SECTION 05500

MISCELLANEOUS METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Ferrous and non-ferrous metal fabrications not described in other Sections. Items include but are not necessarily limited to:

1. Rough hardware.
2. Access ladders
3. Barrier gate at vehicle entrance
4. Metal fence
5. Loose bearing and leveling plates.
6. Loose steel lintels.
7. Elevator pit ladders.
8. Miscellaneous framing and supports for:
   a. Elevator doors.
   b. Door frames, curtainwall and storefront framing.
   c. Signage
   d. Elevator door sills.
   e. HVAC water lines
   f. Roof conductors and secondary roof conductors
   g. Support tubes in elevator shafts for guide rails
   h. Applications not specified in other Sections.
9. Angles and supports embedded in concrete and masonry.
10. Metal bar grate sump covers at elevator pits.
11. Miscellaneous steel trim, including:
    a. Edgings.
12. Handrails and guardrails.
13. Pipe bollards.
14. Construction castings (wheel guards, grates, frames and covers).
15. Floor access doors.

B. Related Sections:

1. Section 03300 - Cast-In-Place Concrete: Concrete fill for bollards.
2. Section 05100 - Structural Steel: Structural steel framing system components.
3. Section 09800 - High Performance Coatings: Paint finish for exterior handrails.
4. Section 09910 - Painting: Paint finish for miscellaneous interior metal. Exterior metal fabrications not specifically covered in Section 09800 - High Performance Coatings shall be covered in this section 09910 – Painting..

1.2 PERFORMANCE REQUIREMENTS

A. General: Fabricate and install metal fabrications to withstand specified loads without exceeding the allowable working stress of the materials involved, including anchors and connections.

1. Apply each load to produce the maximum stress in each component.

2. Allow for thermal movement resulting from a 100 degree F. change (range) in ambient temperature, to prevent buckling, opening up of joints, and overstressing of welds and fasteners.

B. Handrails and Guardrails: Fabricate and install to withstand the following loads:

1. Concentrated load of 200 lbs. applied at any point, non-concurrently, vertically or horizontally, at the top rail.
2. Concentrated load of 200 lbs. applied horizontally over any 1-foot square area of intermediate rails or in-fill.
3. At top rail, a uniform load of 50 lbs. per linear foot applied horizontally at top rail, and a simultaneous load of 100 lbs. per linear foot applied vertically.
4. Concentrated and uniform loads above need not be assumed to act concurrently.

C. Metal Plank Gratings: Capable of withstanding a uniform load of 50 lbs. per sq. ft. or a concentrated load of 250 lbs., whichever produces the greater stress.

D. Ladders: For lengths up to 10 feet, ladders including attachments shall support two loads of 250 pounds each concentrated between any two consecutive attachments. For each 10 feet additional length or fraction thereof, ladders including attachments shall support an additional concentrated load of 250 pounds. Each step or rung in each ladder shall support a single concentrated load of 250 pound minimum..

1.3 SUBMITTALS

A. Product Data: Submit specifications and installation recommendations for manufactured products furnished under this Section, including paint products and grout. List items by manufacturer name and brand name or catalog number.

B. Design Calculations: For items specified to meet performance criteria, provide structural data to demonstrate compliance with requirements. Data shall be sealed and signed by a professional structural engineer licensed by the State of Louisiana to provide this type of engineering.

C. Shop Drawings: Submit fabrication and erection drawings including plans, elevations, sections, and details of all metal fabrications and their connections. Show anchorage and accessory items. Provide templates for items to be installed under other Sections.

D. Samples: Submit samples of materials or products as requested by Authorized Representative.

E. Welder Certificates: Submit certification specified under “Quality Assurance”.

1.4 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable requirements of the following, unless otherwise specified.

1. “Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings” including “Commentary on the AISC Specifications” of the American Institute of Steel Construction (AISC).
2. “Specifications for the Design of Cold-Formed Steel Structural Members” of the American Iron and Steel Institute (AISI).
3. AWS D1.1 “Structural Welding Code - Steel”, D1.3 “Structural Welding Code - Sheet Steel”, and D1.2 “Structural Welding Code - Aluminum” of the American Welding Society (AWS).

B. Welders: Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and is currently certified.

1.5 TESTING LABORATORY SERVICES

A. Work To Be Tested: The Testing Laboratory specified in "Section 01450 - Testing Laboratory Services" shall inspect welded and bolted connections of the following:

1. Lintel angles and relieving angles.

B. Test Procedures: The Testing Laboratory shall inspect and report on shop fabrication and field assembly as follows:

1. Visual weld inspection, according to AWS standards.
2. Radiographic (ASTM E 390) or ultrasonic (ASTM E 164) inspection of welds.
3. Visual and torque inspection of high strength bolted connections, using an inspecting wrench, according to AISC "Specification for Structural Joints".

