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**MIL-STD-1303B(OS)**  
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**SUPERSEDING**  
**MIL-STD-1303A(OS)**  
**5 APRIL 1971**

DEPARTMENT OF DEFENSE  
STANDARD PRACTICE

**PAINTING OF  
NAVAL ORDNANCE EQUIPMENT**



FSC MFFP

MIL-STD-1303B(OS)  
15 April 1975

NAVAL SEA SYSTEMS COMMAND  
Washington, D. C. 20362

Painting of Naval Ordnance Equipment

MIL-STD-1303B(OS)

1. This military standard is approved for use by the Naval Sea Systems Command.
2. Recommended corrections, additions, or deletions should be addressed to the Commanding Officer, Naval Ordnance Station, (502), Indian Head, Md. 20640, or to the Commander, Naval Sea Systems Command, Washington, D. C. 20362.

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## FOREWORD

The purpose of this standard is to establish proper materials, methods, and procedures used in painting of naval ordnance equipment and weapons and major components thereof. This standard shall serve as a guide for designers in specifying requirements on the pertinent drawings and other documents. It shall also be used by manufacturers to fulfill the requirements specified on drawings and other documents. Color coding to identify types and uses of various weapons, equipment, components, or fillers is not covered herein.

The requirements of the standard are presented, as nearly as possible, in a completely self contained form, combining the requirements peculiar to naval ordnance systems.

This standard supersedes all editions of MIL-STD-1303A(OS) and NAVORD OSTD 52. Paint system numbers of the superseded standards are interchangeable with the same paint system numbers in this issue except as follows:

Color No. 16307 may be used as an alternate for former color No. 16440.  
Color No. 26307 may be used as an alternate for former color No. 26440.

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## MILITARY STANDARD

### PAINTING OF NAVAL ORDNANCE EQUIPMENT

#### 1. SCOPE

\*1.1 This standard covers materials, methods, and processes for paint systems approved for use in the painting and protection of various types of naval ordnance equipment and weapons against deterioration (table I). The term "painting" is understood to include such preparatory treatments as cleaning, rust removal, surface treatments, filling, caulking, and the subsequent application of coatings such as pretreatments, primers, and final coats of paint, enamel, varnish, lacquer, or other organic protective films. The paint systems described herein do not include color coding or other data to identify the characteristics of weapons, equipment, components, or fillers. (References should be made to applicable standards, specifications, or drawings for color codes to be used on specific items.)

#### 2. REFERENCED DOCUMENTS

2.1 The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

#### SPECIFICATIONS<sup>1</sup>

##### Federal

TT-C-490	Cleaning Methods and Pretreatments of Ferrous Surfaces for Organic Coatings
TT-E-485†	Enamel; Semi-Gloss, Rust-Inhibiting
TT-E-489†	Enamel, Alkyd, Gloss (For Exterior and Interior Surfaces)

<sup>1</sup>Specifications marked with † comply with the antipollution regulations of Rule 66.

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TT-E-490†	Enamel, Silicone Alkyd Copolymer, Semi-Gloss, Exterior
TT-E-515†	Enamel, Alkyd, Lusterless, Quick Drying
TT-E-516†	Enamel, Lusterless, Quick Drying, Styrenated Alkyd Type
*TT-E-522†	Enamel, Phenolic, Outside
TT-E-527†	Enamel, Alkyd, Lusterless
TT-E-529†	Enamel, Alkyd, Semi-Gloss
TT-F-336†	Filler; Wood, Paste
TT-I-558	Ink, Marking Stencil, Opaque, for Nonporous Surfaces (Metals, Glass, etc.)
TT-L-20	Lacquer, Comouflage
TT-L-32†	Lacquer, Cellulose Nitrate, Gloss, for Aircraft Use
TT-P-25†	Primer, Paint, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints)
TT-P-28†	Paint, Aluminum, Heat Resisting (1200 Deg. F)
*TT-P-98†	Paint, Stencil
TT-P-320	Pigment, Aluminum; Powder and Paste for Paint
TT-P-595†	Preservative Coating, Canvas
TT-P-645	Primer, Paint, Zinc-Chromate, Alkyd Type
TT-P-662†	Primer Surfacer, Sanding, Lacquer and Enamel Type
TT-P-664†	Primer Coating, Synthetic, Rust-Inhibiting, Lacquer-Resisting
*TT-P-1757†	Primer Coating, Zinc Chromate, Low Moisture-Sensitivity
TT-S-300	Shellac, Cut

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TT-V-109†	Varnish, Spar, Alkyd-Resin
TT-V-119†	Varnish, Spar, Phenolic-Resin
TT-V-121†	Varnish, Spar, Water-Resisting
TT-W-571	Wood Preservation, Treating Practices
TT-W-572	Wood Preservative, Water Repellent

Military

MIL-V-173†	Varnish, Moisture and Fungus Resistant (For Treatment of Communications, Electronic, and Associated Equipment)
MIL-C-450†	Coating Compound, Bituminous Solvent Type, Black (For Ammunition)
*MIL-E-480	Enamel, Baking, Phenol - or Urea Formaldehyde
MIL-E-1115	Enamel, White (Formula 30) For Naval Ship-board Use)
MIL-V-1174	Varnish, Spar, Water Resisting (Formula No. 80)
MIL-L-2638†	Lacquer, Vinyl Resin, Gasoline and Water Resistant
MIL-R-3043†	Resin-Coating, Unpigmented, For Engine Components and Metal Parts
MIL-C-3301	Compound, Asphaltic, Hot-Melt (Cavity Lining)
*MIL-L-3891†	Luminescent Material and Equipment (Non-Radioactive)
MIL-S-5002	Surface Treatments and Metallic Coatings for Metal Surfaces of Weapons Systems
MIL-C-5056	Coating, Permanent Resin; Process for Application of, to Aircraft Parts
MIL-F-7179	Finishes and Coatings; General Specification for Protection of Aerospace Weapons Systems, Structures and Parts

