SECTION 050385 - HISTORIC TREATMENT OF DECORATIVE FORMED METAL

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section includes historic treatment of decorative formed metal as follows:

Stabilizing and protecting metal.

Repairing metal and replacing damaged and missing components in place.

Removing and dismantling metal for shop repair and replacement of components; reinstalling repaired metal.

Painting steel uncovered during the Work.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 013591 "Historic Treatment Procedures" for general historic treatment requirements.

Section 073116 "Metal Shingles" for new, stamped-pattern metal shingle panels.

Section 090353 "Historic Treatment of Metal Ceilings" for repair and reconstruction of historic, stamped metal ceilings.

* + - 1. ALLOWANCES

Retain products and Work in this Section that are covered by cash or quantity allowance. Do not include amounts. Insert descriptions of items in Part 2 or 3 to provide information affecting the cost of the Work that is not included under the allowance. Delete this article if all work is done by lump-sum price.

Quantity allowances require a Schedule of Quantity Allowances coordinated with a Unit-Price Schedule. See "Planning the Work" Article in the Evaluations for a discussion of the bidding method.

* + - * 1. Allowances for historic treatment of decorative formed metals are specified in Section 012100 "Allowances."

If using quantity allowances, retain three subparagraphs below or include similar language in Section 012100 "Allowances" to clarify how work covered by quantity allowances is to be authorized.

Perform historic treatment of decorative formed metals under quantity allowances and only as authorized. Authorized work includes**[ work required by Drawings and Specifications and]** work as directed in writing by Director’s Representative.

Retain first subparagraph below to suit Project.

Notify Director’s Representative[weekly] <Insert time interval> of extent of work performed that is attributable to quantity allowances.

Perform work that exceeds quantity allowances only as authorized by Change Orders.

Paragraph below is an example only; revise to suit Project. Insert additional allowances according to retained types of work and allowances established. If there are multiple drawing designations for types of work, establish separate allowances for each drawing designation.

* + - * 1. Repairing **<Insert item description>** is part of **<Insert name of allowance>**.
			1. UNIT PRICES

Retain this article if Work specified in this Section is measured and paid for under the provisions of unit prices. Do not include amounts. Insert descriptions of items in Part 2 or 3 to provide information affecting the cost of the Work that is not included under the unit price.

Retain this article with "Allowances" Article for unit-price adjustments to quantity allowances.

Retain this article without "Allowances" Article if using a single Unit-Price Schedule with a column of estimated quantities on which bids are priced and evaluated.

* + - * 1. Work of this Section is affected by unit prices specified in Section 012200 "Cost Computations."

Unit prices apply to authorized work covered by **[quantity allowances] [estimated quantities]**.

Unit prices apply to authorized additions to, and deletions from, the Work as authorized by Change Orders.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

Pressure spray values are not standardized but are typical for preparatory cleaning without abrasives; revise to suit Project. If abrasives are used, revise values because these pressures are too high.

* + - * 1. Low-Pressure Spray: **[100 to 400 psi ; 4 to 6 gpm ]**.
				2. Medium-Pressure Spray: **[400 to 800 psi ; 4 to 6 gpm** ].
				3. High-Pressure Spray: **[800 to 1200 psi ; 4 to 6 gpm ]**.
			1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at **[Project site] <Insert location>**.

If needed, insert list of conference participants not mentioned in Section 013591 "Historic Treatment Procedures."

Retain one or both subparagraphs below if additional requirements are necessary; include information about conference.

Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of decorative formed metal.

Review methods and procedures related to historic treatment of decorative formed metal including, but not limited to, the following:

Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.

Materials, material application, sequencing, tolerances, and required clearances.

Fire-protection plan.

Decorative formed metal historic treatment program.

Coordination with building occupants.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include recommendations for product application and use.

Include test data substantiating that products comply with requirements.

* + - * 1. Shop Drawings:

Include plans, elevations, and sections showing locations and extent of repair and replacement work, with enlarged details of replacement parts indicating materials, profiles, methods of attachment, accessory items, and finishes.

Include field-verified dimensions and the following:

Full-size patterns with complete dimensions for new, decorative formed metal components and their jointing, showing relation of existing to new components.

Templates and directions for installing anchor bolts and other anchorages.

Identification of each new metal item and component and its location on the structure in annotated plans and elevations.

Provisions for expansion, weep holes, and conduits as required.

Provisions for soldered, welded, and sealant joints if required.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: For each type of decorative formed metal item and component with applied finishes.

Include Samples of available patterns and accessories involving size, color, or finish selection.

* + - * 1. Samples for Verification: For the following products in manufacturer's standard sizes unless otherwise indicated, finished as required for use in the Work:

Retain and revise subparagraphs below and insert others to suit Project.

Each type of new material to be used for replacing existing or missing decorative formed metal; 6 inches long in least dimension or whole item.

Retain "Patterns for Stamping" Subparagraph below and option in "Stamped Samples" Subparagraph below for tight control of appearance and size of custom-stamped components. If retaining both, consider limiting these requirements to specific, highly visible items. These requirements add to Project time and cost.

Patterns for Stamping: Before stamping components, submit the actual patterns from which dies will be made for stamping. Package and ship to prevent loss or damage, or make patterns available for inspection by Director’s Representative at fabrication plant.

Stamped Samples: For stamped components, provide one of each shape, color, and texture of component, suitable and ready for installation.**[ Make this submittal after acceptance of patterns for stamping.]**

Fittings and brackets.

