

ROUGH CARPENTRY

1. GENERAL

1.1 Design Requirements

- .1 Design construction methods for expansion and contraction of materials. Adopt method of construction to ensure that materials are rigidly and securely attached and will not be loosened by work of other Sections. Fasten wood nailers, blocking, framing and strapping solidly to adjacent materials in true planes.

1.2 Quality Assurance

- .1 Lumber Identification: Lumber identification shall conform to requirements of Standard Grading Rules for Canadian Lumber of NLGA or grade stamped by an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.

1.3 Submittals

- .1 Preservative Treatment Test Reports: Duplicate reports from chemical treatment Manufacturer and certification by independent testing agency comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment Manufacturer's written instructions for handling, storing, installing, and finishing treated material.
- .2 For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Site.
- .3 Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 Waste Disposal

- .1 Dispose waste legally off Site, in accordance with governing regulation. Dispose of any end-cuts and left over chemicals in an approved land-fill site. Do not burn or allow other use of end-cuts.

2. PRODUCTS

2.1 Materials

- .1 Framing Lumber: Unless specified otherwise, Spruce/Pine/Fir (SPF), NLGA 121b Standard, with structural members meeting minimum No. 2 Grade requirements of CAN/CSA-O141.

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- .2 Cants, Curbs, Blocking, Nailers and other Members Less Than 89 mm (4") Wide: Spruce, 122c. "Standard" light framing, except as otherwise specified.
- .3 Softwood Plywood, Douglas Fir, CSA O121-M of Following Grades: Good One Side (G1S) elsewhere.
- .4 Rough Hardware: CSA B111; Nails, screws, bolts, lag screws, anchors, special fastening devices and supports required for erection of carpentry components. Use galvanized components if exposed to exterior atmosphere. Galvanize in accordance with requirements of CAN/CSA-G164-M.
- .5 General purpose adhesive: CSA O112 Series.
- .6 Proprietary fasteners: Toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by Manufacturer.

2.2 Wood Preservative-Treated Materials

- .1 Preservative Treatment by Pressure Process: CSA O80 Series, using preservative chemicals acceptable to authorities having jurisdiction, ammoniacal or amine copper quat (ACQ), or copper azole (AC), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated with inorganic boron (SBX).
- .2 Precut wood, where practical, prior to preservative treatment.
- .3 Treat site cut pressure treated lumber cut ends treated with preservatives compatible with pressure treatment chemicals.
- .4 Kiln-dry material after treatment to a maximum moisture content of 19% for lumber and 15% for plywood. Do not use material that is warped or does not comply with requirements for untreated material.
- .5 Mark each treated item with the treatment quality mark of an inspection agency approved by the Canadian Lumber Standards Accreditation Board.
- .6 Application: Treat items indicated on Drawings, and the following:
 - .1 Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, air and vapour barriers, and waterproofing.
 - .2 Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

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2.3 Fire-Retardant-Treated Materials

- .1 General: Identify fire-retardant-treated wood with appropriate classification marking of ULC or another testing and inspecting agency acceptable to authorities having jurisdiction.
- .2 Fire Retardant Treated Wood: To ULC S102, flame spread, fuel contributed and smoke developed ratings of 25 or less, pressure treated.
 - .1 Lumber and plywood: FirePro FRTW by Osmose, or Dricon FRT by Arch Wood Products Inc., or other approved equal.
 - .2 Particleboard: Duraflake FR by Weyerhaeuser, or other approved equal.
- .3 Use treatment that does not promote corrosion of metal fasteners.

3. EXECUTION

3.1 Installation - General

- .1 Install members true to line, levels, and elevations.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members with crown-edge up.
- .4 Install materials so that grade-marks and other defacing marks are not visible or are removed by sanding.
- .5 Frame, anchor, fasten, tie, and brace members to provide necessary strength and rigidity.
- .6 Countersink bolts where necessary to provide clearance for other work.
- .7 Fasten work to hollow units with toggle bolts and to solid masonry or concrete with lead expansion shields and lag screws. Do not use organic fibre or wood plugs.

3.2 Furring And Blocking

- .1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .2 Install furring to support siding applied vertically and where sheathing is not suitable for direct nailing.

3.3 Nailing Strips, Grounds, and Rough Bucks

- .1 Install rough bucks, nailers, and linings to rough openings as required to provide backing for frames and other work.

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3.4 Cants, Curbs, Fascia Backing

- .1 Install wood cants, fascia backing, nailers, curbs, and other wood supports as required and secure using galvanized fasteners.

3.5 Electrical, Data, and Telephone Equipment Backboard

- .1 Supply and install fire retardant treated backboards for mounting equipment as indicated. Use 19 mm ($\frac{3}{4}$ ") thick plywood on 38 x 89 mm (2 x 4) furring around perimeter and at maximum 300 mm (12") intermediate spacing.