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MIL-C-7439†	Coating System, Elastomeric, Rain Erosion Resistant and Rain Erosion Resistant with Anti-Static Treatment, for Exterior Aircraft and Missile Plastic Parts
MIL-P-7962†	Primer Coating, Cellulose Nitrate Modified Alkyd Type, Corrosion-Inhibiting, Fast-Drying (For Spray Application Over Pretreatment Coating)
MIL-C-8514†	Coating Compound, Metal Pretreatment, Resin-Acid
MIL-S-8802†	Sealing Compound, Temperature-Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion
*MIL-C-10578	Corrosion Removing and Metal Conditioning Compound (Phosphoric Acid Base)
MIL-L-11195†	Lacquer, Lusterless, Hot Spray
MIL-P-11414†	Primer, Coating, Lacquer, Rust-Inhibiting
MIL-E-15090	Enamel, Equipment, Light-Gray (Formula No. 111)
MIL-P-15328†	Primer, (Wash) Pretreatment Blue (Formula No. 117-B for Metals)
MIL-P-15929†	Primer Coating, Shipboard, Vinyl-Red Lead (Formula No. 119 - For Hot Spray)
MIL-P-15930	Primer Coating, Shipboard, Vinyl-Zinc Chromate (Formula No. 120 - For Hot Spray)
MIL-P-15931	Paint, Antifouling, Vinyl-Red (Formula No. 121/63)
MIL-P-15935	Paint, Outside, Gray, No. 11 (Vinyl-Alkyd) (Formula No. 122-11)
MIL-E-15936	Enamel, Exterior, Gray, No. 27 (Vinyl-Alkyd) (Formula No. 122-27)
MIL-C-16173	Corrosion Preventive Compound, Solvent Cutback, Cold-Application

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MIL-E-16663†	Enamel, Semi-Gloss, (For Metal Surfaces of Ammunition and Ammunition Containers)
MIL-E-16738	Enamel, Exterior, White, Vinyl-Alkyd, (Formula No. 122-82)
MIL-E-17970	Enamel, Non-flaming (Dry), Chlorinated Alkyd Resin, Soft White, Semi-Gloss, Formula No. 124/58
*MIL-C-18255†	Caulking Compound, Synthetic Rubber Base, Wooden Deck Seam Application
*MIL-F-18264	Finishes, Organic Weapons System, Application and Control of
MIL-C-18487	Compound, Gun Slushing
MIL-H-18911	Head and Motor, Rocket, Inert Parts, Painting and Marking
MIL-P-18948	Projectile, Painting, Marking and Greasing (By Projectile Manufacturers)
MIL-L-19537†	Lacquer, Acrylic-Nitrocellulose Gloss (For Aircraft Use)
MIL-L-19538†	Lacquer, Acrylic-Nitrocellulose, Camouflage (For Aircraft Use)
MIL-P-21563	Paint System, Fluorescent, For Aircraft Application
MIL-P-21600	Paint System, Fluorescent, Removable, for Aircraft Application
MIL-P-21960	Painting and Marking; Warheads, Guided Missile
MIL-P-22332†	Paint, Priming, Exterior and Interior (For Ammunition)
MIL-C-22750†	Coating, Epoxy-Polyamide
*MIL-C-22751†	Coating System, Epoxy-Polyamide, Chemical and Solvent Resistant, Process for Application of

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*MIL-T-23142	Tape, Pressure-Sensitive Adhesive for Dissimilar Metal Separation
MIL-P-23236	Paint Coating Systems, Steel Ship Tank Fuel and Salt Water Ballast
MIL-P-23377†	Primer Coating, Epoxy-Polyamide, Chemical and Solvent Resistant
MIL-C-23675†	Coating, Anti-Fouling, Hull Bottom for Weapons Systems
MIL-G-23827	Grease, Aircraft and Instrument, Gear and Actuator Screw
MIL-I-24092	Insulating Varnish, Electrical, Impregnating
MIL-C-24176†	Cement, Epoxy, Metal Repair and Hull Smoothing
*MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive
MIL-P-24441†	Paint, Epoxy-Polyamide, General Specification for
MIL-C-27315†	Coating Systems, Elastomeric, Thermally Reflective and Rain Erosion Resistant
MIL-E-46096†	Enamel, Lusterless, Quick Drying, Styrenated Alkyd Type, Solar Heat Reflecting, Olive Drab
*MIL G-81322	Grease, Aircraft, General Purpose, Wide Temperature Range
*MIL-C-83019†	Coating, Polyurethane, For Protection of Integral Fuel Tank Seating Compound

#### STANDARDS

##### Federal

FED-STD-141	Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing
FED-STD-595	Colors

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Military

MS-603	Formula for Fuse Thread Luting (For Special Ammunition Use)
MIL-STD-709	Ammunition Color Coding
MIL-STD-889	Dissimilar Metals

\*(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. DEFINITIONS

3.1 Paint systems. Paint systems are the series of coatings applied over properly cleaned and chemically treated or otherwise pretreated surfaces. A paint system will include the following, in the order of application:

(a) Type(s) of primer and number of coats of each, in the order of application to the surfaces including any fillers, surfacers, or sealers required.

(b) Type(s) of finish coats (paints, enamels, lacquers, varnishes, or others) and number of coats of each, in the order of their application over the primer.

(c) Thickness of individual coats or of the entire system and other pertinent information is included where necessary.

3.2 Resins. Resins are solid organic substances, either natural, originating in the secretion of certain plants and insects, or synthetic. They are thermoplastic, flammable, nonconductive of electricity, break with a conchoidal fracture (when hard), and dissolve in certain specific organic solvents but not in water.

\*3.3 Drying oils. Drying oils as used in paint compositions possess (to a marked degree) the property of readily taking up oxygen from the air and changing to a relatively hard, tough elastic substance when exposed in a thin film in air.

