

**SECTION 05 70 00
ORNAMENTAL METAL**

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2024.
- B. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- D. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments; 2024.
- E. ASTM D1735 - Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus; 2021.
- F. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2022.
- G. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2024.
- H. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

1.02 1.01 DESCRIPTION OF WORK

- A. Provide ornamental metal Work as indicated on the Drawings and as specified herein, including, but not limited to the following:
 - 1. Aluminum signage "MATTRESS"
 - 2. Aluminum signage "PAPER AND CARDBOARD"
 - 3. Aluminum signage "METAL, GLASS AND PLASTIC"
 - 4. Aluminum signage "FUTURE ORGANICS"
 - 5. Aluminum signage "FOOD WASTE PROCESSING EQUIPMENT"

1.02 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
- B. American Society for Testing and Materials (ASTM).
- C. American Welding Society (AWS).
 - 1. National Association of Architectural Metal Manufacturers (NAAMM).
 - a. Federal Specifications (FS).
- D. The Society for Protective Coatings (SSPC, formerly Steel Structures Painting Council).
- E. The American Galvanizers Association

1.03 DESIGN REQUIREMENTS

- A. Definitions in ASTM E985 for railing-related terms apply to this Section.
- B. Structural Performance: Design, engineer, fabricate, and install the signage metal fabrications to withstand the structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections as per Section BC 1607.7 of the 2022 NYC Building Code. Apply each load to produce the maximum stress in each respective component of each metal fabrication. In cases where local requirements are more stringent they shall apply.
 - 1. Aluminum signage over steel framing

- C. All signage drawings to be prepared by licensed sign hanger who shall be responsible for filing and securing approval from DOB.

1.04 SUBMITTALS

- 1. Shop Drawings – to be prepared by a NYC licensed sign hanger.
 - a. Show all locations, markings, quantities, materials, sizes and shapes. Show full size details of fabrication and installation for each ornamental metal item required including plans, elevations, profiles of fittings, connections, anchors, details of components and attachments to other units of Work.
 - 1) Indicate materials, profiles of each ornamental metalwork member and fitting, joinery, finishes, fasteners, anchorages and accessory items.
 - 2) Include setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as unit of Work of other Sections.
 - b. Do not fabricate before approval of Shop Drawings.

B. CALCULATIONS

- a. Where metal items are required to comply with certain design loadings, submit structural design, structural calculations, materials properties, and other information needed for structural analysis, signed and sealed by the New York State licensed Professional Engineer responsible for their preparation.
- B. Samples
 - a. Submit sample of each item of hardware provided in this Section.
 - b. Upon request of the Authority, submit one sample of each item included in this Section, for approval.
 - c. Samples for verification: Prepare samples of each type of metal finish required on metal of same thickness and alloy indicated for final work. Where finish involves normal color and texture variations, include sample sets composed of two (2) or more units showing limits of such variations expected in completed work.
 - d. Include 6 inch long samples of linear shapes
 - e. Include 6 inch square samples of plates.
 - (a) Include full-size samples of castings and forgings.
- C. Qualification data for firms and persons specified in Article titled “Quality Assurance” to demonstrate their capabilities and experience.
 - a. Hot Dip Galvanizer/Powder Coating Applicator: Provide proof of Galvanizer/Applicator’s qualifications by submittal of the following:
 - (a) Galvanizer’s written Quality Control/Quality Assurance manual for hot dip galvanizing and factory applied coatings.
 - (b) Certification from the American Galvanizers Association that Galvanizer has completed all course requirements and is a certified Master Galvanizer.

E. TEST REPORTS]

- (1) Submit test reports for zinc metallizing or hot dip galvanizing and coating system as specified herein, paragraph titled “Galvanizing by the Zinc Metallizing Process; or Hot Dip Galvanizing; with Finish Coating”.

1.05 QUALITY ASSURANCE

- A. All fabricated items
 - a. Fabricator shall have a minimum of three (3) years successful experience in the fabrication of items of type specified.
- B. Shop assemble items wherever possible.
- C. The installer shall have a minimum of three (3) years successful experience installing work of the type specified.

