

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

Engineering Directorate

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

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	REVISION BLOCK	
VERSION	CHANGES	DATE
Baseline	Original version	4/15/96
A	Revision to agree with shop practices.	7/7/97
B	Reformatted, drawing notes added, standard topcoats defined, reference added, waterbreak free surface required, primer must be applied in 48 hrs of alodine process, common paint thickness given, timing on second coat, and definitions added.	8/21/01
C	Updated signatures, general review, changed typo of Super Koropon part number.	2/2004
D	Reviewed for accuracy. Updated list of standard primers and topcoats in the section 3.0 parts list table, added cage code information for vendors to section 3.0.	7/2006
E	Minor grammatical changes	06/2010
F	In Table 1, removed empty specification column (NASA uses manufacturer's spec) and filled out material column. Updated distributors in section 3.0, Socomore from historical Lord Corporation for aeroglaze coatings, PPG PRC DeSoto from historical PRC DeSoto and Courtaulds Aerospace for DeSoto and Koropon coatings, respectively. Added drawing callouts for Socomore and PPG PRC DeSoto. In section 4.0, updated document revisions and replaced obsolete ANSI/NCSL Z540-1 with ANS/ISO/IEC 17025:2017 and ANSI/NCSL Z540.3-2006. Also added ASTM D-3359, Standard Test Methods for Rating Adhesion by Tape Test. In section 5.1, added Technical Data Sheet (TDS) terminology. In section 6.1, added clarification on surface preparation to achieve a water-break-free surface. In section 6.4, replaced temperature and relative humidity specifications with manufacturer's requirements; In section 6.5, added Table 2 on coating thickness and reference to adhesion tape testing ASTM D-3359 Standard. Updated Material Safety Data Sheet (MSDS) terminology to Safety Data Sheets (SDS's).	05/2020

Verify correct version before use.

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
Super Koropon 515-700	Epoxy Primer Base	Epoxy
Super Koropon 515-700/910-704	Epoxy Primer	Epoxy
Aeroglaze A276	White Topcoat	Polyurethane coating
Aeroglaze A382	Black/Glossy Topcoat	Polyurethane coating

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Aeroglaze Z306	Black/Flat Topcoat	Polyurethane coating
Aeroglaze 9741/9700	Epoxy Primer	Two-part Epoxy
Aeroglaze 9743/9700	Epoxy Primer	Two-part Epoxy
PPG PRC DeSoto 17925	White Topcoat	Polyurethane coating
PPG PRC DeSoto 17038	Black/Glossy Topcoat	Polyurethane coating
Preservo VPP-702	Primer	Vinyl Phenolic Primer
Preservo 17925 <i>CP-500 Series</i>	White/Glossy Topcoat	Urethane Coating
Preservo 37925 <i>CP-500 Series</i>	White/Flat Topcoat	Urethane Coating
Preservo 37038 <i>CP-500 Series</i>	Black/Flat Topcoat	Urethane Coating
Preservo 25102 <i>CP-500 Series</i>	Blue/Semigloss Topcoat	Urethane Coating
Preservo 13538 NL <i>CP-500 Series</i>	Yellow/Glossy Topcoat	Urethane Coating

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.

PPG PRC DeSoto now distributes Super Koropon (primer base and curing solution), as well as distributing PRC DeSoto paints after the acquisition of PRC- DeSoto. Drawings shall reference the following information:

PPG Aerospace
 PRC-DeSoto 12780
 San Fernando Road
 Sylmar, CA 91342
 CAGE CODE 1MEX7

Or

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DeSoto Aerospace Coatings Incorporated
1608 4th Street
P.O. Box N/K
Berkeley, Ca 94710
Cage Code: 85570

Labeling of the Aeroglaze 9700 series products has been updated. Current product designations include Aeroglaze 9741/9700 and Aeroglaze 9743/9700 The Part B (hardener) for Aeroglaze 9741 and 9743 is designated as Aeroglaze 9700. Aeroglaze products are distributed by Socomore. Drawings shall reference the following information:

Socomore
5475 East State Highway 114
Rhome, TX 76078.
Cage Code: 1MFE1

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. NL is required for NASA applications. 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

ANS/ISO/IEC 17025:2017 <i>calibration laboratories</i>	<i>General requirements for the competence of testing and calibration laboratories</i>
ANSI/NCSL Z540.3-2006 <i>Equipment</i>	<i>Requirements for the Calibration of Measuring and Test Equipment</i>
NASA JPG 8500.4 F <i>Requirements, and Procedures</i>	<i>Engineering Drawing System Manual Drawing Format, Requirements, and Procedures</i>
MIL-F-18264E <i>Application and Control of</i>	<i>Military Specification, Finishes, Organic, Weapon Systems, Application and Control of</i>
MIL-PRF-23377K	<i>Primer Coatings: Epoxy, High Solids</i>
ASTM D-3359 Tape	Military Standard Test Methods for Rating Adhesion by Test

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) or Technical Data Sheet (TDS). Traceable out-time and shelf-life records shall be kept for those materials where the MDS or TDS specifies limits. A re-qualification of the material shall be accomplished in a manner prescribed by the MDS or TDS if the material out-time or shelf-life exceeds the specifications. The paint manufacturer’s instructions shall be used in the absence of a specific MDS or TDS.

5.2 MATERIALS SAFETY ISSUES

All paints and associated materials shall be handled in accordance with applicable Safety Data Sheets (SDS’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) or other equivalent cleaner, such as Methyl Ethyl Ketone (MEK) when applicable.

Parts shall undergo surface preparation to achieve a water-break-free (WBF) surface and be painted immediately after surface preparation. Surface preparation shall be repeated on the parts if there is a break in the painting schedule that is overnight or longer.

Primer should be applied to alodined parts within 24 hours. The time period from alodine application to primer application shall not exceed 48 hours.

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 5.2, 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 at the temperature and a relative humidity per the manufacturer's requirements. If not otherwise stated by the manufacturer, the painting facilities shall be continuously maintained between 67 and 75 °F with a relative humidity between 30 to 60%. All applicable temperature and humidity measurement shall be made with calibrated instrumentation. 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 (see Table 2). The minimum thickness for Aeroglaze, Pre Desoto, and Preservo topcoats is 0.0015 to 0.0020 inches (see Table 2). A contraction in paint thickness of 0.0001 to 0.0002 shall be anticipated during drying.

Table 2: Standard Primers & Coatings Thickness Requirements

Coating	Coating Type	Thickness
Super Koropon	epoxy primer	0.0006-0.0009 in. acceptable range
Aeroglaze	topcoat	0.0015-0.0020 inches minimum
Pre Desoto	topcoat	0.0015-0.0020 inches minimum
Preservo	topcoat	0.0015-0.0020 inches minimum

A second coat may be applied after 45 minutes but must be completed within 96 hours of the application of the first coat. For coating applications that include test coupons, adhesion tape testing will be conducted per ASTM D-3359, Standard Test Methods for Rating Adhesion by Tape Test. 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**

Document 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