

NOT MEASUREMENT SENSITIVE

MIL-T-704K
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SUPERSEDING
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MILITARY SPECIFICATION

TREATMENT AND PAINTING OF MATERIEL

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers materials to be used and procedures to be followed in cleaning, treating, and painting of materiel to provide protection against rust, corrosion, and deterioration.

1.2 Classification. The treatment and painting shall be of the following types as specified in the end item specification:

- | | |
|----------|--|
| Type A - | General. For use where other types are not specified. |
| Type B - | For water immersion and salt air exposure. |
| Type C - | For a one-coat finish for refinishing or warehouse storage. |
| Type D - | High humidity, fast schedule system. |
| Type E - | High humidity, fast schedule, lacquer finish. |
| Type F - | For use on ferrous metals where chemical agent resistance is required, or for greater durability. |
| Type G - | For use on nonferrous metals where chemical agent resistance is required, or for greater durability. |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: SATBE-TSE, Fort Belvoir, VA 22060-5606 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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AMSC N/A

FSC 8010

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

- | | |
|-----------|---|
| QQ-P-416 | - Plating, Cadmium (Electrodeposited). |
| TT-C-490 | - Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings. |
| TT-E-485 | - Enamel, Semigloss, Rust-Inhibiting. |
| TT-E-489 | - Enamel, Alkyd, Gloss, Low VOC Content. |
| TT-E-527 | - Enamel, Alkyd, Lusterless, Low VOC Content. |
| TT-E-529 | - Enamel, Alkyd, Semi-gloss, Low VOC Content. |
| TT-P-28 | - Paint, Aluminum, Heat Resisting (1200 °F). |
| TT-P-645 | - Primer, Paint, Zinc-Molybdate, Alkyd Type. |
| TT-P-664 | - Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC Compliant. |
| TT-P-1757 | - Primer Coating, Zinc Chromate, Low-Moisture Sensitivity. |

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| MIL-B-2427 | - Box, Ammunition Packing, Wood, Nailed. |
| MIL-M-3171 | - Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on. |
| MIL-S-5002 | - Surface Treatments and Inorganic Coatings for Metal Surfaces of Weapons Systems. |
| MIL-C-5541 | - Chemical Conversion Coatings on Aluminum and Aluminum Alloys. |
| MIL-C-8514 | - Coating Compound, Metal Pretreatment, Resin-Acid. |
| MIL-A-8625 | - Anodic Coatings, for Aluminum and Aluminum Alloys. |
| MIL-P-14105 | - Paint, Heat-Resisting (for Steel Surfaces). |
| DOD-P-15328 | - Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric). |
| MIL-P-15931 | - Paint, Antifouling, Vinyl (Formulas No. 121, 121A, 129, and 129A). |
| MIL-C-22750 | - Coating, Epoxy, VOC-Compliant. |
| MIL-P-23377 | - Primer Coatings: Epoxy, Chemical and Solvent Resistant. |
| MIL-P-24441 | - Paint, Epoxy-Polyamide, General Specification For. |
| MIL-E-24635 | - Enamel, Gray, Silicone Alkyd Copolymer Semigloss (for Exterior Use) (Metric). |
| MIL-C-46168 | - Coating, Aliphatic Polyurethane, Chemical Agent Resistant. |
| MIL-L-52043 | - Lacquer, Semi Gloss, Cellulose Nitrate. |
| MIL-P-53022 | - Primer, Epoxy Coating, Corrosion Inhibiting, Lead and Chromate Free. |
| MIL-P-53030 | - Primer Coating, Epoxy, Water Reducible, Lead and Chromate Free. |

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- MIL-C-53039 - Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant.
- MIL-P-53084 - Primer, Cathodic Electrodeposition, Chemical Agent Resistant.
- MIL-P-85582 - Primer Coatings: Epoxy, Waterborne.

STANDARDS

MILITARY

- MIL-STD-889 - Dissimilar Metals.

FEDERAL

- FED-STD-595 - Colors Used in Government Procurement.

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM D 4956 - Sheeting, Reflective, for Traffic Control.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103.)

AMERICAN WOOD PRESERVERS BUREAU (AWPB)

- AWPB Standard LP-2 - Standard for Softwood Lumber, Timber and Plywood Pressure Treated with Water-Borne Preservatives for Above Ground Use.
- AWPB Standard LP-22 - Standard for Softwood Lumber, Timber and Plywood Pressure Treated with Water-Borne Preservatives for Ground Contact Use.

