IS 533 (2007): Gum spirit of turpentine (oil of turpentine)
[PCD 18: Natural and Synthetic Fragrance Materials]

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भारतीय मानक

तारपीन की गम स्प्रिट (तारपीन का तेल) — विशिष्टि

(तीसरा पुनरीक्षण)

Indian Standard

GUM SPIRIT OF TURPENTINE (OIL OF TURPENTINE) — SPECIFICATION

(Third Revision)

ICS 71.100.60

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 2007

Price Group 2

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Natural and Synthetic Fragrance Materials Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was first issued in 1954 and subsequently revised in 1973 and 1998. The Committee noted that even after removal of one or more of its constituents, the product was found to be still conforming to the specification which necessitated the first revision. In the second revision, only a single grade of gum spirit of turpentine, with minimum limits for the major constituents, that is, alpha-pinene and car-3-ene, was specified to ensure coverage of the whole oil to this specification. In this revision, physico-chemical requirements have been prescribed at 20°C in addition to 27°C. Besides, requirement for acid value has been made stringent and distillation range has been modified.

The whole oil of turpentine finds applications in the manufacture of pharmaceuticals, perfumery and other chemicals. Its use in paint industry is being taken up by turpentine from which one or more constituents are removed. The latter material is covered by IS 6646 : 1972 'Specification for oil of turpentine, solvent grade'.

An ISO 11020 : 1998 'Oil of turpentine, Iberian type (*Pinus pinaster* Sol.)' exist which is technically not equivalent to this standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

Indian Standard

GUM SPIRIT OF TURPENTINE (OIL OF TURPENTINE) — SPECIFICATION

(Third Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for the material commercially known as gum spirit of turpentine or oil of turpentine.

This standard does not cover wood turpentine, sulphate or sulphite turpentine and mineral substitutes of turpentine.

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
326	Methods of sampling and test for natural and synthetic perfumery materials:
(Part 1) : 1984	Sampling (*second revision*)
(Part 2) : 1980	Preliminary examination of perfumery materials and samples (*second revision*)
(Part 3) : 2005/ ISO 279 : 1998	Determination of relative density (*third revision*)
(Part 5) : 2006/ ISO 280 : 1998	Determination of refractive index (*third revision*)
(Part 6) : 2005/ ISO 875 : 1999	Determination of solubility in ethanol (*third revision*)
(Part 7) : 2006/ ISO 1242 : 1999	Determination of acid value (*third revision*)
(Part 10) : 2005/ ISO 4715 : 1978	Determination of residue on evaporation (*third revision*)
(Part 19) : 1998	Gas chromatographic analysis of perfumery materials
(Part 20) : 1993	Determination of boiling (distillation) range (*second revision*)
1070 : 1992	Reagent grade water (*third revision*)
1448 [P:20] : 1998	Method of test for petroleum and its products [P:20] : Determination of flash point by Abel apparatus (*second revision*)
2284 : 1988	Method for olfactory assessment of natural and synthetic perfumery materials (*first revision*)
6597 : 2001	Glossary of terms relating to fragrance and flavour industry (*second revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 6597 shall apply.

4 REQUIREMENTS

4.1 Source

The material shall be the genuine distillation product of the oleoresin of *Pinus roxburghii Sargent* mainly.

4.2 Description

4.2.1 The material shall be a clear, limpid and transparent liquid, with a pungent and somewhat bitter taste. It shall also be free from sediment, suspended matter, separated water and added adulterants [*see* IS 326 (Part 2)].

4.2.2 The characteristic odour and taste of the material becomes stronger and less pleasant as the oil ages or is exposed to air (*see* IS 2284 for olfactory assessment).

4.3 Grease Spot Test

Three drops of the material, when successively evaporated from the same spot on an unsized paper, shall leave no grease stain, thus showing the absence of fixed oils.

4.4 Solubility

4.4.1 *Solubility in Alcohol*

The material shall be soluble in 5 volumes of ethyl alcohol (90 percent, *v/v*), in 1 volume of ethyl alcohol (95 percent, *v/v*) when tested as prescribed in IS 326 (Part 6).

