SECTION 050371 - HISTORIC DECORATIVE METAL CLEANING

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

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. Section includes historic treatment of decorative metal in the form of cleaning as follows:

Cleaning metal.

Removing paint.

Removing corrosion.

Priming for repainting.

* + - * 1. Related Requirements:

Retain subparagraph 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.

* + - 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 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 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.

Both paragraphs below are examples 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. Preconstruction testing is part of testing and inspecting allowance.
				2. Cleaning and removing paint from **<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.

* + - * 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 cleaning without abrasives; revise to suit Project. If abrasives are used revise values because these pressures are too high.

* + - * 1. Low-Pressure Spray:

Pressure: **[100 to 400 ]** psi.

Flow Rate: **[4 to 6 ]** gpm.

* + - * 1. Medium-Pressure Spray:

Pressure: **[400 to 800 ]** psi.

Flow Rate: **[4 to 6 ]** gpm.

* + - * 1. High-Pressure Spray:

Pressure: **[800 to 1200 ]** psi.

Flow Rate: **[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 metal.

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

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

Materials, material application, and sequencing.

Fire-protection plan.

Decorative 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.

Consider "Qualification Data" and "Decorative Metal Historic Treatment Program" paragraphs below as they relate to Project goals and importance.

* + - * 1. Qualification Data: For **[historic treatment specialist] [chemical-cleaner manufacturer] [paint-remover manufacturer]**.
				2. Decorative Metal Historic Treatment Program: For cleaning historic decorative metalwork.
				3. Preconstruction Test Reports: For **[chemical cleaning of] [and] [paint removal from]** historic decorative metal.
			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 metal cleaning specialist. Cleaning specialist shall be experienced in using mechanical and chemical methods on the types of metal surfaces indicated.

Retain "Single Specialist" Subparagraph below if required; revise to suit Project. If also retaining "Historic Treatment Specialist Firms" Paragraph below, coordinate the listed specialists in the cited Sections.

Single Specialist: Have the work of **[this Section] [Section 050372 "Historic Decorative Metal Repair"] [Section 050373 "Historic Decorative Metal Refinishing"] [Section 050374 "Historic Decorative Metal Replication"] [and] [Section 050383 "Historic Cast Iron Repair"]** performed by the same historic treatment specialist firm, meeting the specialist qualifications of those Sections.

If retaining "Chemical-Cleaner Manufacturer Qualifications" or "Paint-Remover Manufacturer Qualifications" Paragraph below, or both, verify that manufacturers of products listed in this Section comply with requirements. Retain option if retaining "Preconstruction Testing" Article.

* + - * 1. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing metal cleaners that have been used for similar historic decorative metal applications with successful results and with Company Service Advisors who are available for consultation and Project-site inspection**[, preconstruction product testing,]** and on-site assistance.
				2. Paint-Remover Manufacturer Qualifications: A firm regularly engaged in producing paint removers that have been used for similar historic decorative metal applications with successful results and with Company Service Advisors who are available for consultation and Project-site inspection**[, preconstruction product testing,]** and on-site assistance.
				3. Decorative 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 cleaning decorative 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 cleaning materials and processes are not mockups.

* + - * 1. Mockups: Prepare mockups of historic treatment cleaning processes**[ on existing surfaces]** to demonstrate aesthetic effects and to set quality standards for materials and execution. Prepare mockups so they are inconspicuous.

Mockup in "Cleaning" Subparagraph below is an example only.

Cleaning: Prepare an area **[approximately 2 sq. ft. [as indicated on Drawings] <Insert dimension>** for each process on each type of metal indicated for treatment.

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

* + - 1. PRECONSTRUCTION TESTING

Retain this article for preconstruction testing. Revise article based on designers knowledge of the building's materials and experience with similar work. Usually, test metal cleaning before preparing the Specifications and delete article. Project-specific preconstruction testing can be expensive but may be the best means of proving that performance requirements are met.

* + - * 1. Preconstruction Testing Service: Engage a qualified historic treatment specialist or one or more **[chemical-cleaner] [and] [paint-remover]** manufacturers to perform preconstruction testing on each type of historic metal.