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\*3.4 Pigments. Pigments are fine solid particles that impart hiding and color to paint and are substantially insoluble in the vehicle.

3.5 Pretreatment coatings. Pretreatment coatings are a combination of phosphoric acid and resin solution. They are used to etch the surface of metal and at the same time coat it with an adherent plastic film to improve adhesion of the subsequent primer coating. Pretreatment coatings (wash primer) should not be confused with primers.

3.6 Primers. Primers are the first coat of a paint system. They are applied to suitably prepared wood, or to chemically or electrochemically treated metal, to improve adhesion of the subsequent paint coats and to aid in protecting the metal against corrosion.

3.7 Fillers. Fillers are pigmented compositions for filling pores or irregularities in a surface preparatory to application of other finishes.

3.8 Surfacers. Surfacers are pigmented compositions for filling minor irregularities to obtain a smooth uniform surface preparatory to applying finish coats. They are usually applied over a primer and sanded for smoothness.

3.9 Sealers. Sealers are liquid compositions that prevent excess absorption of finish coats into porous surfaces but can also be used to prevent bleeding.

3.10 Paints. Paints are pigmented liquid compositions that are converted to an opaque solid film after application as a thin layer.

3.11 Enamels. Enamels are paints characterized by their ability to form an especially smooth film.

\*3.12 Lacquers. Lacquers are solutions or dispersions of cellulose compounds and resins (usually synthetic) with or without pigments. Drying occurs primarily by evaporation of the solvent. A relatively hard film is produced more rapidly with lacquers than with paints or enamels containing drying oils because hardening occurs more slowly by the oxidation or polymerization process than by solvent evaporation.

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3.13 Varnishes. Varnishes are solutions of resins and drying oils, or resins alone, in solvents. Upon drying, they form a clear to dark amber film. Varnishes may be mixed with stains to approximately duplicate wood finishes. Varnishes that contain a large amount of opaque pigments are usually listed as enamels.

3.14 Shellacs. Shellacs are rapid-drying solutions or dispersions of certain natural resins (lacs) in alcohol.

3.15 Other terms. Other general terms, frequently encountered in the specifications of paints, varnishes, lacquers, and related materials may be found in section 8 of FED-STD-141.

#### 4. GENERAL REQUIREMENTS

4.1 Use of this standard. This standard shall be used as a general guide to the selection of painting materials, systems, and procedures, and their designation or identification on drawings or other documents applicable to naval ordnance equipment and weapons. For general procedures, such as preparation for painting, reference may be made to the standard as a whole. However, specific reference shall be made, in accordance with the descriptions or designations herein, when particular materials, processes, or paint systems are to be used. System number and alternates, if any, must be specified when this standard is used to define a protective finish on a hardware item.

\*4.2 Use of specification materials and processes. Unless otherwise specified in the procurement documents, materials and processes used in painting of naval ordnance equipment shall be in accordance with the latest issues of the applicable specifications listed herein. The film thickness of paint type materials and techniques of application shall be as specified in MIL-F-18264 or MIL-C-22751, as applicable. Other Federal and military specifications may be used when prior approval is obtained from the Naval Sea Systems Command. Company standards, industry specifications, and industry practices shall be subject to prior approval by the Naval Sea Systems Command before use.

4.3 Surfaces requiring painting. Practically all metal and wood surfaces exposed to weather are painted for protection against deterioration. Surfaces of some metals, such as corrosion-resisting steel, copper alloys, and certain aluminum containers, may be left unpainted if they are enclosed or otherwise sufficiently protected against moisture,

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high humidity, or salt spray. Aluminum containers, where determined necessary, may be coated with primer conforming to TT-P-664.

4.4 Surfaces not to be painted. Certain types of surface do not require painting, or are harmfully affected by painting. These include the following:

(a) Machined surfaces which are required to move against or assemble to others such as threads, slides, bearing contacts, gear teeth, bourrelets, rotating bands, and linkages. Moving parts are generally lubricated when in use.

\*(b) Electrical parts and components already assembled, such as contact supports, relays, sockets, plugs, connectors, and insulators. When any portions of these are to be painted, it shall be done prior to assembly. If "touchup" is required, as on cut or machined plastics, utmost care shall be used to avoid leaving any paint residue on electrical contact surfaces, hinges, pivots, bearing surfaces, or others whose proper operation may be affected by such residues.

(c) Parts of copper or copper alloys, plated or unplated, such as electrical sockets, plugs, connectors, contacts, and terminals.

(d) Plastic, rubber, or ceramic insulators, mounts, spacers, gaskets, or windshields.

(e) Lubrication fittings, oil cups, and grease fittings. Adjacent piping may be painted or color coded.

(f) Identification, instruction, and warning plates.

#### 4.5 Preservation of unpainted surfaces.

4.5.1 Permanent assemblies. When required by the applicable drawings or specifications, mating threaded, bearing, and seating surfaces of metallic parts of weapons that are to be permanently assembled shall be coated before assembly with luting conforming to MS-603. After assembly, the cleanliness of adjacent surfaces to be painted shall conform to IT-C-490. See 5.6.2.1 for treatment of other faying surfaces.

\*4.5.2 Subject to disassembly. Mating threaded, bearing, and seating surfaces of metallic parts that are not immediately assembled, or require disassembly during loading with explosives or other fillers, shall be coated before assembly with preservative grease conforming to MIL-G-81322.

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A thin, continuous film shall be applied, avoiding contact of grease with any adjacent cavity surface or surfaces to be painted.

\*4.5.3 Other unpainted surfaces. Metallic surfaces such as those of electrical contacts, bourrelets, retaining grooves, bearings, and gear teeth shall be coated with a thin, even, continuous film of corrosion-preventive compound conforming to grade 2 of MIL-C-16173. Interiors of gun barrels in storage shall be coated with gun slushing compound in accordance with MIL-C-18487 and protected against corrosion due to the entrance of water.

