



15.1 SCOPE.

15.1.1 Purpose. This section establishes the methods for specifying protective coating requirements.

15.2 APPLICABLE DOCUMENTS. **Note: DoD Policy Memo 05-3 “Elimination of Waivers to Cite Military Specifications and Standards in Solicitation and Contracts” has eliminated the need for waivers to use MIL-SPECS and MIL-STDS on DoD contracts. (See PREFACE 1, Section 2)**

MIL-STD-171	Finishing of Metal and Wood Surfaces
ASME B46.1	Surface Texture (Surface Roughness, Waviness and Lay
FED-STD-595	Color (Requirements for Individual Color Chips)

15.3 DEFINITIONS. *(alphabetically listed).*

15.3.1 Chemical Coating. A superficial layer of a metallic compound produced by the chemical or electrochemical treatment of a surface, e.g., chromate, oxide and anodize films.

15.3.2 Conformal Coating. A coating that conforms to the configuration of the object coated for protection from environmental exposure, electrical shorts and mechanical damage. It is also used as a mechanical support for electrical parts.

15.3.3 Lubricant Coating. A fluid or dry film used to reduce surface friction. The fluid films are produced by petroleum or synthetic base oils, waxes and greases. The dry films are produced by inert mineral substances such as graphite or molybdenum disulfide.

15.3.4 Metallic Coating. A film of metal or metal alloy deposited by chemical, electrochemical or other processes, e.g., electroless plate, electroplate, hot dip, spray plate, vapor plate, etc.

15.3.5 Organic Coating. A film of organic material, e.g., paint, lacquer, enamel, varnish, primer, etc.

15.3.6 Passivation. A surface cleaning treatment that immunizes corrosion resistant steel surfaces against rust by the removal of all free iron particles from the surface. This is not a protective coating but produces the same result by preventing deterioration of the surface.

15.3.7 Permanent Protective Coating. A protective coating used to preserve an item during its designed service life.

15.3.8 Preservative. A temporary protective coating. See PARAGRAPH 15.3.10.

15.3.9 Protective Coating. A film applied to the base material of an item to protect the item from corrosion, abrasion, erosion and other forms of deterioration.

15.3.10 Temporary Protective Coating. A strippable protective coating used to preserve an item during fabrication, handling and storage. This type of coating is not an engineering requirement and is not specified on the engineering drawing.

15.3.11 Vitreous Coating. A film of fused silicates or glasses, porcelain, enamel or ceramic.



15.4 DESIGN PRACTICE.

15.4.1 Types Of Protective Coatings. A protective coating may consist of one or more types of coating and provide protection from corrosion and/or abrasion. In addition, it may be used for decorative purposes and, as a color-coding, may be used for supplementary identification. The type of coating is determined by design requirements and/or service conditions in which the item is used. The responsible designer shall specify the suitable protective coating(s).

15.5 GENERAL REQUIREMENTS

15.5.1 Before And After Coating Dimensions Of Plated Items. When engineering drawings define items to be plated or coated, the applicability of dimensions (and surface texture, when applicable) before or after coating is specified on the drawing by one of the general notes listed in PARAGRAPH 15-8.2.

15.5.2 Selection Of Protective Coating Requirement. Due to the variation in specification coverage, careful consideration should be given to completely specify the protective coating. Some specifications are for the material only; others are for the application of a material or materials; and still others cover the requirements for both the material and its application.

15.5.3 Multiple Protective Coating Control. When chemical pretreatment or metallic coatings are included in the specification requirements of a multiple-coat protective coating, it is not necessary to call out the elements separately since they will be adequately controlled by the overall specification requirements.

15.5.4 Inseparable Parts Assembly Protective Coating. It is not necessary for a detail part of an inseparable assembly to receive a final coating of organic protective coating prior to assembly if the only requirement is the assembly is coated, and the coating requirement is specified on the assembly drawing. The detail part may be prime-coated and receive additional prime and/or finishing coats after assembly.

15.5.5 Location Of Protective Coatings Note(s). The order of preference for specifying the protective coating requirements on the engineering drawing is: (1) finish block, (2) general notes and field of the drawing.