Each type of exposed connection between components. Show method of finishing components at connections.

Each type of exposed finish prepared on metal of the same alloy to be used for the Work of this Section; 6 inches long in least dimension.

Sealant materials.

Accessories: Each type of fastener, anchor, accessory, and miscellaneous support in required finishes.

Consider "Qualification Data" and "Decorative Formed Metal Historic Treatment Program" paragraphs below as they relate to Project goals and importance. To require responsive action by Architect after submittal review, move one or both paragraphs to "Action Submittals" Article.

* + - * 1. Qualification Data: For historic treatment specialist.
				2. Decorative Formed Metal Historic Treatment Program: For historic decorative formed metalwork.
			1. MAINTENANCE MATERIAL SUBMITTALS
				1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents, including material, finish, source, and location on or in building.

Subparagraphs below are examples only; revise to suit Project. If preferred, replace specific number or length with a percentage of required total quantity of each element required. Elaborate on descriptions if some component types require extra materials, but others do not.

Linear Stamped Metal: **[Five] <Insert number>, [96-inch- ] <Insert dimension>** lengths of each full-size configuration of stamped **[fascia] [egg and dart molding] [and] [dentil molding] <Insert item>**.

Stamped Metal Units: **[Five] <Insert number>** additional full-size stamped **[kitchen backsplash panels] [wall wainscoting panels] [lion-head ornaments] [pyramid ornaments] [and] [star ornaments]** of each type.

Prefabricated and Preassembled Sheet Metal Units: **[Two] <Insert number>** full-size **[building cornice] [bracket] [modillion] <Insert item>** of each configuration.

Retain "Dies for Stamping" Paragraph below if future need for stamping dies can be reasonably expected and Director’s Representative has space and takes responsibility for their storage and protection. Often, the stamped metal manufacturer stores dies for long or indefinite periods. Patterns from which dies were made might be useful for display purposes, but they are less useful for fabrication than are dies. If a pattern or patterns are required, revise this article accordingly.

* + - * 1. Dies for Stamping: On completion of manufacturing of stamped components, deliver one unused set of dies of each shape and size of component to Project site. Deliver to a location and at a time determined by Director’s Representative, to become property of Director’s Representative.

Deliver dies carefully packed, protected from dirt, moisture, and deformation so as to arrive in usable, undamaged condition and enable long-term storage and possible future use.

* + - 1. QUALITY ASSURANCE

In "Historic Treatment Specialist Qualifications" Paragraph below, insert additional, specific requirements for demonstrating unique skills of firm and personnel to suit Project. See Section 013591 "Historic Treatment Procedures" for general qualifications of historic treatment specialist.

* + - * 1. Historic Treatment Specialist Qualifications: A qualified, historic decorative formed metal repair specialist. Experience in installing and finishing new decorative formed metalwork is insufficient experience for historic treatment work on decorative formed metal.
				2. Decorative Formed Metal Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including each process or phase of repairing decorative formed metal, related work, and the protection of surrounding materials and Project site.

If materials and methods other than those indicated are proposed for any phase of historic treatment work, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.

Retain required mockups in "Mockups" Paragraph below; insert others to suit Project. Test areas that were prepared or are required as part of a separate contract to evaluate and establish historic treatment materials and processes are not mockups. Generally, retain option because separate mockups may not adequately show blending of new work with existing construction.

* + - * 1. Benchmarks : Prepare benchmarks of historic treatment repair processes**[ on existing surfaces]** to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation. Prepare benchmarks so they are inconspicuous.

Mockups in "Dent Removal," "Replacing Components" and "Stamped Metal Components" subparagraphs below are examples only.

Dent Removal: Repair a **[kitchen backsplash] [wall wainscoting] [fascia] [egg and dart molding] [dentil molding] [lion-head] [pyramid] [and] [star] <Insert item>** component(s) of each type by **[pushing out dents from the back side] [or] [filling dents with sculpted metal-patching compound]** and flattening edges to align repaired components flush with adjacent work.

Replacing Components: Replace a missing or excessively damaged **[kitchen backsplash] [wall wainscoting] [fascia] [egg and dart molding] [dentil molding] [lion-head] [pyramid] [and] [star] <Insert item>** component of each type with new or repaired, salvaged components and align edges of replacement components flush with adjacent work.

Retain "Stamped Metal Components" Subparagraph below for custom stamped metal components or duplicate replacements.

Stamped Metal Components: Submit patterns, models, or plaster castings made from existing decorative formed metal components for each replacement item required.

Approval of benchmarks does not constitute approval of deviations from the Contract Documents contained in benchmarks unless Director’s Representative specifically approves such deviations in writing.

* + - 1. FIELD CONDITIONS

Usually retain this article if Project includes exterior work; revise to suit Project.

* + - * 1. Weather Limitations: Proceed with historic treatment of decorative formed metal only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.
1. PRODUCTS
	* + 1. MANUFACTURERS
				1. Source Limitations: Obtain each type of manufactured metal component or pattern from single source from single manufacturer.
			2. PREFABRICATED METAL PRODUCTS

Copy one or more paragraphs below and re-edit for each product.

Insert drawing designation. Use these designations on Drawings to identify each product.

Retain second option in "Building Cornice" Paragraph below if an exact match is required; revise to suit Project. Revise paragraph title and description for other types of complicated or preconstructed assemblies.