1.6 PROJECT CONDITIONS

A. Delivery, Storage and Handling: Deliver materials in undamaged condition. Store items above ground and under cover. Protect from corrosion and contamination by dirt, grease and other foreign material.

B. Field Measurements: Before fabrication, field-verify dimensions of construction to which metal fabrications must fit. Show critical dimensions on shop drawings.

C. Coordination: Coordinate and cooperate with metalwork supplier to maintain critical construction dimensions.

1. Coordinate and cooperate with metalwork supplier to maintain critical construction dimensions.
2. Coordinate fabrication schedule with construction progress to avoid delay of work.
3. Coordinate location, quantity and dimensions of metal fabrications with related work.

PART 2 - PRODUCTS

2.1 FERROUS METALS

A. Steel Plates, Shapes and Bars: ASTM A 36.

B. Rolled Steel Floor Plates: ASTM A 786. Raised diamond tread pattern (Pattern No. 2).

C. Steel Tubing: ASTM A 500, Grade A, (cold-formed), or ASTM A 501, (hot-formed), structural tubing. Provide tubing with galvanized finish for exterior applications and wherever specified; provide black finish elsewhere.

D. Steel Sheet: ASTM A 611, Grade A (cold-rolled) or ASTM A 570, Grade 33 unless otherwise specified (hot-rolled).

E. Galvanized Sheet: ASTM A 446, Grade A, G90 coating designation.

F. Pipe: ASTM A 53, standard weight (Schedule 40) unless otherwise indicated, Type E, F or S. Provide pipe with galvanized finish for exterior applications and wherever specified; provide black finish elsewhere.

G. Castings: Gray iron, ASTM A 48, Class 30, or malleable iron, ASTM A 47, grade 32510.

H. Stainless Steel: Commercial quality, AISI type 302/304, complying with ASTM A-167, finish as indicated.

2.2 BARRIER GATE

A. Manufacturer/product: Barrier pipe frame gate, double arm swinging type, factory primed.

1. Century Fence Co., "BARRIER GATE"
2. Substitutions as approved by Architect.

B. Materials, Fabrication:

1. Double arm swinging gate frames shall be constructed of 2" O.D. galvanized pipe. The gate frame shall be welded at all corners to form a rigid truss like panel. Hinges shall allow gate to swing 180 degrees (90º in both directions). Latches shall be heavy duty and have a provision for padlocking. Gate posts shall be set in concrete and diameter as recommended by manufacturer for heavy duty operation. All parts shall be constructed of galvanized steel, factory primed.
2. Field Paint barrier gate and post in colors as selected by Architect.

2.3 METAL FENCE AND GATES

A. New Fence and Gate Panels: Fabricated from galvanized steel rods, flat bars, welded to form an open grille pattern as shown on drawings. Grind welds smooth, paint as per section 09910.

2.4 WELDED STEEL BAR GRATINGS

A. Provide gratings capable of withstanding the structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections

1. Minimum 1” thick

B. Fabricate removable grating sections with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.

2.5 ALUMINUM

A. General: Alloy and temper recommended by the manufacturer or specified for the required forming and finishing methods.

B. Gratings: ASTM B 221 extrusions, alloys as follows:

1. 6061-T6 or 6063-T6 for bearing bars and shapes.
2. 6061-T1 for cross bars.

C. Fasteners for Aluminum Gratings: Use fasteners made of same basic metal as fastened metal except use galvanized fasteners complying with ASTM A 153 for exterior aluminum units, unless otherwise indicated. Do not use metals that are corrosive or incompatible with metals joined.

2.6 GROUT AND ANCHORING CEMENT

A. Non-shrink Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, nongaseous grout complying with CE CRD-C 621.

1. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.
2. Approved Products/Manufacturers:
   a. "B-6 Construction Grout"; W. R. Bonsal Co.
   b. "Euco N-S Grout"; Euclid Chemical Co.
   c. "Five Star Grout"; Five Star Products.
   d. "Crystex"; L & M Construction Chemicals, Inc.
   e. "Masterflow 713"; Master Builders.
   f. "Sika Grout 212"; Sika Corporation.
   g. "Sonogrout 14" Sonneborn Building Products Div., Rexnord Chemical Products, Inc.