INSTALLER SHALL BE ACCEPTABLE TO THE FABRICATOR.

- A. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal items similar in material, design, and extent to that indicated for this project.
- B. Hot-Dip Galvanizer/Powder Coating Applicator: The company or individual responsible for application of hot dip galvanizing with a powder coat finish shall be certified as qualified to perform this process by the following:
 - a. Certification from the American Galvanizers Association that Galvanizer has completed all course requirements and is a certified Master Galvanizer.
 - b. Certification from the manufacturer of the powder coatings that the galvanizer is an approved applicator of said manufacturer's material and meets all application and performance criteria.

1.06 PRODUCT HANDLING

- 1) Tag all items to agree with shop drawing designations.
- 2. Brace and support large components to prevent deformation in transit, and store in dry area.
- B. Before shipment to the job, all finished metal shall be adequately protected for transporting and erecting periods.
 - 1. Store aluminum, bronze, and stainless steel components and materials in clean, dry location, away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that permits air circulation within covering.
- C. Replace damaged items, with the approval of the Project Architect, and at no additional cost to the Authority.

1.07 JOB CONDITIONS

- 1. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of ornamental metalwork. Do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay Work.
- 2. Determine location of supporting construction provided by other trades.
 - a. Interface With Other Systems: Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchors, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which will be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
 - b. Coordinate with other trades in scheduling delivery and installation.
- 3. WARRANTY
 - a. Warranty for metal fabrication items with galvanizing by zinc metallizing or hot dip galvanizing, and finish coated with epoxy paint system or powder coat system: The coating applicator's/Contractor's warranty that items shall not show signs of rust, and finish shall be fully warranted against peeling, cracking, crazing, blistering, chalking and fading for a period of 5 years from date of installation of products. If rusting or failure of coating occurs, new items shall be provided or coating shall be refurbished in the shop. Warranty includes labor to remove and replace the items.

PART 2 – PRODUCTS

11.01 MATERIALS

A. METALS

- A. Steel and Iron: Provide steel and iron in the form indicated, complying with the following requirements:
 - 1) Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501

B. STEEL PLATES, SHAPES AND BARS: ASTM A36

C. GRAY IRON CASTINGS: ASTM A48, CLASS 30

- 1) Malleable Iron Castings: ASTM A47, grade as recommended by fabricator for type of use indicated

E. STEEL RODS: ASTM A108

- A. Stainless Steel: Provide austenitic stainless steel in form indicated, complying with the following requirements.
 - 1) Plate, Sheet and Strip: ASTM A204, Type 302/304
 - 2) Tubing: ASTM A554, Grades MT 301, MT 302, or MT 304, as standard with manufacturer.