15.6 FINISH BLOCK ENTRIES.

15.6.1 Finish Block Entries When A Specification Covers Requirements. When a specification adequately controls the application or process, the finish block is to contain an entry similar to one of the following examples:

Example 1: MIL-STD-171, FINISH NO. 1.1.3.1

Example 2: Where the number of coats is controlled by the specification:
MIL-X-XXXX
(X) COATS



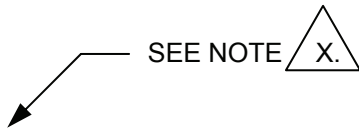
15.6.1 (Continued)

Example 3: Where the thickness is not controlled by the specification:
MIL-STD-XXX, FINISH CODE NO. _____, TYPE _____,
FILM _____
FINAL FILM .0004 TO .0006 THK.

15.7 FINISH CALLED OUT ON THE FIELD OF THE DRAWING.





Example: Where the specification, application or process is called out on the field of the drawing and referenced to the General Notes:

e.g.





15.8 DRAWING NOTE CALLOUTS.

15.8.1 Protective Coating Callout When Space In The Finish Block Is Insufficient. When space within the finish block is too small to contain all the necessary data, or when it is more practical, a flagnote may be used to specify the finish requirements. The flagnote is cross-referenced to the finish block and is to be composed as stated in SECTION 9. For Example:

- a.  ANODIZE PER _____, TYPE _____, CLASS _____.
- b.  NICKEL PLATE PER _____, FINISH NO. _____, ITEM 5 ONLY.
- c.  PRIME PER _____, 2 COATS.
- d.  FINISH PER MIL-STD-XXX, FINISH CODE NO. _____, TYPE _____,
FILM _____, FINAL FILM .0004 TO .0006 THK.

15.8.2 Protective Coating Controlled By Final Dimensions. When plating or coating (and surface texture, when applicable) is a requirement on the drawing, a general note is specified as follows:

 DIMENSIONS, TOLERANCES AND SURFACE TEXTURE  APPLY _____.

- a. BEFORE COATING
- b. BEFORE PLATING
- c. AFTER COATING
- d. AFTER PLATING



15.8.3 Selective Use Of Protective Coating. If a finish or coating does not apply to all items on

- a part, identify the area, features, or surfaces to which the finish applies,
- an assembly, identify the area, features, surfaces, or part(s) to which the finish applies as follows:

 MIL-X-XXXX, TYPE _____, CLASS _____, etc. (*as applicable*) ITEM 5.

15.9 PARTS LIST ENTRIES.

15.9.1 Protective Coating Materials Parts List Callout. Parts list entries are required for materials used to produce organic coatings and some of the other types of protective coatings. Each material required, except those used for in-process thinning, reducing, cleaning, etc., is entered in the parts list as stated in SECTION 10.

15.9.2 Appropriate Protective Coating Callout In Parts List And Finish Blocks. When the application specification for organic coatings controls the materials without reference to other material specifications, the application specification is to be entered in both the finish block and parts list. However, when the application specification references other specifications for the control of the material, the material specifications are entered in the parts list and the applicable specification entered in the finish block.

15.9.3 Final Color Of An Organic Coating Is Located In The Parts List. The parts list will always specify the final color of an organic coating. The entry may be by class, type, etc., of (a) the applicable specification, (b) reference to a material specification called out in the application specification or, (c) when not controlled by either the application or material specification, by reference to a separate document such as FED-STD-595, ANA BULLETIN 166, etc.

15.9.4 A Detail Part Including Protective Coating Callout Is Not An Assembly. A detail part is not considered an assembly when a parts list entry is required to qualify the coating material requirements.

15.10 REFERENCE DATA.

15.10.1 Bibliography. The following bibliography provides general information on the characteristics and applications of the various types of protective coatings.

Materials Handbook, Brady, George S., McGraw-Hill Book Co., Inc., New York, N.Y.

Protective Coatings for Metals, Burns, R.M., Reinhold Publishing Corp., New York, N.Y.

Metal Finishing Guidebook, Metals and Plastic Publications, Inc., Westwood, New Jersey.

Electroplating Engineering Handbook, Graham, A Kenneth, Editor, Reinhold Publishing Corp., New York, N.Y.