

IOWA DEPARTMENT OF NATURAL RESOURCES

DIVISION II

Technical Specifications

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING AND REALTY SERVICES BUREAU
WALLACE STATE OFFICE BUILDING
DES MOINES, IA 50319-0034

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes furnishing and installation of all structural steel work, loose steel lintels, ladders, pipe or tube handrails, gratings, trash racks, aluminum items, louvers, anchor bolts, water control structures, and miscellaneous embedded and non-embedded metal work all as specified herein or as indicated on the Drawings.
- B. Related Sections: Drawings and General Provisions of the Contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 SUBMITTALS

- A. Provide submittals in accordance with Section 01300.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.
- B. Perform shop and/or field welding required in connection with the work of this section in strict accordance with pertinent recommendations of the American Welding Society.
- C. Field Measurement: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- D. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protection: Use all means necessary to protect the materials of this section before, during and after installation and to protect the work and materials of all other trades.
- B. Replacement: In the event of damage, immediately make all repairs and/or replacements necessary to the approval of the IDNR Construction Inspector and at no additional cost to the IDNR.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: For fabrication of the work of this Section which will be exposed to view, use only those materials which are smooth and free from surface blemishes including pitting, seams, marks, roller marks, rolled trade names, and roughness.
- B. Metal Standards: Provide materials complying with:
1. Steel plates, shapes, and bars: ASTM A36.
 2. Steel plates to be bent or cold formed: ASTM A283, Grade C.
 3. Steel tubing, cold formed, ASTM 500; or hot-rolled, ASTM A501.
 4. Gray iron castings: ASTM A48, Class 30.
 5. Steel bars and bar-size shapes: ASTM A306, Grade 65, or ASTM A36.
 6. Cold-finished steel bars: ASTM A108.
 7. Cold-rolled carbon steel sheets: ASTM A336.
 8. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.
 9. Aluminum sheets: ASTM B209-96.
 10. Stainless steel sheets: AISI type 302 or 304, 24 gauge, with number 4 finish.
 11. Malleable iron castings: ASTM A47, grade as selected by the fabricator.
 12. Steel pipe: ASTM A53, type as selected, Grade A, black finish unless galvanizing is required, standard weight (Schedule 40), unless otherwise indicated.
 13. Concrete inserts: Threaded or wedge type, stainless steel. Provide bolts, washers, and shims as required, stainless steel conforming to ASTM A167, ASTM A276, or ASTM A666 for type of approved stainless steel shall be Type 304 or 316.
- C. Grout: Nonshrink Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, nongaseous grout complying with CE CRD-C588. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.
- D. Fasteners: General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required complying with:
1. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.
 2. Lag Bolts: Square head type, FS FF-B-561.
 3. Machine Screws: Cadmium plated steel, FS FF-S-92.
 4. Wood Screws: Flat head carbon steel, FS FF-S-111.
 5. Plain Washers: Round, carbon steel, FS FF-W-92.
 6. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
 7. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
 8. Lock Washers: Helical spring type carbon steel, FS FF-W-84.
- E. Paint: N/A
- F. Other Materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the CONTRACTOR subject to the approval of the IDNR Construction Inspector.

2.02 MANUFACTURED UNITS

- A. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts that bear on wood structural connections; elsewhere, furnish steel washers.
- B. Rough Hardware: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel, iron or aluminum shapes as required for framing and supporting work, and for anchoring or securing work to concrete or other structures.
- C. Loose Steel Lintels: Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8 inch bearing at each side of openings, unless otherwise indicated.
- D. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.
- E. Provide other manufactured units as shown on the Drawings, or if not shown on the Drawings, as required for a complete and proper installation.

2.03 FABRICATION

- A. Shop Assembly: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
 - 1. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - 2. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
 - 3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat head (countersunk) screws or bolts.
 - 4. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
 - 5. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- B. Shop/Factory Finishing: Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be bituminous coated or field welded, and galvanized or aluminum surfaces, unless otherwise indicated, with a metal primer meeting the requirements of AASHTO M 229,

Type II. It is intended as a primer over ferrous metal surfaces, and may be applied by spray, brush, or roller.

1. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning," or SSPC SP-3 "Power Tool Cleaning," or SSPC SP-7 "Brush-Off Blast Cleaning."
2. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning."
3. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods that will result in full coverage of joints, corners, edges and exposed surfaces. Primer coat will not be required for galvanized corrugated metal pipes and assemblies that are to receive bituminous coating.
4. Apply two shop coats of primer to fabricated metal items, including surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.03 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- B. Field Assembly: Fit exposed connections accurately together to form tight hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- C. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Angles, Brackets, Hangers, Frames, and Channels.
 2. Anchor Bolts & Expansion Anchors.
 3. Bolts, Nuts & Washers.
 4. Grating.
 5. Handrails.

1.02 REFERENCES

- A. Specified references, or cited portions thereof, current at the date of bidding documents unless otherwise specified, govern the work.
- B. American Society for Testing and Materials (ASTM):
1. A325 - Specification for High-Strength Bolts for Structural Steel Joints.
 2. A386 - Specification for Zinc Coating (Hot-Dip) on Assembled Steel Products.
 3. A500 - Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 4. A501 - Specifications for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 5. B308 - Aluminum alloy standard steel shapes, rolled or extruded.
- C. American Welding Society (AWS): D.1.1. - Structural Welding Code.
- D. Aluminum Association (AA):
1. WA-20 Welding Aluminum.
 2. Specifications for Aluminum Structures (Section 1 of Aluminum Construction Manual).

1.03 SUBMITTALS

- A. Shop Drawings:
1. Submit Shop Drawings for all metal fabrications in accord with 01300.
 2. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 3. Include erection drawings, elevations, and details where applicable.
 4. Include welded connections using standard AWS welding symbols. Indicate net weld length. Waterproof welds shall be tested to insure proper function for intended applications.

5. Prepare Shop Drawings under seal of a professional structural engineer registered in the State of Iowa. (Not applicable for this project)

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Furnish all connectors, fasteners, welded metal and miscellaneous items required to complete and construct the items shown on the Drawings.
- B. Unless otherwise shown, fasteners and connectors shall be of same material as the attached metal, except for aluminum where fasteners and connectors shall be stainless steel. All fasteners used for submerged or "wet locations" shall be stainless steel.
- C. Furnish washers and lock washers for all bolted connections unless otherwise noted. Washers and lock washers shall be of the same material as fasteners and connector.
- D. Welded Studs and Anchors: Provide fabricated anchor units of diameter and length indicated on drawings. Install in accordance with manufacturer's recommendations and as shown on the plans.

2.02 MATERIALS

- A. Fabricated aluminum angles, brackets, hangers, frames, channels, screen/flow baffle guide slots, stop log guide slots, and related miscellaneous aluminum fabricated items.
 1. Work consists of providing all aluminum fabricated items shown on the Drawings in the numbers, sizes, dimensions and configuration as indicated on the Drawings.
 2. Structural aluminum shapes and plates shall be fabricated from aluminum alloy 6061-T6 unless otherwise noted or approved by INDR Construction Inspector. Welding shall conform to WA-20 Welding Aluminum by the Aluminum Association (AA). Provide full length or perimeter aluminum welding unless specifically directed not to do so on the plans. Protect items from heat warp and distortion. Maintain true and square mitered joints for all frames and similar items. Test all waterproof welds.
 3. Coat surfaces of aluminum items to be embedded and in contact with concrete with coal tar epoxy paint system as identified in this section. Do not paint the exposed portion of these aluminum items.
 4. All bolts, nuts, washers, screws used for assembly or mounting or aluminum fabricated items shall be stainless steel conforming to ASTM A167, ASTM A276, or ASTM A666 for type of approved stainless steel shall be Type 304 or 316. Do not use plated or galvanized assembly hardware with aluminum-fabricated items.
 5. Screen guides, stoplog guides, grating support frames, and all other aluminum fabricated items shall be fabricated as indicated on the Drawings and supplied in the amount as noted on the Drawings. CONTRACTOR must verify fabrication dimensions in the field before beginning fabrication.
 6. Aluminum grating:

- a. Grating shall be fabricated from extruded bearing bars fastened together with extruded spacers to form a rigid grating. The main bearing bars shall be spaced a maximum of 1-3/16 inch apart c-c, spacers shall be placed at 2-inch centers maximum. Grating shall be 1 inch thick .
 - b. Ends of the grating section shall be banded.
 - c. Materials shall conform to "Aluminum Alloy Extruded Bars, Rods, Shapes and Tubes," ASTM Standard B-221, with mill finish.
 - d. See "ALUMINUM GRATING BAR SCREEN" specification for specific requirements.
- D. Anchor Bolts & Expansion Anchors: Anchor bolts, nuts, expansion anchors, bolts, and washers shall be stainless steel.
- E. Bolts, Nuts, Washer, and Sheet Metal Screws: Bolts that will be continuously or intermittently submerged in water or in a generally wet location shall be stainless steel conforming to ASTM A167, ASTM A276, or ASTM A666 for the type approved. Type shall be 304 or 316. All other bolts, nuts and washers shall be hot-dip galvanized unless specifically identified as other materials with the exception that all assembly hardware for aluminum fabrication shall be stainless steel; no galvanized or plated or anodized materials shall be used with aluminum.
- F. Support Posts: Bollards and posts shall be fabricated from 6-inch diameter Schedule 80 steel and shall include anchor studs as indicated on the Drawings. Posts shall be hot-dip galvanized after all fabrication. Units shall be mounted in the concrete base structure and installed in coordination with the installation as indicated on the Drawings.
- G. Coal Tar Epoxy Coating For Use With Aluminum Items In Contact With Concrete and Masonry:
- 1. Aluminum contacting concrete and masonry: Preparation, primer and final coatings in accordance with manufacturer's directions.
 - 2. Coat contact surfaces with one coat of Koppers 654 epoxy primer as manufactured by the Koppers Company followed by two coats of Bitumastic No. 300-M as manufactured by the Koppers Company. Total D.F. thickness 16 mils or greater.
 - 3. Tnemec Tneme-tar #46-413 Coal Tar Epoxy System is acceptable alternate system. Do not coat surfaces of the aluminum items not in contact with concrete.

2.03 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabrication items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to site.
- D. Ease exposed edges to small uniform radius.
- E. Make exposed joints butt tight, flush, and hairline.

- F. Supply all components for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.04 FINISH

- A. Clean Surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Galvanize items to minimum 2.0 oz/sq. ft. zinc coating in accord with ASTM A386.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Obtain INDR Construction Inspector's written approval prior to site cutting or making adjustments not scheduled.
- B. Make provisions for erection loads with temporary bracing. Keep work in alignment.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Metalwork to be embedded in concrete is to be placed accurately and held in correct position with plastic ties while the concrete is placed, or if shown or accepted recessed or blockout shall be formed in the concrete and the metalwork shall be grouted in place. Surfaces of all metalwork in contact with or embedded in concrete shall be thoroughly cleaned of all rust, dirt, grease, loose scale, grout, mortar and other foreign matter and coated with coal tar epoxy coat. If approved by the INDR Construction Inspector, recesses may be neatly cored in the concrete after it has attained its design strength and the metalwork grouted in place. All metalwork shall have proper fit-up and shall be job-measured where necessary.
- C. Guides and Angles: Units shall be set to that edges are flush and square with the wall. Use extreme care to insure that embedded items are set at correct spacing and perpendicular as shown. All metal shall be cut and/or ground to match chamfer of concrete.
- D. After fabrication, each screen, baffle, and other miscellaneous metal item that is removable shall be tested in their intended location, and operated to verify their fit, by the IDNR Construction Inspector.

END OF SECTION 05990

SECTION 06610

FIBERGLASS REINFORCED PLASTICS (FRP) FABRICATIONS

MOLDED RAISED ACCESS FLOOR GRATING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The CONTRACTOR shall furnish, fabricate (where necessary), and install all fiberglass reinforced plastic (FRP) items, with all appurtenances, accessories and incidentals necessary to produce a complete, operable and serviceable installation as shown on the Contract Drawings and as specified herein, and in accordance with the requirements of the Contract Documents.

