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SPECIFICATION FOR

SYNTHETIC RESIN BONDED WOVEN GLASS FABRIC LAMINATED SHEET

BRITISH STANDARDS INSTITUTION

SPECIFICATION FOR

SYNTHETIC RESIN BONDED WOVEN GLASS FABRIC LAMINATED SHEET

B.S. 3953 : 1965

Price 5/- net

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 24th November, 1965.

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 4000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price 15s. The B.S. Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

B.S. 2782. Methods of testing plastics.
B.S. 3534. Epoxide resin systems for glass fibre reinforced plastics. Part 2. Pre-impregnating systems.
B.S. 3591. Industrial methylated spirits.
B.S. 3781. Method for determining the comparative tracking index of solid insulating material.

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/33 Draft for comment D64/6690

CO-OPERATING ORGANIZATIONS

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

Board of Trade
*British Electrical and Allied Manufacturers' Association
*British Plastics Federation
*Electrical Research Association
*Engineering Equipment Users' Association
*Ministry of Aviation
*Ministry of Defence, Army Department
*Ministry of Defence, Navy Department
Ministry of Technology—Building Research Station
Oil Companies Materials Association
Plastics Institute
*Post Office
Royal Institute of British Architects
Royal Institute of Public Health and Hygiene
Rubber and Plastics Research Association of Great Britain
*Society of Motor Manufacturers and Traders Ltd.
Surface Coating Synthetic Resin Manufacturers' Association

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:

Association of British Chemical Manufacturers
Glass Textile Association
Radio and Electronic Component Manufacturers' Federation
Society of British Aerospace Companies
United Kingdom Atomic Energy Authority

BRITISH STANDARD SPECIFICATION FOR

SYNTHETIC RESIN BONDED WOVEN GLASS FABRIC LAMINATED SHEET

FOREWORD

This British Standard has been prepared under the authority of the Plastics Industry Standards Committee at the request of the British Plastics Federation.

The glass fabric laminated sheet materials specified are generally more heat resistant than paper or cotton fabric base laminates, and have generally better mechanical properties, particularly impact strength. In general, most of the glass fabric laminated materials specified can be drilled, tapped, sawn and otherwise machined; reference should be made to the manufacturer's recommendations.

Woven glass fabric made from Type E glass has been specified.

NOTE. Except where metric units are stated first, the figures in British units are to be regarded as standard. The metric conversions are approximate. More accurate conversions should be based on the tables in B.S. 350, 'Conversion factors and tables'.

SPECIFICATION

SCOPE

1. This British Standard specifies a number of types of laminated sheet consisting of layers of woven glass fabric bonded with an epoxide, melamine, phenolic, polyester or silicone resin.

The standard covers only sheet material of the following nominal thicknesses:

All types (except PF1 and PR3)	0·020 in to 0·5 in (0·5 mm to 12·7 mm)
Type PF1	0·020 in to 0·25 in (0·5 mm to 6·4 mm)
Type PR3	0·020 in to 0·125 in (0·5 mm to 3·2 mm)

The nominal density of the classes of material covered by this standard may be taken as 1·6 g/cm³ to 2·1 g/cm³ (equivalent to 17 in³/lb to 13 in³/lb).

CLASSIFICATION

2. The materials are classified as follows:

CLASS EP. Sheet consisting of woven glass fabric bonded with an epoxide resin. Two types, EP1 and EP2, are specified, EP2 having higher mechanical strength than EP1. Both have good electrical properties.

CLASS MF. Sheet consisting of woven glass fabric bonded with a melamine resin. Two types, MF1 and MF2, are specified, MF1 having better electrical properties than MF2. Both have high tracking resistance; mechanical and other electrical properties are moderate.

CLASS PF. Sheet consisting of woven glass fabric bonded with a phenolic resin. One type, PF1, is specified.

CLASS PR. Sheet consisting of woven glass fabric bonded with a polyester resin. Three types are specified; PR1 having better electrical properties, PR2 for general purposes and PR3 with fire retarding properties.

CLASS SIL. Sheet consisting of woven glass fabric bonded with a silicone resin. Three types are specified, SIL1, SIL2 and SIL3, graded primarily according to the specified electrical properties. They can be used at higher temperatures than other material in this standard.

DEFINITIONS

3. For the purposes of this British Standard the following definitions apply:

a. Flatwise. Perpendicular to the plane of lamination.

b. Edgewise. Parallel to the plane of lamination.

c. Direction A and Direction B. Two directions in the plane of a sheet which are mutually at right angles and are related to the surface layers of the laminate. One of these directions is parallel to either the warp or the weft threads of the fabric laminate.

GLASS FABRIC

4. The fabric shall be woven from glass fibre yarn consisting of a number of strands put together with twist.

The glass shall be E Type, i.e. glass containing not more than 1 per cent of alkali metal oxide expressed as Na_2O.

APPEARANCE

5. Sheets shall be substantially free from visible defects. They shall be supplied with trimmed edges.

The type of surface finish and of edge finish shall be as agreed between supplier and purchaser. It is recommended that the possible variations in natural colour and the possible effect, on appearance and properties, of added colouring matter should be discussed and agreed by supplier and purchaser.

FLATNESS

6. When sheet of nominal thickness 0·125 in (3 mm) or above is tested in accordance with Appendix A the departure of the surface of the sheet from the straightedge shall nowhere exceed the value given below.