C. PIPE: ASTM A312, GRADE TP 304

D. BARS AND SHAPES: ASTM A276

E. CASTINGS: ASTM A743, GRADE CF 8 OR CF 20

- A. Aluminum: Provide alloy and temper recommended by aluminum producers or finisher for type of use and finish indicated, and with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required.
 - (a) Extruded Bar and Shapes: ASTM B221, 6063-T6
 - (b) Sheet aluminum: ASTM B209, 6063-T6.
 - (c) Extruded Pipe and Tube: ASTM B429, 6063-T6
 - (d) Drawn Seamless Tube: ASTM B483, 6063-T832
 - (e) Plate and Sheet: ASTM B209, 6061-T6 3003-H16. Use alloy 5005-H16 for anodic coatings.
 - (f) Castings: ASTM B26 or ASTM B108
2. Hot-Dip Galvanizing and Finish Coating
 - a. Zinc metallizing, or hot dip galvanizing and finish coating system shall have the following performance characteristics and results of tests performed on representative samples. Finish coating for metallizing shall be either epoxy coating system or powder coating. Finish coating for hot dip galvanizing shall be powder coating (See paragraph 3 below for acceptable system):
 - (a) Adhesion: Test zinc metallizing/hot dip galvanizing with complete finish coating (epoxy coating system or powder coating system) in accordance with ASTM D4541, Test Method E. Pull-off strength throughout the system shall be not less than 750 psi before and after environmental cycling. Environmental cycling shall be 10 cycles of the following: 4 hrs at 100% humidity per ASTM D1735; 16 hours below 0°F; and 4 hours at 140oF.
 - (b) Corrosion resistance of zinc metallizing/hot dip galvanizing with epoxy coat system or powder coating: A rating of 10 after 1000 hours salt fog (prohesion method) when tested in accordance with ASTM D1654, Procedure A. Scribe shall be cut through all coatings to bare steel substrate. Expose specimens in accordance with ASTM G85.
3. Hot Dip Galvanizing with Powder Coating Finish
 - (a) As a system equivalent to zinc metallizing, it is permitted to use the Duncan Colorgalv Thermoset process of hot dip galvanizing with powder coat finish. Galvanizing coating thickness grade per ASTM A123 shall be 100, with DFT mil thickness coating not less than 3.6 to 3.9 mils.
 - (b) Powder coating thickness shall be as specified in this specification. Coating shall include an architectural grade primer.
- b. Galvanizing repair paint for regalvanizing welds and damaged areas shall conform to ASTM A780 and comply with Military Specification MIL-P-21035B, such as ZRC Cold Galvanizing Compound.
 - 1) Miscellaneous Materials

- c. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.
- d. Fasteners: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
 - (a) Provide concealed fasteners for interconnection of ornamental metal components and for their attachment to other work except where exposed fasteners are unavoidable or are the standard fastening method for ornamental metal system indicated.
 - (b) Provide Phillips truss or pan-head machine screws for exposed fasteners, unless otherwise indicated.
 - (c) Provide vandal resistant fasteners where indicated on the drawings.
- e. Anchors and Inserts: Provide anchors of type, size, and material required for type of loading and installation condition shown, as recommended by manufacturer, unless otherwise indicated. Anchors installed in concrete shall have current ICC-ES listing for performance in cracked concrete as per Section BC 1912. For those anchors exposed to the elements, provide galvanized, stainless steel, or brass depending on the material being anchored.

2.02 METAL FINISHES

- a. Comply with NAAMM "Metal Finishes Manual" for recommendations and designations of finishes, except as otherwise indicated.

B. STAINLESS STEEL FINISHES:

AISI NO. 4 BRUSHED FINISH: (APP. 80 GRIT DIRECTIONAL SATIN FINISH)

C. PAINTED FINISHES:

- 1) Refer to this Section 05 70 00 for hot-dip galvanizing with powder coat finish painting.

2.03 FABRICATION

A. GENERAL

- a. Fabricate ornamental metal to design, dimensions and details shown. Provide ornamental metal members in sizes and profiles shown, and not less than required to comply with requirements indicated for structural performance.
 - (a) Fabricate surfaces exposed to view from materials that are smooth and free of surface blemishes.
 - (b) Do not use materials which have strains, imperfections and discolorations, including welds at metal surfaces.
 - (c) Fabricate and assemble items with directional finishes so that finish is uniform and in the same direction, unless otherwise indicated.
- b. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature, in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and night time sky heat loss.
 - (a) Temperature Change (Range): 100°F (55.5°C).
- c. Form exposed work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to radius of approximately 1/32 inch, unless otherwise indicated. Miter exposed corner joints unless otherwise indicated, and machine fit to hairline joint.
- d. Complete cutting, fitting, forming and drilling, including grinding of metal work, prior to cleaning, finishing, surface treatment and application of finishes.
- e. Provide reinforcement and anchorage required to fulfill performance requirements. Provide brackets and miscellaneous components required for complete installation.

Provide reinforcement sufficient to withstand the anticipated loading and stresses at anchorage and fastener locations, and hardware connections.

