

BRITISH STANDARD 1524 : 1955

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Cellulose Acetate Moulding Material

BRITISH STANDARDS INSTITUTION

BRITISH STANDARD SPECIFICATION

**CELLULOSE ACETATE
MOULDING MATERIAL**

B.S. 1524 : 1955

Incorporating amendment issued December, 1956

BRITISH STANDARDS INSTITUTION

Incorporated by Royal Charter

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THIS BRITISH STANDARD, having been approved by the Plastics Industry Standards Committee and endorsed by the Chairman of the Chemical Divisional Council, was published under the authority of the General Council on 7th April, 1955.

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First revision, April, 1955.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 9,000, fully indexed and with a note of the contents of each, will be found in the BSI Catalogue which may be purchased from BSI Sales Department. The Catalogue may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:—

- B.S. 148. Insulating oil (low viscosity) for transformers and switchgear.
- B.S. 188. Method for the determination of viscosity of liquids in absolute (C.G.S.) units.
- B.S. 410. Test sieves.
- B.S. 509. Acetone.
- B.S. 756. Dean and Stark apparatus.
- B.S. 1006. Determination of fastness to daylight of coloured textiles.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard:—
Committee reference PLC/2. Draft for comment CT(PLC)4163.

CONTENTS

Co-operating organizations	5
Foreword	6

SPECIFICATION

1. Scope	6
2. Definitions	6
3. Classification	6
4. Fines and impurities	7
5. Moisture content	7
6. Impact strength	7
7. Tensile strength	7
8. Deflection under load	7
9. Viscosity change on moulding	8
10. Moisture absorption	8
11. Loss in weight by leaching	8
12. Loss in weight by heating	8
13. Rate of burning	8
14. Liability to bleeding of colour	8
15. Removal of colour by rubbing	8
16. Electric strength	8
17. Heat stability of colour	8
18. Colour fastness to light	9
19. Softening point	9
20. Sampling	9
21. Marking	9

TABLES

1. Classification	7
2. Test requirements	10

B.S. 1524 : 1955

APPENDICES

A. Preparation of specimens for tests	11
B. Conditioning	12
C. Determination of flow temperature	13
D. Determination of moisture content	16
E. Determination of impact strength	17
F. Determination of tensile strength	20
G. Determination of deflection under load	21
H. Determination of viscosity change on moulding	24
J. Determination of moisture absorption	25
K. Determination of loss in weight by leaching	26
L. Determination of loss in weight by heating	27
M. Determination of rate of burning	28
N. Determination of liability to bleeding of colour	29
O. Test for removal of colour by rubbing	30
P. Proof test for electric strength (minute value) at 23°C	32
Q. Determination of heat stability of colour	34
R. Determination of colour fastness to light	34
S. Determination of softening point	35

CO-OPERATING ORGANIZATIONS

The Plastics Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives of the following Government departments and scientific and industrial organizations:—

Admiralty

Board of Trade

British Electrical and Allied Industries Research Association

British Electrical and Allied Manufacturers' Association

*British Plastics Federation

*D.S.I.R.—Building Research Station

*General Post Office

*Ministry of Supply

Ministry of Works

Radio Industry Council

Royal Institute of British Architects.

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the Committee entrusted with the preparation of this British Standard:—

Individual manufacturers

Society of Motor Manufacturers and Traders Ltd.

B.S. 1524 : 1955

BRITISH STANDARD SPECIFICATION FOR CELLULOSE ACETATE MOULDING MATERIAL

FOREWORD

In this British Standard, which is a revision of the 1949 issue, tests have been added for the determination of flow temperature, impact strength, deflection under load, viscosity change on moulding, loss in weight by heating, rate of burning, removal of colour by rubbing, heat stability of colour, and colour fastness to light. As foreshadowed in the 1949 issue opportunity has been taken to change the basis of classification of cellulose acetate moulding materials for testing purposes from softening point to flow temperature, a method which has been found more convenient.

The temperature and humidity of the atmosphere used for conditioning have been changed to 23°C and 50 per cent relative humidity.* These new temperature and humidity conditions are more convenient when a conditioned room is used.

The qualifying clauses in this standard have not been established on statistical principles, as was done in the 1949 issue, because for one reason experience with the many new tests specified has not yet provided a sufficient background on which reliably to base statistical qualifying clauses.

During 1973-4 several discussions took place in the Executive Board of BSI as a result of concern about potential fire hazards involved in the rapidly increasing use of many polymeric materials, especially for furnishing and construction purposes. Issues of great public importance were involved, relating in particular to the use of laboratory fire tests to define quality requirements, in view of the general lack of correlation between the results obtained in such small-scale tests and the fire performance of materials and products in actual conditions of use.

