

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 56

SPECIFICATION FOR SHELLAC

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BRIEF HISTORY

The ISO Recommendation R 56, *Specification for Shellac*, was drawn up by Technical Committee ISO/TC 50, *Lac*, the Secretariat of which is held by the Indian Standards Institution (ISI).

This Technical Committee decided to place on its program of work the question of Shellac and the ISO/TC 50 Secretariat submitted a first draft proposal based on the studies made previously by the Indian Member Body.

This draft proposal was discussed at the first meeting of Technical Committee ISO/TC 50, held in New Delhi, in January 1950. A second draft proposal, which took into account the resolutions adopted at this meeting, was then circulated to the members of the Technical Committee and discussed at the second meeting of ISO/TC 50, held in New York, in June 1952. A revised third draft proposal was then formulated. Some changes were made in this document at the third meeting of the Technical Committee, held in London, in October 1954, and the Technical Committee adopted the document thus revised as a Draft ISO Recommendation.

On 12 September 1956, the Draft ISO Recommendation (No. 99) was distributed to all ISO Member Bodies and was approved, subject to modifications, by the following 21 (out of a total of 37) Member Bodies:

*Australia	Hungary	Spain
Austria	*Ireland	*Sweden
*Bulgaria	Netherlands	Turkey
*Canada	Pakistan	Union of South Africa
*Denmark	Poland	United Kingdom
France	Portugal	U.S.A.
*Greece	Romania	*U.S.S.R.

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in December 1957, to accept it as an ISO RECOMMENDATION.

* These Member Bodies stated that they had no objection to the Draft being approved.

AMENDMENT 1 - JULY 1966
TO ISO RECOMMENDATION R 56-1957

Amendment 1
to ISO Recommendation R 56-1957

SPECIFICATION FOR SHELLAC

1. Clause VIII (Foreword), page 5, lines 1 to 13

Delete

“ In pursuance of the resolution.....
..... for further study.”

2. Section 10, page 9

Read

“ Shellac shall not contain any rosin, as tested by the method prescribed in Appendix F.”

3. Section 14, page 10

Read

“ Shellac shall satisfy a flow test, which is conducted by the method prescribed in Appendix L.”

4. Section 16, page 10

Read

“ The acid value of shellac may be fixed, if desired, by agreement between the purchaser and the vendor. It shall be determined by the method prescribed in Appendix N.”

5. Appendix L, clause L.2.2, page 39, line 4

Read

“ ... for 24 $\pm$ 2 hours.”

BRIEF HISTORY

At the meeting held in New Delhi in February 1961, Technical Committee ISO/TC 50, *Lac*, decided, after due study, that there was no need to continue the investigation regarding quantitative determination of rosin in shellac, as had been planned in 1957. It was further decided that only the method described in Appendix L should be kept for flow tests. For determination of acid value of shellac, it was decided to retain the method described in Appendix N and not to take up consideration of an alternative method.

Consequently, a Draft Revision of ISO Recommendation R 56-1957 was drawn up and adopted by the Technical Committee.

In November 1963, this Draft Revision (No. 633) was circulated to all the ISO Member Bodies for enquiry. It was approved by 20 Member Bodies. No Member Body opposed the approval of the Draft.

The Draft Revision, entitled *Amendment 1 to ISO Recommendation R 56-1957*, was then submitted by correspondence to the ISO Council, which decided, in July 1966, to accept it.

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FOREWORD

I. This ISO Recommendation is based on the decisions arrived at in the first three meetings of the Technical Committee on Lac of the International Organization for Standardization (ISO/TC 50) which were held in New Delhi, India, on January 16, 17, 18 and 19, 1950; in New York, USA, on June 23, 24 and 25, 1952; and in London, United Kingdom, on October 11, 12 and 13, 1954, respectively.