* + - * 1. Building Cornice **<Insert drawing designation>**: Factory-stamped**[ and prefinished]** metal cornice assembly for the building facade**[ Fabricate components that match existing by using original, historic dies or custom-made patterns and dies.]**

Consult manufacturers for recommended sheet metal thickness to suit component size and detailing if inserting a thickness in "Material" Subparagraph below.

Material: **[Aluminum] [aluminum-zinc alloy-coated steel] [copper] [tin-plated steel] [zinc] [or] [zinc-coated (galvanized) steel]; [of thickness needed for component size and embossed design] <Insert thickness>**.

Retain "Size and Pattern(s)" Subparagraph below if these are not indicated on Drawings or by manufacturer's product name or designation.

Size and Pattern(s): **[Match existing] [As indicated by manufacturer's designations] [Match Samples] [As selected by Architect from manufacturer's full range] <Insert requirement>**.

Concealed Finish: **[Mill finish] [Manufacturer's standard primer] <Insert finish>**.

Exposed Finish: **[Match design reference sample] [Match existing] [As indicated on Drawings] [Bright mill finish] [Antiqued] [Primed for on-site painting] [Powder coated] [with] [clear organic coating] <Insert finish>**.

Retain "Color" Subparagraph below for factory-applied color finishes.

Color: **[As indicated by manufacturer's designations] [Match Samples] [As selected by Architect from full range of industry colors and color densities] <Insert color>**.

* + - * 1. Wall-Cladding Panel **<Insert drawing designation>**: Factory-stamped**[ and prefinished]** metal panels for **[kitchen backsplash] [wall wainscoting] [linear molding] <Insert item>.[ Fabricate components that match existing by using original, historic dies or custom-made patterns and dies.]**

Consult manufacturers for recommended sheet metal thickness to suit panel size and detailing if inserting a thickness in "Material" Subparagraph below.

Material: **[Aluminum] [aluminum-zinc alloy-coated steel] [copper] [tin-plated steel] [zinc] [or] [zinc-coated (galvanized) steel]; [of thickness needed for panel size and embossed design] <Insert thickness>**.

Retain "Size" Subparagraph below if these dimensions are not indicated on Drawings or by manufacturer's product name or designation.

Size: **[Match existing] [24 by 24 inches ] <Insert dimensions>**.

Retain "Pattern Type" Subparagraph below for a general description if the pattern is not indicated on Drawings or by manufacturer's product name or designation. The last five options below are examples only; most manufacturers number their designs.

Pattern Type: **[Match existing] [Match Samples] [As selected by Architect from manufacturer's full range] [Concentric squares as selected by Architect from industry's full range] [Deco diamonds as selected by Director’s Representative from industry's full range] [Deco sunburst as selected by Director’s Representative from industry's full range] [Framed floral as selected by Director’s Representative from industry's full range] [Framed medallions as selected by Director’s Representative from industry's full range] <Insert requirement>**.

Retain "Pattern Repeat" Subparagraph below if this dimension is not indicated on Drawings or by manufacturer's product name or designation.

Pattern Repeat: **[Match existing] [3 inches ] [6 inches ] [12 inches ] [24 inches ] <Insert dimension>**.

Concealed Finish: **[Mill finish] [Manufacturer's standard primer] <Insert finish>**.

Exposed Finish: **[Match design reference sample] [Match existing] [As indicated on Drawings] [Bright mill finish] [Antiqued] [Primed for on-site painting] [Powder coated] [with] [clear organic coating] <Insert finish>**.

Retain "Color" Subparagraph below for factory-applied color finishes.

Color: **[As indicated by manufacturer's designations] [Match Samples] [As selected by Director’s Representative from full range of industry colors and color densities] <Insert color>**.

Retain last option in "Stamped Detail" Paragraph below if an exact match is required; revise to suit Project.

* + - * 1. Stamped Detail **<Insert drawing designation>**: Factory-stamped**[ and prefinished]** metal **[lion-head] [pyramid] [and] [star] <Insert item>** panel(s) for application where indicated.**[ Fabricate panels that match existing by using original, historic dies or custom-made patterns and dies.]**

Consult manufacturers for recommended sheet metal thickness to suit panel size and detailing if inserting a thickness in "Material" Subparagraph below.

Material: **[Aluminum] [aluminum-zinc alloy-coated steel] [copper] [tin-plated steel] [zinc] [or] [zinc-coated (galvanized) steel]**; **[of thickness needed for panel size and embossed design] <Insert thickness>**.

Panel Size: **[27 inches long] [or] [48 inches (1219 mm) long] [12 inches across by 4 inches deep] <Insert dimension(s)>**.

Concealed Finish: **[Mill finish] [Manufacturer's standard primer] <Insert finish>**.

Exposed Finish: **[Match design reference sample] [Match existing] [As indicated on Drawings] [Bright mill finish] [Antiqued] [Primed for on-site painting] [Powder coated] [with] [clear organic coating] <Insert finish>**.

Retain "Color" Subparagraph below for factory-applied color finishes.

Color: **[As indicated by manufacturer's designations] [Match Samples] [As selected by Director’s Representative from full range of industry colors and color densities] <Insert color>**.

Insert other formed metal products or trim types if required.

* + - 1. METAL MATERIALS
				1. Provide metal materials made of the alloys, forms, and types that match existing metals and have the ability to receive finishes matching existing finishes unless otherwise indicated. Exposed-to-view surfaces exhibiting imperfections inconsistent with existing materials are unacceptable.

