SRI LANKA STANDARD 953 : 1992

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SPECIFICATION FOR

TURPENTINE

SRI LANKA STANDARDS INSTITUTION

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SLS 953 : 1992

Gr.7

SRI LANKA STANDARDS INSTITUTION
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SPECIFICATION FOR TURPENTINE

FOREWORD

This standard was approved by the Sectoral Committee on Paints and Varnishes and Allied Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 92-03-26.

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 an analysis shall be rounded off in accordance with CS 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 obtained from the publications of the International Organization for Standardization is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and methods of sampling and test for gum spirit of turpentine and wood turpentines for use in paints and varnishes.

2 REFERENCES

CS 102	Presentation of numerical values.
SLS 428	Random sampling methods.
SLS 584	Tests for petroleum and petroleum products - Volume 1.

3 DEFINITIONS

For the purpose of this specification, the following definitions shall apply:

3.1 gum spirit of turpentine : Product obtained from oleoresins from pine trees by distillation at a temperature below 180 °C or by any other method of fractionation which does not alter the terpenic constituents of the oleoresins.

3.2 **wood turpentine** : Product obtained from pine wood.

3.2.1 *steam distilled wood turpentine :* Wood turpentine obtained from pine stumps or cuttings, either by direct steaming of the mechanically disintegrated wood or by steaming the oleoresin obtained by solvent extraction.

3.2.2 *sulfate wood turpentine :* Wood turpentine recovered during the conversion of wood to paper pulp by the sulfate process.

3.2.3 *destructively distilled wood turpentine :* Wood turpentine obtained by fractionation of certain oils recovered by condensing the vapours formed during the destructive distillation of pine wood.

3.2.4 *acid value :* The number of milligrams of potassium hydroxide required to neutralize 1 g of turpentine.

4 TYPES

Turpentine covered under this specification shall be of the following types:

i) Type 1 - gum spirit of turpentine;
ii) Type 2 - steam distilled wood turpentine;
iii) Type 3 - sulfate wood turpentine ; and
iv) Type 4 - destructively distilled wood turpentine.

5 REQUIREMENTS

5.1 Material

The product shall be clear, free from water and from solid matter in suspension. The odour shall be mild and characteristic of turpentine.

5.2 Solubility

The product shall be soluble at 27 ± 2 °C, in all proportions of chloroform, diethyl ether and glacial acetic acid.

5.3 Other requirements

The product shall comply with the requirements given in Table 1 when tested in accordance with the methods given in Column 7 of the table .

TABLE 1 - Requirements for turpentine

Sl. No. (1)	Characteristic (2)	Requirement				Method of test (7)
		Type 1 (3)	Type 2 (4)	Type 3 (5)	Type 4 (6)	
i)	Saybolt colour, min.	+10	+10	+10	+10	**SLS 584:Volume 1 M 3**
ii)	Relative density, at 27°C/27°C (see Note 1)	0.849 to 0.864	0.849 to 0.864	0.854 to 0.864	0.844 to 0.859	Appendix A
iii)	Refractive index, at 27°C (see Note 2)	1.462 to 1.475	1.462 to 1.475	1.462 to 1.475	1.460 to 1.480	Appendix B
iv)	Distillation characteristics, recovery, per cent by volume					Appendix C and
	a) at 152°C	0	0	0	0	
	b) at 170°C, min.	90	90	90	90	
v)	Evaporation residue, per cent by mass, max.	2.5	2.5	2.5	2.5	Appendix D
vi)	Sulfuric polymerization residue, per cent by volume, max.	12	16	16	16	Appendix E
vii)	Acid value, max.	1	1	1	1	Appendix F
viii	Flash point, °C min.	32	32	32	32	**SLS 584:Volume M 6**

NOTES

1. *The corresponding relative density values at different temperatures may be obtained using the formula given in A.3.*
2. *The corresponding refractive index values at different temperatures may be obtained using the formula given in B.3.*

6 PACKAGING AND MARKING

6.1 Packaging

The product shall be suitably packed in clean, dry containers. The containers shall be properly sealed to prevent leakage and shall be strong enough to withstand breakage during handling.

NOTE

The use of glass, steel or high density polyethylene (HDPE) as packing material is recommended. Any other material may be used subjected to proven satisfactory of the material to pack the product.

