SECTION 057000 - DECORATIVE METAL

GENERAL

SUMMARY

Section Includes:

Decorative window security bars.
Decorative mechanical grilles and frames.
Custom door pulls.
Combination hall push-button stations.
Metal reveals at wood paneling.
Cast-metal rosettes at marble joints.

Related Requirements:

Section 057300 "Decorative Metal Railings" for decorative metal railings.
Section 057500 "Decorative Formed Metal" for decorative metal items made from sheet metal.

COORDINATION

Coordinate installation of anchorages for decorative metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

ACTION SUBMITTALS

Product Data: For each type of product, including finishing materials.

Sustainable Design Submittals:

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Shop Drawings: Show fabrication and installation details for decorative metal.

Include plans, elevations, component details, and attachment details.
Indicate materials and profiles of each decorative metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

Patterns, Models, or Plaster Castings: Made from proposed patterns for each design of custom casting required.

Samples for Initial Selection: For products involving selection of color, texture, or design[**including mechanical finishes**].

Samples for Verification: For each type of exposed finish.

Sections of linear shapes.
Full-size Samples of castings and forgings.

For custom castings, submit finished Samples showing ability to reproduce detail[, cast-metal color,] and quality of finish.[Samples may be of similar previous work.]

Samples of [**welded**] [**and**] [**brazed**] joints showing quality of workmanship[**and color matching of materials**].

INFORMATIONAL SUBMITTALS

Qualification Data: For [fabricator] [organic-coating applicator] [anodic finisher] [powder-coating applicator].

Mill Certificates: Signed by manufacturers of stainless steel certifying that products furnished comply with requirements.

Welding certificates.

QUALITY ASSURANCE

Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

Installer Qualifications: Fabricator of products.

Organic-Coating Applicator Qualifications: A firm experienced in successfully applying organic coatings, of type indicated, to aluminum extrusions and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

Anodic Finisher Qualifications: A firm experienced in successfully applying anodic finishes of type indicated and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

Powder-Coating Applicator Qualifications: A firm experienced in successfully applying powder coatings of type indicated and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

Welding Qualifications: Qualify procedures and personnel according to the following:

AWS D1.1/D1.1M, "Structural Welding Code - Steel."
AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

MOCKUPS

Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

Build mockups for the following types of decorative metal:

<Insert, in separate subparagraphs, description of each decorative metal type including mockup size>.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

DELIVERY, STORAGE, AND HANDLING

Store decorative metal in a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

Deliver and store cast-metal products in wooden crates surrounded by enough packing material to ensure that products are not cracked or otherwise damaged.

FIELD CONDITIONS

Field Measurements: Verify actual locations of walls and other construction contiguous with decorative metal by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

DECORATIVE METAL FABRICATORS

Fabricator: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

<Insert manufacturer's name>.

METALS, GENERAL

Metal Surfaces, General: Use materials with smooth, flat surfaces unless otherwise indicated. Use materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

ALUMINUM

Fabricate products from alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.

Bars and Shapes: ASTM B221 (ASTM B221M), Alloy 6063-T5/T52.

Pipe and Round Tubing: ASTM B429/B429M, Alloy 6063-T6.

Tubing: ASTM B210 (ASTM B210M), Alloy 6063-T832.

Plate and Sheet: ASTM B209 (ASTM B209M), [**Alloy 3003-H14**] [**Alloy 5005-H32**] [**Alloy 6061-T6**].

Forgings: ASTM B247 (ASTM B247M), Alloy 6061-T6.

Castings: ASTM B26/B26M, Alloy A356.0-T6.

COPPER AND COPPER ALLOYS

Fabricate products from alloys indicated and temper to suit application and forming methods but with strength and stiffness not less than H01 (quarter-hard) for plate, sheet, strip, and bars and H55 (light-drawn) for tube and pipe.

BRONZE

Extruded Shapes: ASTM B455, Alloy UNS C38500 (architectural bronze).