Retain "Metallic-Coated Steel Sheet" Paragraph below if required for exterior, brake-formed, backup plates and backup-plate repairs, such as used for complicated building cornice assemblies; revise to suit Project.

* + - * 1. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), with **[G60] [G90]** zinc coating**[ or A60 zinc-iron-alloy (galvannealed) coating]**; restricted flatness.

Insert salient properties for specific metal types if required; consult manufacturers for recommendations. Manufacturers of prefabricated components seldom disclose on their websites their metal thicknesses or composition.

* + - 1. ACCESSORIES

Retain "Metal-Patching Compound" Paragraph below for filling nonstructural defects in existing metal surfaces that will be painted; revise to suit Project.

* + - * 1. Metal-Patching Compound: Two-part, epoxy- or polyester-resin, metal-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of metal repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated because of corrosion or deformation. Filler shall be capable of filling deep holes and spreading to feather edge.

Retain "Sealant Materials" Paragraph below if sealant joints are required unless all sealant work, including sealant within decorative formed metal joints, is specified in Section 079200 "Joint Sealants."

* + - * 1. Sealant Materials:

Coordinate type(s) of joint sealant required in first subparagraph below with applicable subparagraphs used in Section 079200 "Joint Sealants" in which various sealant types are specified. Revise sealant type or insert others if required. If more than one type of sealant is required, revise first subparagraph and indicate location of each on Drawings or by inserts.

Provide manufacturer's standard, elastomeric **[nonstaining, single-component, nonsag silicone] [single-component, nonsag urethane] <Insert type>** sealant complying with applicable requirements in Section 079200 "Joint Sealants."

Colors: Provide colors of exposed sealants to match colors of metals in which sealant is placed unless otherwise indicated.

Retain "Antirust Coating" Paragraph below if retaining "Painting Steel Uncovered during the Work" Article. MPI #23 is a performance-based alkyd coating that may or may not contain zinc. SSPC-Paint 20 and SSPC-Paint 29 are zinc-rich coatings.

* + - * 1. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer according to **[MPI #23 (surface tolerant, anticorrosive metal primer)] [or] [SSPC-Paint 20 or SSPC-Paint 29] <Insert requirement>**.

Coordinate surface preparation standard in "Surface Preparation" Subparagraph below with surface preparation standard in "Painting Steel Uncovered during the Work" Article. If known, consider inserting manufacturer's name and product name.

Surface Preparation: Use coating requiring no better than **[SSPC-SP 2, "Hand Tool Cleaning,"] [SSPC-SP 3, "Power Tool Cleaning,"] [or] [SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning,"] <Insert surface preparation standard>** surface preparation according to manufacturer's literature or certified statement.

In "VOC Limit" Subparagraph below, option is the EPA limit for rust-preventive architectural coatings.

VOC Limit: Use coating with a VOC content of **[400 g/L ] <Insert VOC limit>** or less.

* + - 1. PREPARATORY CLEANING MATERIALS

See Section 050371 "Historic Decorative Metal Cleaning" for additional cleaning materials and methods.

If local water is known to be unsuitable, consider informing Contractor of this in "Water" Paragraph below. Hard or softened water may be unsuitable even though potable.

* + - * 1. Water: Potable.

Retain "Hot Water" Paragraph below if heated water is required.

* + - * 1. Hot Water: Water heated to a temperature of 140 to 160 deg F .

Retain remaining paragraphs below to suit Project.

Revise "Detergent Solution, Job Mixed" Paragraph below for specific laundry detergent requirements if known. Detergent products vary in composition.

* + - * 1. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.
				2. Abrasive Materials:

Abrasives can be used for paint removal as well as for cleaning surfaces, depending on the abrasive type and how it is used.

Materials in "Abrasive Pads" Subparagraph below can add fine scratches to stainless steel and other bright-metal finishes. Use these pads only after pretesting the method of use.

Abrasive Pads: Non-scratch, of the following type(s):

Abrasive Pad with Sponge: Combination plastic abrasive pad, consisting of a sponge enclosed with a woven urethane, polypropylene, or other plastic mesh or fabric, without other abrasive components that can scratch metal.

Abrasive Pad of Plant Fibers: Agave, loofa, or another tough plant fiber, without other abrasive components that can scratch metal.

Material in "Medium Abrasives for Ferrous Metals" Subparagraph below can remove paint and plating from ferrous metals. If mechanically cleaning stainless-steel surfaces, allow only stainless-steel tools. Carbon-steel residues can rust and stain stainless-steel surfaces.

Medium Abrasives for Ferrous Metals: Aluminum-oxide paper, emery paper, fine steel wool, steel scrapers, and steel-wire brushes of various sizes.

Medium Abrasives for Copper-Alloys: Extra-fine bronze wool or plastic abrasive pads.

Retain "Blasting Abrasive" Subparagraph below only if allowing abrasive blasting.

Blasting Abrasive: **[Pulverized walnut shells] [Powdered aluminum silicate] <Insert material>**.

* + - * 1. Wash Cloths: Lint-free, absorbent, durable cloth without abrasives that can scratch metal.

Product in "Rust Remover" Paragraph below is commonly used to remove iron oxide and leave behind a protective iron phosphate compound that resists further corrosion.

* + - * 1. Rust Remover: Manufacturer's standard phosphoric acid-based gel formulation, also called "naval jelly," for removing corrosion from iron and steel.
			1. MISCELLANEOUS MATERIALS
				1. Fasteners: Fasteners shall be of the same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal joined.