1.2 REFERENCES

- A. The publications listed below (latest revision applicable) form a part of this specification to the extent referenced herein. The publications are referred to within the text by the designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) Test Methods:

ASTM D 635 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position

ASTM E 84 Surface Burning Characteristics of Building Materials

1.3 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall furnish shop drawings of all fabricated gratings and accessories in accordance with the provisions of this Section.
- B. The CONTRACTOR shall furnish manufacturer's shop drawings clearly showing material sizes, types, styles, part or catalog numbers, complete details for the fabrication and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details.
- C. 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.

- D. 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.

1.4 QUALITY ASSURANCE

- A. All items to be provided under this Section shall be furnished only by manufacturers having a minimum of ten (10) 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.
- B. Manufacturer shall offer a 3 year limited warranty on all FRP products against defects in materials and workmanship.
- C. Manufacturer shall be certified to the ISO 9001-2000 standard.
- D. Manufacturer shall provide proof of certification from at least two other quality assurance programs for its facilities or products (UL, DNV, ABS, USCG, AARR).

1.5 PRODUCT DELIVERY AND STORAGE

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

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Access Floor Grating shall be Micro-Mesh[®] as manufactured by:

Fibergrate Composite Structures Inc.
5151 Belt Line Road, Suite 700
Dallas, Texas 75254-7028 USA
(800) 527-4043 (972) 250-1530 Fax

2.2 GENERAL

- A. All FRP 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.
- B. Fiberglass reinforcement shall be continuous roving in sufficient quantities as needed by the application and/or physical properties required.
- C. Resin shall be { Vinyl Ester, Isophthalic Polyester, Polyester *or* Modified Acrylic - *choose one* }, with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.
- D. 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 due to wear or weathering.
- E. All grating products shall have a tested flame spread rating of 25 or less per ASTM E-84 Tunnel Test. Gratings shall also have tested burn time of less than 30 seconds and an extent of burn rate of less than or equal to 10 millimeters per ASTM D635.
- F. All mechanical grating clips shall be manufactured of Type 316SS (stainless steel).

2.3 MOLDED FRP GRATING

- A. Manufacture: Grating shall be of a one piece molded construction with tops and bottoms of bearing bars and cross bars in the same plane. Grating shall have a square mesh pattern providing bidirectional strength. Grating shall be reinforced with continuous rovings of equal number of layers in each direction. 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 as required to maintain the structural requirements of the CONTRACT.

After molding, no dry glass fibers shall 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, interlaminar voids, porosity, resin rich or resin starved areas.

- B. Non-slip surfacing: Grating shall be manufactured with a smooth sanded top surface.

- C. Bar intersections of full depth bars are to be filleted to a minimum radius of 1/16" to eliminate local stress concentrations and the possibility of resin cracking at these locations. Intersections of secondary, partial depth bars do not require a fillet.
- D. Fire rating: Grating shall be fire retardant with a tested flame spread rating of 25 or less when tested in accordance with ASTM E 84. Certifications shall be dated within the past two years and test data performed only on the resin shall not be acceptable.
- E. Resin system: The resin system used in the manufacture of the grating shall be {Vi-Corr[®], IFR, FGI, Corvex[®], ELS or XFR- choose one}. 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.
- F. Color: Dark Gray
- G. Depth: 1-1/2" with a tolerance of plus or minus 1/16".
- H. Mesh Configuration: 1-1/2" square mesh bottom, 3/4" square mesh top, with a tolerance of plus or minus 1/16" mesh centerline to centerline. Top surface meets ADA requirements. Panels shall be 2'0" x 2'0" square.
- I. Load/Deflection: Load capacity and deflection data was developed using the Recommended Test Procedures for Access Floors by the Ceilings & Interior Systems Construction Association (CISCA). Setup requires that the panels ". . . shall be supported on an understructure support identical to that utilized in an installed system." Load criteria reflect a Case 1 condition defined as "Concentrated loading at the center of the panel (centroid) with panel supported at four (4) corners."

A load of 500 pounds with concentrated loading at the center of the panel (Case 1 centroid) will produce a deflection of 0.07".
- J. Substitutions: Other products of equal strength, stiffness, corrosion resistance and overall quality may be submitted with the proper supporting data to the engineer for

2.4 GRATING FABRICATION

- A. 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 the work. When field dimensions are not required, contractor shall determine correct size and locations of required holes or cutouts from field dimensions before grating fabrication.

