SRI LANKA STANDARD 610:1983
UDC 661.732.1

SPECIFICATION FOR
FORMIC ACID (TECHNICAL GRADE)

BUREAU OF CEYLON STANDARDS

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SLS 610:1983

Gr. 6

BUREAU OF CEYLON STANDARDS
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Sri Lanka.

SRI LANKA STANDARD

SPECIFICATION FOR FORMIC ACID (TECHNICAL GRADE)

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1983-05-19, after the draft, finalized by the Drafting Committee on Chemicals and Chemical Products had been approved by the Chemicals Divisional Committee.

Technical grade formic acid is intended for use in the textile, paper and leather industries, chemical manufacturing industries, plastics manufacture, rubber industry, electroplating and all other general industrial purposes. Formic acid is noted to be highly corrosive, moderately toxic and irritant.

All standard values given in this specification are in SI units.

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

In the preparation of this specification, the assistance obtained from the publications of the Standard Institution of Malaysia is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and the methods of sampling and test for formic acid of technical grade.

2 REFERENCES

ISO	731/II	Determination of total acidity - Titrimetric method
ISO	731/IV	Visual limit test for inorganic chlorides
ISO	731/V	Visual limit test for inorganic sulphates
ISO	731/VI	Determination of iron content -2.2'-Bipyridyl photometric method

ISO 731/VII	Determination of low contents of other volatile acids - Titrimetric method after distillation
ISO 2214	Determination of manganese content - Formaldehyde oxime photometric method
CS 102	Presentation of numerical values
SLS 301	Determination of copper
SLS 428	Random sampling methods

3 REQUIREMENTS

3.1 General requirements

The acid shall consist essentially of formic acid and shall be a clear colourless, fuming liquid with a pungent odour. It shall be miscible with water, alcohol, ether and glycerol.

3.2 Other requirements

Formic acid shall comply with the requirements specified in Table 1 when tested in accordance with the relevant methods prescribed in Column 4 of the table.

TABLE 1 - Requirements for formic acid

Sl. No. (1)	Characteristic (2)	Requirements (3)	Method of test ref. (4)
1	Specific gravity ($27^{\circ}C/27^{\circ}C$), min.	1.190	Appendix B
2	Formic acid content, per cent by mass, min.	85.0	ISO 731/II
3	Residue on evaporation, per cent by mass, max.	0.06	Appendix C
4	Inorganic chloride content, per cent by mass, max.	0.02	ISO 731/IV
5	Inorganic sulphate content, per cent by mass, max.	0.02	ISO 731/V
6	Iron content, mg/kg , max.	10	ISO 731/VI
7	Copper content, mg/kg , max.	0.2	SLS 301
8	Manganese content, mg/kg , max.	0.2	ISO 2214
9	Acetic acid content, per cent by mass, max.	0.3	ISO 731/VII

4 PACKAGING AND MARKING

4.1 Packaging

Formic acid shall be packed in suitable clean, sound, dry and air-tight containers that are resistant to the reactive property of the material. For bulk supplies, packaging and transportation shall be as agreed upon between the purchaser and the supplier. In the case of packaging in containers, the manufacturer/supplier shall ensure that sufficient measures are taken to prevent breakage during handling and transportation.

4.2 Marking

4.2.1 Each container shall be legibly and indelibly marked or labelled with the following information:

a) The words "Formic acid (Technical grade)";

b) Strength of the acid;

c) The manufacturer's/supplier's name and address;

d) The net mass, in kilograms;

e) The batch or code number;

f) Pictorial diagram to indicate corrosive nature (see Fig. 1); and

g) The words, "AVOID BREATHING VAPOUR".

FIGURE 1 - Pictorial marking for corrosive nature

4.2.2 The containers may also be marked with the Certification Mark of the Bureau of Ceylon Standards illustrated below on permission being granted for such marking by the Bureau of Ceylon Standards.

NOTE - The use of the Bureau of Ceylon Standards Certification Mark (SLS Mark) is governed by the provisions of the Bureau of Ceylon Standards Act and the regulations framed thereunder. The SLS mark on products covered by a Sri Lanka Standard is an assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control, which is devised and supervised by the Bureau and operated by the producer. SLS marked products are also continuously checked by the Bureau for conformity to that standard as a further safeguard. Details of conditions under which a permit for the use of the Certification Mark may be granted to manufacturers or processors may be obtained from the Bureau of Ceylon Standards.

5 SAMPLING

Representative samples of the material shall be drawn as prescribed in Appendix A.

6 METHODS OF TEST

Tests shall be carried out as prescribed in the appropriate Appendices and the relevant standards, specified in Column 4 of Table 1.

7 CONFORMITY TO STANDARD

A lot shall be considered as conforming to the requirements of this specification, if the following conditions are satisfied.