6.2 Marking

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

a) Name of the product;
b) Type;
c) Name and address of the manufacturer and/or distributor (including the country of origin);
d) Registered trade mark, if any;
e) Volume, in millilitres/litres;
f) Date of manufacture; and
g) Batch or code number;

NOTE

Attention is drawn to the certification marking facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this standard.

7 SAMPLING

7.1 Lot

In any consignment all containers of turpentine belonging to one type and one batch of manufacture or supply shall constitute a lot.

7.2 Scale of sampling

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

7.2.2 The number of containers to be selected from a lot shall be in accordance with Table 2.

TABLE 2 - Scale of sampling

Number of containers in the lot (1)	Number of containers to be selected (2)
Up to 90	3
91 to 150	4
151 to 280	5
281 to 500	6
501 to 1200	7
1201 and above	9

7.2.3 The containers shall be selected at random. In order to ensure randomness of selection, tables of random numbers given in SLS 428 shall be used.

7.3 Preparation of composite sample

A sufficient quantity of turpentine shall be drawn from each container selected as in 7.2.2 and mixed thoroughly to form a composite sample. Approximately an equal quantity shall be drawn from each sample container. The composite sample thus obtained shall be transferred to a sample container.

7.4 Number of tests

7.4.1 Each container selected as in 7.2.2 shall be inspected for packaging and marking requirements.

7.4.2 Each sample selected as in 7.2.2 shall be tested for the requirements given in 5.1 and 5.2.

7.4.3 The composite sample prepared as in 7.3 shall be tested for the requirements given in 5.3.

8 METHODS OF TESTS

8.1 Unless otherwise specified reagents of analytical grade and distilled water or water of equivalent purity shall be used.

8.2 Tests shall be carried out as prescribed in SLS 584 Volume 1: 1982 and Appendices A to F of this specification.

9 CRITERIA FOR CONFORMITY

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

9.1 Each container inspected as in 7.4.1 satisfies the packaging and marking requirements.

9.2 Each sample tested as in 7.4.2 satisfies the relevant requirements.

9.3 The composite sample tested as in 7.4.3 satisfies the relevant requirements.

APPENDIX A
DETERMINATION OF RELATIVE DENSITY

A.1 APPARATUS

A.1.1 *Relative density hydrometer,* graduated in units of 0.001 with a range from 0.840 to 0.870.

A.2 PROCEDURE

Measure the relative density at 27°C. If this is not possible, measure the relative density at a temperature as near as possible to this temperature and measure the temperature of the sample.

A.3 CALCULATION

Relative density at the
specified temperature t_1 °C $= d^t + 0.000\,82\,(t - t_1)$

where,

d^t is the hydrometer reading taken at the temperature t °c;
t is the temperature, in °C, of the sample; and
t_1 is the specified temperature, in °C.

APPENDIX B
DETERMINATION OF REFRACTIVE INDEX

B.1 APPARATUS

Refractometer, which enables the temperature of the sample to be measured to the nearest 0.2 °C and gives the refractive index to within 0.000 1. (Abbe's refractometer, for instance)

NOTE

It is advisable to use a precision thermostat (a thermostat of the Hoppler type, for instance) so as to be able to regulate the temperature of the water circulating in the refractometer to the nearest 0.1 °C.

B.2 PROCEDURE

Determine the refractive index at 27°C. If it is not possible, measure the refractive index at a temperature as near as possible to this temperature and measure the temperature of the sample.

B.3 CALCULATION

Refractive index at the specified temperature t_1°C = $RI^t + 0.000\,45\,(t - t_1)$

where,

RI^t is the refractometer reading taken at the temperature t°C;
t is the temperature, in °C, of the sample; and
t_1 is the specified temperature, in °C.

APPENDIX C
DETERMINATION OF DISTILLATION CHARACTERISTICS

C.1 PROCEDURE

Carry out the determination according to the M 5 of **SLS 584 : Volume 1 : 1982.** Record the volumes recovered at 152°C and 170 °C.

APPENDIX D
DETERMINATION OF EVAPORATION RESIDUE

D.1 APPARATUS

D.1.1 *Flat-bottomed cylindrical dish,* of glass, diameter 75-mm and depth 25-mm.

D.1.2 *Oven,* regulated at 100 ± 2 °C.