The Executive Board decided that a detailed review of all the issues involved should be carried out as a matter of urgency, and that this should be comprehensive in scope rather than limited to polymeric materials. For this purpose an authoritative Co-ordinating Committee on Fire Tests was established. In the meantime certain general principles were laid down regarding the terminology and approach to be adopted in immediate revisions and amendments of the British Standards involving small-scale fire tests.

In keeping with this policy, amendments were made in February 1975 to Clause 13 and Appendix M of the present standard. Further changes may be made at a later date as a result of the general review undertaken by the Co-ordinating Committee mentioned above.

SPECIFICATION

SCOPE

1. This British Standard specifies requirements for cellulose acetate moulding material.

DEFINITIONS

2. For the purposes of this British Standard the following definitions shall apply:—

a. *Cellulose acetate*. An acetic acid ester of cellulose (excluding mixed esters).

b. *Cellulose acetate moulding material*. A thermoplastic composition in granular form capable of being shaped by heat and pressure, and consisting of cellulose acetate compounded with one or more plasticizers and small proportions of other ingredients.

CLASSIFICATION

3. Five types of material are distinguished by the flow temperature as determined by the method described in Appendix C. The types of material are as shown in Table 1.

* These conditions have also been adopted for plastics testing by the American Society for Testing Materials.

TABLE 1. CLASSIFICATION

Type	Flow temperature
	°C
Very soft	108 up to and including 122
Soft	123 up to and including 137
Medium	138 up to and including 152
Hard	153 up to and including 167
Very hard	168 up to and including 182

NOTE. The types may be sub-divided into grades as shown in the following table in rising order of flow temperature. These grades are comparable with those specified in Method A of A.S.T.M. D.569-48, 'Standard methods of tests for measuring the flow properties of thermoplastic moulding materials'.

Type	Grade
Very soft	S6, S5, S4
Soft	S3, S2, S
Medium	MS, M, MH
Hard	H, H2, H3
Very hard	H4, H5, H6

FINES AND IMPURITIES

4. Not more than 5 per cent of the material shall pass through an 18-mesh B.S. test sieve.* The material shall be free from objectionable impurities.

MOISTURE CONTENT

5. When tested by the method described in Appendix D the moisture content at time of despatch shall be not more than 1.8 per cent.

NOTE. Moulding material complying with this clause is not necessarily suitable for use without pre-drying. A procedure for pre-drying is described in Appendix A.

IMPACT STRENGTH

6. When tested by the method described in Appendix E the impact strength shall comply with the appropriate limit given in Table 2.

TENSILE STRENGTH

7. When tested by the method described in Appendix F the tensile strength shall comply with the appropriate limit given in Table 2.

DEFLECTION UNDER LOAD

8. When tested by the method described in Appendix G the deflection under load shall comply with the appropriate limit given in Table 2.

* B.S. 410, 'Test sieves'.

B.S. 1524 : 1955

VISCOSITY CHANGE ON MOULDING

9. When tested by the method described in Appendix H the viscosity change on moulding shall comply with the appropriate limit given in Table 2.

MOISTURE ABSORPTION

10. When tested by the method described in Appendix J the moisture absorption shall comply with the appropriate limit given in Table 2.

LOSS IN WEIGHT BY LEACHING

11. When tested by the method described in Appendix K the loss in weight by leaching shall comply with the appropriate limit given in Table 2.

LOSS IN WEIGHT BY HEATING

12. When tested by the method described in Appendix L the loss in weight by heating shall comply with the appropriate limit given in Table 2.

BURNING BEHAVIOUR OF 150 mm X 13 mm TEST SPECIMENS

13. a. When tested by the method described in Appendix M, the average rate of burning of three specimens shall not exceed 75 mm per minute.
- b. If required by the purchaser, all three test specimens, when tested by the method described in Appendix M, shall *either* show an extent of burn of less than 125 mm, *or* show an extent of burn of less than 25 mm and no flame or after-glow 5 s after the burner has been removed from the specimen.

NOTE. The test method described in Appendix M is used primarily for the purpose of monitoring the consistency of production of the cellulose acetate moulding material. Its use gives an indication of a suitable formulation which influences the performance of a test specimen under the particular test conditions. In no circumstances should the test results thus obtained be considered as an overall indication of the potential fire hazards presented by products made from the moulding material under actual conditions of use.

LIABILITY TO BLEEDING OF COLOUR

14. When the material is tested by the method described in Appendix N there shall be no staining of the filter paper.

REMOVAL OF COLOUR BY RUBBING

15. When the material is tested by the method described in Appendix O there shall be no staining of the filter paper.

ELECTRIC STRENGTH

16. When so specified by the purchaser, the material shall withstand, without breakdown, the electric stress shown below when tested by the method described in Appendix P.

At the normal condition 12 kV

At the humid condition 9 kV

HEAT STABILITY OF COLOUR

17. If required by the purchaser the heat stability of colour when tested by the method described in Appendix Q shall be as agreed between supplier and purchaser.