Pipe: ASTM B43, Alloy UNS C23000 (red brass, 85 percent copper).

Tube: ASTM B135 (ASTM B135M), Alloy UNS C23000 (red brass, 85 percent copper).

Castings: [ASTM B62, Alloy UNS C83600 (85-5-5-5 or No. 1 composition commercial red brass)] [or] [ASTM B584, Alloy UNS C86500 (No. 1 manganese bronze)].

Plate, Sheet, Strip, and Bars: ASTM B36/B36M, Alloy UNS C28000 (muntz metal, 60 percent copper).

BRASS

Extruded Shapes: ASTM B249/B249M, Alloy UNS C36000 (free-cutting brass).

Seamless Tube: ASTM B135 (ASTM B135M), Alloy UNS C26000 (cartridge brass, 70 percent copper).

Castings: ASTM B584, Alloy UNS C85200 (high-copper yellow brass).

Plate, Sheet, Strip, and Bars: ASTM B36/B36M, Alloy UNS C26000 (cartridge brass, 70 percent copper).

NICKEL SILVER

Extruded Shapes: ASTM B249/B249M, Alloy UNS C79600.

Castings: ASTM B584, Alloy UNS C97300 (12 percent leaded nickel silver).

COPPER

Tube: ASTM B75/B75M, Alloy UNS C12200 (phosphorous deoxidized, high residual phosphorous copper).

Castings: ASTM B824, with a minimum of 99.9 percent copper.

Plate, Sheet, Strip, and Bars: ASTM B152/B152M, Alloy UNS C11000 (electrolytic tough pitch copper) or Alloy UNS C12200 (phosphorous deoxidized, high-residual phosphorous copper).

STAINLESS STEEL

Tubing: ASTM A554, [Grade MT 304] [Grade MT 316] [Grade MT 316L].

Pipe: ASTM A312/A312M, [Grade TP 304] [Grade TP 316] [Grade TP 316L].

Castings: ASTM A743/A743M, [Grade CF 8 or Grade CF 20] [Grade CF 8M or Grade CF 3M].

Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, [**Type 304**] [**Type 316**] [**Type 316L**].

Flat Bar: ASTM A666, [**Type 304**] [**Type 316**] [**Type 316L**].

Bars and Shapes: ASTM A276, [**Type 304**] [**Type 316**] [**Type 316L**].

Wire Rope and Fittings:

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Wire Rope: [**1-by-19**] [**7-by-7**] [**7-by-19**] <**Insert designation**> wire rope made from wire complying with ASTM A492, Type 316.
Wire-Rope Fittings: Connectors of types indicated, fabricated from stainless steel, and with capability to sustain without failure a load equal to minimum breaking strength of wire rope with which they are used.

STEEL AND IRON

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Tubing: [ASTM A500/A500M (cold formed)] [or] [ASTM A513, Type 5 (mandrel drawn)].

Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.

Plates, Shapes, and Bars: ASTM A36/A36M.

Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M unless otherwise indicated.

Steel Sheet, Cold Rolled: ASTM A1008/A1008M, either commercial steel or structural steel, exposed.

TITANIUM

Strip, Sheet, and Plate: ASTM B265, Grade 1.

Bars: ASTM B348, Grade 1.

FASTENERS

Fastener Materials: Unless otherwise indicated, provide the following:

Aluminum Items: [Aluminum] [Type 304 stainless steel] [Type 316 stainless steel] fasteners.
Copper-Alloy (Bronze) Items: Silicon bronze (Alloy 651 or Alloy 655) fasteners[**where concealed, muntz metal (Alloy 280) fasteners where exposed**].
Copper-Alloy (Brass) Items: Silicon bronze (Alloy 651 or Alloy 655) fasteners[**where concealed, brass (Alloy 260 or 360) fasteners where exposed**].
Stainless Steel Items: [**Type 304**] [**Type 316**] stainless steel fasteners.
Titanium Items: [**Type 304**] [**Type 316**] stainless steel fasteners.
Uncoated-Steel Items: Plated steel fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed, Type 304 stainless steel fasteners where exposed.
Galvanized-Steel Items: Plated steel fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating.
Dissimilar Metals: [**Type 304**] [**Type 316**] stainless steel fasteners.

Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.

Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless [**otherwise indicated**] [**exposed fasteners are unavoidable**].

Provide [**Phillips**] [**tamper-resistant**] [**square or hex socket**] flat-head machine screws for exposed fasteners unless otherwise indicated.

Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193[**or ICC-ES AC308**].

Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5 unless otherwise indicated.
Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy [**Group 1 (A1)**] [**Group 2 (A4)**] stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

MISCELLANEOUS MATERIALS

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

For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

Brazing Rods: For copper alloys, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.

Etching Cleaner for Galvanized Metal: Complying with MPI#25.

Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

Lacquer for Copper Alloys: Clear, acrylic lacquer specially developed for coating copper-alloy products.

Shop Primers: Provide primers that comply with [Section 099113 "Exterior Painting."] [Section 099123 "Interior Painting."] [Section 099600 "High-Performance Coatings."]

Universal Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

Shop Primer for Galvanized Steel: [Cementitious galvanized metal primer complying with MPI#26] [Vinyl wash primer complying with MPI#80] [Water-based galvanized metal primer complying with MPI#134].

Intermediate Coats and Topcoats for Steel: Provide products that comply with [Section 099113 "Exterior Painting."] [Section 099123 "Interior Painting."] [Section 099600 "High-Performance Coatings."]

Epoxy Intermediate Coat for Steel: Complying with MPI#77 and compatible with primer and topcoat.

Polyurethane Topcoat for Steel: Complying with MPI#72 and compatible with undercoat.

Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

FABRICATION, GENERAL

Assemble items in the 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.
Use connections that maintain structural value of joined pieces.

Make up wire-rope assemblies in the shop to field-measured dimensions with fittings machine swaged.

Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount is available for tensioning wire ropes.
Tag wire-rope assemblies and fittings to identify installation locations and orientations for coordinated installation.

Form decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.

Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

Form simple and compound curves in bars, pipe, tubing, and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.

Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.

Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.

Comply with AWS for recommended practices in shop [**welding**] [**and**] [**brazing**]. [**Weld**] [**and**] [**braze**] behind finished surfaces without distorting or discoloring exposed side. Clean exposed [**welded**] [**and**] [**brazed**] joints of flux, and dress exposed and contact surfaces.

Where [**welding**] [**and**] [**brazing**] cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for [**Type 1 Welds: no evidence of a welded joint**] [**Type 2 Welds: completely sanded joint, some undercutting and pinholes okay**] [**Type 3 Welds: partially dressed weld with spatter removed**] [**Type 4 Welds: good quality, uniform undressed weld with minimal splatter**].

Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

FABRICATION OF DECORATIVE WINDOW SECURITY BARS

Fabricate decorative window grilles to designs indicated from steel bars and shapes of sizes and profiles indicated. Form steel bars by bending, forging, coping, mitering, and welding.

Welding: Interconnect grille members with full-length, full-penetration welds unless otherwise indicated. Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.

Brackets, Fittings, and Anchors: Provide wall brackets, fittings, and anchors to connect decorative window grilles to other work unless otherwise indicated.

Furnish inserts and other anchorage devices to connect decorative window grilles to concrete and masonry work. Coordinate anchorage devices with supporting structure.
Fabricate anchorage devices that are capable of withstanding loads indicated.

DECORATIVE MECHANICAL GRILLES

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Fabricate decorative grilles from perforated [**aluminum**] [**brass**] [**bronze**] [**stainless steel**] [**steel**] sheet or plate of thickness, size, and pattern indicated. Form perforations by punching, cutting, or drilling to produce openings of sizes and shapes indicated. Roll, press, and grind perforated metal to flatten and to remove burrs and deformations.