(Application for copies should be addressed to the American Wood Preservers Bureau, P.O. Box 6085, 2772 S. Randolph Street, Arlington, VA 22206).

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

- SSPC-SP5 - White Metal Blast Cleaning.
- SSPC-SP6 - Commercial Blast Cleaning.
- SSPC-SP10 - Near-White Blast Cleaning.

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(Application for copies should be addressed to the Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh, PA 15213.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Cleaning. Unless otherwise specified in the end item specification, cleaning procedures shall be in accordance with TT-C-490 or as described herein. Cleaning may be accomplished by:

- a. Chemical methods such as solvent cleaning, alkaline cleaning, acid cleaning, pickling, descaling with hydride, or paint stripping; or,
- b. Electrochemical cleaning methods such as electrolyte alkaline, electropolishing, or electrolytic pickling; or,
- c. Mechanical means such as blasting, chipping, wire brushing, or grinding.

After cleaning, all surfaces shall be kept free from dirt, dust, finger marks, and other contaminants, until treated as specified in 3.2.

3.1.1 Ferrous metal surfaces. Ferrous metal surfaces to be painted shall be cleaned in accordance with 3.1. Where blasting is appropriate, blast in accordance with Steel Structures Painting Council (SSPC) SSPC-SP6 unless SSPC-SP5 or SSPC-SP10 is specified (see 6.2), to remove mill scale, products of corrosion, dirt, casting sand slag, and other foreign substances. (For further information, see Steel Structures Painting Council Manual, Volume 2.) Prior to blasting, the surface shall be cleaned as specified in 3.1 to insure that it is free from all oil and grease. The blasting medium shall be kept free from oil, grease, dirt or any other material that could contaminate the surface. Oil and grease contamination resulting from fabrication, machining, or handling subsequent to cleaning shall be removed in accordance with the appropriate method of TT-C-490. Blast cleaned surfaces shall be pretreated within four hours, and then given a prime coat as soon as possible.

3.1.1.1 Exemptions from abrasive blasting. Blasting shall not be used on surfaces which could be damaged by blasting, such as machined parts or sheet metal thinner than 16 gage (0.0625 inch), or on components containing such surfaces unless protective masking has been applied. Blasting is optional on components of equipment which are painted for protection during limited storage and from which the paint will be worn off immediately when the equipment is placed into use (see 6.4). However, these surfaces shall be dry and free from oil, grease, dirt, and rust.

3.1.1.2 Vehicles. Ferrous metal surfaces of vehicles (see 6.5) shall be cleaned for painting in accordance with 3.1.1 except as specified herein. Surfaces that cannot be cleaned by blasting may be cleaned to base metal by such alternate means as three dimensional/abrasive cleaning, chipping, powered wire brushing, or grinding to the required degree specified for commercial sand blasting. Sheet metal and sheet metal parts of 8 gage (0.164 inch) and thinner may be cleaned to bare metal by

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acid pickling in accordance with TT-C-490, with a maximum of five percent sulfuric acid included. However, chemical cleaning may not be approved for use on assemblies which may entrap acid/alkali, or when for any reason chemical cleaning is considered inadvisable. Old paint may be removed from vehicles requiring repainting by the use of a paint remover.

3.1.2 Zinc surfaces. Zinc surfaces, including zinc-coated substrates, shall be cleaned prior to painting as follows: degrease, soak in a mild and inhibited alkaline cleaner, rinse with clean overflowing water, clean anodically in an inhibited alkaline solution, hot rinse, cold rinse, neutralize in an acid (e.g., 0.25 to 0.75 percent sulfuric acid), and rinse with clean overflowing water. This shall be followed immediately by treatment as specified in 3.2.1.

3.1.3 Aluminum and aluminum alloy surfaces. Aluminum and aluminum alloys shall be cleaned in accordance with 3.1, followed immediately by treatment as specified in 3.2.2.

3.1.4 Magnesium alloy surfaces. Magnesium alloy surfaces shall be cleaned in accordance with MIL-M-3171.

3.1.5 Cadmium surfaces. Cadmium surfaces shall be cleaned in accordance with QQ-P-416, followed immediately by treatment as specified in 3.2.1.