II. India produces a very large proportion of the world output of lac and lac products, of which a part is consumed in that country for various industrial purposes, but the bulk is exported to America and Europe, so that the manufacture and export of shellac is a matter of great interest to India and to the rest of the world. The need for an agreed international standard specification for this important commodity of international trade is obvious. This need has been hitherto met by the procurement policies adopted by the users of this material outside India and by the standards followed by individual exporting firms in India, the United States Shellac Importers' Association and the London Shellac Trade Association. These have not contributed materially towards evolving a generally acceptable set of specifications; on the contrary, by the introduction of arbitrarily selected names used to describe special brands or makes of shellac, the development of a general standard on shellac has been hindered.

III. Notwithstanding the extensive activities of the Indian Lac Cess Committee concerning the rationalization of production and marketing of shellac in India and abroad through the Indian Lac Research Institute, Namkum, Bihar, India, and the London Shellac Research Bureau, and in spite of the interest taken in this matter by the United States Shellac Importers' Association, the American Society for Testing Materials, and the London Shellac Trade Association, considerable confusion and disagreement still exist in the various specifications on shellac that have been evolved and are in use in different countries by different agencies.

IV. The International Electrotechnical Commission carried out a considerable amount of preliminary work by way of collection of data on prevalent practices related to shellac and allied products, but this work did not reach a point where an international agreement could be said to have been attained either on the specifications or on the methods of test. The International Organization for Standardization adopted "Lac" among the subjects to be standardized and, in view of the importance to India of such standardization and also considering the extensive experience available in that country, the Indian Standards Institution was appointed as the Secretariat of the ISO Technical Committee on this subject.

V. The usual trade descriptions of shellac, which are based somewhat indiscriminately on the Indian names of the host trees or the season of cropping the sticklac or visual differences or on *ad hoc* descriptions such as fine, superfine and extra fine or a combination of any of these, have failed to distinguish the different grades. The standard of quality

represented by these names has not remained constant but has varied from year to year and from one country to another. For example, London Superfine and American Superfine are recognized in the trade as different qualities. There has also been a tendency to introduce new names to describe slight variants of the commercially known varieties. The distinction between hand-made and machine-made shellac has not been rigidly observed. To remove this confusion, two types, namely hand-made and machine-made have been recognized in this ISO Recommendation and six different grade designations adopted for each of these two types, all independent of the names of host trees and seasons or of any characteristics of shellac. These designations are grades Special, A, B, C, D and E for hand-made shellac and grades D1, D2, I, II, III and IV for machine-made shellac. Machine-made shellac grades D1 and D2 relate to decolourized material and any of the machine-made grades may be supplied in dewaxed or undewaxed condition. In the first meeting of ISO/TC 50 it was agreed that designations of shellac such as 'VSO', 'Double Triangle G', 'Diamond I', 'Button Lac', 'Garnet Lac', be not specified and that the proposed grade designations should be adhered to. There will be no objection to the existing trade designations and private marks being also used for trade purposes, if required by contracting parties. These designations and private marks do not, however, form a part of the international designations. It is felt that although the new nomenclature might take some time to get established, by the time this occurs, the old designations would probably disappear.

VI. Three of the requirements for shellac, namely those for (a) matter insoluble in hot alcohol, (b) absence of rosin and (c) absence of orpiment are included in this ISO Recommendation as essential clauses; the remainder, namely those for (d) volatile matter (moisture), (e) colour index, (f) wax, (g) ash, (h) matter soluble in water, (j) flow test, (k) heat polymerization test, (m) acid value, (n) lead content and (p) non-volatile matter soluble in cold alcohol, are optional.

VII. In the first meeting of ISO/TC 50 the clause relating to colour index and the related Appendix D were approved tentatively subject to review after a period not exceeding two years and the requirement made optional subject to agreement between the purchaser and the vendor. In the second meeting of the Committee it was decided that the requirement relating to colour index and the related Appendix D should be approved and the requirement should remain optional. In addition, provision has been made (see 8.2) for the appearance and colour to be judged by visual comparison.

VIII. In pursuance of the resolution passed at the third meeting of ISO/TC 50, the methods of test for the determination of rosin content (see 10) are being studied by ISO/TC 50 and when an agreed method is developed, the ISO will issue a separate ISO Recommendation on the subject. The two methods under study are given in the following documents:

- (1) ISO/TC 50 (Secretariat—58) 91 McIlhiney Method for the Determination of Rosin,
- (2) ISO/TC 50 (Secretariat—59) 92 Langmuir Method for the Determination of Rosin.