4.4.2 *Solubility in Other Solvents*

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

4.5 Flash Point

The material shall have a flash point of not less than 35°C when tested as prescribed in IS 1448 [P : 20].

4.6 Colour

The material shall not be darker than a freshly prepared solution of 0.001 g of potassium dichromate in 100 ml of 6 N sulphuric acid.

4.7 The material shall also comply with the requirements given in Table 1.

5 PACKING AND MARKING

5.1 Packing

The material shall be packed as agreed to between the purchaser and the supplier.

5.2 Marking

The containers shall be marked with the following:

a) Name of the material;

b) Manufacturer's name or recognized trade-mark, if any;

c) Year of manufacture; and

d) Volume of the material in the package.

5.3 The containers shall be well protected from light and stored in a cool place.

5.3.1 *BIS Certification Marking*

The containers may also be marked with the Standard Mark.

5.3.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

6 SAMPLING

6.1 Representative samples of the material test shall be drawn from the lots as prescribed in IS 326 (Part 1).

6.2 Number of Tests

6.2.1 Tests for the determination of distillation range shall be conducted on the individual samples.

6.2.2 Test for determination of the remaining characteristics shall be conducted on the composite sample.

6.3 Criteria for Conformity

6.3.1 For individual samples, criteria shall be determined in accordance with 3.7.1 of IS 326 (Part 1).

6.3.2 For composite sample, criteria shall be determined accordance with 3.7.2 of IS 326 (Part 1).

7 TEST METHODS

7.1 Tests shall be conducted as prescribed under 4.3 to 4.7 and the appropriate references to relevant Indian Standard and Annex is given in col 4 and col 5 of Table 1.

7.2 Quality Reagents

Unless specified otherwise, pure chemicals distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which effect the results of analysis.

Table 1 Requirements for Gum of Spirit of Turpentine (Oil of Turpentine)

(*Clauses* 4.7 *and* 7.1)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			IS No.	Annex
(1)	(2)	(3)	(4)	(5)
i)	Relative density[1]			
	at 20°C	0.860 0 to 0.870 0	326 (Part 3)	—
	at 27°C	0.852 0 to 0.862 0		
ii)	Refractive index [1]			
	at 20°C	1.467 0 to 1.477 0	326 (Part 5)	—
	at 27°C	1.468 0 to 1.475 0		
iii)	Acid value, *Max*	1.0	326 (Part 7)	—
iv)	Distillation range:			
	Initial boiler point (IBP) °C, *Min*	155	326 (Part 20)	—
	95 ml, *Max* up to, °C	260		
v)	Residue on evaporation (wholly organic), percent (*m/m*), *Max*[2]	2.0	326 (Part 10)	—
vi)	Alpha-pinene, percent, *Min*	20	—	A
vii)	Car-3-ene, percent range	40–65	—	A

[1] The correction factors for relative density and refractive index for each degree Celsius change in temperature are 0.000 64 and 0.000 38.

[2] For this requirement, 5 g of material shall be heated on boiling water bath for 2 h.

ANNEX A

[*Table* 1, *Sl No.* (vi) *and* (vii)]

DETERMINATION OF ALPHA-PINENE AND CAR-3-ENE BY GAS CHROMATOGRAPHY

A-1 PRINCIPLE

A sample of oil of turpentine is injected into the gas chromatograph [*see* IS 326 (Part 19)] where it is carried by the carrier gas from one end of the column to the other. During its movement, the constituents of the sample undergo distribution at different rates and ultimately get separated from one another. The separated constituents emerge from the end of the column one after another and are detected by suitable means whose response is related to the amount of specific component leaving the column.

A-2 APPARATUS

Any gas chromatograph capable of being operated under conditions suitable for resolving the individual constituents into distinct peaks may be used. A typical chromatogram using such a gas chromatograph with the following chromatographic conditions is shown in Fig. 1.