Form perforations to match existing grilles.
Drawings indicate perforated metal patterns required and are based on products of one manufacturer. Perforated metal patterns produced by other manufacturers may be considered, provided deviations are minor and do not change design concept as judged solely by Architect.

Drill and countersink grilles for mounting screws at 2 inches (50 mm) from corners and at 10 inches (250 mm) or less o.c. Provide units with oval-head [**wood**] [**self-tapping machine**] screws.

Fabricate grille frames from extruded [**aluminum**] [**brass**] [**bronze**] [**stainless steel**] [**steel**] of profiles and to sizes and shapes indicated. Miter frame members at corners and connect with concealed splice plates [**welded**] [**brazed**] to back of frames.

Secure grilles in frames with 0.5-inch- (12-mm-) long [**welds**] [**brazing**] along perimeter of grilles at 4 inches (100 mm) o.c.
Provide frame profiles to match existing frames.
Drawings indicate frame profiles required and are based on products of one manufacturer. Similar frame profiles produced by other manufacturers may be considered, provided deviations are minor and do not change design concept as judged solely by Architect.

Drill and countersink frames for mounting screws at 4 inches (100 mm) from corners and at 16 inches (400 mm) or less o.c. Provide units with oval-head [**wood**] [**self-tapping machine**] screws.

FABRICATION OF CUSTOM DOOR PULLS

Fabricate custom door pulls from [**brass**] [**bronze**] [**stainless steel**] bar stock of profile indicated, fabricated to shapes indicated.

Form curves by bending to produce uniform curvature of radii indicated; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces.
Where radii of bends are too small to avoid buckling, grind bars after bending to restore original profile.
Drill and tap door pulls to receive through bolts for attachment to doors.

Fabricate backing plates for custom door pulls from 1/8-inch (3.2-mm) [**brass**] [**bronze**] [**stainless steel**] sheet.

Cut to shape indicated and bevel edges at a 45-degree angle for one-half thickness of metal.
Drill and countersink holes where indicated for screws and bolts.

Provide units with oval-head through bolts for mounting pulls and with oval-head wood screws for mounting backing plates.

FABRICATION OF COMBINATION HALL PUSH-BUTTON STATIONS

Fabricate units of [**brass**] [**bronze**] [**stainless steel**] to comply with details indicated. Coordinate with elevator signal equipment to provide integrated, closely fitted assemblies.

Fabricate faceplates from 1/8-inch- (3.2-mm-) thick sheet with edges beveled at a 45-degree angle for one-half thickness of metal.
Provide units with rectangular, split-bowl trash receptacle, designed for recess mounting in nominal 4-inch (100-mm) wall depth. Fabricate recessed cabinets, top rings, and split bowls of same metal as face of units; fabricate removable receptacles of drawn aluminum. Nominal dimensions of units are 10 by 10 by 3-1/2 inches (250 by 250 by 90 mm) in depth.
Provide units with emergency pictorial signs and text, complying with requirements of authorities having jurisdiction, indicating that in fire emergency, elevators should not be used and that stairways should be used instead. Engrave pictorial sign and text into front surface of faceplates to a depth of 1/16 inch (1.6 mm) with engraving painted red. Make signs 5 inches (125 mm) wide by 8 inches (200 mm) high.
Provide cutouts in faceplates of units for push buttons of elevator hall push-button station**[, card reader,]** and elevator key switches. Coordinate locations and sizes of cutouts so additional faceplate is not required and so faces of push buttons are flush with fronts of faceplates and key switches project beyond faceplate only by depth of bezel.

FABRICATION OF METAL REVEALS

Fabricate metal reveals for wood paneling from [**3/4-by-3/4-by-1/16-inch (19-by-19-by-3-mm)** extruded-bronze] [**3/4-by-3/4-by-0.025-inch (19-by-19-by-0.6-mm)** brake-formed, stainless steel] [**3/4-by-3/4-by-0.015-inch (19-by-19-by-0.4-mm)** brake-formed titanium] channels.