- f. Provide brackets, plates and straps with each assembly, as required for proper support and anchorage to other work.
- g. Cut, reinforce, drill and tap ornamental metal work to receive hardware and similar items.
- h. Nonwelded Connections: Fabricate ornamental metal for interconnection of members by means of concealed mechanical fasteners and fittings unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- i. Conceal fastenings unless otherwise shown and accepted on final shop drawings.
- j. Welded Connections: Use welding method which is appropriate for metal and finish indicated and which develops strength required. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.
- k. Weld corners and seams continuously and in accordance with recommendations of AWS and CDA. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces.
- l. Form changes in direction of ornamental metal members by radius bends, or by mitering.
- m. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces of ornamental metal components.
- n. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- o. Shop Applied Finishes: Apply shop finishes to match accepted control samples, with direction of grain as indicated on accepted shop drawings, for uniform appearance unless otherwise shown or directed by the Architect.
- p. Separate dissimilar metals with separator material or coating recommended by fabricator to prevent corrosion and galvanic action. Do not extend coating onto exposed surfaces.
- q. Provide factory applied protective covering as required to protect assemblies from damage during shipping and installation.

D. METAL GRATINGS

- 1) Provide metal grating of type and material as indicated on the drawings.
 - b. Provide angle frames and shelf angle supports.
 - 1) Provide galvanized finish.
 - c. Manufacturer: Stainless Steel grating 'KD98' by Kadee industries or approved equal
- #### 2. GALVANIZING AND FINISH COATING

B. General

- a. Galvanize the following items:
- b. All miscellaneous ferrous metal Work (except cast iron) exposed to the weather, or located in exterior wall or roof construction, and any other steel members indicated as galvanized on the Drawings or Specifications.
 - 1) Items that are to be finish painted shall be galvanized by the zinc metallizing process or hot dip galvanized, and finish coated as specified herein.

B. ZINC METALLIZING-FINISH COATING APPLICATORS:

- (a) Atlantic Coast Metallizing & Coatings Corp., Melville, NY
- (b) Avant Guards Manufacturing, Brooklyn, NY
- (c) East Coast Metallizing & Coating Systems Inc., Westbury, NY
- (d) Island Wide Sandblasting Inc., Wyandanch, NY
- (e) Reneuxit LLC, West Chester, PA

C. HOT DIP GALVANIZING WITH POWDER COATING FINISH

1. DUNCAN GALVANIZING CORP, EVERETT, MA

D. POWDER COATING MATERIALS

- (1) Tiger Drylac, Ontario, California; Series 38 Super Durable Powder Coating.

2. PPG INDUSTRIES, PITTSBURGH, PA; CORAFLOX ULTRADURABLE POWDER COATING.

3. THE SHERWIN-WILLIAMS CO., CLEVELAND, OH; POWDURA SUPER DURABLE POWDER

- (1) Coatings Series.

B. Cleaning and Surface Preparation

1. Hardware (bolts, nuts, etc.): Clean and leave free of mill scale before galvanizing.
 - a. Clean all steel first in accordance with SSPC-SP 1 if needed.
 - 1) Steel members: Clean in accordance with SSPC-SP8 before hot-dip galvanizing.
 - (a) Steel members: Clean in accordance with SSPC-SP10 before zinc metallizing. Surface shall have a 3.0 to 4.0 mil anchor pattern. Moisture cannot be present on steel and temperature cannot be less than 50F above the dew point. Thermal spray must be applied within 4 hours of blasting.
 - (1) Shop Coat - Hot-dip Galvanizing Only – Required for galvanized items not indicated to receive finish paint coat.

