UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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DIVISION 09 - FINISHES

SECTION 09 01 90.50

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05/09, CHG 1: 08/17

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USACE / NAVFAC / AFCEC / NASA	**UFGS-09 01 90.50 (May 2009)**
	Change 1 - 08/17

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UNIFIED FACILITIES GUIDE SPECIFICATIONS

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SECTION 09 01 90.50

PREPARATION OF HISTORIC WOOD AND METAL SURFACES FOR PAINTING
05/09, CHG 1: 08/17

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NOTE: This guide specification covers the requirements for preparation for painting wood and metal surfaces in historic structures.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature

to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH 0100	(2017; Suppl 2020) Documentation of the Threshold Limit Values and Biological Exposure Indices

ASTM INTERNATIONAL (ASTM)

ASTM D173/D173M	(2003; R 2011; E 2012) Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing
ASTM D3274	(2009; R 2017) Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation
ASTM D3359	(2017) Standard Test Methods for Rating Adhesion by Tape Test
ASTM D4214	(2007; R 2015) Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4	(2007) Brush-Off Blast Cleaning
SSPC PA Guide 5	(2023) Guide to Maintenance Coating of Steel Structures in Atmospheric Service
SSPC SP 1	(2015) Solvent Cleaning
SSPC SP 2	(2018) Hand Tool Cleaning
SSPC SP 3	(2018) Power Tool Cleaning
SSPC SP 5/NACE No. 1	(2007) White Metal Blast Cleaning
SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning
SSPC SP 10/NACE No. 2	(2015) Near-White Blast Cleaning

1.2 SUMMARY

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NOTE: The Federal Clean Air Act requires each state

to meet the National Ambient Air Quality Standards. In addition, each state or local government may impose more restrictive requirements. States with areas identified as exceeding EPA standards for ozone must adopt limits on the volatile organic compound (VOC) content of paint removers, wood preservatives, solvents and other chemical preparation materials. Therefore, the designer should determine the local restrictions and eliminate prohibited materials. It may be necessary to specify locally available commercial products which have been developed to meet local restrictions.

The requirements for Contractor test report responsibilities should be modified regarding exempt materials.

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The procedures proposed for the accomplishment of the work must provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, and coordination with other work in progress. Submit the names, quantity represented, and intended use for proprietary brands of materials proposed to be substituted for the specified materials when the required quantity of a particular batch is 200 liters 50 gallons or less. Submit manufacturer's current printed product description, safety data sheets (SDS) and technical data sheets for each product. Provide detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing and drying times for each product submitted. Include in the work plan a Safety and Health plan describing procedures for handling monitoring, and disposition of VOCs and other hazardous and toxic materials. Submit [one copy] [[_____] copies] of the Work Plan and a certificate stating that products proposed for use meet the VOC regulations of the local Air Pollution Control Districts having jurisdiction over the geographical area in which the project is located. Include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations. Test the materials designated by the Contracting Officer.

1.3 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the

Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.
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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Work Plan; G[, [_____]]

Materials

Qualifications

SD-07 Certificates

Work Plan

1.4 QUALITY ASSURANCE

Perform work in compliance with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in the CONTRACT CLAUSES. Include analyses of the potential impact of surface preparation operations on personnel and on others involved in and adjacent to the work zone in the Activity Hazard Analysis.

1.4.1 Worker Exposures

Do not expose workers to chemical substances exceeding limits as established by ACGIH 0100.

1.4.2 Training

Inform workers, having access to an affected work area, of the contents of the applicable SDS and of potential health and safety hazard and protective controls associated with materials used on the project. An affected work area is one which may receive dust, mists, and odors from the surface preparation operations. Workers involved in surface preparation and clean-up must be trained in the safe handling and

application, and the exposure limit, for each material which the worker will use in the project. Instruct personnel having a need to use respirators and masks in the use and maintenance of such equipment.

1.4.3 Coordination

Coordinate work to minimize exposure of building occupants, other Contractor personnel, and visitors to mists and odors from surface preparation and cleaning operations.