B. Epoxy Grout: 100% solids, pre-proportioned epoxy/aggregate non-shrink grout.

1. Provide grout specifically recommended by the manufacturer for interior and exterior applications of type specified in this Section.
2. Approved Products/Manufacturers:
   a. "Por-Rok Epoxy Grout"; Minwax Construction Products.
   b. "Euco High Strength Grout"; Euclid Chemical Company.
   c. "Sikadur 42 Grout-Pak"; Sika Corporation.

2.7 CONNECTIONS

A. General: Use materials same as or compatible with metal being connected. For steel, provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

B. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported items, unless otherwise indicated.

C. Expansion Bolts: USM "Parabolt", Red Head "Sleeve Anchors", Hilti "Kwik-Bolt", or similar expanding shield type anchor bolt, galvanized or stainless steel.

D. Concrete Inserts: Threaded or wedge type capable of sustaining, without failure, the imposed load with a safety factor of 4; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

E. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

F. Bolts and Nuts: Regular hexagon head bolts, ASTM A 307, Grade A, with ASTM A 563 hex nuts and flat washers.

G. High Strength Bolts and Nuts: ASTM A 325 and A 490, as indicated.

H. Machine Screws: ANSI B18.6.3.

I. Lag Bolts: ANSI B18.2.1.

J. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.

2.8 PAINT

A. Shop Primer for Ferrous Metal (where indicated to receive paint under Section 09910): Manufacturer- or fabricator-selected lead-free, modified alkyd primer, which is resistant to normal atmospheric corrosion, compatible with finish paint systems indicated, and able to provide a sound foundation for field-applied topcoats despite prolonged exposure.

B. Primer for Ferrous or Galvanized Metal (where indicated to receive coating under Section 09910): Use primer as specified in "Section 09910."

C. Galvanizing Repair Paint: High zinc dust content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with ASTM A 780.

D. Bituminous Paint: Cold-applied asphalt mastic containing no asbestos fibers.

E. Zinc Chromate Primer: Alkyd type lead-free zinc chromate protective coating.

2.9 CONCRETE FILL AND REINFORCING MATERIALS

A. Concrete Materials and Properties: Comply with requirements of "Section 03300" for normal weight, ready-mix concrete with minimum 28 day compressive strength of 3,000psi, and a W/C ratio of 0.55 maximum, unless otherwise indicated.

B. Non-Slip Aggregate Finish: Factory-graded, packaged aluminum oxide grits or crushed emery; rustproof and non-glazing; unaffected by freezing, moisture or cleaning materials.

C. Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.

D. Welded Wire Fabric: ASTM A185, unless otherwise indicated.

2.10 FABRICATION, GENERAL

A. Metal Surfaces: For metal fabrications exposed to view in the completed work, select materials for surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller and extrusion marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

B. Materials: Form metal fabrications from materials of type and kind, size, thickness, and shapes indicated but not less than that needed to comply with performance requirements specified.

1. Basic materials specified are acceptable minimum for size, strength and quality. Use materials of higher strength, better quality and larger dimension if necessary because of fabricator's shop practices, materials availability and to comply with specified performance requirements.

C. Methods: Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support.

1. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
2. Shear and punch metals cleanly and accurately. Remove burrs.

3. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
4. Remove sharp or rough areas on surfaces exposed to contact by building occupants.
5. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use Phillips flat-head (countersunk) screws and bolts for exposed fasteners, unless another type is indicated. Locate joints where least conspicuous.
6. Provide for anchorage of type indicated. Coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
7. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
8. Fabricate joints that will be exposed to weather to exclude water. Provide weep holes where water may accumulate.

D. Shop Welds: Weld corners and seams continuously, to comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

E. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping, handling, and installation. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.11 ROUGH HARDWARE

A. Anchors and Supports: Furnish bent and otherwise custom fabricated bolts, plates, anchors, hangers, brackets, dowels and other miscellaneous steel and iron shapes for framing, supporting, and anchoring or securing metal fabrications and woodwork to concrete, masonry or other construction. Straight bolts and other stock rough hardware items for anchoring wood members are specified in “Section 06100.”

B. Counter Brackets: For support where indicated, provide stainless, galvanized or prime painted, (material and sizes as indicated on Drawings) steel brackets. Grind smooth all edges, corners and surfaces to eliminate cutting and snagging hazards.