	Sample	*Oil of Turpentine*
a)	*Column*:	
	1) Material	Stainless steel
	2) Length	3 m
	3) I. D.	0.32 cm
	4) Stationary phase	AT-1000, 10 percent by mass
	5) Solid support	Chromosorb WHP, 100 – 120 mesh
b)	Carrier gas	Nitrogen
	Flow rate	20 ml/min
c)	*Conditions*:	
	1) Column temperature:	
	Initial	100°C

Sample	*Oil of Turpentine*
Final	200°C
Ramp	2°C/min for 1 h
2) Injection port temperature	230°C

d) *Detector*:

1) Type	FID
2) Temperature	250°C

A-3 PROCEDURE

Set the gas chromatograph for the appropriate operating conditions and inject sample at injection port where it is vapourized and well mixed with the carrier gas. This is then led into the chromatographic column in the vapour form. The constituents of the sample are separated out by virtue of their differing interaction with the stationary phase. For this separation to be efficient, it is necessary that the column is maintained at particular temperature throughout the time required for the resolution of the constituents. As the sample enters the detector, it gives the signal corresponding to the amount of particular constituent leaving the column. The detector signal on transmission to an electronic integrator plots the chart. From the specific area under different peaks corresponding to specific constituent, the quantities of different constituents are determined.

A-4 CALCULATION

Peak areas are calculated either by the most commonly used triangular method or automated integration. When an electronic integrator is used, concentrations of the constituents on the basis of the peak areas on chromatogram are automatically calculated and presented as a printout. For specific constituents, internal standard method is employed for higher accuracy.

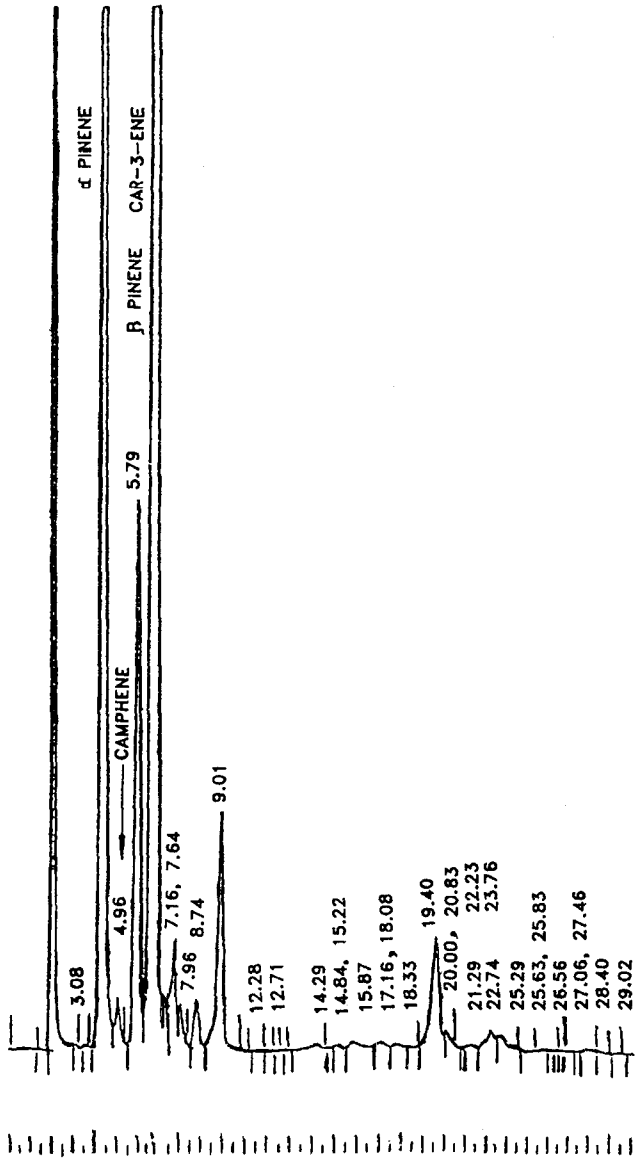

FIG. 1 TYPICAL CHROMATOGRAM OF OIL OF TURPENTINE

This Indian Standard has been developed from Doc : No. PCD 18 (2319).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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