1.4.4 Qualifications

Provide qualified workers trained and experienced in the preparation for painting of wood and metal surfaces in historic structures, submit documentation of 5 consecutive years of work of this type and a statement certified by the Contractor attesting that the experience and qualifications of the workers (journeymen) comply with the specifications.. Provide a list of similar jobs identifying when, where, and for whom the work was done and a current point-of-contact for identified references.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver paint removers, solvents, and other chemicals, used for surface preparation, in sealed containers that legibly show the designated name, formula or specification number, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Furnish such materials in containers not larger than 20 L 5 gallons; store them in accordance with the manufacturer's written directions; and, as a minimum, store them off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors and at temperatures between 4 and 35 degrees C 40 and 95 degrees F.

1.6 ENVIRONMENTAL REQUIREMENTS

Unless otherwise recommended by the product manufacturer, provide an ambient temperature between 7 and 35 degrees C 45 and 95 degrees F when applying paint removers, solvents, or other preparation materials.

PART 2 PRODUCTS

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NOTE: When the required quantity of a particular material is 200 liters 50 gallons or less, the factors of time, value of material versus cost of testing, and the end use of material may justify acceptance on the basis of manufacturer's data.

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2.1 PAINT REMOVERS

Provide chemical paint removers that are a commercial item specifically manufactured for the type of paint to be removed.

2.2 EPOXY CONSOLIDANTS

2.2.1 Liquid Consolidant

Provide liquid wood consolidant consisting of a 2-part, low-viscosity liquid epoxy that meets the criteria of Table 1.

2.2.2 Epoxy Paste

Provide epoxy paste consisting of a 2-part, thixotropic paste that meets the criteria of Table 1.

TABLE 1		
	LIQUID CONSOLIDANT	EPOXY PASTE
Properties	Low-Viscosity Liquid	No-Slump, Thixotropic Paste
Toxicity	Low	Very Low
Toxicity Cured	Non-Toxic	Non-Toxic
Ratios	1:1 by Volume	1:1 by Volume
Pot Life @ Room Temp.	30 minutes min.	50 minutes min
Hardening @ Room Temp.	1 hr. or longer	1 hr. or longer
Hardening @ 60 deg. C 140 deg. F	16 min. or less	18 min. or less
Viscosity Poises @ 22 deg. C 72 deg. F	4.7 max.	Thixotropic paste
Solids	95 percent min.	98 percent min.
Tensile Strength	27.6 MPa4000 psi	17.25 MPa2500 psi
Elongation	50 percent	4 percent
Compressive Strength		
Failure	131 MPA19,000 psi	---
Yield	24 MPa3500 psi	38 MPa5500 psi

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Use methods for preparation of historic wood and metal surfaces for painting which are the gentlest possible to achieve the desired results. Do not damage or marr substrate materials in the process of surface preparations. Collect and analyze samples of the existing paint finishes for the purpose of documentation or matching, if [so directed by the Contracting Officer] [required by the contract documents.] Material and application requirements for paints are covered in Section 09 90 00 PAINTS AND COATINGS.

3.2 VENTILATION

Ventilate interior work zones, having a volume of 280 cubic meters 10,000 cubic feet or less, at a minimum of 2 air exchanges per hour. Maintain ventilation in larger work zones by means of mechanical exhaust. Exhaust solvent vapors outdoors, away from air intakes and workers. Temporarily seal return air inlets in the work zone before start of work until the prepared surfaces have dried. Operators and personnel in the vicinity of paint removal processes involving chemicals or mechanical action (sanding or blasting) must wear respirators.

3.3 PROTECTION OF AREAS NOT TO BE PAINTED

Remove or protect items not to be painted, which are in contact with or adjacent to painted surfaces, prior to surface preparation and painting operations. Replace items removed prior to painting when painting is completed. Following completion of painting, reinstall removed items. Restore surfaces contaminated by preparation materials to original condition.

