

Fibreglass Reinforced Plastic Grating and Structural Fabrications

Specifiers Guide

Part 1. General

1.01 Related Documents:

- A. Contract drawings
- B. General specification sections

1.02 Summary

- A This section includes:
 - 1. GRP grating and stair treads
 - 2. GRP grating embedment angles
 - 3. GRP structural fabrications
 - 4. GRP stairs
 - 5. GRP handrails
 - 6. GRP ladders and safety cages

1.03 Scope of Work

- A The contractor shall supply all labour, materials and equipment as required to properly install all GRP products specified herein.

1.04 Quality Assurance

- A All GRP products and fabrications shall be supplied by an experienced company who has continually engaged in the manufacture or fabrication of fibreglass reinforced plastic for a minimum of 5 years.
- B The installing contractor shall assure that all dimensions are taken accurately and communicated properly to the GRP fabricator. The installing contractor shall also ensure that all manufacturer's instructions and recommendations are carried out.
- C No substitution of materials will be accepted unless they are submitted for review and the Architect / Engineer approves their use.

1.05 Design Requirements

- A All GRP gratings shall fully conform to BS4592 Part 4 1992 as it pertains to worker safety and dimensions.
- B GRP grating shall be designed to support 5 kn sq m. Deflection shall not exceed 1/100th of the width.
- C GRP structural shapes shall conform to EN13706 European standard for structural pultruded profiles.
- D Stairs, ladders and walkways shall conform to BS5395 Part 3 1985.

1.06 Submittals

- A Submit complete shop drawings and engineering data for all GRP materials and fabrications as required by the scope of work.
- B Product data;
 - 1 Manufacturers catalogue with load data for all GRP gratings.
 - 2 Manufacturers catalogue with data for all structural shapes.
 - 3 Drawings showing all GRP materials as required and include all dimensions, fasteners, tolerances, assembly and installation details as required.

Part 2. Products

2.01 General

- A All GRP materials shall be manufactured with either Isophthalic polyester or vinyl ester resins.
- B All structural shapes shall be constructed of chopped strand roving, transverse mat and synthetic veil including UV light inhibitors.
- C All structural shapes shall be fire retardant as per ASTM e-84 class 1 flame spread of 20 or less.
- D After fabrication of GRP, all cuts, holes and abrasions shall be sealed to prevent corrosion.

2.02 GRP Grating and Stair Treads

- A GRP grating shall be moulded fibreglass grating made with either Isophthalic polyester or vinyl ester resins.
- B Grating shall be 25mm, 38mm or 50mm thick with a grid pattern of 38mm for 25mm and 38mm depths and 50mm grid pattern for 50mm thick grating.
- C Colour shall be selected from RAL colour range.
- D All moulded gratings shall have ultraviolet inhibitors.
- E Gratings and stair treads shall have integral grit surface for slip resistance.
- F Stair treads shall have a 38mm solid black nosing.
- G All gratings and stair treads shall be attached with 316 stainless steel grating clips. A minimum of 4 clips per piece shall be used.
- H Manufacturers, The Grating Company Ltd. 01787 319922.

2.03 GRP Embedment Angles

- A All GRP gratings set in concrete openings shall have a GRP embedment angle frame.
- B Embedment angles shall be of the correct depth to suit the grating to be installed and shall have a minimum 30mm support for gratings.
- C Embedment angle shall have a continuous integral anchor.
- D GRP embedment angles shall be manufactured from vinyl ester resin.
- E Manufacturers, The grating Company Ltd. 01787 319922.

2.04 GRP Structural Fabrications

A Minimum physical properties shall be:

	Property	Unit	Test Method	Minimum Properties	
				E23 Grade	E17 Grade
1.1	Full section test	GPa	Annex D, prEN13706-2	23	17
1.2	Tension modulus-axial	GPa	EN ISO 527-4	23	17
1.3	Tension modulus-transverse	GPa	EN ISO 527-4	7	5
1.4	Tension strength-axial	MPa	EN ISO 527-4	240	170
1.5	Tension strength-transverse	MPa	EN ISO 527-4	50	30
1.6	Pin bearing strength-axial	MPa	Annex E, prEN13706-2	150	90
1.7	Pin bearing strength-transverse	MPa	Annex E, prEN13706-2	70	50
1.8	Flexural strength-axial	MPa	EN ISO 14125	240	170
1.9	Flexural strength-transverse	MPa	EN ISO 14125	100	70
1.10	Interlaminar shear strength-axial	MPa	EN ISO 14130	25	15

B Structural shapes shall be fabricated as per the drawings with good quality workmanship, closely fitted joints and in accurate position to permit installation and proper joining of parts on site.

C All fixings are to be 316 stainless steel.

D All joint surfaces to be bonded shall be properly abraded to remove surface shine and be free of burrs or other foreign materials that would prevent proper adhesion.

E Use high-strength epoxy adhesives designed for use with GRP and mechanical fasteners.

F All pieces to be clearly marked and identified.

G Shop assemble pieces into the largest practical assembly suitable for shipping.

I Manufacturers, The Grating Company Ltd. 01787 319922.

2.05 GRP Stairs

A Fabricate from GRP structural shapes as noted in section 2.04.

B Use BS5395 Part 3 1985 for rise and going.

C Use stair treads as specified in section 2.02.

D Use GRP handrails as specified in section 2.06.

E Use stainless steel fixings throughout.

F Manufacturer, The Grating Company Ltd. 01787 319922.

2.06 GRP Handrail

- A The handrail system shall be made from Isophthalic resin.
- B All handrail components shall be fire retardant as per ASTM E 84 class 1.
- C Handrail posts shall be 51 x 51 x 4 square tube.
- D All handrail components shall be in safety yellow.
- E All post to rail connections to be fully bonded.
- F GRP handrail shall have a minimum 1 midrail and toe board.
- G Manufacturers, The Grating Co Ltd. 01787 319922.

2.07 GRP Ladders and Safety Cages

- A Ladders and cages shall be manufactured from Isophthalic resin.
- B All ladder and cage components shall be fire retardant as per ASTM E 84.
- C Ladder rails shall be 51 x 51 x 4 square tube. Ladder rungs shall be 32mm diameter serrated tube.
- D Ladders and cage shall be safety yellow.
- E Ladder rungs shall penetrate into the posts and fixed into place using 4 No. GRP dowels and resin to prevent rung rotation.
- F Ladder stand off brackets are to be GRP or stainless steel and be installed at a maximum 2000mm centres. All fixings to be 316 stainless steel.
- G Ladder cages, if required shall be fabricated from GRP hoops and straps. GRP hoops are to be 100mm x 6mm GRP and shall be spaced at maximum 1200mm centres. GRP straps shall be 40 x 20 x 3 GRP 'U' channel. Hoops and straps are to be bonded with epoxy resin and bolted with 316 stainless steel bolts.
- I Manufacturers, The Grating Co Ltd. 01787 319922.

Part 3. Execution

3.01 Inspection

- A Upon receipt of material at job site, the contractor shall inspect all materials for shipping damage.

3.02 Handling and Storage

- A Handle all GRP materials with reasonable care to prevent damage. Do not drag GRP material.
- B If GRP materials are not being installed immediately, then store to prevent twisting, bending or breakage of any kind.

3.03 Installation

- A Installing contractor to coordinate and verify that other construction trades and materials have been installed per the contract drawings and that they are accurate in location, alignment, elevation and are plumb and level.
- B Install GRP materials in accordance with the installation drawings supplied by the GRP supplier.

- C Install materials accurately in location and elevation level and plumb.
- D All field cuts, holes or abrasions must be sealed with sealing resin to prevent corrosion.

END