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# Ceylon Standard Specification for Record Ink

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BUREAU OF CEYLON STANDARDS

# SPECIFICATION FOR RECORD INK

**C. S. 60: 1969**

(Attached AMD 260)

Gr. 3



**BUREAU OF CEYLON STANDARDS**
**53, Dharmapala Mawatha,**
**Colombo 3.**

Ceylon 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.

**BUREAU OF CEYLON STANDARDS**
**53, Dharmapala Mawatha,**
**Colombo 3.**

*Telephone:* 26051, 26054, 26055. *Telegrams:* "PRAMIKA"

# CEYLON STANDARD SPECIFICATION FOR BLUE-BLACK RECORD INK

## FOREWORD

This Ceylon Standard Specification has been prepared by the Drafting Committee on Writing Inks. It was approved by the Agricultural and Chemicals Divisional Committee of the Bureau of Ceylon Standards and was authorised for adoption and publication by the Council of the Bureau on 13th January, 1969.

This specification is a revision of the tentative Ceylon Standard 32 of 1961, published by the Standards Advisory Council of the then Department of Industries.

To obtain the best results with record ink, it is recommended that a steel dip-pen be used for writing and that the writing be allowed to dry naturally and without blotting.

The publications of the British and Indian Standards Institutions have been of considerable assistance in the preparation of this standard.

## 1. SCOPE

This specification prescribes the requirements and methods of test for blue-black record inks to be used for archival and documentary purposes.

## 2. REQUIREMENTS

The ink shall be of the ferro gallo-tannate type and shall write with an initial blue colour which develops within 15 days to dense black. The ink shall also comply with the following requirements: (The composition of the standard reference ink shall be as given in the Appendix).

### 2.1 Composition

2.1.1 The iron content shall be not less than 5 grammes and not more than 6 grammes per litre, calculated as metallic iron and ascertained by the method given in Sub clause 5.1.

2.1.2 The blue dye content shall be sufficient to match the colour of the appropriate standard reference ink.

### 2.2 Corrosive action

The corrosive action of the ink shall be measured on brass and shall not exceed 10 per cent when tested as per method given in Sub-clause 5.2.

2.3 **Freedom from sediment**

The ink shall show no greater sediment than that of freshly prepared standard reference ink when tested by the method given in Sub-clause 5.3.

2.4 **Stability**

The ink when tested as in Sub clause 5.4 shall be free from deposit, surface growth and scale and shall be at least equal to freshly prepared standard reference ink in these respects.

2.5 **Performance**

2.5.1 **Penetration**

Writing and stripes shall not penetrate unreasonably deep through cream wove paper of substance 60g/m$^2$ and of sizing 30 sec., at a temperature of 27°$\pm$ 2°C and relative humidity of 75 $\pm$ 10 per cent. The penetration shall not be any deeper than the standard reference ink.

2.5.2 **Permanence**

When tested according to the method given in Sub-clause 5.5, the writing and stripes shall be a close match in provisional colouring matter to and shall remain as dark as, and be no more affected in respect of permanence to light and resistance to water than those from the standard reference ink,

## 3. PACKING AND MARKING

3.1 The type, size, shape and seal of the containers shall be subject to mutual agreement between the purchaser and vendor. If containers are of glass, they shall be of alkali-free quality.

3.2 Each container shall be marked with the following information:—

(i) name of manufacturer;
(ii) registered trade-mark;
(iii) volume of material in the container;
(iv) date of manufacture of the ink (this may be in code).

## 4. SAMPLING

4.1 **Lot**

All containers of the same size in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot.

If a consignment is declared or known to consist of different batches of manufacture, or of different size of containers, the containers belonging to the same batch and of the same size shall be grouped together and each such group shall constitute a separate lot.

4.2 The number (n) of containers to be drawn from a lot shall depend on the size of the lot and shall be in accordance with the following table.