3.4 CLEANING OF SURFACES

Provide surfaces that are clean and free of grease, dirt, dust and other foreign matter before application of paint or surface treatments. After cleaning, exhibit a surface disfigurement rating of 7 or greater when evaluated in accordance with ASTM D3274. Clean dirt and surface contaminants by brush with solutions of water and detergent or trisodium phosphate, then rinsed clean with water and let dry. Clean surfaces on which mildew or other microbiological growth is present with a detergent solution containing household bleach. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Provide low toxicity cleaning solvents with a flashpoint in excess of 38 degrees C 100 degrees F. Program cleaning so that dust and other contaminants will not fall on newly prepared or newly painted surfaces.

3.5 EXISTING PAINT

Test existing paint for adhesion to substrate in accordance with ASTM D3359, Test Method A and obtain a rating of 4 or better in order to be considered sound. Existing paint meeting this requirement may be considered a satisfactory base for repainting.

3.6 PAINT REMOVAL

Remove flaking, cracking, blistering, peeling or otherwise deteriorated paint by scraping with hand scrapers. After scraping, remove large areas of paint or paint on architectural details using sanders, heat guns or heat plates, or chemical paint removers. Remove paint to bare substrate or first sound paint layer. Do not use open flame heat devices. Mechanical paint removal must not damage or mar the substrate material.

3.6.1 Chemical Paint Removers

Use chemical paint removers in accordance with manufacturer's recommendations. If chemical strippers are used, neutralizesubstrate to a pH of 5 to 8.5 after stripping.

3.6.2 Lead Paint

In preparation of lead-based painted surfaces for repainting, follow the procedures described in Section 02 83 00 LEAD REMEDIATION.

3.7 SURFACE PREPARATION

After cleaning and removal of deteriorated paint, feather and sand edges of remaining chipped paint. Repair damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls with suitable material to match adjacent undamaged areas. Roughen slick surfaces. Clean rusty metal surfaces in accordance with [SSPC SP 1] [SSPC SP 2] [SSPC SP 3] [SSPC SP 5/NACE No. 1] [SSPC SP 6/NACE No.3] [SSPC 7/NACE No.4] [SSPC SP 10/NACE No. 2]. Remove chalk so that when tested in accordance with ASTM D4214, the chalk resistance rating is no less than 8. Provide new, proposed coatings that are compatible with existing coatings. If existing surfaces are glossy, reduce the gloss.

3.8 WOOD SURFACES

Clean wood surfaces of foreign matter. Prime or touch up surfaces adjacent to surfaces to receive water-thinned paints before applying water-thinned paints. Scrape and clean small, dry seasoned knots, and give a thin coat of commercial knot sealer before application of the priming coat. Scrape off pitch on large, open, unseasoned knots and all other beads or streaks of pitch, or, if it is still soft, remove with mineral spirits or turpentine, and thinly coat the resinous area with knot sealer.

3.8.1 Interior Wood Surfaces

Sand interior wood surfaces to receive stain. Give oak and other open-grain wood to receive stain a coat of wood filler recommended by the finish manufacturer not less than 8 hours before the application of stain; remove excess filler and sand the surface smooth. Sanding of wood floors is specified in Section 09 64 29 WOOD STRIP AND PLANK FLOORING. Moisture content of the wood must not exceed 12 percent as measured by a moisture meter, unless otherwise authorized.

3.8.2 Wood Repair

Remove and repair badly decayed areas. Replace areas and pieces decayed beyond repair with new pieces that match originals in all respects. Patch moderately decayed areas, weathered, or gouged wood with approved patching compounds, and sand smooth. Identify and correct the source or cause of wood decay prior to application of patching materials. Completely dry wet wood to a moisture content not exceeding 12 percent, as measured by a moisture meter, to its full depth before patching, unless otherwise authorized. Wood that is to be patched must be clean of dust, grease, and loose paint.

