)	(2)	(3)	(4)	(5)
i)	Black	-	N 2.5 max.	1.0 max.
ii)	Blue	2.5 - 6.25 PB	3 - 5	10 - 14
iii)	Brown	2.5 - 7.5 YR	2 - 3	4 - 8
iv)	Green	2.5 - 5 G	4 - 5	08 min.
v)	Red	5 - 7.5 R	3 - 4	12 min.
vi)	Yellow	2.5 - 7.5 Y	8 - 9	12 min.

NOTE : *The complete Munsell notation for a chromatic colour is written symbolically : HV/C. The notations H, V and C denote hue, value and chroma respectively. The notation for an achromatic (neutral) colour is written symbolically NV/. Refer Munsell books of colour for further details.*

4.3 Toxic substances

The amount of toxic substances migration from crayons and pastels shall not exceed the limits given in Table **2** when tested in accordance with Appendix **C**.

TABLE 2 - Requirements for toxic substances of crayons and pastels

Sl. No.	Toxic substances	Requirements mg/kg max.	Method of test
(1)	(2)	(3)	(4)
i)	Arsenic, as As	5.0	Appendix C
ii)	Lead, as Pb	5.0	
iii)	Chromium, as Cr	5.0	
iv)	Antimony, as Sb	5.0	
v)	Mercury, as Hg	1.0	
vi)	Selenium, as Se	5.0	
vii)	Cadmium, as Cd	5.0	

4.4 Stability

Crayons and pastels shall not show appreciable bending or deterioration when tested in accordance with Appendix **D**.

4.5 Properties of drawing

Crayons and pastels shall colour on drawing material without scratching, able to colour uniformly without unevenness on drawing materials, easy overlapping of colours when drawing when tested in accordance with Appendix **E**.

4.6 Dimensions

Crayons and pastels shall also comply with the dimensions prescribed in Table **3.**

TABLE 3 - Dimensions

Sl. No. (1)	Characteristic (2)	Requirement (3)
i)	Diameter, mm, min.	7.5
ii)	Length, mm, min.	60

4.7 Transverse breaking force

The transverse breaking force of crayons and pastels shall be minimum of 6.0 N when tested in accordance with Appendix **F**.

NOTES :

1. *The dimensional characteristic refers to the length and the diameter or the comparable dimension to diameter. Comparable dimension to diameter in square or hexagonal products shall be measured between diametrically opposed corners.*

2. *When the product is wrapped, dimensional measurements shall be taken after removing the wrapper.*

5 PACKAGING AND MARKING

5.1 Packaging

5.1.1 At least six sticks shall be packed in a container.

5.1.2 Containers shall prevent breakage of the contents during normal handling and transportation.

5.1.3 A number of such containers packed on the same day, with an equal number of sticks per container shall be packed in a carton as agreed to between the purchaser and the supplier.

5.2 Marking

5.2.1 The following information shall be legibly and indelibly marked on the wrapper of each stick of crayons and pastels:

a) Name of colour (see Table **1** and **4.2.2**) ; and
b) Brand name.

5.2.2 The following information shall be legibly and indelibly marked on each container of crayons and pastels:

a) Type of the product ;
b) Name and address of the manufacturer including country of origin ;
c) Registered trade mark, if any ;
d) Number of sticks in the container ;
e) Batch no. / lot identification no./code no. (**NOTE :***Date of manufacture may be used as the batch no. /lot identification no. / code no. if one batch is manufactured during the day.*) ;
f) Date of packaging of containers ; and
g) Best before.

5.2.3 The following information shall be legibly and indelibly marked on each carton of crayons and pastels:

a) Type of the product ;
b) Name and address of the manufacturer including country of origin ;
c) Registered trade mark, if any ;
d) Number of containers in a carton ;
e) Number of sticks in the container ;
g) Batch no/ lot identification no. /code no. (**NOTE :***Date of manufacture may be used as the batch no. /lot identification no. / code no. if one batch is manufactured during the day.*) ;
h) Date of packaging of containers ; and
j) Best before.

APPENDIX A
COMPLIANCE OF A LOT

The sampling scheme given in this appendix should be applied where compliance of a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection.

Where compliance with this standard, appropriate schemes of sampling and inspection shall be adopted based on manufacturer's control systems coupled with types, tests and testing procedures.

A.1 LOT

In any consignment all the containers of the same size, packed on the same day and manufactured under similar conditions shall constitute a lot.

A.2 SCALE OF SAMPLING

A.2.1 Samples shall be tested from each lot for ascertaining its conformity to the requirements of this specification.