Use test areas as indicated and representative of proposed materials and existing construction.

Propose changes to materials and methods to suit Project.

* + - 1. FIELD CONDITIONS

Usually retain this article; revise to suit Project.

* + - * 1. Weather Limitations: Proceed with historic treatment of decorative 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. CLEANING MATERIALS

For a decorative metal item having a mix of materials, such as painted and plated metals, consider using cleaning materials and a single cleaning method selected for gentleness to all the materials and finishes on the item.

Retain materials in this article to suit Project and required cleaning methods. Acidic cleaners are generally not used on exposed metals unless they will be painted.

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.

Revise "Nonacidic Liquid Chemical Cleaner" Paragraph below to suit Project. Always test cleaners on substrates to be cleaned; strongly alkaline solutions can damage bare aluminum.

* + - * 1. Nonacidic Liquid Chemical Cleaner: Manufacturer's standard mildly alkaline liquid cleaner, formulated for removing organic soiling from ordinary building materials including polished stone, brick, copper, brass, bronze, aluminum, stainless steel, plastics, wood, and glass.

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

* + - * 1. Abrasive Materials:

Abrasive Pads for Copper-Alloy Cleaning: Extra fine bronze wool or plastic abrasive pads.

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

Revise "Abrasives for Ferrous Metal Cleaning" Subparagraph below if mechanically cleaning stainless-steel surfaces; allow only stainless-steel tools. Carbon-steel residues can rust and stain stainless-steel surfaces.

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

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. PAINT REMOVERS

Retain one or more paint removers in this article to suit Project. Insert other types if required.

"Alkaline Paste Paint Remover" and "Covered or Skin-Forming Alkaline Paint Remover" paragraphs below describe caustic materials that require neutralizing afterwash; do not use these products on aluminum.

* + - * 1. Alkaline Paste Paint Remover: Manufacturer's standard alkaline paste or gel formulation for removing paint from metals, and containing no methylene chloride.
				2. Covered or Skin-Forming Alkaline Paint Remover: Manufacturer's standard covered or skin-forming alkaline paste or gel formulation for removing paint from metal, and containing no methylene chloride.

Products in "Solvent-Type Paste Paint Remover," "Low-Odor, Solvent-Type Paste Paint Remover," and "Covered, Solvent-Type Paste Paint Remover" paragraphs below require water rinsing, which can promote corrosion on ferrous metals. Products in "Solvent-Type Paste Paint Remover" Paragraph contain methylene chloride.

* + - * 1. Solvent-Type Paste Paint Remover: Manufacturer's standard water-rinseable, solvent-type paste or gel formulation for removing paint from metals.
				2. Low-Odor, Solvent-Type Paste Paint Remover: Manufacturer's standard low-odor, water-rinseable, solvent-type paste, gel, or foamed emulsion formulation for removing paint from metals; and containing no methanol or methylene chloride.
				3. Covered, Solvent-Type Paste Paint Remover: Manufacturer's standard, low-odor, covered, water-rinseable, solvent-type paste or gel formulation for removing paint from metals; and containing no methanol or methylene chloride.

Insert other types of products and systems such as abrasive dry or wet blasting to suit Project. See the Evaluations.

* + - 1. MISCELLANEOUS MATERIALS

Product in "Liquid Strippable Masking Agent" Paragraph below does not protect against paint removers.

* + - * 1. 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.
				2. Masking Tape: Nonstaining, nonabsorbent material; compatible with chemical solutions being used and substrate surfaces; and that will easily come off entirely, including adhesive.
				3. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:

Previous effectiveness in performing the work involved.

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. FERROUS METAL PRIMERS

Retain finishes in this article to suit Project. Copy article and revise for different iron and steel primers. If retaining more than one, indicate location of each on Drawings or by inserts. Repaired iron and steel generally require immediate priming to prevent corrosion before final painting.