3.1.6 Wood surfaces. Wood surfaces to be painted shall be dry and cleaned of all dirt, oil, grease, and other foreign substances with an aliphatic hydrocarbon solvent, for example, mineral spirits.

3.1.7 Cleanliness. After cleaning, all surfaces shall be kept free from dirt, dust, finger marks, and other contaminants until treated as specified in 3.2.

3.2 Treatment.

3.2.1 Ferrous metal, zinc or cadmium surfaces. Ferrous metal and zinc or cadmium surfaces shall be treated as soon as possible after cleaning as specified in 3.1 as follows:

- a. With an organic wash pretreatment conforming to DOD-P-15328 or MIL-C-8514; or,
- b. With a zinc phosphate chemical conversion coating in accordance with TT-C-490, type I.

Any evidence of rust or contamination on a previously cleaned surface shall be cause for recleaning prior to pretreating.

3.2.2 Aluminum surfaces. Aluminum surfaces shall be treated as soon as possible after cleaning as specified in 3.1 as follows:

- a. With an organic wash pretreatment conforming to DOD-P-15328 or MIL-C-8514; or,
- b. In accordance with MIL-A-8625 or MIL-C-5541.

Any evidence of corrosion or contamination on a previously cleaned surface shall be cause for recleaning prior to pretreating.

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3.2.3 Magnesium alloy surfaces. Prior to painting, magnesium alloy surfaces shall be treated in accordance with MIL-M-3171, type I or III. Treated surfaces that become scratched in handling shall be touched up in accordance with MIL-M-3171, type I.

3.2.4 Wood surfaces. Unless otherwise specified (see 6.2), wood shall be pressure-treated and marked in conformance with AWPB LP-2 for above-ground, or AWPB LP-22 for ground-contact installations, except that only ammoniacal copper arsenate, ACA, chromated copper arsenate, CCA, or ammonical copper zinc arsenate (ACZA) preservatives shall be used for treatment. Wood shall be dried to the specified moisture content (see 6.2) appropriate for the size, species, and ultimate service conditions, but in no case greater than 20 percent. Wood which will be painted shall be sealed with a polyurethane-based wood sealer in accordance with the NSN below.

TYPE	NSN	SIZE	VOC
1-component	8010-01-327-6479	5 gallon	2.05 lb/gal
1-component	8010-01-327-6480	55 gallon	
2-component	8010-01-327-5190	10 gallon	5.1 lb/gal
2-component	8010-01-327-5189	110 gallon	

3.2.4.1 Surface application. When specified (see 6.2), for repainting, or when pressure-treated material is not available, wood having a moisture content less than 20 weight percent shall be treated with a water solution of 1.8 percent copper-8-quinolinolate (oxine copper), or 3.0 percent zinc as metal, in the form of zinc naphthenate, as specified in MIL-B-2427, or 2.0 percent copper as metal in the form of copper naphthenate, except that the solution may be applied by brushing or spraying if the item is too large for immersion.

3.2.5 Hardware and hardware items. Hardware and hardware items such as bolts, capscrews, washers, pins, springs, and grease fittings are not to be cleaned and treated prior to assembly and painting if there is no evidence of rust or corrosion.

3.2.6 Corrosion-resisting steel surfaces. Corrosion-resisting steel surfaces shall be cleaned as specified in 3.1 and then treated as follows unless the corrosion-resisting steel has already been passivated and has not been contaminated or depassivated by working, forming, or shaping the end item (this process is primarily a passivating treatment for corrosion-resisting steels and not a cleaning treatment):

- a. Degrease, as specified in MIL-S-5002.
- b. Immerse for 30 minutes in a solution containing 20 percent by volume of nitric acid (sp. gr. 1.42) and 2 percent by weight of sodium dichromate at 120 to 130 °F.
- c. Rinse in clean, hot water.
- d. Immerse for 1 hour in a solution containing 5 percent by weight of sodium dichromate, at 140 to 160 °F.
- e. Rinse in clean, hot water.
- f. Rinse in final hot (160 to 210 °F) rinse maintained at pH 3 to 5 by addition of flake chromic acid or proprietary mixtures of chromic and phosphoric acid.

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Surfaces to be painted shall be treated with wash primer conforming to DOD-P-15328 or MIL-C-8514.

