

Process Specification for the Application of Thermal and Corrosion Control Paints and Coatings

Engineering Directorate

Structural Engineering Division

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E	Minor grammatical changes	06/2010
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1.0 SCOPE

This process specification establishes the technical requirements for the application of thermal and corrosion control paints and coatings to flight hardware, ground support equipment (GSE), and models manufactured by JSC.

2.0 APPLICABILITY

This process specification applies to the application of thermal and corrosion control paints and coatings. Paints listed in the table in section 3.0 are acceptable for use in flight hardware, both in habitat and external environments.

3.0 USAGE

This process specification shall be called out on the engineering drawing by using a drawing note that identifies the primer and topcoat, if applicable. For example:

PRIME WITH {xxx} PRIMER AND TOPCOAT WITH {yyy} COATING PER NASA/JSC PRC-4002.

Some standard primers and coatings and their standard thicknesses are defined in section 6.5. The engineering drawing shall include a note with the additional information when nonstandard primers and coatings are selected, or if a specific thickness or number of coats is required. For example:

COATING THICKNESS SHALL NOT EXCEED ZZZ.

In addition to the specification callout, a description of the paint/primer material shall be included in the parts list on the engineering drawing according to the following examples:

Table 1: Standard Primers & Coatings

Part number	Description	Material	Specification
Super Koropon 515-700	Epoxy Primer Base		
Super Koropon 515-700/910-704	Epoxy Primer		
Aeroglaze A276	White Topcoat		

Aeroglaze A382	Black/Glossy Topcoat		
Aeroglaze Z306	Black/Flat Topcoat		
Aeroglaze 9741/9700	Epoxy Primer		
Aeroglaze 9743/9700	Epoxy Primer		
Pre Desoto 17925	White Topcoat		
Pre Desoto 17038	Black/Glossy Topcoat		
Preservo VPP-702	Primer		
Preservo 17925 <i>CP-500 Series</i>	White/Glossy Topcoat		
Preservo 37925 <i>CP-500 Series</i>	White/Flat Topcoat		
Preservo 37038 <i>CP-500 Series</i>	Black/Flat Topcoat		
Preservo 25102 <i>CP-500 Series</i>	Blue/Semigloss Topcoat		
Preservo 13538 NL <i>CP-500 Series</i>	Yellow/Glossy Topcoat		

When Super Koropon Primer is used without the curing solution, it is called "Super Koropon Primer Base." The primer base dries but does not cure if used by itself. This allows fasteners and faying surfaces to be disassembled. This option may be used when fasteners are wet-installed per PRC-4004. Super Koropon Primer (both primer base and curing solution) are manufactured by Courtaulds Aerospace. Drawings shall reference the following information:

Courtaulds Aerospace
Glendale, CA 91203
CAGE Code 83574

The product labeling of the Aeroglaze 9700 series products has changed. Aeroglaze 9741/9700 and Aeroglaze 9743/9700 are manufactured by the Lord Corporation. The Part B (hardener) for Aeroglaze 9741 and 9743 is now designated Aeroglaze 9700. These Aeroglaze products are manufactured by the Lord Corporation. Drawings shall reference the following information:

Lord Corporation
 Cary, NC 27512
 CAGE Code 9J509

The Preservo paints that are listed in Table 1 are considered to be standard and may be used in spaceflight hardware. Preservo now lists an extension on their part numbers. The designation «L» indicates that the paint contains lead and «NL» indicates no lead. These primers are manufactured by Preservo Corporation. Drawings shall reference the following information:

Preservo Paints
 Houston TX 77047
 CAGE Code 53346

Nonstandard paints or primers (those not listed above) may be used, but should be reviewed and approved in advance by Materials and Processes Branch (ES4) personnel.

When primer or topcoats are intentionally removed during the fabrication sequence, such as when match drilling for bolts, re-painting of the fresh metal surfaces is not required when wet installation of fasteners or touch-up alodine is to be implemented.

3.1 WORK INSTRUCTIONS

Work instructions shall be generated for implementation of this process specification. The work instructions shall contain sufficient detail to ensure that the manufacturing process produces consistent, repeatable products that comply with this specification.