A.2.2 The number of containers to be selected from a lot shall be in accordance with Table **4**.

TABLE 4 – Scale of sampling

Number of containers in the lot (1)	Number of containers (2)
Up to 400	6
401 to 800	7
801 to 1 000	8
1 001 to 4 000	9
4 001 and above	10

A.2.3 If the containers are packed in cartons, 10 per cent of the cartons subject to a minimum of three cartons shall be selected and as far as possible an equal number of containers shall be drawn from each carton so selected to form a sample as given in Table **4**.

A.2.4 The cartons and containers shall be selected at random. In order to ensure randomness of selection, tables of random numbers as given in **SLS 428** shall be used.

A.3 NUMBER OF TESTS

A.3.1 Each carton selected as in **A.2.3** shall be inspected for packaging and marking requirements (**5.2.3**).

A.3.2 Each container selected as in **A.2.2** or **A.2.3** shall be inspected for packaging and marking requirements (**5.2.2**).

A.3.3 Five sticks from each container selected as in **A.2.2** or **A.2.3** shall be measured for dimensions (**4.6**).

A.3.4 Two containers, if the lot contains 1 000 or less containers or three containers, if the lot contains more than 1 000 containers, shall be drawn from the containers selected as in **A.2.2** or **A.2.3** and the sticks in these containers shall be tested for colour (**4.2**).

A.3.5 The sticks tested as **A.3.4** shall be tested for grit (**4.1.2**) and properties of drawing (**4.5**).

A.3.6 Four containers shall be selected from the remaining containers and the sticks in these containers shall be tested for breaking force (**4.7**) and stability (**4.4**), taking two containers for one requirement.

A.3.7 From the sticks tested as in **A.3.4** a sufficient number of sticks of each colour shall be drawn and tested for requirements of each toxic substance (**4.3**).

A.4 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied :

A.4.1 Each carton inspected as in **A.3.1** satisfies the relevant requirements.

A.4.2 Each container inspected as in **A.3.2** satisfies the relevant requirements.

A.4.3 The value of the expression $\bar{x}$ - 1.2 s, (see Notes) calculated using the test results on dimensional requirements when tested as in **A.3.3** is not less than the relevant specification limits.

NOTES :

1. *Mean* $(\bar{x})$ $= \dfrac{\text{Sum of the observed values}}{\text{Number of values}}$

2. *Standard deviation (s)* = *The positive square root of the quotient obtained by dividing the sum of squares of the deviations of the test results from their arithmetic mean by one less than the number of test results.*

A.4.4 The sticks tested as in **A.3.4** satisfy the relevant requirements.

A.4.5 The sticks tested as in **A.3.5** satisfy the relevant requirements.

A.4.6 The value of the expression, x - 1.2 s, calculated using the test results on breaking force when tested as in **A.3.6** is not less than the relevant specification limit.

A.4.7 Each stick tested for stability as in **A.3.6** satisfies the relevant requirement.

A.4.8 The test results on the content of toxic substances when tested as in **A.3.7** satisfy the relevant requirement.

APPENDIX B
DETERMINATION OF COLOUR

PROCEDURE

Colour a piece of white paper, for example, Whatman No. 41 filter paper, with the crayon or pastel using normal manual force, until the intensity of the colour reaches a level beyond which further colouring does not increase the intensity of the colour. By referring to the Munsell books of colour, determine the Munsell colour notation corresponding to the colour of the prepared paper. (See Note to Table **1**).

APPENDIX C
DETERMINATION OF TOXIC SUBSTANCES

C.1 REAGENT AND APPARATUS

Use the reagents and apparatus given in **6.1** and **6.2** of **ISO 8124-3 :1997**.

C.2 PREPARATION OF TEST SAMPLES

Prepare the test solution as described in **8.7.1** and **8.7.4** of **ISO 8124-3 :1997**. The following methods of analysis are recommended, but other methods may be used, provided that the limits of detection complying with the requirements of clause **9** of **ISO 8124-3 : 1997**.

C.3 PROCEDURE

The following methods of analysis are recommended, but other methods may be used, provided that the limits of detection comply with the requirements of clause **9** of **ISO 8124-3 : 1997**.

C.3.1 For determining the **antimony** content in the order of 10 mg/kg in the material (0.2 mg/l in the resulting solution), hydride generation atomic absorption spectrophotometry employing background correction can be used.

C.3.2 For determining the **arsenic** content in the order of 5 mg/kg in the material (0.1 mg/l in the resulting solution), hydride generation atomic absorption spectrophotometry employing background correction can be used.