3.3 Painting.

3.3.1 Application. The first coat of paint or primer shall be applied to a dry, clean surface as soon as practicable after cleaning and treating the metal or wood (see 3.1 and 3.2). Coatings shall be applied in an ambient temperature of not less than 50 °F nor more than 90 °F unless within a range explicitly allowed by the material specification. Paint and surface shall be approximately the same temperature except when hot spray is used. Painting shall conform to the applicable portions of table II and shall be applied by any method which will deposit the dry film coat thickness specified in table I (dip, flow coat, brush, spray) and comply with any applicable transfer efficiency regulations. When Army camouflage is required, refer to table IIa for the various finish and primer coats to use, and these paints shall only be sprayed or brushed. The exterior topcoats are normally applied under camouflage pattern painting (CPP) guidelines in three-color patterns having a base coat of camouflage Green 383, color No. 34094 of FED-STD-595, pattern colors of Brown 383, color No. 30051 of FED-STD-595, and Black, color No. 37030 of FED-STD-595, henceforth designated Green 383, Brown 383, and Black. Panels or subassemblies pre-painted prior to final assembly shall be treated and painted as specified herein. A smooth even surface, free from runs, sags or other defects which might interfere with the application and adhesion of subsequent coats shall be provided. When painting on any portion of the coating is initiated, the complete operation, including the priming coats and the finishing coats, shall be completed as soon as practicable, allowing sufficient drying time between coats. Baked finishes, except on materials that would be adversely affected by such treatment, will be permitted if the baked finish conforms to performance requirements of the applicable paint specification.

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TABLE I. Average dry-film thickness of each applied coat.

Specification	Pretreatment coat (mils)	Prime coat	Immediate coat (mils)	Finish coat (mils) <u>1/</u>
TT-P-28	-	-	-	0.8 - 1.2
TT-E-485	-	1.0 - 1.5	-	1.0 - 1.5
TT-E-489	-	-	-	1.0 - 1.5
TT-E-527	-	-	-	1.0 - 1.5
TT-E-529	-	-	-	1.0 - 1.5
TT-P-645	-	min 2.0	-	-
TT-P-664	-	1.0 - 1.5	-	-
TT-P-1757	-	0.7 - 1.0	-	-
MIL-P-14105	-	-	-	1.5 - 2.5
DOD-P-15328	0.3 - 0.5	-	-	-
MIL-P-15931	-	-	-	min 2.0
MIL-C-22750	-	-	-	min 1.0 <u>3/</u>
MIL-P-23377	-	0.6 - 0.9 <u>2/</u>	-	-
MIL-P-24441	-	min 3.0	min 3.0	min 3.0
MIL-E-24635	-	-	-	min 2.0
MIL-C-46168	-	-	-	min 1.8 <u>3/</u>
MIL-L-52043	-	-	-	0.8 - 1.2
MIL-P-53022	-	1.0 - 1.5 <u>4/</u>	-	-
MIL-P-53030	-	1.0 - 1.5 <u>4/</u>	-	-
MIL-C-53039	-	-	-	min 1.8 <u>3/</u>
MIL-C-53084	-	1.0 - 1.5 <u>4/</u>	-	-
MIL-P-85285	-	-	-	min 2.0
MIL-P-85582	-	0.6 - 0.9 <u>2/</u>	-	-

- 1/ For Army use on exterior surfaces, green 383 shall be the base topcoat color when chemical agent resistance is required. Interior surfaces shall be painted as specified on the applicable drawings.
- 2/ For use on nonferrous metals when a chemical agent resistant topcoat will be applied.
- 3/ For use when chemical agent resistance is required.
- 4/ For use on ferrous and nonferrous metals when a chemical agent resistant topcoat will be applied.

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TABLE II. Finishing systems.