## 5. DETAILED REQUIREMENTS

### 5.1 Preparation of painting.

\*5.1.1 Metallic surfaces. Before application of any pretreatment, primer, paint, or preservative, metallic surfaces shall be clean, dry, and free of oils, grease, dirt, finger prints, peeling paint, scale, rust, and any other foreign materials. Surfaces of ferrous metals, aluminum and its alloys, magnesium and its alloys, and titanium and its alloys shall be cleaned and surfaces treated in accordance with MIL-F-7179 and the applicable requirements of MIL-S-5002. Copper and its alloys (brasses, bronzes, etc.) shall be treated in accordance with type 1 of MIL-C-10578.

\*5.1.2 Nonmetallic surfaces. Wood surfaces shall be clean, smooth, and sanded. Dents, holes, and checks shall be filled with wood filler conforming to TT-F-336. Wood surfaces shall be treated with a preservative in accordance with TT-W-571. Canvas shall be treated with preservative in accordance with TT-P-595. Reinforced rubber and plastics are not usually treated, but cut surfaces may be coated with varnish conforming to MIL-V-173 in order to reduce moisture penetration.

5.2 Naval Sea Systems Command standard paint systems. Certain paint systems (3.1) have become established as standard for naval ordnance equipment. New systems are added as required, especially for missiles and other weapons. Certain systems have become obsolete or have been replaced by more up-to-date systems employing improved materials or providing greater resistance to deteriorating influences. Table I shows currently approved paint systems for naval ordnance equipment and their principal uses. Table II, the index to table I, enables ready location of systems suitable for certain applications. Systems that have been discontinued, altered, or replaced by others since the previous issue are shown in table III.

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Table I

## NAVAL SEA SYSTEMS COMMAND STANDARD PAINT SYSTEMS

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*7	Enamel, dull black	TT-P-1757	TT-E-527 black, No. 37038	1	Interior nonbearing surfaces of optical instruments, for minimum reflectance
*9	Enamel, semigloss black	TT-P-1757	MIL-E-16663, or TT-E-529 black, No. 27038, and blue, No. 25109 for inert or dummy ammunition	1	Knobs, eye pieces, and like items of optical instruments; inert or dummy ammunition
10	Paint, heat resistant aluminum	None	TT-P-18	2	Heat ducts, parts, or components subjected to high temperatures (500° to 1200° F)
11	Paint, haze gray (for wood)	TT-F-536 filler, TT-P-25 primer	TT-E-490 color No. 26270	2	Wooden boxes exposed on shipboard topside (for metal, use system No. 22)
*15	Enamel, lusterless and semigloss white	TT-P-1757 (color No. 34151)	TT-E-516 white, No. 37875, TT-E-529 white, No. 27875	1	Interior surfaces of mine cases (except where in contact with explosives) and instrument cases; exterior of missiles, where specified

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*14	Enamel, gloss white	TT-P-1757 for metal; TT-P-25 for wood	TT-E-489 white No. 17875	2	Metal surfaces not exposed to weather, for high light reflectance
*14A	Enamel, gloss white	TT-P-1757	TT-E-489 white, No. 17875	2	Interiors of gun mount enclosures, or shields for high light reflectance; bomb bays
*14B	Enamel, gloss white	TT-P-1757	MIL-E-1115 white, No. 17875	1	General purpose interior and exterior use
*14C	Paint, interior white	TT-P-1757	MIL-E-17970	1	Metal interior surfaces not exposed to weather, for high light reflectance and fire retarding
*17	Lacquer, flat black	TT-P-1757	TT-L-70 black, No. 37038	2 or more	Background on name plates; exterior of optical instrument housing cases
*22	Paint, haze gray (for metal)	TT-P-1757 TT-E-485 on gun barrels; primer TT-P-25 on non-metals	TT-E-490 color No. 26270	2	Exteriors of gun barrels, mounts, launchers, depth charges, and projectors; cases for torpedo test equipment

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*25	Paint, aluminum	TT-P-1757	TT-P-320, type II, class B, 2-lb to 1-gal varnish, MIL-V-1174	2	Metal cases, armored cable, ammunition and cartridge boxes, and tanks; exteriors of gun barrels, mounts launched depth charges, and projectors; ammunition and cartridge boxes and tanks
*27	Lacquer, gloss white	TT-P-1757	TT-L-32 color No. 17875	2 or more	Interiors of instrument cases, for maximum light; torpedo interiors, where specified
31	Varnish (for wood)	TT-F-336 filler	TT-V-121, TT-V-119, or TT-V-109	2	Natural wood finish, e.g., for hardwood boxes
33	Orange shellac	None	TT-S-300, type II grade A, body 2	1 or more	Hardwood boxes and accessories
36	Bleached shellac	TT-F-336 filler	TT-S-300, type I, grade A, body 1	2	Wooden accessories
*37	Enamel, semigloss light gray	TT-P-1757 TT-P-662 if required for smoothing	MIL-E-15090, class 2, light gray, color No. 26307	2	Equipment in shields, turrets or electrical panels and enclosures; cables, fire control equipment enclosed

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*37A	Enamel, gloss light gray	TT-P-1757 TT-P-662 if required for smoothing	MIL-E-15090 class 1, light gray, color No. 16307	2	Portable instruments; exterior of optical instrument transporting cases
42	Varnish, electrical insulating	None	MIL-V-173 or MIL-I-24092	1	Sealing, touchup, or moisture-proofing of electrical parts
*46	Enamel, olive drab	TT-P-1757 color T	TT-E-485 (semigloss) color No. 24087, TT-E-516 (lusterless) color No. 34087	2 or more	Exterior cases of mines, crates, flight gear, instrument racks; exteriors of bombs, projectiles, and rocket heads where specified
*46A	Enamel, lusterless black	TT-P-1757	TT-E-516, black, color No. 37038	2	Mine anchors and crates
47	Coating compound, acid-proof, cavity lining	None	MIL-C-450, solvent type, or MIL-C-3301, hotmelt	1	Surfaces of cavities in contact with explosives; acid resistant coating
*48	Paint, anti-fouling red	MIL-P-15328 pre-treatment, one coat followed	MIL-P-15931	2 or more to 4 mils minimum	Exterior surfaces of moored mines, and floats; stencilling on moored mines <sup>2</sup>