Retain "Repair Primer" or "Finish Primer" Paragraph below, or both. Retain option in "Repair Primer" 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.
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 metal cleaning by one of the following] [firms that may provide historic decorative metal cleaning include, but are not limited to, the following]**:

**<Insert, in separate subparagraphs, names of historic treatment specialist firms>**.

* + - 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 proven 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 sufficient 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 METAL CLEANING, GENERAL
				1. Have historic decorative metal cleaning performed by a historic treatment specialist.

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

* + - * 1. Cleaning Appearance Standard: Cleaned surfaces are to have a uniform appearance as viewed from **[20] [50]** feet away by Director’s Representative.
				2. Execution of the Work: In cleaning historic items, disturb them as minimally as possible and as follows:

Remove deteriorated coatings and corrosion.

Sequence work to minimize time before protective coatings are reapplied.

Clean items in place unless otherwise indicated.

* + - * 1. Mechanical Coating Removal: Use most gentle mechanical methods, such as scraping and wire brushing, that will 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. Repaint: Where indicated, prepare painted decorative metal by **[cleaning surface, removing less than firmly adhered existing paint, sanding edges smooth,] [removing existing paint]** and priming for painting as specified.
			1. CLEANING

Retain cleaning methods in this article to suit Project; consult a preservation specialist before retaining or inserting other methods. See the Evaluations. High-pressure spray may be too harsh if applied to metal attached to masonry with soft joints.

* + - * 1. Use only those methods indicated for each type of decorative 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.

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.

Retain first subparagraph below unless spray application of chemical cleaners is unacceptable. Wind drift of chemical cleaners is often a problem with spray application.

For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with nozzle having a cone-shaped spray.

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.

* + - * 1. Water Cleaning: Clean with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray. Supplement with **[natural-fiber] [or] [plastic]** bristle brush. Use small brushes to remove soil from joints and crevices.
				2. Detergent Cleaning:

Wet surface with **[cold] [hot]** water applied by low-pressure spray.

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

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

Rinse with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray to remove detergent solution and soil.

Retain subparagraph below if mockup is used.

Repeat cleaning procedure where needed if required to produce cleaning effect established by mockup.

* + - * 1. Nonacidic Liquid Chemical Cleaning: Apply chemical cleaner to surfaces according to chemical-cleaner manufacturer's written instructions.

Alkaline cleaners work better with hot water.

Wet surface with **[cold] [hot]** water applied by low-pressure spray.

Apply cleaner to surface**[ in two applications]** by brush**[ or low-pressure spray]**.

Retain one option in first subparagraph below; revise to suit Project. Third option is an example only.

Let cleaner remain on surface for period **[recommended in writing by chemical-cleaner manufacturer] [established by mockup] [of two to three minutes] <Insert requirement>**.

Retain one of first two options and one of last three options in "Non-Ferrous Metals" Subparagraph below.

Non-Ferrous Metals: Rinse with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray to remove chemicals and soil.

Ferrous Metals: Do not rinse ferrous metals with water; neutralize chemical cleaner on ferrous metals as recommended in writing by manufacturer. Dry immediately with clean, soft cloths. Follow direction of grain in metal.

Retain subparagraph below if mockup is used.

Repeat cleaning procedure where needed if required to produce cleaning effect established by mockup. Do not repeat more than once.

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

* + - * 1. Cleaning with Abrasive Pads: Clean surfaces to remove dirt**[, leaving uniform patina intact,]** by light rubbing with abrasive pads and water. **[Rinse with cold water to remove residue. Apply rinse by low-pressure spray] [Do not rinse ferrous metals with water; wipe with damp cloths to remove residue] <Insert requirement>**.

Generally, retain first option in "Cleaning by Abrasive Blasting" Paragraph below for decorative 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**[, leaving uniform patina intact,]** 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 damp cloths to remove residue] <Insert requirement>**.

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

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

Pressure and Distance from Surface: As established by mockup.

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 abrasives for ferrous metal cleaning.

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 preconstruction 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, soft 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 abrasives for ferrous metal cleaning.