Match existing fasteners in material and in type of fastener unless otherwise indicated.

Use concealed fasteners for interconnecting decorative formed metal components and for attaching them to other work unless exposed fasteners are **[unavoidable] [or] [the existing fastening method]**.

Revise first subparagraph below if another screw type is required.

For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.

Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

Retain "Anchors to Building" Paragraph below for connections of a large assembly to the building. Do not use expansion anchors where expansion can cause damage to substrate material.

* + - * 1. Anchors to Building: **[Adhesive type] [expansion type] [or] [types indicated on Drawings]** with bolt heads of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal anchored.

If retaining "Strength" Subparagraph below, verify safety factors with Project's structural Director’s Representative; revise to suit Project.

Strength: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing according to ASTM E488 conducted by a qualified independent testing agency.

* + - * 1. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.
				2. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, glazed masonry, and polished stone surfaces from damaging effects of acidic and alkaline cleaners.
				3. Masking Tape: Nonstaining, nonabsorbent material; compatible with chemical solutions being used and substrate surfaces, and that will easily come off entirely, including adhesive.
				4. Other Products: Select materials and methods of use based on the following, subject to approval of a benchmark :

Previous effectiveness in performing the work.

Little possibility of damaging exposed surfaces.

Consistency of each application.

Uniformity of the resulting overall appearance.

Do not use products or tools that could do the following:

Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in the Contract.

Leave an unintended residue on surfaces.

* + - 1. METAL FABRICATION

Revise paragraphs below to suit Project.

* + - * 1. Fabricate repairs of decorative formed metal items and components in sizes and profiles to match existing decorative formed metal unless otherwise indicated, with accurate curves, lines, and angles. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
				2. Stamped components shall have embossed designs that are sharp and clear and shall be trimmed to exact size so that installed edges will be concealed or exposed as indicated on Drawings.
				3. Provide uniform, neat seams with minimum exposure of welds, solder, and sealant.
				4. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for fasteners. Use concealed fasteners where possible; use exposed fasteners to match existing work.
				5. Comply with AWS for recommended practices in welding. Provide welds behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.

Use materials and methods that match color of base metal, minimize distortion, and develop maximum strength and corrosion resistance.

Remove flux immediately.

At exposed connections, match contours of adjoining surfaces, and finish exposed surfaces smooth and blended so no roughness shows after finishing.

Retain "Date Identification" Paragraph below for historic treatment projects where differentiation of new materials from original materials is required.

* + - * 1. Date Identification: Permanently label, on a concealed, interior surface of the metal body of each new component, in easily read characters, "MADE **<Insert year>**." Manufacturer's name may also be labeled. Do not deform components with this identification process.
			1. FINISHES, GENERAL
				1. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
				2. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
			2. ALUMINUM FINISHES

Retain finishes in this article for aluminum assemblies or components to suit Project; insert other finishes if required. Refinishing is specified in Section 050373 "Historic Decorative Metal Refinishing." These aluminum finishes are shop applied. If retaining more than one, indicate location of each on Drawings or by inserts. Insert other finishes to suit Project.

* + - * 1. Mill finish.
				2. Bright mill finish.

"Baked-Enamel or Powder-Coat Finish" Paragraph below references AAMA standard for pigmented organic coating on extrusions and panels. Indicate color on Drawings or in the Historic Decorative Formed Metal Schedule.

* + - * 1. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, applying, and baking finish.

Consider inserting other high-performance finishes from Section 057000 "Decorative Metal."

* + - 1. FERROUS METAL FINISHES

Retain finishes in this article for ferrous metal assemblies or components to suit Project; insert other finishes if required. If retaining more than one, indicate location of each on Drawings or by inserts. Repaired steel and galvanized-steel sheet generally require immediate priming to prevent corrosion before final painting.

Retain "Repair Primer" or "Finish Primer" Paragraph below, or both. Retain option in first paragraph to require primer to be compatible with remaining existing paint, if any, and with applied finish.

* + - * 1. Repair Primer: Manufacturer's standard, rust-inhibiting, fast-curing, lead- and chromate-free universal primer, compatible with**[ firmly adhered existing paint and]** applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
				2. Finish Primer: Primer complying with applicable requirements in **[Section 090391 "Historic Treatment of Plain Painting"] <Insert Section number and title>** for finish painting of primed historic metal.

Finish in "Baked-Enamel or Powder-Coat Finish" Paragraph below is shop applied to thoroughly cleaned bare metal only. These finishes are for new assemblies or components to suit Project. Refinishing is specified in Section 050373 "Historic Decorative Metal Refinishing."

* + - * 1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
			1. STAINLESS-STEEL FINISHES

Retain finishes in this article for stainless-steel assemblies or components to suit Project; insert other finishes if required. Refinishing is specified in Section 050373 "Historic Decorative Metal Refinishing." These finishes can be shop or field applied. If retaining more than one, indicate location of each on Drawings or by inserts.

* + - * 1. Surface Preparation: Remove tool and die marks and stretch lines from new replacement stainless steel, or blend into finish.

Retain "Restored Finish" Paragraph below for finish applied to match existing stainless steel or Sample.

* + - * 1. Restored Finish: Grind and polish surfaces to produce uniform, directionally textured, polished finish to match **[existing finish] [Sample]**, free of cross scratches.