D.2 PROCEDURE

Weigh the dish (D.1.1) to the nearest 0.1 mg. Add 10 ml of the sample and weigh the dish and sample to the nearest 10 mg. Evaporate on a boiling water bath for 2 hours. After evaporation, place the dish for 2 hours in the oven (D.1.2).

Cool in a desiccator and weigh the dish with the residue to the nearest 0.1 mg.

D.3 CALCULATION

$$\text{Evaporation residue, per cent by mass} = \frac{m_2 - m_0}{m_1 - m_0} \times 100$$

where,

m_0 is the mass, in g, of the dish;
m_1 is the mas, in g, of the dish and the sample; and
m_2 is the mass, in g, of the dish and the evaporation residue.

APPENDIX E
DETERMINATION OF SULFURIC POLYMERIZATION RESIDUE

E.1 REAGENT

Sulfuric acid, 98.5 per cent (m/m) solution.

E.2 APPARATUS

E.2.1 *Flask* 45 ml capacity, with neck graduated upto 5 ml (see the Figure).

Dimensions in millilitres

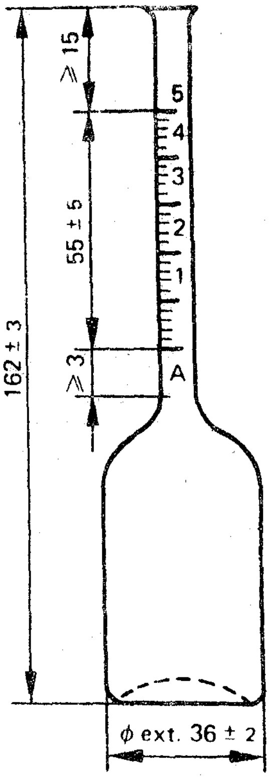

Figure - Flask for sulfuric polymerization test

E.2.2 *Burette*

E.3 PROCEDURE

Pour 20 ml of the sulfuric acid (E.1) into the flask (E.2.1) which is immersed in iced water. Add 5 ml of the sample slowly, drop dy drop, from the burette (E.2.2). Shake the flask frequently and make sure that the temperature does not exceed 60 °C. When the temperature of the mixture ceases to rise, shake the flask vigorously and heat on a water bath at 60 °C to 65 °C for 10 minutes, carefully mixing the contents of the flask by shaking vigorously five or six times during heating.

Cool the flask to room temperature and add sufficient sulfuric acid to bring the unpolymerized residue into the graduated neck. The separation line between the residue and the sulfuric acid mixture shall be at, or slightly above, the zero graduation.

Allow the stoppered flask to stand for one night (it may also be centrifuged) and read the volume of unpolymerized residue, in millilitres.

E.4 CALCULATION

$$\text{Sulfuric polymerization residue, per cent by volume} = \frac{5 - V}{5} \times 100$$

where,

V is the volume, in ml, of the unpolymerized residue.

APPENDIX F
DETERMINATION OF ACID VALUE

F.1 REAGENTS

F.1.1 *Ethanol,* 95 per cent (V/V), neutral to the phenolphthalein solution (**F.1.2**).

F.1.2 *Phenolphthalein,* 1 per cent (m/m) solution in 95 percent (V/V) ethanol solution.

F.1.3 *Potassium hydroxide,* 0.1 mol/l standard volumetric solution in 95 per cent (V/V) ethanol solution.

F.2 PROCEDURE

F.2.1 Using a pipette, tranfer 10 ml of the sample to a 100 ml conical flask which has been previously weighed. Determine the mass of the sample to the nearest 0.1 mg.

F.2.2 Add 20 ml of the ethanol (**F.1.1**) and a few drops of the phenolphthalein solution (**F.1.2**), to the conical flask. Titrate with the ethanolic potassium hydroxide solution (**F.1.3**), until the mixture becomes pink.

F.3 CALCULATION

$$\text{Acid value} = 56.1 \frac{Vc}{m}$$

where,

c is the concentration, in mol/l, of the ethanolic potassium hydroxide solution;
V is the volume, in ml, of the ethanolic potassium hydroxide solution used ; and
m is the mass, in g, of the sample.

Blank P

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.*

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SRI LANKA STANDARDS INSTITUTION

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