3.8.2.1 Epoxy Wood Repair

Apply epoxy wood repair materials in accordance with manufacturer's written instructions. Follow health and safety instructions in accordance with the manufacturer's instructions. Use clean mixing equipment to avoid contamination. Provide mix and proportions as directed by the manufacturer. Provide batches large enough to complete the specific job intended. Completely cure batching materials before painting or

reinstallation of patched pieces.

3.8.2.2 Epoxy Consolidant and Epoxy Paste

Use epoxy liquid wood consolidant: 1) to penetrate and impregnate deteriorated wood sections in order to reinforce wood fibers that have become softened or absorbent. 2) as a primer for areas that are to receive epoxy paste filler. Use epoxy paste to fill areas where portions of wood are missing such as holes, cracks, gaps, gouges, and other voids.

3.8.3 Exposed Ferrous Metals

Spot-prime exposed ferrous metals such as nail heads on or in contact with wood surfaces to be painted with water-thinned paints, with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.8.4 Finishing Nails

Set finishing nails, and prime all holes and surface imperfections. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler, colored to match the finish coat if natural finish is required, allowed to dry, and sanded smooth. Putty or wood filler must be compatible with subsequent coatings.

3.8.5 Wood Preservative

Treat areas of bare wood in exterior locations prone to excessive moisture or standing water with a commercial, fungicide, paintable water repellant/preservative. Do not use water repellant/preservatives on interior surfaces.

3.9 METAL SURFACES

Clean metal surfaces of foreign matter. Prepare metal in accordance with SSPC PA Guide 5. Remove grease, oil, and other soluble contaminants by solvent cleaning in accordance with SSPC SP 1. Surfaces must be free from soils and corrosion; e.g. grease, oil, solder flux, welding flux, weld spatter, sand, rust, scale, and other contaminants that might interfere with the application of the new finish. Gently clean to achieve the desired result. Do not abrasively clean metals which are soft, thin, or exhibit fine detail. Evidence of corrosion or contamination on a previously cleaned surface must be cause for recleaning prior to painting.

3.9.1 Ferrous Surfaces

Mechanically clean surfaces that contain loose rust, loose mill scale, and other foreign substances with hand tools according to SSPC SP 2, power tools according to SSPC SP 3 or by blast cleaning according to [SSPC SP 5/NACE No. 1], [SSPC SP 6/NACE No.3], [SSPC 7/NACE No.4], [SSPC SP 10/NACE No. 2]. Protect shop-coated ferrous surfaces from corrosion by treating and touching up corroded areas immediately upon detection.

3.9.2 Nonferrous Metallic Surfaces

Solvent-clean galvanized, aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces in accordance with SSPC SP 1.

3.9.2.1 Aluminum

Treat aluminum surfaces in accordance with ASTM D173/D173M or ASTM D173/D173M. Do not use steel wool, steel brushes and uninhibited caustic etching solutions, such as sodium hydroxide, on aluminum.

3.9.2.2 Zinc

Clean zinc surfaces including zinc-coated substrates prior to painting as follows: degrease, soak in a mild and inhibited alkaline cleaner, rinse with clean overflowing water, clean anodically in an acid (e.g. 0.25 to 0.75 percent sulfuric acid), and rinse with clean overflowing water.

3.10 TIMING

Give surfaces that have been cleaned, pretreated, and otherwise prepared for painting a coat of the specified first coat as soon as practical after such pretreatment has been completed, but prior to any deterioration of the prepared surface. Unless otherwise directed, applythe first coat primer within 48 hours of surface preparation.

3.11 SURFACES TO BE PREPARED FOR PAINTING

Prepare surfaces as specified and as shown in the painting schedule [in Section 09 90 00 PAINTS AND COATINGS] [on the drawings].

3.12 CLEANING

Place cloths, cotton waste and other debris, that might constitute a fire hazard, in closed metal containers for removal at the end of each day. Remove containers from the site or destroy in an approved manner. Remove preparation materials and other deposits on adjacent surfaces and leave the entire job clean and ready for painting.

-- End of Section --