C.3.3 For determining the **cadmium** content in the order of 15 mg/kg in the material (0.3 mg/l in the resulting solution), flame atomic absorption spectrophotometry employing an air/acetylene flame and background correction can be used.

C.3.4 For determining the **chromium** content in the order of 25 mg/kg in the material (0.5 mg/l in the resulting solution), flame atomic absorption spectrophotometry employing a nitrous oxide/acetylene flame and background correction can be used.

C.3.5 For determining the **lead** content in the order of 50 mg/kg in the material (1.0 mg/l in the resulting solution), flame atomic absorption spectrophotometry employing an air/acetylene flame and background correction can be used.

C.3.6 For determining the **mercury** content in the order of 5 mg/kg in the material (0.1 mg/l in the resulting solution), cold vapour generation atomic absorption spectrophotometry employing background correction can be used.

C.3.7 For determining the **selenium** content in the order of 50 mg/kg in the material (1.0 mg/l in the resulting solution), hydride generation atomic absorption spectrophotometry employing background correction can be used.

C.4 ANALYTICAL CORRECTION

The analytical results obtained in accordance with **C.3** shall be adjusted by subtracting the analytical correction in Table **5** to obtain an adjusted analytical result.

TABLE 5 – Analytical correction

Sl. No. (1)	Toxic substances (2)	Analytical correction % (3)
i)	Arsenic	60
ii)	Lead	30
iii)	Chromium	30
iv)	Antimony	60
v)	Mercury	50
vi)	Selenium	60
vii)	Cadmium	30

Example:

An analytical result for lead of 120 mg/kg was obtained. The necessary analytical correction taken from Table **5** is 30 %. Therefore the adjusted analytical result is

$$120 - \frac{120 \times 30}{100} = 120\text{-}36 = 84 \text{ mg /kg}$$

APPENDIX D
DETERMINATION OF STABILITY

D.1 PROCEDURE

Fix horizontally the crayon or pastel without the wrapper as shown in Figure **1** and keep for one hour in a chamber, maintained at a temperature of 37 $\pm$ 2 ^{o}C. Observe the crayon or pastel for bending or deterioration.

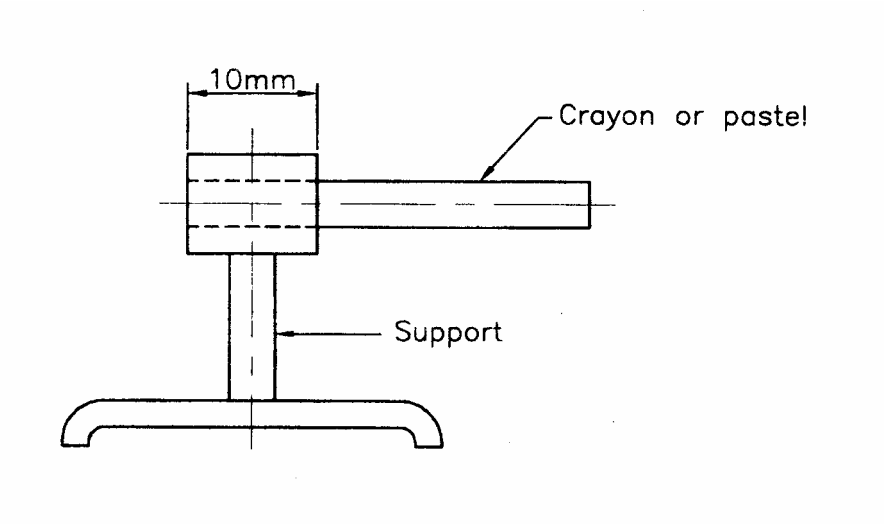


FIGURE 1 - Apparatus for determination of stability

APPENDIX E
DETERMINATION OF GRIT AND PROPERTIES OF DRAWINGS.

E.1 PROCEDURE

E.1.1 Examine visually whether colouring is uniform when drawing on drawing paper.

E.1.2 Examine visually whether overlap- drawing is possible or not with redrawing by other colour on the drawing paper coloured once in (**E.1.1**).

APPENDIX F
DETERMINATION OF TRANSVERSE BREAKING FORCE

F.1 APPARATUS

The apparatus as shown in Figure **2** shall be of such construction that a crayon or pastel can be supported at two points 50 mm apart, and a can suspended from the crayon or pastel midway between the supports into which lead shots could be poured in gradually.