**TABLE 1**

**Scale of sampling**

| Lot size (N) | No. of containers to be taken (n) |
|---|---|
| (1) | (2) |
| Up to 100 | 3 |
| 101 to 300 | 4 |
| 301 to 500 | 5 |
| 501 to 800 | 7 |
| 801 and above | 10 |

4.3 Additional number of containers may be drawn from the lot if the total quantity of the material taken out proves to be inadequate for all the tests and these containers shall be taken at random from the lot.

4.4 **Test sample**

4.4.1 Each container in the sample shall be examined for sediment. If any of the containers are found to contain sediment, the whole lot shall be declared as not conforming to this specification.

4.4.2 If the containers in the sample are free from sediment, the contents of all the "n" containers taken shall be mixed well, and representative sample not less than 500 ml total volume shall be drawn.

## 5. TESTS

Samples shall be tested from each lot for ascertaining the conformity of the material to the requirements of the specification.

Tests shall be carried out as prescribed below:—

## 5.1 Determination of iron

### 5.1.1 Reagents

(i) Sodium thiosulphate solution, approximately 0.025 N.
(ii) Hydrochloric acid, 1:1 (v/v) dilute solution
(iii) Chlorine water
(iv) Potassium iodide, 20% (w/v) solution.
(v) Starch indicator, 0.5% freshly prepared solution.

### 5.1.2 Procedure

Evaporate to dryness on a steam bath 10.0 ml of the fluid ink in a porcelain basin of about 50 ml capacity. Ignite the residue at moderate heat and add 5 ml of hydrochloric acid to the ash. Cover with a watch-glass and heat on a steam bath till the oxides of iron are dissolved. Add 2 ml of chlorine water and evaporate to dryness, until no traces of chlorine are present in the residue.

Dissolve the iron salts in 1 ml of the hydrochloric acid and dilute to 20 ml with water. Filter, wash and add 10 ml of potassium iodide solution to the filtrate and washings collected in a flask. Stopper the flask and heat in a bath maintained at 55°C for one hour and cool rapidly with cold water to room temperature.

Make up the solution to about 100 ml and titrate with the standard sodium thiosulphate. Perform a blank experiment on the reagents and apply the necessary correction.

### 5 1.3 Calculation

$$\text{Iron content per litre} = \frac{55.84 \times N \times V}{10}$$

where N = normality of sodium thiosulphate solution used

and V = volume in milliltres of N normal sodium thiosulphate solution required.

## 5.2 Determination of corrosion

### 5.2.1 Apparatus

Brass pieces containing 70 per cent copper and 30 per cent zinc, having the dimensions appproximately 25mm x 25mm x 0.3 mm. All the surfaces of the brass pieces shall be smooth and well polished.

5.2.2 **Procedure**

Thoroughly clean the brass piece with ethyl alcohol and ether. Dry at 105° ± 2°C and weigh accurately to the nearest milligramme. Suspend the brass piece by means of a silk thread in 50 ml of ink contained in a beaker. Keep it completely immersed and without touching the beaker for 7 days at room temperature. The beaker shall remain covered during this period. After 7 days, remove the brass piece, wash with water and wipe with a soft lint free cloth. Rinse with alcohol and dry as before to constant weight.

5.2.3 **Calculation**

$$\text{Percentage loss in weight} = \frac{W_o - W_1}{W_o} \times 100$$

where $W_o$ = original weight of the brass used

and $W_1$ = final weight of the brass

5.3 **Determination of sediment**

5.3.1 **Procedure**

Shake the ink thoroughly, then withdraw 50 ml with a pipette and place in a 100 ml beaker covered with a filter paper and leave for 48 hours. Hold it up against the light and tilt it slowly in such a manner that any sediment on the bottom can be observed.

5.4 **Determination of stability**

5.4.1 Take 25 ml of the ink and place in a 50 ml beaker which is covered with a filter paper and allow it to remain at room temperature for two weeks.