Run grain to match existing metal.

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

Retain "Bright, Cold-Rolled, Unpolished Finish" Paragraph below for nondirectional finish not required to match existing stainless steel; revise to suit Project.

* + - * 1. Bright, Cold-Rolled, Unpolished Finish: No. 2B.
1. EXECUTION
	* + 1. HISTORIC TREATMENT SPECIALIST

Retain this article if list of preapproved firms is used as quality-control procedure.

If retaining second option in "Historic Treatment Specialist Firms" Paragraph below, include procedure for approving other firms in Document 002213 "Supplementary Instructions to Bidders.

* + - * 1. Historic Treatment Specialist Firms: Subject to compliance with requirements **[provide historic decorative formed metal repair by one of the following] [firms that may provide historic decorative formed metal repair include, but are not limited to, the following]**:
			1. PROTECTION
				1. Comply with each manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

Cover adjacent surfaces with materials that are proved to resist chemical solutions being used unless products being used will not damage adjacent surfaces. Use protective materials that are waterproof and UV resistant. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

Do not apply chemical solutions during winds of enough force to spread them to unprotected surfaces.

Neutralize alkaline and acid wastes before disposal.

Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

* + - 1. HISTORIC DECORATIVE FORMED METAL REPAIR, GENERAL

Revise this article to suit Project. See Section 013591 "Historic Treatment Procedures" for general historic treatment procedures.

Retain "Repair Appearance Standard" Paragraph below to control overall appearance from a distance.

* + - * 1. Repair Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from **[20 feet ] [50 feet ] <Insert distance>** away by Director’s Representative.
				2. Execution of the Work: In repairing historic items, disturb remaining existing work as minimally as possible and as follows:

Stabilize decorative formed metal to reestablish structural integrity and weather resistance while maintaining the existing form of each item.

Remove deteriorated coatings and corrosion.

Sequence work to minimize time before protective coatings are reapplied.

Repair items where stabilization is insufficient to stop progress of deterioration.

Repair items in place unless otherwise indicated, and retain as much original material as possible.

Replace or reproduce historic items where indicated or scheduled.

Make historic treatment of materials reversible whenever possible.

Install temporary protective measures to stabilize decorative formed metal that shall be repaired later.

* + - * 1. Mechanical Coating Removal: Use only the gentlest mechanical methods, such as scraping and wire brushing, that do not abrade metal substrate. Do not use abrasive methods, such as sanding, or power tools except as indicated as part of the historic treatment program and approved by Director’s Representative.
				2. Repairing Decorative Formed Metal: Match existing materials and features, retaining as much original material as possible to complete the repair.

Unless otherwise indicated, repair decorative formed metals by straightening, patching, piecing-in, splicing, or otherwise reinforcing metals with new metal, matching existing metal, form, and texture.

Where indicated, repair decorative formed metal by limited replacement to the extent indicated, matching existing material.

* + - * 1. Replacing Decorative Formed Metal Components: Where indicated, duplicate and replace items with new metal, matching existing metal.

Replace heavily deteriorated or missing parts or features of decorative formed metal with compatible materials, using surviving prototypes to create patterns or dies for duplicate replacements.

Retain one of two subparagraphs below. Indicate on Drawings or in the Historic Decorative Formed Metal Schedule where substitute materials may be used. If retaining second subparagraph, insert requirements for substitute materials in Part 2.

Do not use substitute materials unless otherwise indicated.

Compatible substitute materials may be used.

* + - 1. PREPARATORY CLEANING

Retain cleaning methods in this article for cleaning metal before performing repair work; revise to suit Project; consult a preservation specialist before retaining or inserting other methods. See the Evaluations in Section 050371 "Historic Decorative Metal Cleaning." Spray methods are typically inappropriate for interior areas. High-pressure spray may be too harsh for thin stamped metal ornament and if applied to metal attached to masonry with soft joints.

* + - * 1. Perform preparatory cleaning before performing repair work. Use only those methods indicated for each type of decorative formed metal and its location.

Brushes: If using wire brushes, use brushes of same base metal composition as metal being treated. Use brushes that are resistant to chemicals being used.

Retain "Spray Equipment" Subparagraph below only if allowing spray methods.

Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that spray methods do not damage surfaces.

Equip units with pressure gages.

Fan-spray angle in first subparagraph below is considered efficient for low and medium pressure and less harmful than sprays with narrower angles. Never use a fan spray with an angle of less than 15 degrees.

For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.

Retain first subparagraph below if high-pressure spray is permitted.

For high-pressure water-spray application, use fan-shaped spray that disperses water at an angle of at least 40 degrees.

Retain first subparagraph below if heated water is required. Revise temperature range to suit Project.

For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.

Uniformity: Perform each cleaning method in a manner that results in uniform coverage of all surfaces, including corners, contours, and interstices, and that produces an even effect without streaks or damaging surfaces.

Protection: After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

Generally, retain last option in "Water Cleaning" Paragraph below for decorative metals with desirable patina. This method can remove patina if used aggressively.

* + - * 1. Water Cleaning: Clean with **[cold] [hot]** water applied with **[sponges or wash cloths] [low-pressure spray] [medium-pressure spray] [high-pressure spray]**. Supplement with **[natural-fiber] [or] [plastic]** bristle brush**[ and abrasive pads]**. Use small brushes to remove soil and loose paint from joints and crevices.**[ Leave uniform patina intact.]**
				2. Detergent Cleaning:

Wet surface with **[cold] [hot]** water applied with **[sponges or wash cloths] [low-pressure spray]**.