Type	Surface	Pretreatment	Primer	Coats	Intermediate	Coats 9/	Topcoat 10/	Coats 9/
A	Metal A-1 1/ A-2 2/	DOD-P-15328 5/ DOD-P-15328 7/ 3.2.4	TT-P-664 6/	1	-	-	TT-E-529	1
			TT-P-645	1	-	-	MIL-E-24635	2
			TT-P-664 6/	1	-	-	TT-E-529 11/ 12/ 13/	1
B	Metal B-1 3/ B-2 4/	-	MIL-P-24441 (formula 150)	1	MIL-P-24441 (formula 151)	1	MIL-P-24441 (formula as specified) MIL-P-15931	1
			MIL-P-24441 (formula 150)	1	MIL-P-24441 (formula 151)	1	-	2
			-	-	-	-	TT-E-485	1
C	Metal	DOD-P-15328 5/	-	-	-	-	TT-E-529	1
D	Metal	DOD-P-15328 5/	TT-P-1757 8/	1	-	-	MIL-L-52043	1
E	Metal	DOD-P-15328 5/	TT-P-1757 8/	1	-	-	MIL-C-46168 MIL-C-53039 MIL-C-22750 14/	1 1 2
F	Ferrous metal	DOD-P-15328 5/	MIL-P-53022	1	-	-	MIL-C-46168 MIL-C-53039 MIL-C-22750 14/	1 1 2
G	Non-ferrous metal	DOD-P-15328 5/	MIL-P-53022	1	-	-	-	-

1/ Lead and chromate free primers and topcoats.

2/ For marine environment.

3/ For intermittent water immersion. For salt air exposure, use MIL-C-85285 topcoat.

4/ For continuous use in sea water; not for salt air exposure.

5/ Alternates specified in 3.2 can be used interchangeably with DOD-P-15328.

6/ For Air Force consignments, type A primers may conform to TT-P-1757.

7/ Not required for Navy applications.

8/ Color optional.

9/ For Navy applications (see 6.2) in coastal and marine environments, use at least 6.0 mils total film thickness for 5 years protection for ground support equipment; for type B, use at least 9 mils for 3.5 years protection.

10/ When camouflage painting is required, it shall replace these topcoats (see table IIA).

11/ For vehicles or equipment specified in 3.3.4.5 a, b, and c, the finish coat shall conform to TT-E-489.

12/ For Navy consignments, type A finish coats shall be as specified in the end item specification or the contract.

13/ For Air Force consignments, type A finish coats shall conform to TT-E-489.

14/ MIL-C-22750 is for non-camouflage, interior use only.

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TABLE IIA. Camouflage paint systems. 1/

Top Coat	Primer	
	Aluminum	Steel
MIL-C-46168 MIL-C-53039 MIL-C-22750 2/	MIL-P-23377 3/ MIL-P-53022 MIL-P-53030 MIL-P-53084 MIL-P-85582 3/	MIL-P-53022 MIL-P-53030 MIL-P-53084

- 1/ Each coating in the camouflage system is a chemical agent resistant coating (CARC), and unless noted otherwise, is lead and chromate free.
 2/ Interior use only. Chromate pigments allowed.
 3/ Contains chromate.

3.3.2 Drying time. Drying time for the paints specified shall be as specified in the material specification. Air-drying time between coats, under favorable conditions, shall be 24 hours or less but in no case less than the time specified for the recoating or self-lifting test in the material specification. Subject to approval of the contracting officer, drying times may be extended to compensate for such adverse drying conditions as low temperature and high humidity.

3.3.3 Contact surfaces. Metal to metal, wood to metal, and wood to wood contact surfaces, except those to be welded or hot riveted or where paint will interfere with the fit or function of a part in assembly, shall have the specified treatment and primer (see table II) applied before assembly. Surfaces welded or hot riveted shall be cleaned and painted with the specified coating systems after assembly. Wheels shall be cleaned, treated, primed, and painted prior to the tires being mounted. The surface of the wheel in contact with the tire shall be cleaned, treated and primed only.

3.3.3.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.4 Color. Color numbers specified herein shall conform to FED-STD-595 except where otherwise specified herein or in the specification for the end item.

3.3.4.1 Color for Army. Unless otherwise specified (see 6.2), all material, except aircraft and other items (see 6.7), shall be painted conforming to one of the systems shown in table IIA, with the topcoat color green 383. The system used shall be compatible with and shall provide good adhesion for subsequent coatings of paint in order to provide for camouflage pattern painting (see 3.3.6). Paint systems conforming to MIL-C-46168 or MIL-C-53039 shall receive subsequent coats of paint conforming to MIL-C-46168 or MIL-C-53039 only. Camouflage coatings are subject to the QPL and batch validation requirements of the material specifications. The responsible activity is: US Army Research Laboratory, ATTN: AMSRL-MA-E, Fort Belvoir, VA 22060-5606.

3.3.4.2 Color for Navy. The color of the finished unit shall be as specified in the end item specification or the contract.