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacers	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*48 (con- tinued)		by MIL-P-15930, four coats to 4 mils minimum thickness		thick- ness	
48A	Enamel, exterior white	1 coat MIL-P-15328 plus 1 coat of MIL-P-15929 or MIL-P-15930	MIL-E-16738 white, color No. 27875	1 or more to 4 mils minimum thick- ness	Marking, lettering on mines <sup>2</sup>
49	Paint, vinyl alkyd, gray	MIL-P-15328 pre-treatment, one coat followed by MIL-P-15930, one coat, plus MIL-P-15929 to 4 mils minimum	MIL-P-15935 gray, No. ii	To 4 mils minimum thick- ness	Floats, buoys, and harbor defense items <sup>2</sup>
*50	Coating, phenolic resin	None	MIL-E-480, type I, brown, color No. 30117	2 or more, 3 mils minimum and 5 mils maximum	General usage on steel torpedo parts

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
50A	Coating, phenolic resin (air-drying)	None	TT-E-522 brown, color No. 30117 (unless otherwise specified)	2 or more, 3 mils minimum and 5 mils maximum	General usage on steel torpedo parts
*51	Paint, fluorescent orange	TT-P-1757 and TT-L-20, white	MIL-L-3891, type F, liquid form orange color plus TT-L-32 clear	Not more than 3, 2.5 ± 0.5 mils thickness 1 coat 1.0 ± 0.1 mil thickness	Torpedo exercise head, for visibility; floating for underwater objects (distance sighting)
*52	Enamel, semigloss green	MIL-P-15328 (1 coat) TT-P-1757 color Y (1 coat)	MIL-E-16663, type 1, green, color No. 24108 White, color No. 27875 (alternate green and white with final coat green)	2 1	Exterior surfaces of aluminum torpedoes; metal surfaces of ammunition and ammunition containers
53	Paint, vinyl alkyd gray	MIL-P-15930	MIL-P-15935	1	Torpedoes

See footnotes at end of table.

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Table I (cont'd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*54	Coatings for color coding and marking	TT-P-1757 green and yellow	TT-L-20, TT-E-515, TT-E-516, or MIL-E-16663, color as applicable	1	Color coding of weapons and ammunition components in accordance with MIL-STD-709
			TT-I-558, TT-P-98 color as specified	1	Lettering and stencil information
55	Hot Lacquer	MIL-P-11414	MIL-L-11195, color as specified	1	Bombs, projectiles, rockets, missiles, shells, and grenades
56	Lacquer, acrylic, gloss white-blue	MIL-C-8514 and MIL-P-7962, or MIL-P-23377	MIL-L-19537, white, color No. 17875; blue, color No. 15109	2	Aircraft and missiles where specified for synthetic oil resistance; warheads, missiles
56A	Lacquer, acrylic, lusterless	MIL-C-8514 and MIL-C-7962, or MIL-P-23377	MIL-L-19538, color as specified	2	Missiles and aircraft where specified for synthetic oil resistance
*57	Paint, epoxy for hydraulic fluid resistance, haze gray	None	MIL-C-22750 color as specified	1	Talos trainer

See footnotes at end of table:

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
*58	Enamel, quick drying lusterless yellow, black, brown, and blue	TT-P-645 TT-P-1757	TT-E-515, yellow, color No. 33538, black, color No. 37038, brown, color No. 30117, blue, color No. 35109	1	Exterior of anchor housings (parts of underwater mines)
*59	Paint, lusterless black, or other colors as specified	TT-P-1757	TT-L-20, colors as specified	1	Exterior of ammunition or automotive components
*60	Enamel, semigloss blue, gray	MIL-P-15328 and TT-P-645 or MIL-P-15328 and TT-P-1757	MIL-E-16663, blue, color No. 25109, gray, color No. 26307	1	Terrier missile containers - metal surfaces of ammunition and ammunition containers
62	Enamel, semigloss white	TT-P-645	TT-E-485, white, color No. 27875	2	Tartar missile containers
63	Enamel, exterior gray	MIL-P-15328 (1 coat), MIL-P-15930 (1 coat)	MIL-E-15936	3 or more to 6 mils minimum	General usage on aluminum or steel torpedo

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Number of coats	
64	Lacquer, nitrocellulose, gloss clear	MIL-L-2638, type I (white, 1.5 to 2.0 mils)	MIL-L-3891, type F, liquid form, orange color	2 or more 2 to 3 mils	Torpedo exercise heads
			TT-L-32 clear	1 coat 1.0 to 1.5 mils	
*65	Enamel, styrenated alkyd, lusterless	TT-P-1757 (1 coat)	TT-E-516, color as specified	1	Aluminum drill floats
66	Coating, anti-fouling white	MIL-C-8514 (1 coat) 0.2 to 0.3 mil plus MIL-P-7962 (2 coats) total thickness 0.4 mil	MIL-C-23675, white	2 light passes, 1.0 mil per pass; 2.0 mils total thickness	Floats and hull bottoms; marking, lettering on mines
67	Enamel, olive drab	MIL-P- (0.0009 to 0.0011 mil)	TT-E-489, color No. 140S7	1	Ammunition items, shells, rockets and mines, interior and exterior
*69	Lacquer, fuel-resistant	None	MIL-C-83019 or MIL-P-24441 (epoxy)	1	Internal surfaces of steel fuel tanks