Drill for mounting screws 6 inches (150 mm) from ends of channels and not more than 24 inches (600 mm) o.c.
Locate mounting screws at same heights for all channels.
Provide [**black-finished,**]hex-socket, wafer-head screws for mounting reveals.

FABRICATION OF CAST-METAL ROSETTES

Fabricate cast-metal rosettes to design indicated from [**aluminum**] [**brass**] [**bronze**] [**nickel silver**]. Drill and tap castings for threaded mounting studs.

Provide custom castings to match design indicated.
Manufacturer's stock castings may be considered, provided deviations are minor and do not change design concept as judged solely by Architect.
Drawings indicate cast-metal rosette designs required and are based on products of one manufacturer. Castings produced by other manufacturers may be considered, provided deviations are minor and do not change design concept as judged solely by Architect.

FINISHES, GENERAL

Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

ALUMINUM FINISHES

Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

Clear Anodic Finish: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm] [AA-M12C22A31, Class II, 0.010 mm] or thicker.

Color Anodic Finish: AAMA 611, [AA-M12C22A42/A44, Class I, 0.018 mm] [AA-M12C22A32/A34, Class II, 0.010 mm] or thicker.

Color: [Champagne] [Light bronze] [Medium bronze] [Dark bronze] [Black] <Insert color>.
[Match Architect's sample] [As selected by Architect from full range of industry colors and color densities].

Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

Siliconized Polyester Finish: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.

Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range].

High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

Superior-Performance Organic Finish: [**Two**] [**Three**] [**Four**]-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

COPPER-ALLOY FINISHES

Finish designations for copper alloys comply with the system established for designating copper-alloy finish systems defined in NAAMM's "Metal Finishes Manual for Architectural and Metal Products."

Buffed Finish: M21 (Mechanical Finish: buffed, smooth specular).

Hand-Rubbed Finish: M31-M34 (Mechanical Finish: directionally textured, fine satin; Mechanical Finish: directionally textured, hand rubbed).

Medium-Satin Finish: M32 (Mechanical Finish: directionally textured, medium satin).

Fine-Matte Finish: M42 (Mechanical Finish: nondirectional finish, fine matte).

Buffed Finish, Lacquered: M21-O6x (Mechanical Finish: buffed, smooth specular; Coating: clear, organic, air dried, as specified below):

Clear, Organic Coating: Lacquer specified for copper alloys; applied by air spray in two coats per manufacturer's written instructions, with interim drying, to a total thickness of 1 mil (0.025 mm).

Hand-Rubbed Finish, Lacquered: M31-M34-O6x (Mechanical Finish: directionally textured, fine satin; Mechanical Finish: directionally textured, hand rubbed; Coating: clear, organic, air dried, as specified below):

Clear, Organic Coating: Lacquer specified for copper alloys; applied by air spray in two coats per manufacturer's written instructions, with interim drying, to a total thickness of 1 mil (0.025 mm).

Medium-Satin Finish, Lacquered: M32-O6x (Mechanical Finish: directionally textured, medium satin; Coating: clear, organic, air dried, as specified below):

Clear, Organic Coating: Lacquer specified for copper alloys; applied by air spray in two coats per manufacturer's written instructions, with interim drying, to a total thickness of 1 mil (0.025 mm).

Fine-Matte Finish, Lacquered: M42-O6x (Mechanical Finish: nondirectional finish, fine matte; Coating: clear, organic, air dried, as specified below):

Clear, Organic Coating: Lacquer specified for copper alloys; applied by air spray in two coats per manufacturer's written instructions, with interim drying, to a total thickness of 1 mil (0.025 mm).

Statuary Conversion Coating over Satin Finish: M31-C55 (Mechanical Finish: directionally textured, fine satin; Chemical Finish: conversion coating, sulfide)[**, with color matching Architect's sample**].