END OF SECTION

FRP FABRICATIONS

1. GENERAL

1.1 Work Included

- .1 Supply and installation of FRP grating

1.2 References

- .1 ASTM D-638 -Tensile Properties of Plastics
- .2 ASTM D-790 – Flexural Properties of Unreinforced and Reinforced Plastics
- .3 ASTM D-2344 – Apparent Interlaminar Shear Strength of Parallel Fibre Composites by Short Beam Method
- .4 ASTM D-495 – High Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation
- .5 ASTM D-696 – Coefficient of Linear Thermal Expansion for Plastics

1.3 Design Criteria

- .1 Member sizes shown on the Drawings are a minimum.
- .2 Design the grating to support a uniform live load of 4.8 kPa or a concentrated live load of 2.2 kN, and other loads shown on the Drawings. Limit live load deflection to $1/360$ of span. Design the members in accordance with the Manufacturer's recommendations.

1.4 Submittals

- .1 Submit Shop Drawings in accordance with Section 01300 – Submittals.
- .2 Submit two samples of each type of grating.
- .3 Submit a colour chart of the standard range of colours.

1.5 Quality Assurance

- .1 Fabricators and erectors of this system to have a minimum of five (5) years successful installation and if requested by the Contract Administrator can provide a list of completed projects.
- .2 The installation subcontractor shall be an erector approved by the Manufacturer and shall have completed a course in the method of erection. The installation Subcontractor shall submit a letter from the Manufacturer stating he has successfully completed a course and is currently in good standing and is a Manufacture approved installer of the product.
- .3 Prior to the beginning of any fabrication or installation work, the Contract Administrator, at any reasonable time, may review the Work to ensure the material is free of visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles, and pits.
- .4 Items delivered to Site and erected to be free from chips, marks, or cracks.

FRP FABRICATIONS

1.6 Delivery, Storage, and Handling

- .1 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.
- .2 All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, other deformations, and other types of damage. Store items in an enclosed area and free from contact with soil and water. Store adhesives, resins and their catalysts, and hardeners in dry indoor storage facilities between 20°C and 27°C until they are required.

2. PRODUCTS

2.1 Materials

.1 Grating

- .1 Manufacture: grating components shall be high strength and high stiffness molded elements having a maximum of 70% and a minimum of 60% glass content (by weight) of continuous roving and continuous strand mat fibreglass reinforcements. The finished surface of the product shall be provided with a surfacing veil to provide a resin rich surface which improves corrosion resistance and resistance to ultraviolet degradation. Grating to be manufactured with vinyl ester resins.
- .2 Grating shall be resistant to full and wetted contact with the following chemicals:
 - .1 Specified chemicals: 39% Ferric Chloride, 93% Sulphuric Acid, 50% Sodium Hydroxide, 19% Aqua Ammonia, and 0.8% Sodium Hypochlorite.
 - .2 Neutralizing chemicals: Sodium Hydroxide, Caustic Soda, Lime, Soda Ash, Sulphuric Acid, and Sodium Bisulphite.
- .3 Fire rating: grating shall be fire retardant with a tested ASTM E84 flame spread rating of 25 or less when tested in accordance with ULC S102. Manufacturer may be required to provide certification of ULC S102 test on grating panels from an independent testing laboratory. Certification shall be dated within the past two years. Test data shall be from full scale testing of actual production grating, of the same type and material supplied for the Work. Test data performed only on the base resin shall not be acceptable.
- .4 The manufacture of the grating 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 corrosion resistance and shall not be accepted.
- .5 Surfacing: grating shall be concave finished.

FRP FABRICATIONS

- .6 Hardware: stainless steel Type 316 hold-down saddle clips, minimum four per panel.
- .7 Size: grating shall be moulded bi-directional 38 mm x 38 mm and 38 mm height.
- .8 Colour: to be selected from the Manufacturer's standard range of colours.
- .9 Acceptable products: Precision Grate CF by Precisioneering and Fibregate Vi-Corr by StonCor Fibregate.

3. EXECUTION

3.1 Grating Installation

- .1 Grating shall be installed in accordance with Manufacturer's Shop Drawings. Lock grating panels securely in place with hold-down fasteners as specified herein. Field cut and drill panels with carbide or diamond tipped bits and blades. Seal cut or drilled surfaces in accordance with Manufacturer's instructions; provide adequate ventilation.
- .2 Fabricate and install grating panels such that adjacent panels have perpendicular bars lining up to present a continuous appearance. Clip panels together to prevent differential panel to panel movement.
- .3 Grating shall meet the minimum dimensional requirements as shown or specified. The Contractor shall provide and/or verify measurements in field for work fabricated to field conditions as required by grating manufacturer. Determine correct size and locations of required holes or cutouts from field dimensions before grating fabrication.
- .4 Each grating section shall be readily removable, except where indicated on Drawings. Manufacturer to provide openings and holes where located on the Drawings. Grating supports shall be provided at openings in the grating by contractor where necessary to meet load/deflection requirements specified herein. Grating openings which fit around protrusions (pipes, cables, machinery, etc.) shall be discontinuous at approximately the centerline of opening so each section of grating is readily removable. Gratings shall be fabricated free from warps, twists, or other defects which affect appearance and serviceability.
- .5 All shop fabricated grating cuts and drilled holes shall be coated with vinyl ester resin to provide maximum corrosion resistance. All field fabricated grating cuts and drilled holes shall be coated similarly by the Contractor in accordance with the Manufacturer's instructions.
- .6 Hold-down clips shall be supplied and installed and spaced at a maximum of 1000 mm apart with a minimum of four per piece of grating.

END OF SECTION