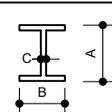
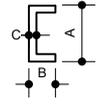
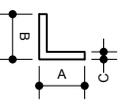
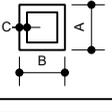
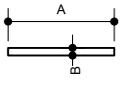
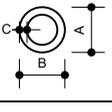
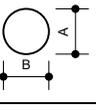


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## Structural GRP - Profiles

The use of GRP profile is now substantially increased in lieu of traditional steel members because of high strength, rust free and low cost. The following are some of the typical size members for your selection

PROFILES	DIMENSION (mm)			WEIGHT kg/m
	A	B	C	
UNIVERSAL I-BEAM 	100	100	6.5	3.95
	150	80	8	4.96
	250	125	12	9.6
	300	150	15	16
C-CHANNEL 	50	30	5	0.98
	76	25	5	1.06
	76	35	5	1.32
	120	40	5	1.68
	200	44	7.6	4.40
	200	60	10	5.60
	250	68	12	9.30
EQUAL ANGLE 	38	38	5	0.68
	50	50	6.4	1.03
	76	76	6.4	1.93
	76	76	8	2.43
	76	76	10	3.10
	100	100	10	4.15
HOLLOW SECTION 	38	38	5	1.03
	51	51	6.3	1.93
	60	60	5	2.43
	210	110	5	3.10
PLATE 	400	3	/	2.45
	400	6		4.86
	400	8		6.45
	400	10		8.10
ROUND HOLLOW SECTION 	18	18	3.5	0.45
	50	50	3.5	1.15
	50	50	4.0	1.31
	50	50	4.8	1.58
ROUND SOLID SECTION 	11	11	/	0.23
	16	16		0.42
	18	18		0.53
	20	20		0.59



### MECHANICAL PROPERTIES

Tested to British Standards BS 2782  
Model : YSWR40

TEST DESCRIPTION	RESULT
Tensile Strength	189 N/mm <sup>2</sup>
Tensile Modulus	13129 N/mm <sup>2</sup>
Compressive Strength	238 N/mm <sup>2</sup>
Flexural Strength	257 N/mm <sup>2</sup>
Flexural Modulus	10122 N/mm <sup>2</sup>
Interlaminar Shear Strength	18.5 N/mm <sup>2</sup>
Nominal Density of DuraPro <sup>®</sup> Profiles	1554 kg/m <sup>3</sup>

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## Product Data of Dura<sup>®</sup> Products

*For general industrial services and construction applications*

### Company Profile

YEUNG'S<sup>®</sup> Fiberglass Systems has its own engineering team specializing strictly in the design of fiberglass structures, equipped with the latest in CAD hardware and software. We know how to take advantage of the special structural properties of GRP to build the most cost-effective structures. Our engineering team can step in at any point in the design process, working from your rough sketches or design drawings.

Our fabrication shop is fully equipped to build any type of structure out of GRP. Completed structures are fully assembled in the shop to check for fit and quality, and then partially disassembled into traceable pieces (if required), carefully crated, and shipped to your job-site along with complete erection drawings. **Providing quality and performance for your fiberglass Products requirements**

### Introduction to GRP

The formal name for FIBERGLASS is called Glassfibre Reinforced Plastic or GRP in short. Because GRP is a strong and durable material, they can be employed in a wide number of buildings and construction applications. GRP generally consists of high tensile strength glassfibre protected by high quality unsaturated polyester resin (e.g. epoxy). The term composite more accurately describes the products manufactured by today's fiberglass industry in Hong Kong. High performance resins (normally polyester or epoxy) are combined in a mould with high strength fiberglass to form a final product.

GRP products are used in applications requiring high mechanical strengths but with lightweight requirements. Combining glassfibre with plastics increases the materials' physical strength, stiffness, impact resistance and dimensional stability, and increases its use over wider temperature range.

### Why GRP

*The specific gravity of GRP is roughly one-fifth that of steel and, as such, its use covers a wider range of applications when lightweight is important. In addition, GRP is the ideal material for infrastructure uses and all types of specialist construction because they have strength that is competitive with many structural materials. The major benefits of GRP can be summarized as:*

- ❖ Easily moulded to any complex shapes
- ❖ Lightweight Excellent strength-to-weight ratios
- ❖ Extremely strong, durable
- ❖ Weather-resistant
- ❖ Vandal resistant
- ❖ Requires minimal maintenance
- ❖ Non-conductive – Thermally and Electrically
- ❖ Accidental damage can be easily repaired
- ❖ Aesthetic appearance and corrosive resistant
- ❖ Available in a wide range of colours
- ❖ Ease of Installation
- ❖ Easily designed to meet specific criteria: impact resistance, insulation properties, fire resistance, etc.
- ❖ Can be fire retardant, meeting Class I or II rating for surface spread of flame under

BS 476:Part 6 and Part 7:1971 standard

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**Design Standards**

Our GRP Products are designed and complied with the following international standards:

- BS 476 Part 6 :1989 Method of test for fire propagation for products
- BS 476 Part 7 :1997 Method of test to determine the classification of the surface spread of flame of products
- 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 'loom-state' with Part 1.
- Part 3 – Finished fabrics for use with 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.
- BS 4994 Specification for design and construction of vessels and tanks in reinforced plastics
- Code of Practice on Wind Effect in HK 1983
- Mechanical test for GRP laminate:
- 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

TECHNICAL DATA SHEET

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## Mechanical Properties

Fiberglass Products manufactured by Yeung's Fiberglass Company had been tested, certified and approved by the Civil Engineering Department, the University of Hong Kong.

All data below are more strengthened than some of the fiberglass Products you can get in the market.

Model No. YSWR40

Type of GRP Laminate	=	40%	glass content by weight
Tensile Strength	=	189	Nmm <sup>-2</sup>
Tensile Modulus	=	13129	Nmm <sup>-2</sup>
Compress Strength	=	238	Nmm <sup>-2</sup>
Flexural Strength	=	257	Nmm <sup>-2</sup>
Flexural Modulus	=	10122	Nmm <sup>-2</sup>
Inter-laminate Shear Strength	=	18.5	Nmm <sup>-2</sup>
Nominal Density	=	1554	kg/m <sup>3</sup>

## Submittals & Tests

### Submittals

YEUNG'S<sup>®</sup> shall submit the following for review and approval prior to fabrication of the Products upon request.

1. Detailed scale drawings of each Products, completed with all accessories.
2. Detailed handling and installation instructions.
3. Design calculations for each Products where stipulated herein.

### Tests

1. Products are to be tested for the degree of surface cure using Barcol hardness and acetone sensitivity methods as indicated in the referenced British Standards (BS) Specifications.
2. Products are to be visually inspected for laminate quality and workmanship as indicated in the referenced BS Specifications.
3. After the Product has been installed, a hydrostatic test shall be performed by the purchaser.