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3.3.4.3 Color for Air Force. Unless otherwise specified herein or in the end item specification, the color of the finish paint shall be strata-blue No. 15045.

3.3.4.4 Color for Marine Corps. Unless otherwise specified herein or in the end item specification, painting shall be as in 3.3.4.1.

3.3.4.5 Color for special-purpose vehicles and equipment.

- a. Vehicles and equipment used for materials handling and warehousing and for service, construction, maintenance, and emergency purposes on landing strips, taxiways, perimeter roads, and aircraft flight areas (exclusive of garbage, refuse-handling collection trucks, ambulances and fire fighting vehicles) shall be painted yellow gloss No. 13538. Except for vehicles and equipment used for materials handling, bumper plates of corresponding front and rear flat surfaces shall be painted with 4-inch diagonal stripes alternating colors of yellow gloss No. 13538 and black No. 17038. The stripes shall be inclined at 45 degrees to the left and right of the vertical centerline to simulate an inverted V-pattern. Sufficient space shall be allowed on bumpers for application of markings as required.
- b. Garbage and refuse collection trucks shall be painted white gloss No. 17875, except for the Navy trucks which shall be painted white gloss No. 17886.
- c. Crash rescue trucks and fire fighting vehicles assigned for fire protection, including fire marshal's vehicles, shall be painted lime yellow gloss No. 13670.
- d. When greater safety precautions are essential, a phosphorescent paint may be used in lieu of regular enamel provided it conforms to the other requirements specified herein.

3.3.5 Stenciling and marking. Stenciling and marking as required shall be with enamel specified below except as specified for airfield equipment (see 3.3.4.5). Size and location of the letters and figures on vehicular equipment shall be as specified in the end item specification (see 6.7). Lusterless markings shall be made with an enamel conforming to TT-E-527. Gloss markings shall be made with an enamel conforming to TT-E-489.

a. For Army use:

Noncamouflage. The marking shall be applied in lusterless white No. 37875 on equipment painted olive drab or other dark color, in gloss white No. 17875 on vehicles painted gloss green 14050, and in gloss black 17038 on vehicles painted in light colors (see 6.2).

Camouflage. Camouflage marking (see 6.7). When a chemical agent resistant system is required the equipment must be identified as instructed below. All equipment requiring an operator should be stenciled in the driver/operator compartment with the word "CARC" using chemical agent resistant black and up to one inch letters. The stencil should be located in close vicinity to the instrument panel at a level where the driver's vision is not obstructed by a protective mask. The equipment should also have the stencil applied as described above in the area painted either green 383 or brown 383 nearest the data plate.

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- b. For Navy, the marking shall be applied in gloss black No. 17038 on equipment painted gray, yellow, green, and olive drab, and in gloss navy blue on equipment painted white.
- c. For Marine Corps, the markings shall be as in 3.3.5.a.
- d. For Air Force, the marking shall be applied in gloss black No. 17038 on materials handling, maintenance, and construction vehicles painted yellow. All other vehicles shall be marked with reflectorized tape conforming to ASTM D 4956 in the appropriate color.

3.3.6 Camouflage pattern painting. Camouflage pattern painting when specified in the contract shall be in addition to the requirements of this specification and shall conform to the pattern stipulated.

3.3.7 Surfaces not requiring paint. Fabrics, plastics, rubber working parts of machinery, lubrication fittings and other surfaces not normally painted shall not be painted unless required by the specification for the end item. Such surfaces shall be masked or protected during treatment and painting to prevent damage to them.

3.3.8 Engines and other hot surfaces. Engines shall be cleaned and treated as specified herein and painted in accordance with the applicable engine specification. Paint which is not heat resistant, including CARC, shall not be applied to surfaces subject to temperatures greater than 400 °F. When cleaning and painting of manifolds, exhaust pipes, mufflers, and other parts subject to high temperatures are specified in the applicable engine specification, the paint shall conform to MIL-P-14105 in a pattern-compatible color if normally visible during operation or TT-P-28, as applicable.

3.3.9 Sealing. Unless otherwise specified in the end item specification, sealing of the interiors of gear cases or similar compartments and reservoirs shall be in accordance with the contractor's standard practice. The sealer (see 6.8) shall be applied prior to assembly and shall withstand, without wrinkling, blistering, peeling, or loss of adhesion, immersion in lubricating oil, hydraulic fluids, and cutting compounds for the operating temperatures and atmospheric conditions specified for the end item.