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Numbers of coats	
70	Coating, permanent resin	None	MIL-R-3043 and MIL-C-5056	1	Baked coating for interior of magnesium fuel tanks, droppable steel tanks, interior of plumbing lines carrying liquids or fire fighting chemicals; parts housed in lubricating hydraulic oil or grease
*71	Enamel, heat-resistant	None	TT-E-489 or silicone finish	1	Surfaces and components exposed to high temperatures (400° to 500° F)
*72	Coating system, elastomeric, rain-erosion	TT-P-1757 (on metal only) None for other surfaces	MIL-C-7439 or MIL-C-27315	See uses	Leading edges of glass fiber reinforced plastic radomes, antenna, and magnetic airborne detector housings exposed to the airstream; exterior missile plastics parts; rain erosion and anti-static; thickness 8 to 10 mils; minimum thickness 2 mils
73	Coating system for areas around alkaline storage batteries	MIL-C-8514 (1 coat) plus MIL-P-15930 (1 coat)	MIL-E-15936	2	Areas around alkaline storage batteries (within 12 inches) or parts further removed but subjected to spillage or spray

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Numbers of coats	
74	Coating system for areas around acid storage batteries	MIL-C-8514 (1 coat) plus MIL-P-15930 (1 coat)	MIL-C-7439	15 mils	Area around acid storage batteries and parts subjected to spillage or spray of the batteries
75	Coating, epoxy polyamide, chemical and solvent resistant	MIL-P-23377 (1 coat)	MIL-C-22750 color as specified	1	Interior or exterior surfaces of ordnance equipment subjected to the influence of synthetic lubricants; exterior markings
*76	Enamel, gloss, color as specified	TT-P-1757	TT-E-489, color as specified	2 (0.8 to 1.2 mils thickness)	Interior and exterior surfaces of aircraft, aircraft parts, and related equipment; suitable for ground equipment and parts where good weather resistance is required
*77	enamel, camouflage, quick drying, color as specified	TT-P-1757	TT-E-527, color as specified	1	Interior and exterior metal surfaces of ordnance equipment which require a camouflage finish and require a coating which withstands weather exposure
78	Compound, edge sealing	None	MIL-S-8802	1	Edge sealing of plastic or ceramic insulators for radio antennas and the like, after installation in exterior location

See footnotes at end of table.

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Table I (contd)

System No.	Name and color	Primer, <sup>1</sup> filler, surfacer	Final coats and colors		Uses
			Paint and color No. FED-STD-595	Numbers of coats	
*79	Paint, fluorescent red orange	TT-P-1757	TT-L-20, white, color No. 37875	1	Exterior of torpedoes, missiles, and mines used for training
			MIL-P-21563, color No. 633	3	
			Overlay	1	
79A	Paint, fluorescent removable	MIL-P-7962	MIL-L-19537, white, color No. 17875	1	Removable fluorescent paint on training ordnance equipment
			MIL-P-21600 color No. 633	3	
			Overcoat	1	
80	Paint, silicate, phosphate or silicone zinc	MIL-P-23236, coating system class 3 (applied in accordance with MIL-P-23236) or MIL-P-24441		4 maximum for system	Used over abrasive blasted steel surfaces (down to the white metal) on steel shipboard tanks used for fuel and saltwater ballast
80A	Paint, silicate, plus vinyl or epoxy coating	MIL-P-23236, class 3 system	Coat with a vinyl or epoxy paint (alkaline resistant) as required for color or TT-E-490	1	Guns or gun mounts
81	Enamel, lusterless, solar heat reflecting	TT-P-662 (1 coat) and MIL-P-15328 (1 coat)	MIL-E-46096, olive drab	1	Chaparral Missile Mk 50 Mod 0

<sup>1</sup>One coat except where otherwise noted.<sup>2</sup>Items shall be marked "COATED WITH ANTI-FOULING SYSTEM."

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Table II

## INDEX TO PAINT SYSTEMS IN TABLE I

Type of equipment, weapon, surface, or exposure	System No.
Acid resistant	47, 74
Ammunition	
Exterior metal surfaces and containers	52, 59
Inert or dummy	9
Anchor housing	
Exterior	58
Antistatic	72
Armored cable	25
Battery racks and areas around acid storage batteries	47, 74
Bombs	46, 55
Bomb bays	14A
Exteriors, before loading explosives	67
Boxes	
Accessories, wooden	36
Ammunition	25
Cartridge	25
Hardwood	31, 33
Metal	22
Wooden (exposed on topside)	12
Buoys	49
Cables	37
Camouflage finish, good weather resistance	77
Cases	
Instrument	13, 27
Metal	25
Mine, interior	13
Torpedo test equipment	22
*Cavities in contact with explosives	47
Color coding of weapons and ammunition components	54
Crates	46, 46A
Deck, below	37
Depth charges	22, 25
Distance sighting	51
Electrical panels and enclosures	37
Electrical parts	
Moisture-proofing	42
Sealing	42
Touchup	42
Exterior markings	75

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Table II (contd)

Type of equipment, weapon, surface, or exposure	System No.
Fire control equipment	37
Below decks	37
Enclosed	46
Flight gear	48, 49, 66
Floats	65
Drill, aluminum	79A
Fluorescent finish, for training equipment	14B
General purpose, exterior and interior	76
Ground equipment and parts for good weather resistance	22
Gun barrels	25
Exterior	49
Harbor defense items	14A
High light reflectance	
High temperature exposure, heat ducts, parts components, and surfaces	10, 71
Instrument racks	46
Instruments	
Portable	37A
Launchers	22
Lettering and stencilling	54, 48, 48A
Magnesium fuel tanks, interior	70
Mines	
*Metal not exposed to weather, for high light reflectance fire retarding	14, 14C
Anchors	46A, 48
Exterior cases before loading with explosives	46, 67
Floats	48
Moored	48
Stencilling and marking of moored mines	48, 48A, 66
Missiles	81
Chaparral	13, 55
Exterior, where specified	72
Rain-erosion resistance	56, 56A
Synthetic oil resistance	62
Tartar containers	60
Terrier containers	56
Warheads	22, 80A
Mounts, gun	14A, 25
Enclosures, interior surfaces	17
Name plates	
Optical instruments	17
Exterior surfaces	37A
Exterior transporting cases	