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

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

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

Insert other chemical-assisted methods or high-temperature cleaning methods such as flame cleaning if required. These methods require specialized care and are generally restricted to shop locations for reasons of safety and fire prevention.

* + - 1. PAINT REMOVAL

Retain one or more paint removal methods in this article to suit Project; consult a preservation specialist before retaining or inserting other methods. See the Evaluations. High-pressure spray may be too harsh if applied to metal attached to masonry with soft joints.

* + - * 1. Use only those paint-removal methods indicated for each type of decorative metal.

Application: Apply paint removers according to paint-remover manufacturer's written instructions. Do not allow paint removers to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.

Apply materials to all surfaces, corners, contours, and interstices, to provide a uniform final appearance without streaks.

After work is complete, remove protection no longer required. Remove tape and adhesive marks.

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.

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.

Unless otherwise indicated, hold spray nozzle at least 6 inches from surface and apply material in horizontal, back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.

For chemical spray application, use low-pressure tank or chemical pump suitable for chemical indicated, equipped with cone-shaped spray.

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 tip that disperses water at an angle of at least 40 degrees.

Retain 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.

* + - * 1. Paint Removal with Alkaline Paste Paint Remover:

Retain first subparagraph below if loose and peeling paint is significant.

Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.

Apply paint remover to dry, painted metal with brushes.

Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.

Retain one of first two subparagraphs below; do not rinse cast iron with water. Retain one of first two options and one of last three options in first subparagraph. Alkaline paint removers work better with hot water.

Rinse with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray to remove chemicals and paint residue.

Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.

Repeat process if necessary to remove all paint.

* + - * 1. Paint Removal with Covered or Skin-Forming Alkaline Paint Remover:

Retain first subparagraph below only if loose and peeling paint is significant.

Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.

Apply paint remover to dry, painted metal with brushes or as recommended in writing by manufacturer.

Apply cover according to manufacturer's written instructions.

Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.

Scrape off paint and remover.

Retain one of first two subparagraphs below; do not rinse cast iron with water. Retain one of first two options and one of last three options in first subparagraph. Alkaline paint removers work better with hot water.

Rinse with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray to remove chemicals and paint residue.

Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.

For spots of remaining paint, apply alkaline paste paint remover according to "Paint Removal with Alkaline Paste Paint Remover" Paragraph.

Retain "Paint Removal with Solvent-Type Paste Paint Remover" Paragraph below for solvent-type paste and low-odor, solvent-type paste paint removers; delete paragraph if using only covered, solvent-type paste paint remover.

* + - * 1. Paint Removal with Solvent-Type Paste Paint Remover:

Retain first subparagraph below only if loose and peeling paint is significant.

Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.

Apply thick coating of paint remover to painted decorative metal with natural-fiber cleaning brush, deep-nap roller, or large paint brush. Apply in one or two coats according to manufacturer's written instructions.

Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.

Retain one of first two subparagraphs below; do not rinse cast iron with water. Retain one of first two options and one of last three options in first subparagraph. Some manufacturers advise that heated water may improve stripping efficiency.

Rinse with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray to remove chemicals and paint residue.

Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.

Repeat process if necessary to remove all paint.

* + - * 1. Paint Removal with Covered, Solvent-Type Paste Paint Remover:

Retain first subparagraph below only if loose and peeling paint is significant.

Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.

Apply paint remover to dry, painted decorative metal with natural-fiber cleaning brush, deep-nap roller, or large paint brush; or as recommended in writing by manufacturer.

Apply cover according to manufacturer's written instructions.

Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.

Scrape off paint and remover.

Retain one of two subparagraphs below; do not rinse cast iron with water. Retain one of first two options and one of last three options in first subparagraph. Some manufacturers advise that heated water may improve stripping efficiency.

Rinse with **[cold] [hot]** water applied by **[low] [medium] [high]**-pressure spray to remove chemicals and paint residue.

Use mechanical methods recommended in writing by manufacturer to remove remaining chemicals and paint residue.

* + - 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.

Retain "Manufacturer's Field Service" Paragraph below to require a Company Service Advisors to provide on-site assistance. Retain option if retaining "Preconstruction Testing" Article.