1. GALVANIZE HARDWARE IN ACCORDANCE WITH ASTM A153.

1. Galvanize steel shapes in accordance with ASTM A123. Apply zinc coating as per Thickness Grade specified in ASTM A123.
 - a. Shop Coat – Galvanizing by the Zinc Metallizing Process – Provide for all galvanized items indicated to receive finish paint, which includes all galvanized items exposed to public view and other items shown on Drawings or specified herein. Finish paint shall be the epoxy coat system or the powder coat system; producing a smooth, uniform surface, free of bubbles, runs, or sags. Hot Dip Galvanizing with powder coat finish is also permitted as specified in Paragraph H below.
 - (a) Thermally spray metallizing material at a rate of 4.0 to 6.0 mils DFT. Sprayed coating shall be free of lumps, blisters, and loosely adhering particles. Coating shall be capable of passing the inspection requirements of Mil Std 2138A(SH) of 5/13/92, but with adhesion 750 psi minimum per ASTM D4541, Test Method E.
 - (1) Epoxy Coating System, as specified in Section 09900: After the metallizing material has cured, apply a first coat of paint at a rate of 4.0 to 6.0 mils DFT, Polyamide Epoxy Paint such as Tnemec Series 27 FC Typoxy. Top coat shall be Acrylic Aliphatic Polyurethane such as Tnemec Series 73 Endura-Shield, applied at a rate of 2.0 to 3.0 Mil DFT.
 - (2) Powder Coating System: After the metallizing material has cured, properly prepare the item and apply Tiger Drylac Series 38 Super Durable Powder Coating; or PPG Industries Coraflox Ultradurable Powder Coating; or Sherwin-Williams Powdura Super Durable Powder Coatings Series system.
 - (b) Oven bake item for 20 minutes at 450°F, and remove all oil and grease. Cool surface to 72°F, clean with an organic solvent. Apply paint within 3 hours of final cleaning.
 - (c) Apply an out-gas-forgiving primer at the rate of 2- 3 mils DFT. Oven cure material at 400°F for 10 minutes.
 - (d) In order to avoid oxidation, final topcoat must be applied within 12 hours.
 - (e) Apply a lead-free TGIC polyester powder topcoat finish at a rate of 4.0 to 5.0 mils DFT.

(f) Oven cure at 400°F to 450°F, for 30 minutes, or as recommended by coating manufacturer.

(1) Hot Dip Galvanizing with Powder Coating Finish

- b. As a system equivalent to zinc metallizing, it is permitted to use the Duncan Colorgalv Thermoset process of hot dip galvanizing with powder coat finish. Galvanizing coating thickness grade per ASTM A123 shall be 100, with DFT mil thickness coating not less than 3.6 to 3.9 mils.
- c. Comply with ASTM A123 for fabricated products and ASTM A153 for hardware, with zinc coating thicknesses not less than those specified in this specification Section 05700, 3.6 to 3.9 mils DFT.
- d. Fill vent holes after galvanizing, if applicable, and grind smooth.
- e. Galvanizing shall exhibit a rugosity (smoothness) 4 rug or less (16-20 microns of variation) when measured by a profilometer over a 1 inch straight line on the surface of elements that are less than 24 pounds per running foot. Profilometer shall be capable of operating in 1 micron increments.
- f. The incoming material shall be inspected, material hung on a rack or chain to be galvanized.
- g. Material submerged into caustic cleaner removing the organics from the surface and rinsed with water.
- h. Material pickled with hydraulic acid removing iron oxides from the surface and rinsed with water.
- i. Material submerged into a flux removing any oxides that have formed after pickling and protecting the material from further formation of additional oxides before being galvanized.
 - 1) The material submerged into Zinc bath at 850°F.
- j. The material shall be allowed to naturally cool and not quenched with water or chemicals.
- k. The galvanizing shall be inspected and pre-finished, removing edge tears, spikes, drips, or sharp protrusions which could cause potential harm to someone handling or using the material.
- l. The Galvanized material shall be abraded to create a 1- 1.5 mil profile for surface preparation. The profile shall be produced by abrasive blasting and or hand abrading.
- m. The galvanized material shall be inspected prior to powder coating to determine conformance of the material to ASTM A123 and this specification Section 05700 for quality and thickness of zinc coating, not less than 3.6 to 3.9 mils DFT.
- n. The galvanized surface profile shall be measured at 1- 1.5 mils and recorded utilizing Press-O-Film tape.
- o. All galvanized material shall be outgassed after profiling and before powder coat application.
- p. A coating inspection form shall be filled out completely with material information, application conditions, and quality standards.
- q. All powder coating products shall be electrostatically applied following the recommendations of the powder supplier and the requirements of the powder coating Manufacturers Technical Data Sheet, and with Dry Film Thickness not less than is specified in this specification Section 05700.
- r. The first coat shall consist of an Epoxy Primer powder applied at not less than 2.0 – 3.0 mils Dry Film Thickness. The powder shall be heated to 400°F to provide adhesion with the next coat of powder, and in accordance with the manufacturer's recommendations.
- s. The next coat of powder to be applied shall be Sherwin Williams Powdura Super Durable or approved equal applied at a dry film thickness of not less than 4.0- 5.0 mils. The surface of the fabrications after applying the powder shall be heated to 400°F for at least 10 minutes to cure the powder and in accordance with the