7.1 Each container examined as in A.6.1 satisfies the marking and packaging requirements.

7.2 Each individual sample tested as in A.6.2 satisfies the relevant requirements.

7.3 The composite sample tested as in A.6.3 satisfies the relevant requirements.

APPENDIX A

SAMPLING

A.1 LOT

In any consignment all the containers of the same size, containing material belonging to one batch of manufacture shall be grouped together to form a lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

In drawing, preparing and storing the samples, the following precaution and directions shall be observed.

A.2.1 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A.2.2 The sampling instrument used shall be clean and dry.

A.2.3 The samples shall be placed in suitable, clean, dry and air-tight containers on which the material has no action.

A.2.4 The sample containers shall be of such size that they are almost completely filled by the sample.

A.2.5 The sample shall be stored in a cool and dry place.

A.2.6 Glass sampling tube may be used as the sampling instrument.

A.3 SCALE OF SAMPLING

A.3.1 Samples shall be tested from each lot separately for ascertaining the conformity of the material to the requirements of this specification.

A.3.2 The number of containers to be selected from the lot shall be in accordance with Table 2.

TABLE 2 - Scale of sampling

No. of containers in the lot	No. of containers to be selected
Up to 1 000	5
1 001 to 3 000	8
3 001 to 10 000	13
10 001 and above	20

A.3.3 The containers shall be selected at random. In order to ensure randomness of selection, a random number table as given in SLS 428 shall be used.

A.4 PREPARATION OF INDIVIDUAL SAMPLE AND COMPOSITE SAMPLE

A.4.1 Individual sample

Stir the material with a glass rod and draw a sample of not less than 100 ml to form an individual sample. Individual sample shall be obtained from containers selected as in A.3.2.

A.4.2 Composite sample

A small but equal quantity of the material shall be taken out from each container selected as in A.3.2 with the help of the sampling tube, after thoroughly stirring the acid with a glass rod. The material so obtained shall be mixed thoroughly to form the composite sample not less than 200 ml.

A.5 REFERENCE SAMPLE

If a reference sample is required, the required individual and composite samples, for reference, shall be obtained as follows:

a) The size of the individual sample shall be 300 ml and each individual sample so obtained shall be divided into three equal parts. One set of individual samples shall be marked for the purchaser, another for the supplier and third set to be used as a reference sample.

b) The size of the composite sample shall be 600 ml and composite sample so obtained shall be divided into three equal parts. One set of composite samples shall be marked for the purchaser, another for the supplier and third to be used as a reference sample.

A.6 NUMBER OF TESTS

A.6.1 All the containers selected as in A.3.2 shall be examined for packaging and marking requirements. (This may be done at the place of inspection).

A.6.2 Tests for determination of specific gravity, acetic acid content, inorganic chloride content and inorganic sulphate content shall be conducted on each of the individual samples (see A.4.1).

A.6.3 Tests for the determination of all other requirements given in Table 1 shall be conducted on the composite sample (see A.4.2).

APPENDIX B

DETERMINATION OF SPECIFIC GRAVITY

B.1 PRINCIPLE

For the purpose of this specification, the specific gravity of a material shall mean the ratio of the mass of a given volume of the material at the specified temperature to the mass of an equal volume of distilled water at the same temperature.

B.2 PROCEDURE

Fill the specific gravity bottle with the material to over-flowing, holding the specific gravity bottle on its side in such a manner as to prevent the entrapment of air bubbles. Insert the stopper, immerse in the water bath maintained at 27°C and hold for 30 minutes. Remove the specific gravity bottle from the bath and clean and dry it thoroughly. Allow it to come to room temperature and weigh.

B.3 CALCULATION

$$\text{Specific gravity at } 27^{\circ}C/27^{\circ}C = \frac{m_1 - m_o}{m_2 - m_o}$$

where,

m_1 = mass, in g, of the specific gravity bottle with the material at 27 ± 2°C;

m_o = mass, in g, of the specific gravity bottle; and

m_2 = mass, in g, of the specific gravity bottle with water at 27 ± 2°C.

APPENDIX C

DETERMINATION OF RESIDUE ON EVAPORATION ON A WATER BATH

C.1 PRINCIPLE

Determination of the mass of residue, (if any) on evaporation of the sample to constant mass at 110°C.

C.2 PROCEDURE

C.2.1 Evaporate 100 ml of the sample to dryness in an accurately weighed basin of platinum, silica or borosilicate glass having a capacity of about 150 ml, on a water bath. Continue the drying in an oven at a temperature of 110 ± 2°C.

C.2.2 Cool the basin and its contents to room temperature in a desiccator and weigh accurately.

C.2.3 Repeat this series of operations of drying, cooling and weighing, until the mass recorded is constant.

C.2.4 Determine the mass of the final residue, if any by difference.

C.3 CALCULATION

The residue on evaporation is given as a percentage, by mass, by the following expression:

$$\frac{m}{\rho}$$

where,

m = the mass, in g, of residue found; and

ρ = the density of the sample at 27°C, in g/ml.

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

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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.

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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.