

UNCLASSIFIED

AD 4 2 3 6 7 4

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION, ALEXANDRIA, VIRGINIA



UNCLASSIFIED

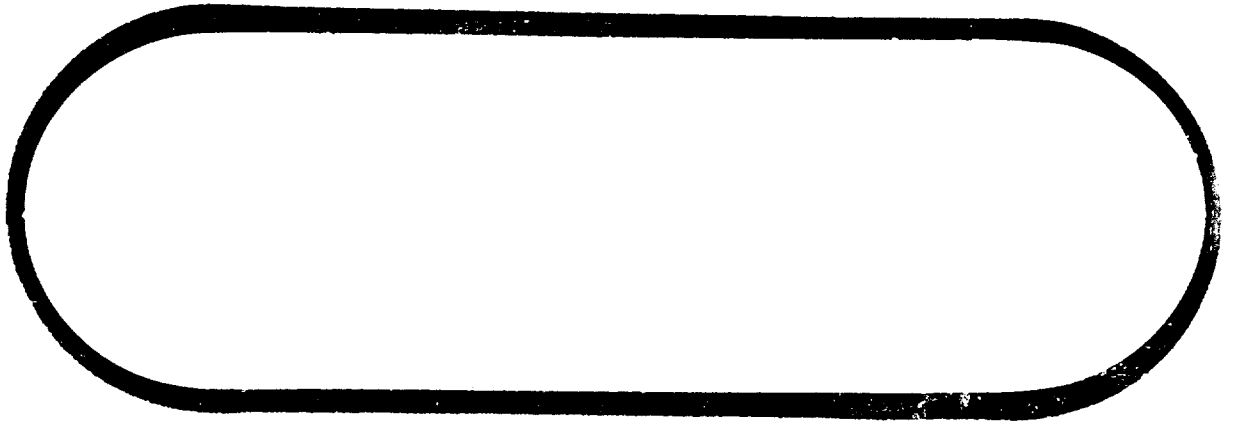
NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

CAT. NO. DDC

NO. 12110

423674

BOEING



SEATTLE, WASHINGTON

**Best
Available
Copy**

THE **BOEING** COMPANY
SEATTLE 24, WASHINGTON

DOCUMENT NO D2-4051

UNCLASSIFIED TITLE PROTECTIVE FINISH REQUIREMENTS FOR
MODEL WS-133A

MODEL NO WS-133A CONTRACT NO AF 04(647)289

ISSUE NO _____ ISSUED TO _____

CLASSIFIED TITLE _____
(STATE CLASSIFICATION)

78102 2-5544
WORK ORDER NO UNIT NO ITEM NO

<p>A HA... <input checked="" type="checkbox"/></p>
--

PREPARED BY Earl Groshart 11-29-62
Earl Groshart 11-29-62
 SUPERVISED BY A.G. Bender 12-15-62
A.G. Bender
 APPROVED BY F.T. Gustafson 12/15/62
F.T. Gustafson
 CLASS & DISTR. _____
 APPROVED BY _____ (DATE)

NO. OF PAGES 82 (EXCLUDING TITLE AND REVISION AND ADDITION PAGES.)

REVISIONS				ADDITIONS			
PAGE	DATE	PAGE	DATE	PAGE	DATE	PAGE	DATE
Complete revision 7/15/59. Note: Original title page with approval date of 4/15/59 is replaced by a new title page with approval date of 7/17/59.				6A	2-27-60		
				8A	"		
				35A	"		
				35B	"		
				53A	"		
				53B	"		
27	9-1-59	48	9-1-59	58A	"		
28	9-1-59	70	9-1-59	58B	"		
				60A	"		
				61A	"		
				63A	"		
				64A	2-27-60		
Complete revision 2/27/60. Note: This revision includes the addition and deletion of pages as noted for 2/27/60.				v	2-27-60		
				vi	2-27-60		
				vii	2-27-60		
				viii	2-27-60		
a	6-17-60						
b							
f							
g							
2				43A	6-17-60	10	2-27-60
3				43B	6-17-60	13	2-27-60
4				48A	6-17-60	18	2-27-60
5				54A	6-17-60	70	2-27-60
8							
36				41a	8-1-60		
37				48b	8-1-60		
40				Va	8-1-60		
41							
42							
43							
44							
54							
72							
ii							
iv							
v							
vi							
viii							
Revision of 8-1-60							
f	8-1-60						
g	8-1-60						
36	8-1-60						
41	8-1-60						
48a	8-1-60						
iii	8-1-60						
v	8-1-60						
vii	8-1-60						