COLOUR FASTNESS TO LIGHT

18. If required by the purchaser the colour fastness to light when tested by the method described in Appendix R shall be as agreed between supplier and purchaser.

SOFTENING POINT

19. If required by the purchaser, the softening point when tested by the method described in Appendix S shall be as agreed between supplier and purchaser.

SAMPLING

20. A representative sample of about 5 lb shall be taken for testing for compliance with this British Standard.

MARKING

21. Material purporting to comply with this British Standard shall have the containers marked with the identity of the supplier, the type of material, and the number of this British Standard, i.e. B.S. 1524.

NOTE 1. The mark B.S. 1524 on the container is an indication by the supplier that the goods purport to comply with the requirements of this British Standard.

NOTE 2. The presence, in addition, of a registered certification mark of the British Standards Institution on a container is an independent assurance that the contents do comply with the requirements of the relevant British Standard. This certification mark may be used by the manufacturers only under licence from the B.S.I. and particulars of the conditions under which licences are granted may be obtained from the Director, British Standards House, 2 Park Street, London, W.1.

B.S. 1524 : 1955

TABLE 2. TEST REQUIREMENTS

Property	Appendix	Units		TYPE				
				Very soft	Soft	Medium	Hard	Very hard
				Flow temperature (see Appendix C)				
				108-122°C	123-137°C	138-152°C	153-167°C	168-182°C
Impact strength	E	ft lb	Value to be:—	*	3.0	2.0	1.0	*
Tensile strength	F	lb/sq. in.	not less than	*	2200	3000	4000	*
Deflection under load	G	mm	not greater than	*	50	40	35	*
Viscosity change on moulding	H	per cent	not greater than	40	40	40	50	50
Moisture absorption	J	per cent	not greater than	*	4.5	5.0	5.5	*
Loss in weight by leaching	K	per cent	not greater than	*	5.0	4.0	3.0	*
Loss in weight by heating	L	per cent	not greater than	*	6.0	4.0	3.0	*

* As agreed between purchaser and supplier.

APPENDIX A

PREPARATION OF SPECIMENS FOR TESTS

Sheets for the production of specimens 0.060 ± 0.002 in. thick for certain of the tests set out in this standard shall be prepared by compression moulding. Fig. 1 shows a suitable type of mould. The sheets shall not be finished by surface machining such as sanding or finishing.

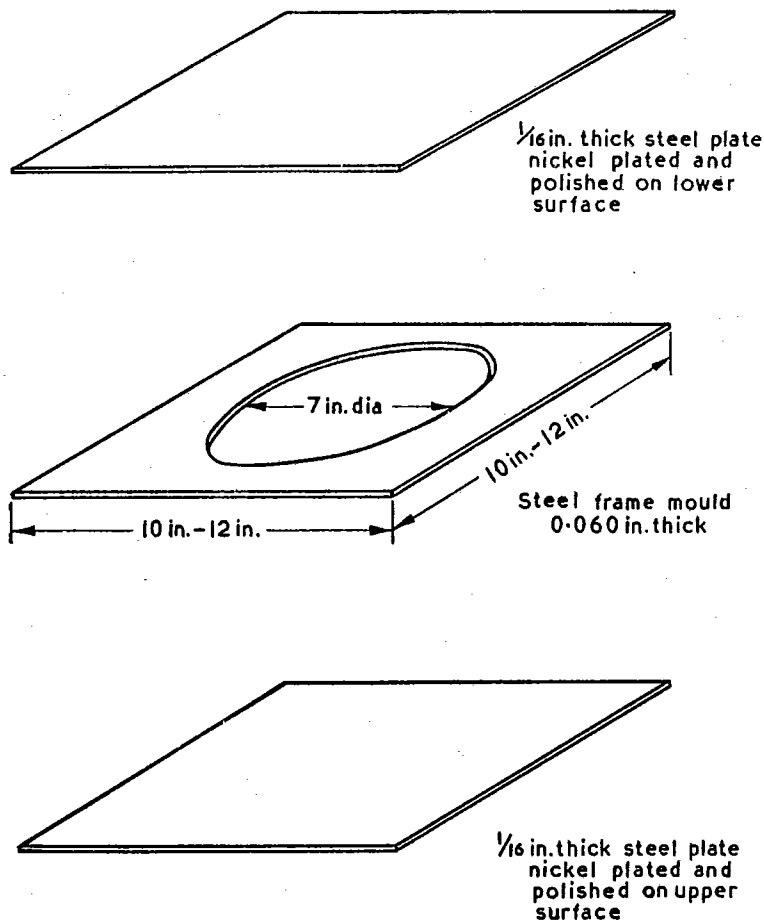


Fig. 1. Mould

The moulding material shall be pre-dried by heating in a vented oven at $70 \pm 2^\circ\text{C}$ for three hours with the material, in layers $\frac{1}{2}$ in. thick, in shallow trays.