manufacturer's recommendations. The color of the powder shall match the approved color sample that will be approved by the Project Architect.

19. ALL REPAIRS OF GALVANIZING SHALL FOLLOW ASTM A780.

- a. All repairs to powder coating shall be sanded and feathered with the surrounding area. The damaged area shall be cleaned and abraded to receive a powder or liquid coating. The liquid coating can be applied using either a spray or brush method.
- b. Apply powder coating system within time frame after galvanizing as part of the Duncan Colorgalv process to ensure oxides will not form and GoldGalvthermoset process will be complete.

PART 3 - EXECUTION

3.01 3.01 INSPECTION

- A. Make all required measurements in the field to ensure proper and adequate fit.

3.02 DISCREPANCIES

- A. Immediately notify Architect.
- B. Do not proceed until fully corrected.

3.03 ERECTION OR INSTALLATION

1. Provide anchorage devices and fasteners where necessary for securing ornamental metal items 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.
 - a. Provide inserts, setting plates, and other items of concealed work required for attachment of ornamental metal work, in a timely manner to facilitate on going construction.
 2. Perform cutting, drilling, and fitting required for installation of ornamental metal work. Set work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Do not weld, cut, or abrade surfaces of ornamental metal components that have been coated or finished after fabrication and are intended for field connection by mechanical means without further cutting or fitting.
 3. Fit exposed connections accurately together to form tight, hairline or, where indicated, with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding and grinding are required for proper shop fitting and jointing of ornamental metal items, restore finishes to eliminate any evidence of such corrective work.
 4. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units as required.
 5. Install concealed gaskets, joint fillers, insulation and flashings as the work progresses, so as to make work weathertight, soundproof or lightproof as required.
 6. Restore protective coverings that have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
- B. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.
 1. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent surfaces.
 2. Corrosion Protection: Coat concealed surfaces of aluminum and steel which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
 3. Adjust ornamental metal work prior to anchoring to ensure matching alignment at abutting joints.

- C. Install items as detailed in the drawings; for manufactured items, install as recommended by the Manufacturer, unless indicated otherwise.
 - 1. Coordinate with other trades involved.
- D. Field Touch-Up
 - a. Painted Members: After erection, clean all damaged areas in shop coat, exposed surfaces of bolts, bolt heads, nuts and washers, abrasions, and all field welds and unpainted areas adjacent to field welds to the same standards as the shop coat and paint with primer paint to same thickness as the shop coat. Finish painting is specified in Section 09900.
 - 1) Galvanized Members: After erection, clean and paint all damaged areas to the galvanizing, welds, and areas adjacent to welds with the galvanizing repair paint complying to ASTM A780. For galvanized members to be painted, finish painting shall be the final two coats of the epoxy coating system. If applied in shop, touch up shall be the final two coats. For powder coating system follow instructions of the powder coat manufacturer, to match surrounding undamaged areas.
 - (a) PROTECTION
- E. Protect finishes of ornamental metal work from damage during construction period by use of temporary protective coverings approved by ornamental metal manufacturer. Remove protective covering at time of Substantial Completion.
 - 1. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL DATE SUBMITTED DATE APPROVED

PRODUCT DATA: _____

(EACH ITEM)

SHOP DRAWINGS: _____

(EACH ITEM)

1. LOCATIONS, MATERIALS,

SIZES, SHAPES, DETAILS

2. FASTENING, ANCHORAGE,

CONNECTIONS, TEMPLATES.

STRUCTURAL DESIGN & CALCULATIONS: _____