Patina Conversion Coating: M36-C12-C52 (Mechanical Finish: directionally textured, uniform; Chemical Finish: nonetched cleaned, degreased; Chemical Finish: conversion coating, ammonium sulfate)[**, with color matching Architect's sample**].

Statuary Conversion Coating, Bright Relieved and Lacquered: M12-C55-M2x-O6x (Mechanical Finish: matte finish, as cast; Chemical Finish: conversion coating, sulfide; Mechanical Finish: buffed, as specified; Coating: clear, organic, air dried, as specified below)[**, with color matching Architect's sample**]:

Clear, Organic Coating: Lacquer specified for copper alloys; applied by air spray in two coats per manufacturer's written instructions, with interim drying, to a total thickness of 1 mil (0.025 mm).

Blackened, Bright Relieved, and Lacquered: M33-O60-M2x-O6x (Mechanical Finish: directionally textured, coarse satin; Coating: black, air dried; Mechanical Finish: buffed, as specified; Coating: clear, organic, air dried, as specified below)[**, with blackening and buffing matching Architect's sample**]:

Clear, Organic Coating: Lacquer specified for copper alloys; applied by air spray in two coats per manufacturer's written instructions, with interim drying, to a total thickness of 1 mil (0.025 mm).

STAINLESS STEEL FINISHES

Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

Run grain of directional finishes with long dimension of each piece.

Stainless Steel Tubing Finishes:

180-Grit Polished Finish: Uniform, directionally textured finish.
320-Grit Polished Finish: Oil-ground, uniform, fine, directionally textured finish.
Polished and Buffed Finish: 320-grit finish followed by buffing [**to a high luster finish**] [**to a mirror-like finish**] [**to match Architect's sample**].

Stainless Steel Sheet and Plate Finishes:

Bright, Cold-Rolled, Unpolished Finish: ASTM A480/A480M, No. 2B.
Directional Satin Finish: ASTM A480/A480M, No. 4.
Dull Satin Finish: ASTM A480/A480M, No. 6.
High Luster Finish: ASTM A480/A480M, No. 7.
Mirror Finish: ASTM A480/A480M, No. 8.

When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

Sputter-Coated Finish: Titanium nitride coating deposited by magnetic sputter-coating process over indicated mechanical finish.

Colored, Oxide-Film Finish: Clear, oxide interference film produced by degreasing and then immersing in a mixture of chromic and sulfuric acids.

Product: Subject to compliance with requirements, provide INCO colored stainless steel finish as developed and licensed by International Nickel Co., Ltd.
Color: [Match Architect's sample] [As selected by Architect from finisher's full range].

STEEL AND IRON FINISHES

Galvanizing: Hot-dip galvanize products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips indicated to be galvanized to comply with ASTM A123/A123M.

Hot-dip galvanize steel and iron hardware indicated to be galvanized to comply with ASTM A153/A153M.
Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

Preparing Galvanized Items for Shop Priming: After galvanizing, thoroughly clean decorative metal of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

Preparing Nongalvanized Items for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with [SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."] [SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."] [requirements indicated below:]

Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
Interiors (SSPC Zone 1A): SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

Primer Application: Apply shop primer to prepared surfaces of items unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

Shop prime uncoated ferrous-metal surfaces with [universal shop primer] [primers specified in Section 099113 "Exterior Painting."] [primers specified in Section 099123 "Interior Painting."] unless [zinc-rich primer is] [primers specified in Section 099600 "High-Performance Coatings" are] indicated.
Do not apply primer to galvanized surfaces.

Shop-Painted Finish: Comply with [Section 099113 "Exterior Painting."] [Section 099600 "High-Performance Coatings."]

Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range].

High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.

Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range].

Powder-Coat Finish, Nongalvanized: Prepare, treat, and coat nongalvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:

Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
Treat prepared metal with iron-phosphate pretreatment, rinse, and seal surfaces.
Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range].