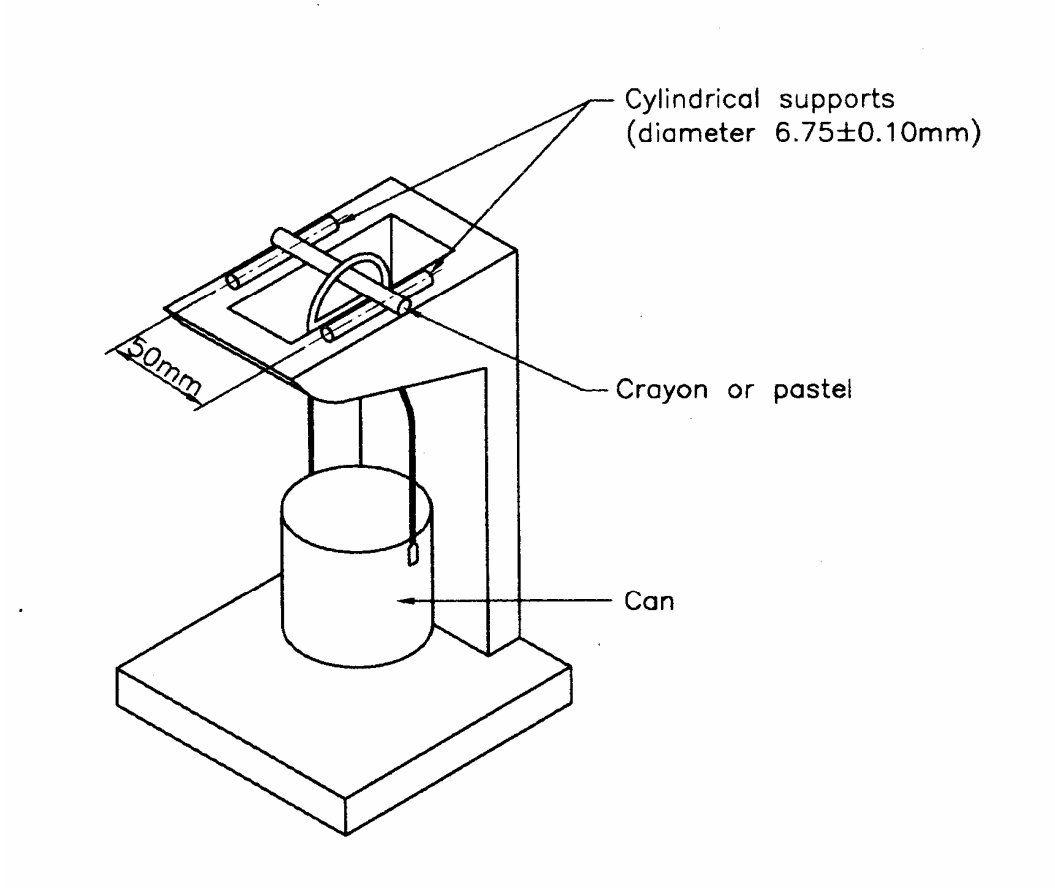


FIGURE 2 - Apparatus for determination of transverse breaking force

F.2 Place the crayon or pastel (see Note) on the two supports in such a way that an equal length of the stick projects out from the both supports. Suspend the can from the test specimen midway between the two supports and pour lead shots gradually until the crayon or pastel breaks.

NOTE : *If the crayon or pastel is wrapped, test should be carried out without removing the wrapper.*

The transverse breaking force of the test specimen shall be based on the total mass of the can and the lead shots in it.

APPENDIX G
GENERAL EXCLUSION LIST FOR CRAYONS AND PASTELS

G.1 The following substances shall not be present as ingredients or contaminants in crayons and pastels.

G.1.1 Substances classified and labelled as toxic or highly toxic according to the Chemicals Regulations (Hazard Information and Packaging for Supply), which implement Directive 67/548/EEC and subsequent amendments and adaptations.

G.1.2 Dye and colourants

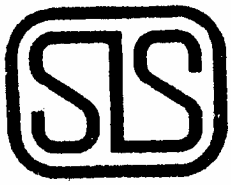
Auramine (Basic Yellow 2 – CI 41000)
Azo dyes which can decompose in the body to bioavailabe aromatic amines that are classified as Category 1 or 2 carcinogens, according to Directive 67/548/EEC
Chrysodine (Basic Orange 2 – CI 11270)
Cresylene Brown (Basic Brown 4 – CI 21010)
Induline (Solvent Blue 7 – CI 50400)
Fuschine (Basic Violet 14 – CI 42510) (**NOTE :** *Formerly listed as 'magenta'*)

……..

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*



Printed at SLSI (Printing Unit)

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.