In respect of flow test (see 14), a standard method adopted by the ISO/TC 50 is given in Appendix L, but for specialized requirements, alternative or additional tests may be desired and, for this purpose, the ISO/TC 50 has issued a separate document ISO/TC 50 (Secretariat—52) 85 in which three other tests are described.

Beside the alkalimetric method for the determination of acid value, another alternative method, known as the Kamath-Mainkar method, has been given in document ISO/TC 50 (Secretariat—42) 70 for further study.

Limits and methods of test for non-volatile matter soluble in cold alcohol are also being studied by the ISO/TC 50 and when an agreement is arrived at, the ISO will issue a separate ISO Recommendation on this subject. The two methods for cold alcohol solubles under study by the Committee are contained in the following documents:

- (a) ISO/TC 50 (Secretariat—50) 83,
- (b) ISO/TC 50 (Secretariat—51) 84.

IX. In pursuance of the resolution passed at the second and third meetings, the mesh sizes of sieves given in the text of this ISO Recommendation have been indicated in terms of aperture dimensions, and a note giving number designations of approximately equivalent sieves of USA, United Kingdom, France, India and other countries has been added for the sake of convenience.

X. Acknowledgement is due for the assistance that has been derived from the specifications and publications of the American Society for Testing Materials, the American Bleached Shellac Manufacturers' Association, the United States Shellac Importers' Association, the British Standards Institution, the Agricultural Marketing Adviser to the Government of India, Messrs Angelo Brothers, Ltd., Calcutta, and the Indian Lac Research Institute. Considerable assistance has been derived also from "A Handbook of Shellac Analysis" by M. Rangaswami and H.K. Sen, issued by the Indian Lac Research Institute, which gives a critical review of the characteristics and methods of tests of lac and lac products and which was designed by the authors to serve as an approach to international agreement on standardization in this field. The comments received from the American Standards Association, the British Standards Institution, the Standards Association of Australia, the Swiss Association for Standardization, the Association Française de Normalisation and the Indian Standards Institution, which were forwarded for consideration of ISO/TC 50, are also acknowledged.

XI. For the purpose of deciding whether a particular requirement of this ISO Recommendation is complied with, the final value observed or calculated, expressing the result of test or analysis, shall be rounded off to the same number of places as that in the specified value, it being always understood that the analyst will carry out his determination to at least one place more than in the specified value.

XII. In order to facilitate cross references to clauses of the different appendices in this ISO Recommendation, the clauses in each appendix bear, besides the serial number, a letter prefix corresponding to the letter number of the appendix. Thus reference to A-2 or B-3 means that clause 2 of Appendix A or clause 3 of Appendix B is under reference.

SPECIFICATION FOR SHELLAC

1. SCOPE

- 1.1** This ISO Recommendation prescribes the requirements and methods of test for shellac, hand-made and machine-made.
- 1.2** This ISO Recommendation is intended chiefly to cover the technical provisions for guiding the purchase of the material, but does not include all the necessary provisions of a contract.
- 1.3** The limits prescribed in this ISO Recommendation are limits for rejection.

2. TERMINOLOGY

- 2.1** For the purposes of this ISO Recommendation, the following definitions apply:
- (a) *Sticklac* is the natural product of lac insects.
 - (b) *Seedlac* is the product obtained by washing crushed sticklac.
 - (c) *Shellac* is the product obtained by refining seedlac by heat processes or by solvent processes or by both heat and solvent processes.
 - (d) *Approved sample* is the sample agreed upon between the purchaser and the vendor as the standard for colour.

3. SAMPLING

- 3.1** Samples should be taken in the manner prescribed in Appendix A.

4. FORM AND CONDITION

- 4.1** Shellac may be in the form of flakes, or sheets, or buttons, or any other form agreed between the purchaser and the vendor.

5. TYPES AND GRADES

5.1 There are two types of shellac, namely:
hand-made and machine-made.

5.2 There shall be six grades in each type of shellac, namely:

(a) *hand-made* — Special, A, B, C, D and E,

(b) *machine-made* — D1, D2, I, II, III and IV.