5.5 **Determination of permanence**

5.5.1 **Preparation of stripes**

Place a clean, unused sheet of cream wove paper, of substance 60g/m$^2$ and sizing 30 sec, flat and unwrinkled on a piece board or glass plate having a smooth surface. Fix the board or glass plate so that the surface of the paper makes an angle of 45° with the vertical. Take 1 ml of the ink in a one millilitre pipette and allow the nozzle just to touch the paper near the top edge, the pipette remaining vertical. Release the ink carefully to form across the paper a perfect stripe of uniform width and intensity and free of wavy effect.

Dry the stripe for 15 minutes and remove the paper from the board. Cut off a strip of paper 4 cm width from the bottom of the sheet at right angles to the stripe and reject it. Cut the remaining paper into strips, each 5cm wide and at right angles to the stripe. Repeat the experiment with the standard reference ink at the same time and under the same conditions.

5.5.2 **Visual examination before development**

The stripes ink must be visually examined immediately for colour depth and intensity by incident and transmitted light. and must not show inferiority to standard reference ink when tested in the same way.

5.5.3 **Performance after development**

Expose the stripes for 15 days to air and diffused daylight in the shade at room temperature to allow full development. Then examine for the following.

(i) **Intensity of colour.** The fully developed stripes should be at least equal to those of the standard reference ink when examined visually by incident and transmitted light.

(ii) **Resistance to immersion in water.** After immersion in water for 24 hours the stripes should not show signs of bleeding, and the loss of colour should not be more than that of the standard reference ink tested in a separate vessel.

(iii) **Resistance to fading.** Expose the stripes to an ultraviolet lamp at the distance of 25 cm from the source for 48 hours. The lamp should emit radiations at 3660 A units so that the intensity at 90 cm from the lamp is approximately 450 microwatts per square centimetre. The loss in intensity of fading should not be greater than that of the standard reference ink tested under the same conditions.

## APPENDIX
## Standard Reference Ink

The standard reference ink shall have the following composition:-

| | | |
|---|---|---|
| Gallic acid | 6.4g | |
| Tannic acid | 19.5g | |
| Ferrous sulphate ($FeSO_4 \cdot 7H_2O$) | 25.0g | |
| Sulphuric acid | 3.0g | (1.63 ml, sp.gr.1.84) |
| Phenol | 1.0g | |
| Blue dye, Ink Blue (British Colour Index* 42780, ammonium salt of trisulphonated, triphenyl para rosaniline) | 3.0g | |
| Distilled water to one litre | | |

All materials employed shall be of the purest quality available.

* Colour Index, Second Edition 1956, Published by the Society of Dyers and Colourists.

AMD 260

**Amendment No. 1 approved on 2000-03-23**
**to CS 60 : 1969**

# CEYLON STANDARD SPECIFICATION FOR RECORD INK

## Clause 3 PACKAGING AND MARKING

Insert the following as (i) in 3.2 and number accordingly.

(i) Name of the material;

# BUREAU OF CEYLON STANDARDS

The Bureau of Ceylon Standards (BCS) is the national standards organisation of Ceylon and was established by the Hon. Minister of Industries & Fisheries, as provided for by the Bureau of Ceylon Standards Act, No. 38 of 1964.

The principal objects of the Bureau as set out in the Act are to promote standards in industry and commerce, prepare national standard specifications and codes of practice and operate a Standardisation Marks Scheme and provide testing facilities, as the need arises.

The Bureau is financed by Government grants and the sale of its publications. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The detailed preparation of standard specifications are done by Drafting Committees composed of experts in each particular field assisted by permanent officers of the Bureau. These Committees are appointed by Divisional Committees, which are appointed by the Council. All members of the Drafting and Divisional Committees render their services in an honorary capacity. In preparing the standard specifications the Bureau endeavours to ensure adequate representation of all view points.

In the international field the Bureau represents Ceylon in the International Organinisation for standardisation (ISO) and will participate in such fields of standardisation as are of special interest to Ceylon.

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