C. Clip Angles: For attachment where indicated, provide prime painted steel clip angles, 1-1/4" x 1-1/4" x 1/8" (or 11 gauge) 1-1/2" long, spaced not more than 24 inches o. c.

D. Fabrication: Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts, which bear on wood; elsewhere, furnish steel washers.

2.12 STEEL LADDERS

A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with ANSI A14.3.

B. Siderails: Continuous steel flat bars, ½ inch x 2-1/2 inches, with eased edges, spaced 18 inches apart.

C. Bar Rungs: Round or square steel bars, 3/4 inch size, spaced 12 inches o. c.

1. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
2. Provide non-slip surface on top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a type of manufactured rung which is filled with aluminum oxide grout.

D. Attachment: Support each ladder at top and bottom and at intermediate points spaced not more than 5'-0" o. c. by means of welded steel brackets.

1. Size brackets to support dead load in addition to design live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
2. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.

E. Finish: Galvanize ladders, including brackets and fasteners, at exterior locations; otherwise provide prime-painted finish.

2.13 ALUMINUM LADDERS

A. Manufacturer: Subject to compliance with requirements, provide one of the following, or pre-bid approved equal:

1. "Series 560"; Alaco Ladder Co., Chino, Calif.
2. "Model TU"; O'Keefe's, Inc., San Francisco, Calif.
3. "Aluminum Ladder"; Tri-Tech, Inc., Austell, Georgia.
4. "Aluminum Fixed Access Ladder"; Sharon Companies, Medina, Ohio.

B. Description: Configuration as shown on the Drawings, including walk-through over-roof platform with rail extensions and special wall brackets. Select components and attachments to support dead load in addition to design live loads indicated. Comply with requirements of ANSI A14.3.

1. Siderails - Tubular extruded aluminum.
2. Rungs - Minimum 1" square or 1-1/8" diameter, tubular extruded aluminum, serrated surface.
3. Brackets - Minimum 1/8" thick aluminum, welded to side rails and anchored to building with expansion bolts.
4. Safety Cage - Provide manufacturer's standard riveted aluminum construction safety cage for ladders over 20 feet length.
5. Finish - As fabricated mill finish.

2.14 LOOSE BEARING AND LEVELING PLATES

A. Description: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Plates shall be flat, free from warps or twists, and

of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

B. Finish: Galvanize after fabrication.

2.15 LOOSE STEEL LINTELS

A. Description: Fabricate loose structural steel lintels from steel angles and shapes of size and at locations indicated. Weld adjoining members to form a single unit where indicated.

B. Length: Size lintels for equal bearing of one inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.

C. Finish: Galvanize lintels located in exterior walls. Provide prime-painted finish for lintels in interior walls.

2.16 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports, which are not a part of structural steel framework, as indicated and necessary for support, bracing and connection of other construction. Fabricate from structural steel shapes, plates and bars of welded construction, for field assembly and connection. Cut, drill and tap units to receive hardware, hangers, and similar items.

B. Anchors: Equip units with welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise indicated, provide steel straps 1-1/4 inches wide x 1/4 inch x 8 inches long, spaced 24 inches o. c.

C. Finish: Galvanize miscellaneous framing and supports in exterior locations. Provide shop-primed finish for interior locations.

2.17 STAINLESS STEEL

A. Metal Surfaces, General: For surfaces exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, roughness, or, for steel sheet, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.

B. Tubing: ASTM A 554, Grade MT 304.

C. Pipe: ASTM A 312/A 312M, Grade TP 304.

D. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.

E. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.

F. Bars and Shapes: ASTM A 276, Type 304.

G. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.18 STAINLESS STEEL FINISHES

A. General:

1. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
   a. All exposed work below 8'-0" above Finished Floor shall be Class 1 (Architectural Metals).
2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering prior to shipment.
3. Remove or blend tool and die marks and stretch lines into finish.
4. Grind and polish surfaces to produce uniform directional, textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

B. Exposed Surfaces: Provide the following finish for all exposed surfaces.

1. Bright, Directional Polish: Match AISI No. 4 finish.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.19 STRUCTURAL STEEL DOOR FRAMES

A. Description: Fabricate steel door frames from structural shapes and bars of size and to dimensions indicated, fully welded. Plug weld built-up members, and continuously weld exposed joints.

B. Anchors: Secure door frames to adjoining concrete or masonry. Provide 1/8" x 2" straps with a minimum 8" embedment, unless otherwise indicated. Weld anchors to frame jambs not more than 12" from both bottom and head of frame and space intermediate anchors not more than 32" apart.