6. VOLATILE MATTER (moisture)

6.1 Shellac shall contain not more than 2.0 per cent of volatile matter (moisture) as determined by the method prescribed in Appendix B.

7. MATTER INSOLUBLE IN HOT ALCOHOL

7.1 Shellac shall not contain matter insoluble in hot alcohol, determined by either of the methods prescribed in Appendix C, as agreed between the purchaser and the vendor, in excess of the limits given below:

Hand-made		Machine-made	
Grade	Maximum per cent	Grade	Maximum per cent
Special	1.0	D1	0.5
A	1.0	D2	0.5
B	1.5	I	0.5
C	2.0	II	0.5
D	3.0	III	1.0
E	4.0	IV	1.0

8. COLOUR INDEX

8.1 The colour index of shellac, as determined by the method prescribed in Appendix D, shall not exceed the limits given below:

Hand-made		Machine-made	
Grade	Colour index	Grade	Colour index
Special	6.0	D1	2.0
A	8	D2	5.0
B	10	I	8
C	15	II	12
D	22	III	22
E	50	IV	50

8.2 Alternatively, the appearance and the colour of shellac shall not be inferior to those of an approved sample, when judged by visual examination.

9. WAX

9.1 Shellac shall not contain wax in excess of 5.5 per cent, as determined by Method I prescribed in Appendix E.

9.2 *Dewaxed shellac.* When a machine-made grade is offered as dewaxed shellac, the limit of wax is subject to agreement between the purchaser and the vendor and is determined by Method II prescribed in Appendix E.

10. ROSIN

10.1 Shellac shall not contain any rosin, as tested by the method prescribed in Appendix F, except when the presence of a specified percentage is agreed to between the purchaser and the vendor, in which case the determination is carried out as agreed between the purchaser and the vendor (see Foreword, clause VIII).

11. ORPIMENT AND OTHER ARSENICAL IMPURITIES

11.1 Shellac shall not contain any orpiment, as tested by the method prescribed in Appendix G, except when a specified percentage is agreed to between the purchaser and the vendor, in which case the determination is carried out as prescribed in Method I of Appendix H.

11.2 When the material is required for food or drug preparations, the determination of traces of arsenic, too small for titration by Method I of Appendix H, shall be carried out by Method II of Appendix H.

12. ASH

12.1 Shellac shall not leave, on incineration, ash in excess of the limits given below:

Hand-made		Machine-made	
Grade	Maximum per cent	Grade	Maximum per cent
Special	0.5	D1	0.3
A	0.5	D2	0.3
B	0.8	I	0.3
C	1.0	II	0.3
D	1.0	III	0.5
E	1.0	IV	0.5

12.2 The ash is determined by the method prescribed in Appendix J.

13. MATTER SOLUBLE IN WATER

13.1 Shellac shall contain not more than 0.5 per cent of matter soluble in water and the aqueous extract shall be neutral to methyl red. Matter soluble in water shall be determined by the method prescribed in Appendix K.

14. FLOW TEST

14.1 Shellac shall satisfy a flow test, which is conducted by the method prescribed in Appendix L, unless otherwise agreed between the purchaser and the vendor (see Foreword, clause VIII).

15. HEAT POLYMERIZATION TEST

15.1 If agreed between the purchaser and the vendor, shellac shall satisfy a heat polymerization test. The method shall be that prescribed in Appendix M and unless otherwise agreed, the temperature of test shall be 150 °C.

16. ACID VALUE

16.1 The acid value of shellac may be fixed, if desired, by agreement between the purchaser and the vendor. It is determined by the method prescribed in Appendix N, unless otherwise agreed between the purchaser and the vendor (see Foreword, clause VIII).

17. LEAD CONTENT

17.1 The limit of lead content is subject to agreement between the purchaser and the vendor, and the percentage of lead is determined by the method prescribed in Appendix P.

18. NON-VOLATILE MATTER SOLUBLE IN COLD ALCOHOL

18.1 The limits and methods of test for non-volatile matter soluble in cold alcohol are subject to agreement between the purchaser and the vendor (see Foreword, clause VIII).