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Table II (contd)

Type of equipment, weapon, surface, or exposure	System No.
Interior surfaces	7
Knobs, eyepieces	9
Parts housed in lubricating hydraulic oil or grease	70
Plumbing carrying liquids or fire fighting chemicals	70
Projectiles	46, 55
Projectors on shipboard topside	22, 55
Propellant containers	55
Radio antennas, plastic or ceramic insulators, edge sealing	78
Rain erosion	72
Rocket heads, where specified	46
Before loading with explosives	67
Rockets	55, 67
Shells, before loading with explosives	67
Shields, before loading with explosives	14A, 25
Equipment in shields	37
Surfaces, exterior .	
Cavities in contact with explosives	47
Metal not exposed to weather, for high light reflectance	14, 14C
Fire-retarding	14C
Shipboard, topside	22, 25
Steel tanks	80
Droppable	70
Internal surfaces of fuel tanks	69
Synthetic lubricant exposure, interior or exterior surfaces	75
Talos trainer	57
Tanks	25, 80
Torpedoes	53
*Aluminum exterior surfaces	52, 63
For training	79
*Exercise heads	64
For visibility	51
Interiors, where specified	27
Steel parts	50
Training ordnance equipment, fluorescent	79A
Turrets	37
Underwater or floating objects	51

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Table III

## DISCONTINUED, ALTERED, OR REPLACED PAINT SYSTEMS

Former system No.	Current system No.	Changes
*7	7	Final coat, TT-E-527 supersedes MIL-E-5556
*9	9	Final coat, MIL-E-16663 or TT-E-529 supersedes MIL-E-5556
10	10	Final coat, MIL-P-14276 deleted
12	12	Final coat, TT-E-490 supersedes MIL-E-15130
14A	14A	Final coat, MIL-E-7729 deleted
14C	14C	Final coat, MIL-E-17970 supersedes TT-P-26
22	22	Final coat, TT-E-490 supersedes MIL-E-15130
*27	27	Final coat, TT-L-32 supersedes TT-L-31
*37	37	Final coat, color 26440 changed to 26307
42	42	Final coat, MIL-V-1137 deleted
*50A	50A	Final coat, TT-E-522 supersedes MIL-C-18468
*51	51	First coat, MIL-E-3891 supersedes MIL-P-21724
54	54	Final coat, TT-L-20 supersedes MIL-L-73; final coat, TT-P-98 supersedes MIL-P-15149
59	59	Final coat, TT-L-20 supersedes MIL-L-73
68	-	Discontinued
76	76	Final coat, TT-E-489 supersedes MIL-E-7729
77	77	Final coat, TT-E-527 supersedes MIL-E-5556

5.3 Nonstandard paint systems. Use of paint systems other than those shown in table I shall be subject to prior approval by the Naval Sea Systems Command. Systems employing materials and processes covered by Federal and military specifications and standards will be given preference. Use of new or improved materials or processes will be approved if it is shown that such use affords better protection or greater economy. Results of tests by standard methods or properly controlled experimental procedures will be required. Specification data suitable for inclusion in Federal or military specifications shall be furnished as soon as practicable to enable procurement without use of proprietary designations.

5.4 Paint systems for ordnance.

5.4.1 Shipboard topside. Preparation for painting shall be in accordance with 5.1. Fixed ordnance on shipboard topside which is exposed to view from sea or air shall be painted haze gray, system 22, or aluminum, system 25, on all exterior surfaces.

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5.4.2 Unexposed surfaces. Exterior surfaces of ordnance equipment not normally exposed to view from sea or air shall be painted light gray, system 37. This applies to both portable and fixed equipment within shields, turrets or other enclosures, or below deck. Refer to table I for other systems and their uses.

5.4.3 Interiors. Interior surfaces of gun mount enclosures or shields shall be painted gloss white, system 14A. The final coats may be applied after installation. Refer to table I for other paint systems and their uses.

5.5 Paint systems for weapons. All weapons and their parts shall be properly cleaned and prepared for painting in accordance with MIL-F-7179. Unpainted surfaces shall be treated in accordance with 4.5. Refer to table II for paint systems suitable for various types of weapons and exposure conditions.

5.5.1 Color coding. Color coding used for identification of types or uses of various weapons or their fillers is not covered herein. Reference should be made to current specifications for painting of particular weapons or to color coding standards. Any paints listed for system 54 in table I may be used for color coding.

5.5.2 Missiles and rockets. Color coding shall conform to MIL-STD-709. Paint systems approved for use on missiles, rockets, and their various components are listed in table I. Reference should be made to MIL-H-18911 and MIL-P-21960. In general, exteriors of motors, JATO's, boosters, and sustainers are painted blue gray (system 55) when loaded with propellant. Warheads shall be painted in accordance with applicable specifications, such as MIL-H-18911 and MIL-P-21960, and drawings. Hot lacquer, system 55, is particularly applicable for high production. Interior surfaces which are in contact with high explosives shall be coated in accordance with system 47.

5.5.3 Bombs. Bombs shall be painted as specified in the applicable drawings. Systems 46, 55, or 67 may be used. Paints for color coding are listed under system 54.

5.5.4 Torpedoes. For painting of torpedoes and their components, reference may be made to systems 27, 50, 51, 52, 53, 63, 64, or 79, as applicable.

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\*5.5.5 Mines and depth charges. Painting of mines depends on the types of mines (moored or bottom). Systems 48, 49, and 67 are used where the greatest antifouling and protection against water are required. Systems 46 and 46A are used where less severe conditions are expected. System 47 is used for explosive cavity lining, and system 54 is used for color coding. Depth charges and projectors exposed on shipboard topside shall be painted haze gray, system 22, or aluminum, system 25.