Generally, retain first option in first subparagraph below for decorative metals with desirable patina. This method can remove patina if used aggressively.

Scrub surface with detergent solution and **[natural-fiber] [or] [plastic]** bristle brush**[ and abrasive pads]** until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil and loose paint from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.**[ Leave uniform patina intact.]**

Retain one of first two options and one of last four options in subparagraph below.

Rinse with **[cold] [hot]** water applied with **[sponges or wash cloths] [low-pressure spray] [medium-pressure spray] [high-pressure spray]** to remove detergent solution, soil, and loose paint.

Retain "Cleaning by Abrasive Blasting" Paragraph below only if allowing abrasive blasting. Retain last option below for metals with desirable patina. Abrasive blasting can remove patina if used aggressively or with hard abrasives.

* + - * 1. Cleaning by Abrasive Blasting: Clean surfaces to remove dirt**[ and loose paint]** by dry blasting with specified blasting abrasive at pressure and distance from surface indicated below. **[Rinse with cold water, low-pressure spray to remove residue] [Do not rinse ferrous metals with water; wipe with soft brushes and damp cloths to remove residue] [Leave uniform patina intact] <Insert requirement>**.

Retain one of two "Pressure and Distance from Surface" subparagraphs below.

Pressure and Distance from Surface: Maximum pressure of **[60 psi ] [100 psi ] [200 psi ] <Insert value>** with specified blasting abrasive propelled from a distance of **[6 to 12 inches ] [12 to 18 inches ] <Insert dimension>** from surface.

Pressure and Distance from Surface: As established by benchmarks.

Method in "Chemical Rust Removal" Paragraph below is commonly used to convert reddish-brown iron oxide (rust) into a water-soluble, black, iron phosphate compound that is easier to remove and resists further corrosion.

* + - * 1. Chemical Rust Removal:

Remove loose rust scale with approved, medium abrasives for ferrous metals.

Apply rust remover with brushes or as recommended in writing by manufacturer.

Allow rust remover to remain on surface for period recommended in writing by manufacturer or as determined by testing. Do not allow extended dwell time.

Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended in writing by manufacturer to remove residue.

Dry immediately with clean wash cloths. Follow direction of grain in metal.

Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

Method in "Mechanical Rust Removal" Paragraph below is labor-intensive but avoids use of harsh chemicals.

* + - * 1. Mechanical Rust Removal:

Remove rust with approved, medium abrasives for ferrous metals.

Wipe off residue with mineral spirits and either steel wool or soft rags.

Dry immediately with clean wash cloths. Follow direction of grain in metal.

Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

* + - 1. DISMANTLING, REPAIR, AND INSTALLATION
				1. Repair decorative formed metal in place insofar as practicable unless otherwise indicated. Where necessary, dismantle components from their substrate and repair and reinstall them according to approved historic treatment program.

Indicate on Drawings or in the Historic Decorative Formed Metal Schedule which items are to be dismantled and reinstalled. Dismantled and salvaged items may be available for creating duplicates. Verify condition and availability of existing materials for repair and reinstallation or to create molds or patterns.

* + - * 1. Deformed Components: Flatten bent and deformed components, so that embossed pattern along full length of the component's edges will again nest tightly against adjacent work insofar as practicable.

Retain "Defects in Painted Metal Surfaces" Paragraph below for filling nonstructural defects in existing metal surfaces that will be painted.

* + - * 1. Defects in Painted Metal Surfaces: Repair non-load-bearing defects in existing metal surfaces, including dents and gouges more than **[1/16 inch ] [1/8 inch ] <Insert dimension>** deep or **[1/2 inch ] [1 inch ] <Insert dimension>** across and all holes and tears by filling with metal-patching compound. Remove burrs. Prime iron and steel surfaces immediately after repair to prevent flash rusting.

Apply metal-patching compound to fill depressions, nicks, cuts, and other voids created by rusted, removed, or missing metal.

Mix only as much patching compound as can be applied according to manufacturer's written instructions.

Apply patching compound in layers of maximum 1/8-inch thickness and as recommended in writing by manufacturer until the void is completely filled.

Finish patch surface smooth and shaped flush with adjacent contours, without voids in patch material.

Clean spilled compound from adjacent materials immediately.

* + - * 1. Installation:

Locate and place decorative formed metal items level and plumb and in alignment with adjacent construction.

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.

Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed to protect metal surfaces and to make a weathertight connection.

Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.

Install concealed joint fillers, sealants, and flashings, as the Work progresses, to make exterior items weatherproof.

Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.

Retain "Touch Up" Paragraph below for prefinished assemblies, components, and bare-metal finishes; revise to suit Project.

Touch Up: At completion of installation, touch up and restore damaged or defaced finish surfaces and fastener heads.

Retain "Sealant" Paragraph below if joint sealants are required; revise to suit Project.

* + - * 1. Sealant: Clean and prepare joint surfaces and apply and cure sealant according to Section 079200 "Joint Sealants."

Keep joints to receive sealant dry and free of debris.

Option in first subparagraph below establishes priming as default requirement rather than relying on Contractor's judgment.

**[Prime joint surfaces unless sealant manufacturer recommends against priming. ]**Do not allow primer to spill or migrate onto adjoining surfaces.