C. Finish: Galvanize frames and anchors in exterior locations. Provide prime-painted finish for interior locations.

2.20 STEEL PIPE GUARDRAILS AND HANDRAILS

A. General: Fabricate pipe guardrails and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads. Guardrails and handrails at steel framed stairs are specified under METAL STAIRS in Section 05510.

B. Exterior Steel Railings: Form from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.

C. Interior Steel Railings: Form from steel pipe with black finish. Provide nongalvanized steel or iron fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

D. Joints: Connect railing members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.

E. Fabrication:

1. Form changes in direction of railing members by radius bends.
2. Form simple and compound curves by bending pipe in jigs to produce uniform curvature. Maintain cylindrical cross-section of pipe throughout entire bend

without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.

3. Close exposed ends of pipe by welding 3/16" thick steel plate in place or with prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4" or less.
4. Connect railing posts to steel framing by direct welding unless otherwise indicated.
5. For railing posts set in concrete fabricate sleeves from steel pipe not less than 6" long and with an inside diameter not less than 1/2" greater than the outside diameter of post, with steel plate closure welded to bottom of sleeve.
6. For removable railing posts, fabricate slip-fit sockets from steel pipe whose inside diameter is sized for a close fit with posts and to limit deflection of post without lateral load, measured at top, to not more than 1/24 of post height. Provide socket covers designed and fabricated to resist accidental dislodgement.

F. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use 4" high x 1/4" steel plate welded to, and centered between, each railing post.

G. Brackets, Flanges, Fittings and Anchors: Provide brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of railings and attachment to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

1. For galvanized railings, provide galvanized brackets, flanges, fittings and anchors.
2. For nongalvanized railings, provide nongalvanized brackets, flanges, fittings and anchors, except provide galvanized anchors embedded in exterior concrete and masonry.

2.21 WHEEL GUARDS

A. Description: Provide wheel guards of 3/4" thick, hollow core, gray-iron castings, of size and shape indicated. Provide holes for countersunk anchor bolts and grouting.

2.22 FLOOR ACCESS DOORS

A. Description: Upward-acting single leaf aluminum floor door.

1. Frame: 1/4" thick extruded aluminum with built-in neoprene cushion and strap anchors bolted to exterior surface.
2. Door Leaf: 1/4" thick aluminum diamond plate, reinforced if necessary to support 150 lbs./sq. ft. live load without deflection more than 1/150 of span.
3. Hardware: Steel can action hinges, torsion bar counterbalance mechanism; doors shall automatically lock in 90 degree open position. Stainless steel snap lock with removable release handle on upper side. Release and closing of open door by means of vinyl grip handle.

B. Acceptable Products: One of the following, or pre-bid approved equal:

1. Bilco Co., Model K.
2. Dur-Red Products, Model SEA.

2.23 SHELF AND RELIEVING ANGLES

A. Description: Fabricate shelf and relieving angles from steel angles of sizes indicated. Provide slotted holes to receive ¾-inch bolts, spaced not more than 6 inches from

ends and not more than 24 inches o. c., unless otherwise indicated. Align expansion joints in angles with expansion joints in masonry.

1. Furnish wedge-type concrete inserts, complete with fasteners, for attachment of angles to cast-in-place concrete.
2. Provide brackets to support angles at cavity walls from back-up masonry and structural framing.

B. Finish: Galvanize angles and bolts for exterior masonry.

2.24 PIPE BOLLARDS

A. Fabricate pipe bollards from galvanized Schedule 80 steel pipe.

1. Bollards shall be 8" diameter, 48" high and 48" in ground unless otherwise shown on Drawings.

B. Sleeve Anchorage: Fabricate sleeves for bollard anchorage from steel pipe with 1/4 inch thick steel plate welded to bottom of sleeve, and with an inside diameter not less than 1/2 inch greater than bollard outside diameter.

C. Fill bollards with concrete as shown on Drawings.

2.25 FINISHES

A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes. Finish items after fabrication.

B. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process after fabrication. Comply with the following requirements:

1. ASTM A 153 for galvanizing iron and steel hardware.
2. ASTM A 123 for galvanizing both fabricated and non-fabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.

C. Prime Painted Finish: Apply shop primer to all surfaces of metal fabrications, except those with galvanized finish. Do not paint contact surfaces, which are to be welded, high strength bolted and riveted.

1. Preparation for Shop Priming: Clean ferrous metal of scale, rust, oil, moisture, and dirt before applying paint. Comply with SSPC Articles SP-1, "Solvent Cleaning", and SP-3 "Power Tool Cleaning" or SP-7, "Brush-Off Blast Cleaning".

