
International Standard



276

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Linseed stand oil for paints and varnishes — Specifications and methods of test

Standolies d'huile de lin pour peintures et vernis — Spécifications et méthodes d'essai

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 276 was developed by Technical Committee ISO/TC 35, *Paints and varnishes*, and was circulated to the member bodies in December 1979.

It has been approved by the member bodies of the following countries :

Australia	Ireland	Poland
Austria	Israel	Romania
Brazil	Italy	South Africa, Rep. of
China	Kenya	Sweden
Egypt, Arab Rep. of	Korea, Rep. of	Switzerland
France	Netherlands	United Kingdom
India	Norway	

The member body of the following country expressed disapproval of the document on technical grounds :

Germany, F.R.

This International Standard cancels and replaces ISO Recommendation R 276-1962, of which it constitutes a technical revision.

Linseed stand oil for paints and varnishes — Specifications and methods of test

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1 Scope and field of application

This International Standard specifies the requirements and the corresponding methods of test for five types of linseed stand oil suitable for paints and varnishes.

2 References

ISO 150, *Raw, refined and boiled linseed oil for paints and varnishes — Specifications and methods of test.*

ISO 842, *Raw materials for paints and varnishes — Sampling.*

ISO 3681, *Paint media — Determination of saponification value — Titrimetric method.*

ISO 3682, *Paint media — Determination of acid value — Titrimetric method.*

3 Definition

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linseed stand oil — Polymerized linseed oil obtained from linseed oil by heat treatment and conforming to the requirements given below.

NOTE — Certain of these materials are also referred to as "lithographic varnishes".

4 Required characteristics and their tolerances

The five types of linseed stand oils shall have the characteristics shown in the table.

5 Sampling

Take a representative sample of the oil as described in ISO 842.

Table – Required characteristics and their tolerances

Characteristic	Requirement					Test method
	Stand oil 1 extra low viscosity	Stand oil 2 low viscosity	Stand oil 3 medium viscosity	Stand oil 4 high viscosity	Stand oil 5 extra high viscosity	
Viscosity						Clause 6
at 23 °C Pa-s P	max. 0,9 (max. 9)	0,9 to 3,4 (9 to 34)	3,4 to 6,8 (34 to 68)	6,8 to 13 (68 to 130)	min. 13 (min. 130)	
(at 25 °C) Pa-s P	max. 0,8 (max. 8)	0,8 to 3 (8 to 30)	3 to 6 (30 to 60)	6 to 11 (60 to 110)	min. 11 (min. 110)	
Clarity and colour	To be agreed between the interested parties	To be agreed between the interested parties	To be agreed between the interested parties	To be agreed between the interested parties	To be agreed between the interested parties	1)
Odour	Similar to that of a reference sample agreed between the interested parties	Similar to that of a reference sample agreed between the interested parties	Similar to that of a reference sample agreed between the interested parties	Similar to that of a reference sample agreed between the interested parties	Similar to that of a reference sample agreed between the interested parties	1)
Ash, max. % (m/m)	0,10	0,10	0,10	0,10	0,10	ISO 150
Acid value, gKOH/kg max.	6	10	12	15	20	ISO 3682
Saponification value gKOH/kg	186 to 200	186 to 200	186 to 200	186 to 200	186 to 200	ISO 3681
Unsaponifiable matter, max. % (m/m)	2,0	2,0	2,0 <small>ISO 276:1981</small>	2,0	2,0	ISO 150
Polybromide test	Negative result	—	—	—	—	Clause 7
Test for presence of colophony (rosin)	Negative result	Negative result	Negative result	Negative result	Negative result	ISO 150
Test for presence of blown oils	Negative result	Negative result	Negative result	Negative result	Negative result	Clause 8

1) The method should be agreed between the interested parties.

Methods of test

During the analyses, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

6 Viscosity

Any method for measuring the dynamic viscosity of liquids may be used.

7.1.2 Potassium hydroxide, 56 g/l ethanolic solution.

7.1.3 Sodium sulphate, anhydrous.

7.1.4 Bromine.

7 Polybromide test

7.1.5 Diethyl ether, ρ_{20} 0,712 to 0,716 g/ml, yielding a non-volatile residue at 80 °C of not more than 0,001 % (m/m).

