

Structural Plans
for
Glassfibre Reinforced Plastic (GRP)
Water Tank
by
Yeung's Fiberglass Company,
Hong Kong

Note: This document is for the Glassfibre Reinforced Polyester (GRP) water tanks with a volume capacity and height dimension not exceeding 8m³ and 2m respectively. Please refer to the separate document if your requirements are out of this range.



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Section A Preface

The purpose of this document is to give a general information of the structural plans of Glassfibre Reinforced Plastic (GRP) Water Tank manufactured by Yeung's Fiberglass Company, Hong Kong. According to the practice note for authorized persons and registered structural engineers (PNAP 222) published by the Buildings Department on January 1998, the structural requirements of fiberglass water tank is covered in this document for submission purpose only.

Section B Physical Details of GRP Water Tank

- Location : Please specify
- Colour : Cream for Freshing Water and Gray for flushing water
- Size : As shown in GBP
- Accessories : All GRP Water Tanks contain a manhole cover at the top



Section C Design Standard

Our Yeung's GRP Water Tanks are designed and complied with the following international standard:

- BS 3396 **Part 1 – Loom state fabrics**
 - Range of woven glass fiber fabrics, intended for the reinforcement of rigid plastic moulding and laminates.
- Part 2 – Desized fabrics**
 - Requirement for residual size content, breaking strength and packaging of desized fabrics originally complying in the 'loomstate' with Part 1.
- Part 3 – Finished fabrics**
 - Finished fabrics for use with polyester resin system

Requirements for glass fiber fabrics specified in Parts 1 & 2, which have been designed to a residual size content of not more than 0.1% and finished for use with polyester resin systems.

- BS 3479 Woven Roving fabrics for “E” glass fiber for the reinforcement of Polyester resin.
- BS 3691 Glass Fiber roving for the reinforcement of polyester and epoxide Resin system.
Specific requirement for glass roving made from type “E” glass, together with requirements for laminates prepared from the roving.
- BS 3749 Woven Glass fiber roving fabrics for the

reinforcement of polyester resin systems.

Ten fabrics made from type “E” glass. Reinforcing properties specified by cross breaking strength of laminates made from fabric.

- Code of Practice on Wind Effect in HK 1983

Material test for GRP laminate (by the University of Hong Kong)

- BS 2782 Part 3 : Method 341A : 1977
Determination of Apparent Interlaminar Shear Strength
- Part 3 : Method 335A: 1978
Determination of Flexural Properties
- Part 3 : Method 345A: 1979
Determination of Compressive Properties
- Part 3 : Method 320E: 1976
Determination of Tensile Properties

Section D Material of Fiberglass GRP Water Tank

All GRP water tanks are designed and fabricated with 35% glass content in weight of Woven Roving Mat with general-purposed resin.

- Glass Fiber : Woven Roving Mat – lower alkali “E” Glass ¹
- Resin : Scott Bader Crystic 196E (For Freshing Water)
(Complied with BS 3532 Type B, or equivalent – see appendix)

¹ E Glass is a high quality electrical grade glass fibre containing less than 1% of alkali expressed as combined sodium and potassium oxides. This glass is used world-wide as the standard reinforcement for all resin system.

Section E Mechanical Properties of GRP Water Tank

Type of GRP Laminate with	:	35% glass content by weight Polyester Resin
Tensile Strength	:	171 Nmm ⁻²
Elongation	:	1.8 %
Tensile Modulus	:	12600 Nmm ⁻²
Compress Strength	:	102 Nmm ⁻²
Flexural Strength	:	250 Nmm ⁻²
Flexural Modulus	:	12810 Nmm ⁻²
Interlaminar Shear Strength	:	18.5 Nmm ⁻²

Section F Fixing Details

See Attachment for fixing mechanisms

Section G Fixing Calculations

Details of the strength calculations, fixing calculations, including the wind pressure (based on the Code of Practice on Wind Effects of Hong Kong 1983) can be obtained on special request.