4.0 REFERENCES

ANSI/NCSL Z540-1	<i>Calibration Laboratories and Measuring and Test Equipment General Requirements</i>
JPG 8500.4	<i>Engineering Drawing System Manual</i>
MIL-F-18264D	<i>Military Specification, Finishes, Organic, Weapon Systems, Application and Control of</i>

MIL-P-23377G

*Primer Coatings: Epoxy, High Solids***5.0 MATERIAL REQUIREMENTS****5.1 PAINT STORAGE AND SHELF-LIFE ISSUES**

The out-time and shelf-life of the material shall not exceed the shelf-life requirements specified by an applicable Material Data Sheet (MDS). Traceable out-time and shelf-life records shall be kept for those materials where the MDS specifies limits. A re-qualification of the material shall be accomplished in a manner prescribed by the MDS if the material out-time or shelf-life exceeds the MDS specifications. The paint manufacturer's instructions shall be used, which is one year from shipment in most cases, in the absence of a specific MDS.

5.2 MATERIALS SAFETY ISSUES

All paints and associated materials shall be handled in accordance with applicable Material Safety Data Sheets (MSDS's). All requisite safety precautions shall be taken by painting personnel with regard to toxicity and industrial health hazards. The spray gun shall be properly grounded to prevent explosion or fires caused by static discharges prior to paint spraying.

6.0 PROCESS REQUIREMENTS**6.1 SURFACE PREPARATION**

The meticulous cleaning of the hardware surface cannot be overemphasized, since this factor is of prime importance in obtaining adequate paint finish. Reclaimed paint thinner shall not be used, since these materials may leave a grease film that could prevent proper paint adhesion. All abrasive or cutting particles shall be removed after hardware manufacture before painting begins. The surface to be painted shall be cleaned in an appropriate manner using isopropyl alcohol (IPA), Methyl Ethyl Ketone (MEK), or other equivalent cleaner.

Parts shall be painted immediately after cleaning so the application is to a water-break free surface. Parts must be re-cleaned if there is a break in the painting schedule that is overnight or longer.

Primer must be applied to alodined parts within 48 hours of the alodine process.

6.2 PAINT APPLICATION

Unless otherwise specified, paint or primer may be applied by spraying, brushing, tumbling, roller coating, flow coating, or any other approved method which ensures a smooth continuous film that is free from defects such as dried overspray, runs, sags, blisters, or orange peels. The use of dipping of paint or primer has such a deleterious effect on the quality of the finish that it is expressly prohibited. Prior to paint application by a spray gun, safety precautions with regard to grounding, as prescribed in 5.0 shall be strictly enforced. Standard primers include Super Koropon and Aeroglaze Primer. Standard topcoats include Aeroglaze, Pre Desoto, and Preservo.

6.3 CURE SCHEDULE

Curing time or other parameters required for application are prescribed by the applicable MDS, unless otherwise specified by the drawing or CAD model. Contractors shall obtain applicable MDS documentation from the originating activity before processing.

6.4 FACILITIES AND EQUIPMENT

Painting facilities shall be continuously maintained between 67 and 75°F with a relative humidity between 30 to 50%. All applicable temperature and humidity measurement instrumentation shall be made with calibrated devices. Paint spray guns may be used when applicable.

6.5 COATING SPECIFIC REQUIREMENTS

An epoxy primer, such as Super Koropon, shall be applied in such a way that one layer of primer is in the range of 0.0006-0.0009 in. thick. The minimum thickness for Aeroglaze, Pre Desoto, and Preservo topcoats is 0.0015 to 0.0020 inches. A contraction in paint thickness of 0.0001 to 0.0002 shall be anticipated during drying.

A second coat may be applied after 45 minutes, but must be done within 96 hours. A part sitting overnight or longer must be re-cleaned. The optimal time to recoat can be found on the MDS.

7.0 PROCESS QUALIFICATION

Process qualification for painting is not required by this specification. However, work instructions shall be generated according to section 3.1 of this specification.

8.0 PROCESS VERIFICATION

All painting applied according to this process specification shall be visually inspected for uniformity and absence of scratches. The part surfaces to be painted shall be indicated on the engineering drawing. Failure to meet any of the requirements specified herein shall be cause for rejection and will be documented according to NASA/JSC SR&QA procedures.

9.0 TRAINING AND CERTIFICATION OF PERSONNEL

All painting and coating operations shall be performed by qualified operators. Training and certification records shall be kept. These requirements shall be satisfied by the training and certification of personnel per the 4000 series Detailed Process Instructions (DPI's) for work performed at JSC facilities,

10.0 DEFINITIONS

Blisters	Bubbles or pimples on the painted surface
Curing time	Time to achieve full cure of epoxy primers/paints
Orange peels	Film roughness that is a result of poor application
Runs	Blemishes caused by excessive flow of the coating
Sags	Too much flow during application