Powder-Coat Finish, Galvanized: Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:

Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter.
Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range].

TITANIUM FINISHES

General: Fabricate items from finished titanium stock, taking care not to damage finish during fabrication. Protect finish as needed during fabrication by applying a strippable, temporary protective covering.

Dull Matte Finish: Pickled and annealed.

Bright Matte Finish: Vacuum annealed.

PART 3 - EXECUTION

EXAMINATION

Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative metal.

Proceed with installation only after unsatisfactory conditions have been corrected.

INSTALLATION, GENERAL

Provide anchorage devices and fasteners where needed to secure decorative metal to in-place construction.

Perform cutting, drilling, and fitting required to install decorative metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.

Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for

proper shop fitting and jointing of decorative metal, restore finishes to eliminate evidence of such corrective work.

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.

Install concealed gaskets, joint fillers, insulation, and flashings as work progresses.

Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.

Retain protective coverings intact; remove coverings simultaneously from similarly finished items to preclude nonuniform oxidation and discoloration.

Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal arc welding and requirements for welding and for finishing welded connections in "Fabrication, General" Article. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

Field Brazing: Comply with requirements for brazing and for finishing brazed connections in "Fabrication, General" Article. Braze connections that are not to be left as exposed joints but cannot be shop brazed because of shipping size limitations.

Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

INSTALLATION OF DECORATIVE WINDOW SECURITY BARS

Fasten security bar frames to concrete and masonry walls with cast-in-place or post-installed anchors. Peen exposed threads of anchors to prevent removal of security bars.

INSTALLATION OF DECORATIVE MECHANICAL GRILLES

Mount decorative grilles at heights and in positions indicated, adjusting ductwork to be centered on grilles if any.

Secure to framing and blocking with specified fasteners.
On marble, brick, and other solid surfaces, secure with wood screws in plastic plugs.

INSTALLATION OF DECORATIVE-METAL-CLAD, HOLLOW-METAL DOORS AND FRAMES

Install doors and frames to comply with requirements specified in Section 081113 "Hollow Metal Doors and Frames."

INSTALLATION OF CUSTOM DOOR PULLS

Install door pulls at heights and locations shown. Install with backing plates on both sides of doors. Fasten backing plates to doors with oval-head [**wood**] [**self-tapping metal**] screws and secure pulls through doors and backing plates with oval-head machine screws.

INSTALLATION OF COMBINATION HALL PUSH-BUTTON STATIONS

Coordinate installation of combination hall push-button stations with installation of related elevator signal equipment components. Secure units in place with faceplate overlapping surrounding wall finish and drawn into contact with surrounding wall finish at entire perimeter of faceplate.

INSTALLATION OF METAL REVEALS AT WOOD PANELING

Install metal reveals between wood panels as paneling is installed. Secure to wood grounds with specified screws.

INSTALLATION OF CAST-METAL ROSETTES AT MARBLE JOINTS

Install cast-metal rosettes at intersections of marble joints where indicated. Install only after marble work is complete and joints are grouted. Secure to wall by drilling a 3/4-inch- (19-mm-) round hole at intersection of marble joints and by filling hole with molding plaster into which threaded stud is embedded. Angle drill and rotate so bottom of hole is larger than at surface.

Secure rosettes in place with masking tape until plaster sets. After plaster has set, remove masking tape and adhesive residue.

CLEANING AND PROTECTION

Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

Clean copper alloys according to metal finisher's written instructions in a manner that leaves an undamaged and uniform finish matching approved Sample.

Touchup 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 to comply with SSPC-PA 1 for touching up shop-painted surfaces.

Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in [Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."] [Section 099600 "High-Performance Coatings."] [Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."]

Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

Protect finishes of decorative metal from damage during construction period with temporary protective coverings approved by decorative metal fabricator. Remove protective covering at time of Substantial Completion.

Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057000