D. Stainless Steel Finish: Bright, Directional Polish: No. 4 finish

1. Remove or blend tool and die marks and stretch lines into finish.
2. Grind and polish surfaces to produce uniform, directionally textured polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
3. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examination: Examine surfaces and spaces to receive metal work. Inspect for proper size, structural soundness, and location. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Coordination: Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery and installation of such items.

3.2 INSTALLATION, GENERAL

A. Embedded Items: Set sleeves and other metal fabrications embedded in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications and for properly transferring loads to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

C. Cutting, Fitting and Placement: Perform cutting, drilling, shimming, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrications accurately in location, alignment and elevation; with edges and surfaces level, plumb, true and free of rack; and measured from established lines and levels. Use metal, same as item being installed, for shimming; for exposed work, fill shim space uniformly with non-shrink nonmetallic grout.

1. Provide temporary bracing and support for items that are to be built into concrete, masonry and similar construction.
2. Fit exposed connections accurately to form hairline joints. Weld connections, which are not to be left as exposed joints, but cannot be shop welded because of installation conditions or shipping size limitations. Do not weld, cut or abrade the surfaces of units, which have been hot-dip galvanized, and are intended for bolted or screwed field connections.

D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.3 SETTING LOOSE PLATES

A. Preparing Surfaces: Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

B. Positioning: Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout.

C. Grouting: Pack non-shrink nonmetallic grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Anchor supports securely to, and rigidly brace from, building structure.

3.5 INSTALLATION OF BOLLARDS

A. Bollards: Fill bollards fully with concrete having a 28-day minimum compressive strength of 3,000psi. Finish top of concrete smooth and uniform, crowned to shed water.

3.6 INSTALLATION OF RAILINGS

A. General: Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings.

1. Set posts plumb in each direction within 1/8" in 3 feet.
2. Align rails level (or properly sloped) within 1/4" in 12 feet.
3. Do not cut, weld or abrade surfaces that have been finished after fabrication and are intended for field connection by mechanical or other means without further cutting and fitting.

B. Anchoring Posts:

1. Preset sleeves in concrete. After posts have been inserted into sleeves, plumbed and adjusted to proper height, fill space between post and sleeve solid with epoxy grout mixed and placed to comply with grout manufacturer's directions. Temporarily brace and support railing assemblies until grout sets.
2. Without preset sleeves, anchor posts in concrete by forming, or core drilling, holes at least 5 inches deep and 3/4-inch larger than post outside diameter. Remove loose material from holes. Plumb, align and adjust post to proper height. Fill space between post and concrete with epoxy grout mixed and placed according to grout manufacturer's instructions. Temporarily brace and support railing until grout sets.
3. For exterior work, leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8-inch build-up, sloped away from post.

C. Anchoring Rail Ends:

1. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
2. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.

D. Wall-Mounted Handrails: Secure wall handrails with brackets and end fittings. Provide bracket with not less than 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required to support design loads. Secure wall brackets and wall return fittings to building construction as follows:

1. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
2. For concrete and solid masonry, use drilled-in expansion shield and concealed hanger bolt .
3. For hollow masonry anchorage, use toggle bolts having square heads.
4. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.

5. For steel framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.

E. Railing Connections:

1. Non-welded Connections: Use mechanical joints for connecting components. Locate exposed fasteners in least conspicuous locations. Seal recessed holes of exposed locking screws with plastic filler cement, colored to match finish of rails.
2. Welded Connections: Use fully welded joints for connecting components. Cope or butt components to provide full contact, or use fittings designed for this purpose.

3.7 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanizing Repair: For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

C. Completion: Completed metal work shall be securely anchored, free from rattles and excessive vibration during use. Items shall be plumb, level, straight and properly aligned. Exposed grouting shall be neat, uniform, and without holes and gaps.

1. Joints shall be snug fitting and uniform; exposed welds shall be ground smooth and touched-up, and free of crevices, spatter and flux. Bolts, screws, nuts and other threaded fasteners shall occur only where permitted, and shall be drawn up tightly but not over-tightened; exposed heads and nuts shall be undamaged.
2. Remove, adjust and reinstall, or remove and replace, items, which are not in compliance due to improper installation and materials, and items, which are defective or damaged.
3. Clean finished surfaces, which are soiled and marked by metal work installation. Remove and replace other materials, which cannot be cleaned and those damaged by metal work installation.

END OF SECTION