3.3.10 Electrical components. Electrical components of equipment not otherwise governed by applicable specifications shall be treated and painted in accordance with the contractor's standard practice.

3.3.11 Safety, health, and environment. Operations specified herein involve selection, use, and disposal of hazardous materials. Appropriate precautions must be taken, compliant with all applicable safety, health, and environmental regulations (see 6.3).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.2 General inspection requirements. All equipment being processed shall be inspected at the various stages of cleaning, surface treating, electroplating, and application of other types of finishes and coatings, to ascertain that each process is done in strict accordance with this specification and individual specifications. The inspections and tests covered in this section shall not be considered restrictive. Any condition not in full accord with the applicable drawings and specification shall be regarded as defective.

4.3 Examination. The end item treatment and painting shall be examined for defects specified in table III.

4.3.1 Tests. Materials, prior to their use, shall be inspected, sampled, and tested in accordance with the applicable specification and standard to determine compliance with the requirements of the particular specification. When purchasing camouflage paint, QPL suppliers must be used, and production samples from each lot of each paint manufactured shall be submitted to the US Army Research Laboratory, ATTN: AMSRL-MA-E, Fort Belvoir, VA 22060-5606, for testing. Samples of surfaces with molded-in green colors shall also be sent to the above laboratory. The submission of these samples is for validation of the paint or surfaces for spectral and gloss characteristics. With this information, the inspector will have the means, along with the painting procedures, to accept or fail an end product.

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TABLE III. Examinations.

Item Number	Defects	Reference Paragraph
101.	Cleaning not as specified.	3.1
102.	Ferrous metal surfaces to be painted not prepared as specified.	3.1.1
103.	Blasting used on surface where specified not to be used.	3.1.1.1
104.	Vehicles not cleaned as specified.	3.1.1.2
105.	Zinc surfaces not cleaned as specified.	3.1.2
106.	Aluminum and aluminum-alloy surfaces not cleaned as specified.	3.1.3
107.	Magnesium alloy surfaces not cleaned as specified.	3.1.4
108.	Cadmium surfaces not cleaned as specified.	3.1.5
109.	Wood surfaces to be painted not cleaned as specified.	3.1.6
110.	All surfaces not kept clean after cleaning as specified.	3.1.7
111.	Ferrous metal, zinc, or cadmium surfaces not treated as specified.	3.2.1
112.	Aluminum surfaces not treated as specified.	3.2.2
113.	Magnesium alloy surfaces not treated as specified.	3.2.3
114.	Seasoned wood surfaces not treated as specified.	3.2.4
115.	Wood surfaces treated with alternate surface application preservative not as specified.	3.2.4.1
116.	Hardware and hardware items are treated and painted contrary to requirements of specification.	3.2.5
117.	Corrosion-resisting steel surfaces not cleaned and treated as specified.	3.2.6
118.	The first coat of paint or primer not applied as specified.	3.3.1
119.	Dry-film thickness of each applied coat not as specified.	Table I
120.	Finishing system not as specified.	Table II
121.	Camouflage paint system not as specified.	Table IIA
122.	Drying time of the paints not as specified.	3.3.2
123.	Contact surfaces not treated and painted as specified.	3.3.3
124.	Dissimilar metals not insulated from each other as specified.	3.3.3.1
125.	Color numbers not as specified.	3.3.4
126.	Color for Army not green 383 as specified.	3.3.4.1
127.	Color for Navy not as specified.	3.3.4.2
128.	Color for Air Force not strata-blue No. 15045 as specified.	3.3.4.3
129.	Color for Marine Corps not green 383 as specified.	3.3.4.4
130.	Color for special-purpose vehicles and equipment not as specified.	3.3.4.5
131.	Stenciling and marking not as specified.	3.3.5
132.	Camouflage pattern painting not as specified.	3.3.6
133.	Surfaces which require no paint not as specified.	3.3.7
134.	Engines not cleaned and treated as specified.	3.3.8
135.	Seal use not as specified.	3.3.9
136.	Electrical components of equipment not governed by applicable specifications not treated and painted as specified.	3.3.10

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5. PACKAGING

(This section is not applicable to this specification.)

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The Department of the Army has mandated that CARC will be the specified finish for all painted combat and combat support materiel, based on chemical agent resistance and improved durability.