- B. Layout: Each grating section shall be readily removable, except where indicated on drawings. Manufacturer to provide openings and holes where located on the contract drawings. 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.
- C. Sealing: All shop fabricated grating cuts shall be sealed to provide maximum corrosion resistance. All field fabricated grating cuts shall be coated similarly by the contractor in accordance with the manufacturer's instructions.
- D. Hardware: For panels installed on structural members, Type 316 stainless steel hold-down clips shall be provided, with a minimum of four per piece of grating, or as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Shop inspection is 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.

3.2 INSTALLATION

- A. Contractor shall install gratings in accordance with manufacturer's assembly drawings. Panels are to be supported with grating legs in each corner or other equivalent support mechanism. Lock grating panels securely in place with hold-down fasteners or as specified herein. Field cut and drill fiberglass reinforced plastic products with carbide or diamond tipped bits and blades. Seal cut or drilled surfaces in accordance with manufacturer's instructions. Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.

SECTION 055300

ALUMINUM FLUSH TOP BAR GRATINGS

Part 1: General

1.1 Scope

The contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install grating, stair treads and frames.

1.2 Quality Assurance

A.1 Comply with applicable provisions and recommendations of the following: NAAMM Metal Bar Grating Manual designated ANSI/NAAMM MBG 531 (Aluminum and Light Duty Steel and Stainless Steel Grating) and MBG 532 (Heavy Duty Steel Grating).

A.2 Aluminum:

ASTM B221, Aluminum Alloy, Extruded Bars, Rods, Wire, Shapes and Tubing.

B.1 Take field measurements prior to preparation of final shop drawings and fabrication where required to ensure proper fitting of the work.

1.3 Submittals

A. The contractor shall submit for approval shop drawings for the fabrication and erection of all work. Include plans, elevations, and details of sections and connections. Show type and location of all fasteners.

B. The contractor shall submit the manufacturer's specifications, load tables, anchor details and standard installation details.

C. Samples of grating and anchorage system shall be submitted for approval.

Part 2: Product

General:

Design is based upon use of aluminum gratings as manufactured by Ohio Gratings, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship to be used under this Section and shall not, in any way, be construed as limiting competition.

1. Grating: Swaged Aluminum Flush Top type 6063-T6 SGF Series by Ohio Gratings Inc., or equal.

2. Bearing Bars: Type 6063-T6 aluminum rectangular bars 1" x 3/16" width on a maximum of 19/16" centers. (Note other spacing may be specified at the discretion of the architect/engineer.)

3. Cross Bars: Type 6063-T6 aluminum diamond bar and tail mechanically locked at right angles to, and in the same plane as, the top surface of bearing bars at a maximum of 2" on center. (Note other cross bar spacing may be specified at the discretion of the architect/engineer.)

4. Surface: Plain.

5. Loading: Grating to carry a pedestrian loading equal to a uniform load of 100# per square foot over the required clear span with deflection not to exceed ¼". (Note: alternate loading requirements may be specified at the discretion of the architect/engineer.) (NOT APPLICABLE FOR THIS PROJECT)

6. Finish: The gratings shall be provided mill finish.

7. Fabrication and Tolerances shall be in accordance with ANSI/ NAAMM Metal Bar Grating Manual.

8. Section of grating for this project shall be end banded.

Part 3: Execution

3.1 Installation

A. Prior to grating installation, contractor shall inspect supports for correct size, layout and alignment. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI / NAAMM Metal Bar Grating Manual.

C. Cutting, Fitting and Placement.

1. Perform all cutting and fitting required for installation. Grating shall be placed such that cross bars align.
2. Wherever grating is pierced by pipes, ducts and structural members, cut openings neatly and accurately to size and weld a rectangular band bar of the same height and material as the bearing bars.
3. Cutouts for circular obstructions are to be at least 2" larger in diameter than the obstruction.
4. Utilize standard panel widths wherever possible.

D. Protection of Aluminum from Dissimilar Materials:

1. Where aluminum surfaces come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with one coat of bituminous paint or other approved insulating material.
2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint or other approved insulating material.

3.2 Grating Attachment

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

End Section 055300