* + - * 1. Manufacturer's Field Service: Engage chemical-cleaner and paint-remover manufacturers' Company Service Advisors for consultation and Project-site inspection**[, to perform preconstruction product testing,]** and to provide on-site assistance when requested by Director’s Representative.
			1. REMOVAL, DISMANTLING, AND REINSTALLATION

Indicate on Drawings or in the Historic Decorative Metal Cleaning Schedule which decorative metal items are to be removed or dismantled and reinstalled.

* + - * 1. Perform removal, dismantling, and reinstallation work as required in Section 050372 "Historic Decorative Metal Repair."
			1. PRIMING
				1. Repair Primer: Apply immediately after completing a repair.
				2. Finish Primer: Apply as soon after cleaning as possible.
			2. HISTORIC DECORATIVE METAL CLEANING SCHEDULE

This schedule demonstrates a method to indicate extensive historic treatment requirements for decorative 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 used; and where direction by a historic treatment specialist is considered insufficient. The design professional decides what to include in a schedule and what to annotate on Drawings. This schedule is an example only; revise to suit Project and coordinate with historic decorative metal schedules in Section 050372 "Historic Decorative Metal Repair" and Section 050373 "Historic Decorative Metal Refinishing," if retained.

Insert drawing designation for each 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 Decorative Railing [DMR-1] <Insert drawing designation>: Wrought-iron railing and gate.

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

Paint Removal: **[Alkaline paste paint remover] [Covered or skin-forming alkaline paint remover] [Solvent-type paste paint remover] [Low-odor, solvent-type paste paint remover] [Covered, solvent-type paint remover] <Insert method>**.

Repairs: As specified in Section 050372 "Historic Decorative Metal Repair."

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

* + - * 1. Treatment of Decorative Railing **[DMR-2] <Insert drawing designation>**: Cast-iron balustrade.

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

Paint Removal: **[Alkaline paste paint remover] [Covered or skin-forming alkaline paint remover] [Solvent-type paste paint remover] [Low-odor, solvent-type paste paint remover] [Covered, solvent-type paste paint remover] <Insert method>**.

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

Repair: As specified in Section 050372 "Historic Decorative Metal Repair."

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

* + - * 1. Treatment of Decorative Railing **[DMR-3] <Insert drawing designation>**: Bronze railing with bronze handrail.

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

Cleaning: **[Water cleaning] [Detergent cleaning] [Chemical cleaning] [Abrasive blasting] <Insert description>**.

Repair: As specified in Section 050372 "Historic Decorative Metal Repair."

Bronze Finish: **[Satin finish with statuary conversion coating on railing; satin hand-rubbed finish, lacquered, on handrail] <Insert requirement>**.

* + - * 1. Treatment of Decorative Cast-Iron Facade and Storefront [DMFS-#] <Insert drawing designation>: Repair facade and storefront and replace missing components.

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

Cleaning: **[Water cleaning] [Detergent cleaning] [Chemical cleaning] [Abrasive blasting] <Insert description>**.

Paint Removal: **[Alkaline paste paint remover] [Covered or skin-forming alkaline paint remover] [Solvent-type paste paint remover] [Low-odor, solvent-type paste paint remover] [Covered, solvent-type paste paint remover] <Insert method>**.

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

Repair: As specified in Section 050372 "Historic Decorative Metal Repair."

Finish Treatment: As specified in **[Section 050373 "Historic Decorative Metal Refinishing."] [Section 090391 "Historic Treatment of Plain Painting."] <Insert Section number and title.>**

* + - * 1. Treatment of Bronze Grille **[DMG-#] <Insert drawing designation>**: Strip paint and coat grille.

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

Paint Removal: **[Solvent-type paste paint remover] [Low-odor, solvent-type paste paint remover] [Covered, solvent-type paste paint remover] <Insert method>**.

Protective Coating: As specified in **[Section 050373 "Historic Decorative Metal Refinishing."] <Insert Section number and title.>**

END OF SECTION 050371