7.1 Reagents

7.1.1 Sulphuric acid, 196 g/l solution.

7.1.6 Light petroleum (petroleum ether), boiling range 40 to 60 °C.

7.2 Preparation of the fatty acids

Saponify about 15 g of the oil with 70 ml of the ethanolic potassium hydroxide solution (7.1.2) by boiling for 1 h under reflux.

Transfer the soap solution to a porcelain dish and, after addition of 50 ml of hot water, expel the ethanol by evaporating on a steam bath.

Dissolve the soap in 50 ml of hot water, transfer to a beaker of 500 ml and acidify with 25 ml of the sulphuric acid solution (7.1.1). Boil the solution whilst passing a slow current of carbon dioxide through it, until the layer of fatty acids is clear. Allow to cool to room temperature, add 150 ml of the light petroleum (7.1.6). Filter the light petroleum layer through anhydrous sodium sulphate (7.1.3) (the filtrate should not contain water).

Evaporate the solvent on the steam bath, removing the last traces with a slow current of carbon dioxide.

7.3 Procedure

7.3.1 Dissolve 1 g of the fatty acids (7.2) in 10 ml of diethyl ether, (7.1.5), and cool to $-10\text{ }^{\circ}\text{C}$ in a 100 ml conical flask fitted with a ground glass stopper. Carefully add 0,3 ml of bromine (7.1.4) whilst stirring the mixture. Swirl the mixture thoroughly. Place the flask in an ice water bath and allow to stand for 5 min at $0\text{ }^{\circ}\text{C}$, until any sediment present has settled. Experience has shown that one of the following phenomena takes place :

- a crystalline sediment is produced (see 7.3.2);
- a crystalline sediment and dark emulsion are produced (see 7.3.3);
- a dark emulsion is formed (see 7.3.4);
- the solution is clear (see 7.3.4).

7.3.2 As the immediate formation of a crystalline sediment reveals the presence of linseed oil or another non-polymerized polybromide-forming oil, report the test as being positive.

7.3.3 If, in addition, an emulsion or a heavy liquid layer is formed on the bottom of the flask, as usually occurs in the case of stand oil of higher viscosity, add 5 ml of diethyl ether at $0\text{ }^{\circ}\text{C}$ and swirl the flask again in the ice water bath, in order to facilitate the detection and identification of the crystalline sediment. If this is not sufficient to dissolve the heavy liquid phase, make further additions of 5 ml of cold diethyl ether and cool again until the heavy liquid layer dissolves. Finally, examine the

contents of the flask again. If a crystalline sediment is present, report the test as being positive.

7.3.4 If only a dark emulsion of a heavy liquid layer is formed on the bottom of the flask, or if the solution is clear, allow the mass to stand in the ice water bath for 12 to 16 h. If crystals are formed after this period, remove the liquid phase by additions of diethyl ether (5 ml at a time, as in 7.3.3), and examine again for the presence of crystals.

If a clear solution is obtained and a crystalline sediment is not observed, the absence of linseed oil or an amount too small for detection is indicated. Report the test as being negative.

7.4 Limit of sensitivity

The presence of about 4 to 4,5 % (*m/m*) of linseed oil in linseed stand oil is detected immediately when using the procedure specified in 7.3.2 and 7.3.3. The presence of less than 4 % (*m/m*) of linseed oil may be detected by carrying out the procedure specified in 7.3.4.

The test described in 7.3.4 gives a negative result if the proportion of linseed oil present is less than about 2 to 3 % (*m/m*).

NOTE Both the polybromides of fish oil fatty acids and the hexabromides from the linolenic acid of linseed oil, form a crystalline sediment.

8 Test for the presence of blown oils

Mix thoroughly in a 50 ml measuring cylinder fitted with a ground glass stopper, 10 ml of stand oil and 30 ml of the light petroleum (7.1.6). The solution should be clear. If after 3 days storage at room temperature the solution shows no deposit, report the test as being negative.

9 Test report

The test report shall contain at least the following information :

- the type and identification of the product tested;
- a reference to this International Standard (ISO 276);
- the results of the tests, and whether or not the product complies with the relevant specification limits;
- any deviation, by agreement or otherwise, from the procedures specified;
- the date of the tests.

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