5.5.6 Gun ammunition. Until color codes are standardized, gun ammunition shall be painted in accordance with current specifications, such as MIL-P-18948 or other applicable documents.

5.6 Sealing and painting procedures. Various details in connection with sealing and painting procedures, such as sealing against water entry, drainage, protection of metals against electrolytic corrosion, conditions for painting, and details of paint application are described below.

\*5.6.1 Drainage and water seals. Considerable damage to equipment may result from retention of water, particularly salt water, in cavities, cracks, recesses, depressions, or on level surfaces. It is of utmost importance to guard against such damage by proper design and by use of sealing materials where necessary. Drainage holes shall be provided wherever horizontal surfaces might retain water. Irregularities which prevent free drainage may be smoothed by applying as many coats of surfacer conforming to TT-P-662 as necessary over the primer coat and sanding until smooth. Rough or pitted surfaces may be smoothed by filling with cement conforming to MIL-C-24176 after phosphating or pretreatment. Seams, cracks, or openings at joints should be filled with caulking compound conforming to MIL-C-18255 after priming.

5.6.2 Prevention of electrolytic corrosion. To minimize corrosion due to electrolytic action between dissimilar metals, as defined in MIL-STD-889, such metals should not be placed in direct contact with each other. When it is necessary to place dissimilar metals close together, they shall be insulated from each other, as indicated below, and exposed edges sealed to prevent contact with moisture. It is particularly important to guard against contact with salt water, which greatly accelerates electrolytic action.

\*5.6.2.1 Treatment of faying surfaces. Surfaces in close contact are termed faying surfaces. When faying surfaces move with respect to one another or are enclosed within brackets or cases containing lubricants

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or hydraulic fluids, no additional protection is required. Grease conforming to MIL-G-81322 may be applied for protection during shipment or storage, except when grease conforming to MIL-G-23827 is specified for the particular equipment, it shall be used.

\*5.6.2.1.1 Metal surfaces with noncritical dimensions. Unless otherwise specified (see 4.5.1) or where dimensions or fits are critical (as in optical instruments), faying surfaces of both similar and dissimilar metals to be permanently assembled shall be painted on each surface with two coats of primer conforming to TT-P-1757. Allow each coat to dry hard before the next coat is applied. When metals are dissimilar as defined in MIL-STD-889, insulation tape a minimum of 20 mils thick shall be applied, in addition to primer coats, over the entire area of each surface. The insulation tape shall be 0.010 inch thick and shall conform to MIL-I-24391 or other approved equivalent specification such as MIL-T-23142. After surfaces are joined, any openings shall be sealed with caulking compound conforming to MIL-C-18255 and well covered with the specified coat of paint to prevent entrance of water.

\*5.6.2.1.2 Metal surfaces of critical dimensions. Faying surfaces of parts having critical dimensions, such as optical and fire-control instruments, are normally protected against moisture and should not be painted. Parts which are to be in contact with instrument grease conforming to MIL-G-23827 may be coated before assembly. Optical parts shall be assembled only with specified cements or sealers.

\*5.6.2.1.3 Wood. Two coats of varnish conforming to MIL-V-1174 shall be applied to surfaces of wood that will be in contact with metal. Two coats of primer conforming to TT-P-1757 shall be applied to the metal surfaces. If required by the exposure conditions, wood may be treated with water-repellant preservative conforming to type II, composition A, of TT-W-572 prior to painting.

### 5.6.3 Conditions for painting.

5.6.3.1 Atmospheric conditions. Painting should be performed when the air temperature is between 60° and 90° Fahrenheit and the relative humidity is not over 65 percent. Dusty or windy conditions should be avoided to prevent contamination of freshly painted surfaces.

\*5.6.3.2 Preparation of surfaces. Thorough surface cleaning and preparation in accordance with MIL-F-7179 are prerequisites for acceptable painting. Surfaces shall be thoroughly dry. It is preferred

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that any welding, brazing, or soldering operations be performed before painting. However, if any of these operations are performed after painting, the surfaces within the heat-affected area shall be reprimed and repainted in accordance with this standard. When painted surfaces have been marred, abraded, or show rust, the affected areas shall be recleaned, reprimed, and repainted, in the same manner as the original surfaces.

5.6.4 Application of coatings. Unless otherwise specified, each pretreatment, primer, and paint coat shall be allowed to dry hard before the next coat is applied. Paint coverage shall be uniform and unbroken. Methods of paint application (brushing, spraying, or dipping) shall be in accordance with good workmanship. Thinning, baking, drying, mixing, or other procedures shall be in accordance with the applicable specifications for the materials used or for the items to be painted.

5.6.5 Paint thickness. For naval ordnance, it is desirable to prevent buildup of heavy paint coats. However, certain minimum thicknesses are recognized as desirable for optimum protection under specified conditions, exposures, or deteriorating influences. The thickness of each coat or equivalent shall be as follows:

- (a) Primers shall be 0.5 to 0.8 mil thick.
- (b) Paints, enamels, varnishes, lacquers, and other paint-type coatings shall be 0.8 to 1.2 mils thick.
- (c) Sprayed coatings shall be built up to the same thicknesses as brush or dip coats.
- (d) Where thicker coats are specified, as for hotmelt cavity lining, the thickness shall conform to the applicable specifications for the item.

\*5.6.6 Colors. Color numbers shall be in accordance with FED-STD-595. Colors of final paint coats shall be in accordance with the applicable specifications for the paint, enamel, lacquer, or varnish, the applicable specifications and drawings for the item, MIL-STD-709, or this standard. Colors of primers not specified herein shall be in accordance with the applicable specification for the item.

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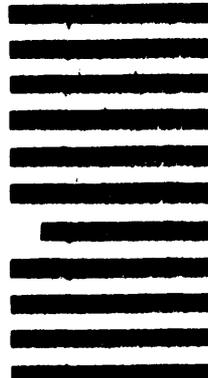
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