

Australian Standard[®]

SMALL PLEASURE BOATS CODE

**Part 4—REINFORCED PLASTICS
CONSTRUCTION**

This Australian standard was prepared by Committee CS/1/3, Reinforced Plastics Boats. It was approved on behalf of the Council of the Standards Association of Australia on 21 May 1985 and published on 4 October 1985.

The following interests are represented on Committee CS/1/3:

Association of Australian Port and Marine Authorities
Australian Boating Industry Association
Department of Defence
Department of Transport
National Safety Council of Western Australia
Plastics Institute of Australia
Royal Institution of Naval Architects

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PREFACE

This standard was prepared by the Association's Committee on Reinforced Plastics Boats in response to a request by the Australian Boating Industry Association. It replaces AS F3—1962, Reinforced Plastics Boats, which was withdrawn in 1979.

AS 1799—1975, SAA Small Boats Code is being extensively revised and expanded so that it covers most pleasure boats up to 15 m in length. This includes power boats, yachts and fun boats. It does not, however, include canoes.

The standards for small pleasure boats are as follows:

1799.1—General Requirements for Power Boats*

1799.2—General Requirements for Yachts*

1799.3—Engineering

1799.4—Reinforced Plastics Construction (this standard)

1799.5—Aluminium Construction*

Further parts, covering other types of construction, may also be considered.

This standard is written in the form of a code of practice for the construction of fibreglass boats up to 15 m in length. It is not a simple matter to assess the compliance or otherwise of a finished hull with the standard unless the materials and methods employed are inspected during construction. For this reason the Committee has decided that the standard is not suitable for use with the Standards Mark Certification Scheme.

The calculations in this standard are based on a maximum deflection of 1 percent of the span. This limit should be taken as a guide only when using the standard as it is not a requirement of the standard.

* In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

SMALL PLEASURE BOATS

PART 4—REINFORCED PLASTICS CONSTRUCTION

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies structural requirements for reinforced plastics boats having an overall length of 15 m or less. It does not apply to boats used for commercial purposes or exclusively for racing nor to canoes or sailboards. Requirements are specified for monohull vessels only; structural requirements for bridging, used in multi-hull vessels, are not included.

This standard is based on the more commonly used polyester resins reinforced with glass fibre, but does not exclude the use of other materials.

NOTES:

1. Symbols used in this standard are defined in Appendix D.
2. Advice on conditions for laminating is given in Appendix C.

1.2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1145	Determination of Tensile Properties of Plastics Materials
AS 1720	SAA Timber Engineering Code
AS 2132	Methods for the Determination of the Flexural Properties of Plastics
AS 2269	Structural Plywood
AS 2272	Marine Plywood
ISO 1172	Textile Glass Reinforced Plastics—Determination of Loss on Ignition
ISO 3268	Plastics—Glass Reinforced Materials—Determination of Tensile Properties
BS 3496	E Glass Fibre Chopped Strand Mat for the Reinforcement of Polyester Resin Systems
BS 3532	Unsaturated Polyester Resin Systems for Low Pressure Fibre Reinforced Plastics
BS 3691	Glass Fibre Rovings for the Reinforcement of Polyester and of Epoxide Resin Systems
BS 3749	Woven Roving Fabrics of E Glass Fibre for the Reinforcement of Polyester Resin
ASTM D2562	Visual Defects in Parts Molded from Reinforced Thermosetting Plastics, Recommended Practice for Classifying
ASTM D2583	Test Method for Indentation Hardness of Rigid Plastics by means of a Barcol Impressor

1.3 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.3.1 Accelerator—a compound added to the resin during the curing process in order to speed the decomposition of the catalyst.

NOTE: An accelerator is also commonly known as a 'promotor'.

1.3.2 Additive—a compound added to the resin/catalyst/accelerator mix to achieve some characteristic other than quick curing.

NOTE: Four main types of additives can be used, viz—

- (a) Thixotropic
- (b) Pigment
- (c) Fire retardant
- (d) Filler

1.3.3 Binder—a bonding material used to hold chopped strands of reinforcing fibre together in a mat or other form during manufacture, handling or moulding. The binder must neither accelerate nor inhibit the curing of the resin.

1.3.4 Catalyst—a compound added to resin to convert it from a liquid to solid.

NOTE: Correctly, a catalyst is an agent added to speed up a chemical reaction but which itself is not used up in the reaction. As used herein, catalysts—also known as 'initiators' or 'hardeners'—decompose into free radicals and speed up the process of setting or curing.

1.3.5 Chopped strand mat—reinforcement in the form of a pliable mat comprising approximately 50 mm long chopped strands of reinforcement (e.g. glass) fibre bonded together in a random manner, with a binder.

NOTE: Glass chopped strand mats are normally of low alkali glass with medium solubility binder which wets out slowly, so enabling the mat to retain its strength during the early stage in the layup process. Densities varying from 225 g/m² to 900 g/m² are normally available. The 450 g/m² and 600 g/m² mats are most suitable for boat hull construction since these give an economical buildup, conformity to shape and ease of handling.

Advantages of glass chopped strand mat reinforcements are as follows:

- (a) Equal physical properties in all directions.
- (b) Good inter-laminar bond due to interlocking action of fibres.
- (c) Can be moulded or formed into moderately complex surfaces.

1.3.6 Curing—the process by which resins, which are normally of limited storage life, harden to form solids.

NOTE: Curing takes place slowly if the polyester resin is uncatalysed, taking months to years dependent upon storage conditions and whether the resin is powdered or in solution. For boat-building purposes curing agents, usually catalysts, are necessary to produce setting within practical periods of time.

1.3.7 Curing time—the time taken to completely convert liquid polyester resin into a solid.

NOTE: Curing time is a function of the ambient temperature and of the type and concentration of catalyst and accelerator and is normally specified by the manufacturer.