Fill sealant joints with specified joint sealant as recommended in writing by sealant manufacturer and the following:

Install sealant using only proven installation methods that ensure sealant is deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding metal.

Do not allow sealant to overflow or spill onto adjoining surfaces or to migrate into the voids of adjoining surfaces, particularly rough or sculptural textures. Promptly remove excess and spillage of sealant as the work progresses. Clean adjoining surfaces by means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved benchmark .

* + - 1. PRIMING AND PAINTING

Retain one or more paragraphs below; revise to suit Project.

* + - * 1. Repair Primer: Apply immediately after completing a repair.
				2. Finish Primer: Apply as soon after cleaning as possible according to applicable requirements in **[Section 090391 "Historic Treatment of Plain Painting"] <Insert Section number and title>** for finish painting of primed historic metal.

Retain "Finish Painting" and "Touch Up" paragraphs below for on-site painting of unfinished surfaces; revise to suit Project.

* + - * 1. Finish Painting: Apply as soon as possible after repair and installation according to applicable requirements in **[Section 090391 "Historic Treatment of Plain Painting."] <Insert Section number and title.>**
				2. Touch Up: At completion of installation, touch up and restore damaged or defaced painted surfaces.
			1. PAINTING STEEL UNCOVERED DURING THE WORK

Retain this article if steel may be uncovered during the Work. These steel items can include the metal fabrications required for structurally supporting projecting building cornices and window bays. Revise to accommodate another method or methods if required. See the Evaluations.

* + - * 1. Notify Director’s Representative if steel is exposed during metal repair or removal. Where Director’s Representative determines that the steel is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:

Coordinate "Surface Preparation" Subparagraph below with surface preparation standard for antirust coating in "Preparatory Cleaning Materials" Article.

Surface Preparation: Remove paint, rust, and other contaminants according to **[SSPC-SP 2, "Hand Tool Cleaning,"] [SSPC-SP 3, "Power Tool Cleaning,"] [or] [SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning,"] <Insert surface preparation standard,>** as applicable to comply with paint manufacturer's recommended preparation.

Antirust Coating: Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).

Consult Project structural Director’s Representative about option in paragraph below; revise to suit Project.

* + - * 1. If on inspection and rust removal the thickness of a steel member is found to be reduced from rust by more than **[1/16 inch] <Insert dimension>**, notify Director’s Representative before proceeding.
			1. FIELD QUALITY CONTROL
				1. Testing Agency: Director’s Representative will engage a qualified testing agency to perform tests and inspections. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
				2. Notify testing agency in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors have had reasonable opportunity to inspect work areas at locations of lift devices or scaffolding.
			2. HISTORIC DECORATIVE FORMED METAL SCHEDULE

This schedule demonstrates a method to indicate extensive historic treatment requirements for decorative formed metal. A schedule helps to prevent confusion where Project includes several items of varying sizes, characteristics, and complexities; where extensive drawing notations would otherwise be needed; and where direction by a historic treatment specialist is considered insufficient. The design professional must decide what to include in a schedule and what should be indicated on Drawings. This schedule is an example only; revise to suit Project.

Insert drawing designation for each existing item to be treated, and indicate the methods of treatment that apply to the item. Use these designations on Drawings to identify locations.

* + - * 1. Treatment of Projecting Building Cornice **[MPBC-1] <Insert drawing designation>**:

Perform repair work **[in the shop] [or] [in the field]**.

Paint Removal: As specified in Section 050371 "Historic Decorative Metal Cleaning," except use no spray methods.

Rust Removal: **[Chemical] [Mechanical] <Insert method>**.

Repair: **[Flatten deformed components] [replace missing bracket with replicated, stamped detail] [and] [patch holes by filling with metal-patching compound] <Insert description>**.

Painted Finish: As specified in **[Section 090391 "Historic Treatment of Plain Painting."] <Insert Section number and title.>**

Gilding: As specified in **[Section 090398 "Historic Treatment of Gilding."] <Insert Section number and title.>**

* + - * 1. Treatment of Wall Cladding **[WC-1] <Insert drawing designation>**:

Perform repair work **[in the shop] [or] [in the field]**.

Paint Removal: As specified in Section 050371 "Historic Decorative Metal Cleaning," except use no spray methods.

Repair: **[Flatten deformed panels] [replace missing panels with replicated, stamped wainscoting panels] [and] [patch holes by filling with metal-patching compound] <Insert description>**.

Painted Finish: As specified in **[Section 090391 "Historic Treatment of Plain Painting."] <Insert Section number and title.>**

* + - * 1. Treatment of Stamped Detail **[SD-1] <Insert drawing designation>**:

Perform repair work **[in the shop] [or] [in the field]**.

Paint Removal: As specified in Section 050371 "Historic Decorative Metal Cleaning," except use no spray methods.

Repair: **[Flatten deformed panels] [and] [Patch holes by filling with metal-patching compound] <Insert description>**.

Replicate: Existing **[lion-head] [pyramid] [star] <Insert item>** ornament.

Painted Finish: As specified in **[Section 090391 "Historic Treatment of Plain Painting."] <Insert Section number and title.>**

Color: **<Insert requirement>**.

Patina Finish: **[Repair missing patina spots] [Repatinate entire unit] to match existing as specified in [Section 050373 "Historic Decorative Metal Refinishing."] <Insert Section number and title.>**

Gilding: As specified in **[Section 090398 "Historic Treatment of Gilding."] <Insert Section number and title.>**

END OF SECTION 050385