GLASSFIBER REINFORCED PLASTICS (GRP) MOULDED AND PULTRUDED GRATING

1. GENERAL

1.1 All Glass Reinforced Plastic (GRP) Moulded and Pultruded Grating shall be designed, supplied and installed by Yeung's Fiberglass Company, a Specialist Contractors in the "Supply and Installation of Glass (or Fibre) Reinforced Plastic Units" category of the list of approved Suppliers of Materials and Specialist Contractors for Public Works of HKSAR Government.

1.2 The Contractor should be in the approved list of registered sub-contractor under PROVISIONAL CONSTRUCTION INDUSTRY CO-ORDINATION BOARD of Hong Kong

1.3 The Contractor should have more than 20 years proven solid experiences on manufacturing GRP Moulded and Pultruded Grating.

1.4 The Contractor shall furnish, fabricate (where necessary), and install all glass reinforced plastic (GRP) items, with all appurtenances, accessories and serviceable installation as shown on the Contract Drawings and as specified herein, and in accordance with the requirements of the Contract Documents.

2. CONTRACTOR SUBMITTALS

2.1 The Contractor shall furnish shop drawings of all fabricated gratings and accessories in accordance with the provisions of this Section.

2.2 The Contractor shall furnish manufacturer's shop drawings clearly showing material sizes, types, styles, part or catalog numbers, complete details for the fabrication of and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details.

2.3 The Contractor shall submit the manufacturer's published literature including structural design data, structural properties data, grating load/deflection tables, corrosion resistance tables, certificates of compliance, test reports as applicable, concrete anchor systems and their allowable load tables, and design calculations for systems not sized or designed in the contract documents.

2.4 The Contractor may be requested to submit sample pieces of each item specified herein for acceptance by the ENGINEER as to quality and color. Sample pieces shall be manufactured by the method to be used in the WORK.

3. PERFORMANCE

3.1 GRP Panel must have the following mechanical properties, tested by the University of Hong Kong. Test Report must be submitted in the tender stage for review.

Type of GRP Laminate = 35% glass content by weight
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}
Inter-laminate Shear Strength = 18.5 Nmm^{-2}

3.2 GRP Moulded and Pultruded Grating shall comply with Fire Retardant Requirement BS 476 Part 3, 6 and 7 Standard and test reports of these tests shall be submitted in tender

3.3 Fulfill Impact Test based on BS 6206 and must be carried out by the University of Hong Kong and test reports of these tests shall be submitted in tender

4. QUALITY ASSURANCE

4.1 All items to be provided under this Section shall be furnished only by manufacturers having a minimum of twenty (20) years experience in the design and manufacture of similar products and systems. Additionally, if requested, a record of at least five (5) previous, separate, similar successful installations in the last five (5) years shall be provided.

4.2 Manufacturer shall offer a 3 year limited warranty on all GRP products against defects in materials and workmanship.

5. PRODUCT DELIVERY AND STORAGE

5.1 Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer. Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and noted as such to facilitate

their movement to a dry indoor storage facility.

5.2 Storage of Products: All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, other deformations, and other types of damage. Store adhesives, resins and their catalysts and hardeners in dry indoor storage facilities between 70 and 85 degrees Fahrenheit (21 to 29 degrees Celsius) until they are required.

6. MANUFACTURER

6.1 DuraGrat and DuraDeck GRP Moulded and Pultruded Grating shall be manufactured by:
Yeung's Fiberglass Company
Unit F, 23/FL., CNT Tower, 338 Hennessy Road, Wanchai, Hong Kong
Contact : Ir. Herbert Yeung (Tel. 28938865 Fax. 28936321)

7. PRODUCT

7.1 All GRP items furnished under this Section shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.

7.2 Fiberglass reinforcement shall be continuous roving in sufficient quantities as needed by the application and/or physical properties required.

7.3 Resin shall be ISOFR Polyester, with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.

7.4 All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure to corrosives, wear or weathering.

7.5 All mechanical parts shall be manufactured of Type 316SS (stainless steel).

8. PULTRUDED GRP GRATING

8.1 Manufacture: Grating shall be of a one piece, integrally molded construction, manufactured by the Moltrusion® method. "T"-shaped bearing bars shall run in the lengthwise direction of the panel. Cross bars, on 4" centers, shall be approximately half the depth of the bearing bars allowing the free flow of liquids under the grating during washdown or other spills. This self-draining feature minimizes the pooling of corrosives and other liquids which will extend the life of the grating. Grating shall be reinforced with continuous strand rovings, interwoven

with the reinforcements of the cross bars. The top layer of reinforcement shall be no more than 1/8" below the top surface of the grating so as to provide maximum stiffness and prevent resin chipping of unreinforced surfaces. Percentage of glass (by weight) shall not exceed 35% so as to achieve maximum corrosion resistance and to maintain the structural requirements of the Contract.

After manufacture, dry glass fibers shall not be visible on any surface of bearing bars or cross bars. All bars shall be smooth and uniform with no evidence of fiber orientation irregularities, resin rich or resin starved areas.

8.2 Non-slip surfacing: Grating shall be manufactured with a quartz grit slip resistant surface on the top of each bar. The embedded grit shall not penetrate beyond 5mm

8.3 Fire rating: Grating shall be fire retardant to BS 476 Part 3, Part 6 and Part 7. Test data performed only on the resin shall not be acceptable.

8.4 Resin system: The resin system used in the manufacture of the grating shall be CRYSTIC® Polyester. Manufacturer may be required to submit corrosion data from tests performed on actual grating products in standard chemical environments. Corrosion resistance data of the base resin from the manufacturer is not a true indicator of grating product corrosion resistance and shall not be accepted.

8.5 Mesh Configuration: 20x20mm (mini-mesh) with load bars on 6.4mm centers.

9. GRATING FABRICATION

9.1 Measurements: Grating supplied shall meet the dimensional requirements and tolerances as shown or specified. The Contractor shall provide and/or verify measurements in field for work fabricated to fit field conditions, as required by grating manufacturer to complete their fabrication work.

When field dimensions are not required, contractor shall determine correct size and locations of required holes or cutouts from field dimensions before field fabricating grating.

9.2 Sealing: All shop fabricated grating cuts shall be coated with vinyl ester resin to provide maximum corrosion resistance. All field fabricated grating cuts shall be coated similarly by the contractor in accordance with the manufacturer's instructions.

10. GRATING FABRICATION

10.1 Shop inspection shall be authorized as required by the Owner and shall be at Owner's expense. The fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that inspection may be provided. The grating shall be as free, as commercially possible, from visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles and pits. The surface shall have a smooth finish (except for grit top surfaces).

10.2 Contractor shall install gratings in accordance with manufacturer’s assembly drawings. Lock grating panels securely in place with hold-down fasteners as specified herein. Field cuts or drilled holes in reinforced plastic products shall be done with carbide or diamond tipped bits and blades. Cut, drilled or scared surfaces shall be sealed with a compatible resin, in accordance with manufacturer's instructions, to prevent corrosive attack of the glass reinforcements. Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.