6.1.1 Type A. Type A is intended to be the general purpose system for materiel and equipment when chemical agent resistance (types F and G) is not required, and when the application does not require type B or type C painting.

6.1.2 Type B. Type B is intended for materiel and equipment such as boats, pontoons, and other items that are subjected to water immersion and salt air exposure.

6.1.3 Type C. Type C is intended for equipment, which because of the nature of the end item, or its use, warrants only one coat of paint.

6.1.4 Type D. Type D is intended for equipment as a fast-curing system in a humid environment.

6.1.5 Type E. Type E is intended for equipment as a fast-curing lacquer topcoat system in humid environments.

6.1.6 Type F. Type F is intended for use on ferrous surfaces where chemical agent resistance is required. It should also be used where greater durability of the coating is desired for severe exposure.

6.1.7 Type G. Type G is used on nonferrous surfaces for the reasons stated in type F.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of the specification.
- b. Type of finish (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. If blast cleaning per SSPC-SP5 or SSPC-SP10 is required in lieu of SSPC-6 (see 3.1.1).
- e. Wood treatment if other than specified (see 3.2.4).
- d. Required moisture content (see 3.2.4).
- g. When surface application is required (see 3.2.4.1).
- h. Additional coats, when required (see 3.3.1, table II footnote 9/).
- i. Color of finish paint if other than as specified (see 3.3.4.1).
- j. Applicable marking required (see 3.3.5a).

6.3 Hazardous methods and materials. Judicious selection of methods and materials will minimize personnel exposure, and use and disposal costs (see 3.3.11).

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6.4 Exemptions from abrasive blasting. Examples of components from which blast cleaning may be omitted (see 3.1.1.1) are: track assemblies; track roller assemblies, including mounting frames; interiors of welded-type box sections; rippers, scarifiers, ejectors, push plates, blades, bowls, and buckets for dozers, scrapers, and crane shovels; interiors of drums of cement mixers; and interiors of aggregate driers.

6.5 Vehicle. The term "vehicle" as used in the specification includes all wheeled and track laying conveyances and chassis powered by a self-contained power unit; trailers and semi-trailers towed by conveyances and bicycles; and equipment propelled by self-contained and permanently mounted power units, such as materials handling equipment and engineer construction equipment. The term vehicle will not apply to generator sets, conveyances designed primarily for use on railway or other trackage and animal drawn conveyances.

6.6 Color chips.

6.6.1 Army use. Color chips for camouflage coatings may be obtained from the Commanding Officer, US Army Research Laboratory, ATTN: AMSRL-MA-E, Fort Belvoir, Virginia 22060-5606.

6.6.2 Non-camouflage colors. Color chips for FED-STD-595 may be obtained from: General Services Administration, Room 6654, 7th & D Street, SW, Washington, DC 20407.

6.7 Marking. The contracting officer should furnish the contractor with the necessary information for marking vehicles (see 3.3.5). Camouflage painting and marking of Army material should conform to AR 750-58.

6.8 Sealers. Commercial sealers may be used; however, material conforming to the following specifications has been found acceptable for use as a sealer:

TT-P-645	- Primer, Paint, Zinc-Molybdate, Alkyd Type.
MIL-P-23377	- Primer Coating, Epoxy, Polyamide. (nonferrous).
MIL-P-53022	- Primer, Epoxy Coating, Corrosion Inhibiting, Lead and Chromate Free.
MIL-P-53030	- Primer Coating, Epoxy, Water Reducible, Lead and Chromate Free.

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - ME
Navy - YD

Preparing activity:

Army - ME

Project 8010-1265

Review activities:

Army - AR, AV, EA, GL, MD, MI, MR
Navy - MC, MS

User activities:

Army - AT
Navy - OS, SH

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-T-704K

2. DOCUMENT DATE (YYMMDD)
921104

3. DOCUMENT TITLE Treatment and Painting of Materiel

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)
(1) Commercial
(if applicable)
(2) AUTOVON

7. DATE SUBMITTED

8. PREPARING ACTIVITY

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654-3466

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US Army Belvoir RDE Center
ATTN: SATBE-TBE
Fort Belvoir, VA 22060-5606

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:

Defense Quality and Standardization Office
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466
Telephone (703) 756-2340 AUTOVON 289-2340