19. CHARACTER OF REQUIREMENTS

19.1 The character of requirements for shellac is given in table 1, page 11.

19.1.1 The optional requirements are subject to agreement between the purchaser and the vendor.

TABLE 1
Requirements for Shellac

Clause reference	Character of requirement	Characteristic	Maximum limits for grade												Methods of testing Refer- ence to Appen- dix
			Hand-made						Machine-made						
			Special	A	B	C	D	E	D ₁	D ₂	I	II	III	IV	
6	Optional	Volatile matter (moisture) per cent	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	B
7	Essential	Matter insoluble in hot alcohol, per cent	1.0	1.0	1.5	2.0	3.0	4.0	0.5	0.5	0.5	0.5	1.0	1.0	C
8.1	Optional	Colour index or	6.0	8	10	15	22	50	2.0	5.0	8	12	22	50	D
8.2	Optional	Appearance and colour	Not inferior to appearance and colour of an approved sample												
9	Optional	Wax, per cent Devaxed shellac	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	5.5 —	E E
10	Essential	Rosin	Nil						Nil						F
11	Essential	Orpiment *	Nil						Nil						G
12	Optional	Ash, per cent	0.5	0.5	0.8	1.0	1.0	1.0	0.3	0.3	0.3	0.3	0.5	0.5	J
13	Optional	Matter soluble in water, per cent	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	K
14	Optional	Flow test	As agreed between purchaser and vendor												L
15	Optional	Heat polymerization test	As agreed between purchaser and vendor												M
16	Optional	Acid value	As agreed between purchaser and vendor												N
17	Optional	Lead content **	As agreed between purchaser and vendor												P
18	Optional	Non-volatile matter soluble in cold alcohol	As agreed between purchaser and vendor (see Foreword, clause VIII).												

* If a specified percentage of orpiment content is agreed to between the purchaser and the vendor, its determination is made by the method prescribed in Appendix II.

** Shellac is not expected to contain any lead, but to guard against inadvertent contamination, when lead-free shellac is required, it shall not contain more than 0.03 percent of lead calculated as lead.

Appendix A

(Section 3)

SAMPLING OF SHELLAC

A-1. DRAWING OF SAMPLES

A-1.1 Only original, unopened packages of shellac are sampled.

A-1.2 Ten per cent of the packages, selected at random from each lot, are sampled.

A-1.3 For this purpose a lot does not exceed 200 packages.

A-1.4 Unused portions of samples are sent to the purchaser on request.

A-1.5 SHELLAC IN A FREE FLOWING CONDITION. Samples are taken from different places in each package by means of a suitable tryer so as to yield a total of 5 kg (or 10 lb) of material consisting of approximately equal portions from each package sampled. The material is then thoroughly mixed and heaped and quartered along two diameters which intersect at right angles, and two opposite quarters mixed. One half of the material is labelled as the "original observation sample" and is, if necessary, further sub-divided by the normal process of quartering to form a number of original observation samples (see clause A-1.7). The other half of the material is treated as described under clause A-2.1 to form the "analysis sample".

A-1.6 BLOCKY OR MATTED SHELLAC. Samples are taken from different places in each package by chipping or other suitable means so as to yield a total of 5 kg (or 10 lb) of material consisting of approximately equal portions from each package sampled. The material is then thoroughly mixed and heaped and quartered along two diameters which intersect at right angles, and two opposite quarters mixed. One half of the material is labelled as the "original observation sample" and is, if necessary, further sub-divided to form a number of original observation samples (see clause A-1.7). The other half of the material is roughly ground so as to pass a sieve having a nominal aperture of 6.3 mm (see clause A-4.1) and is then treated as described under clause A-2.1 to form the "analysis sample".

A-1.7 An original observation sample is used for the determination of volatile matter (moisture), when this requirement is agreed upon between the purchaser and the vendor. The original observation sample is placed in an air-tight container, sealed and labelled as "original observation sample", and "sample for the determination of volatile matter (moisture)" when volatile matter (moisture) requirement is agreed upon.