DELETIONS

REVISIONS				ADDITIONS			
PAGE	DATE	PAGE	DATE	PAGE	DATE	PAGE	DATE
f 4 5 30 39 40 41 41a 43a 44	9-10-60	60 60a 61 61a 62 63 63a 64 64a 65 66 67 68 69 71	11-1-60	j 48e 48d 75 76 77 78 79 80 81 82 83 84 85 86	11-1-60	40a	3-3-61
Cover a b g i 1 4 5 6 6a 7 8 8a 11 29 34 35A 35B 36 40 41a 43a 45 48 48a 48b 49 50 51 52 53 53a 53b 54 54a 55 56 57 58 58A 58B	11-1-60	39 40	3-3-61 3-3-61	<u>Deletions</u> Appendix A 11-1-60 41a 3-3-61			
		a i j 6 6a 7 73 74 75 76 77 78 79 80 81 82 83	5-15-61	<u>Additions</u> 6b 5-15-61 6c 6d 6e 74a 74b 74c 74d 74e 74f 74g 74h 74i <u>Deletions</u> 84 5-15-61 85 86			
		61 61A	8-3-61 8-3-61				

MODEL WS-133A

DOCUMENT NO D2-4051

TITLE PROTECTIVE FINISH REQUIREMENTS OF MODEL WS-133A AND MODEL WS-133A-M

REVISIONS				ADDITIONS			
PAGE	DATE	PAGE	DATE	PAGE	DATE	PAGE	DATE
f 43b	11-6-61 11-6-61						
j 76 77 79 80	7-26-62			74j 74k 74l 74m 74n 74o 74p	7-26-62		
<p>COMPLETE REVISION</p> <p>All existing pages were deleted and the present pages released 12-1-62. Title page dated 11-1-60 is replaced and resigned.</p>							
22 23 75	8-23-63 8-23-63 8-23-63						
1 73	10-9-63 10-9-63						

TABLE OF CONTENTS

	<u>Page Number</u>
Title Page	--
Table of Contents	a
List of Tables	A
1. Scope	1
2. References	2
2.1 Specifications (Government)	2
2.2 The Boeing Company Specifications and Documents	5
3. General Requirements	8
3.1 Classification of Environments	8
3.2 Design Considerations	9
3.3 Service Limitations of Finishes	12
3.4 Sequencing of Finishing Operations	13
3.5 Repair Procedures	15
4. Aerospace Vehicle Equipment Requirements	17
4.1 Color Requirements	17
4.2 Marking Requirements	17
4.3 Basic Finishes	19
A. Steel (Alloy and Carbon)	19
B. Steel (Corrosion Resistant)	22
C. Aluminum Alloys	22
D. Magnesium	23
E. Copper and Nickel Alloys	24
4.4 Assembly and Installation Finishes	25
A. Open or Partially Closed Tubular or Hollow Parts	25
B. Closed Tubular or Hollow Parts	25
C. Installation of Mating and Faying Surfaces	26
D. Installation of Hardware	26
E. Electrically Bonded Surfaces	27
5. Aerospace Ground Equipment (Mechanical Ground Equipment and Operational Ground Equipment)	28
5.1 Color Requirements	28
5.2 Marking Requirements	33
5.3 Basic Finishes	34
A. Steel (Alloy and Carbon)	34
B. Steel (Corrosion Resistant)	39
C. Aluminum Alloys	40
D. Magnesium	43
E. Copper and Nickel Alloys	43
F. Concrete	43
G. Wood	44
H. Fiberglass	44
I. Plastic and Plastic Foam	45



TABLE OF CONTENTS (Continued)

	<u>Page Number</u>
5.4 Installation and Hardware Finishes	46
A. Open or Partially Closed Tubular or Hollow Parts	46
B. Closed Tubular or Hollow Parts	47
C. Installation of Mating or Faying Surfaces	47
D. Installation of Hardware	47
E. Hardware Oriented Finishes	48
6. Electronic and Electrical Equipment Requirements	54
6.1 Color Requirements	54
6.2 Marking Requirements	55
6.3 Basic Finishes	57
A. Steel (Alloy and Carbon)	57
B. Steel (Corrosion Resistant)	59
C. Aluminum Alloys	59
D. Copper and Nickel Alloys	62
6.4 Assembly and Installation Finishes	64
A. RFI Finishes, Mating and Faying Surfaces	64
B. RFI Finishes, Installation of Gaskets	69
7. Finish Code Summation	72
7.1 Ferrous Materials Including Corrosion Resistant Steel Requiring Plating	72
7.2 Aluminum Alloys	72
7.3 Magnesium Alloys	74
7.4 Copper and Nickel Base Alloys	77
7.5 Wood	77
7.6 Plastics and Plastic Foams	78
7.7 Rubber and Rubber-Like Synthetics	78
7.8 Corrosion Resistant Steel	78
7.9 Special Purpose Finishes	79
7.10 Multiple Substrate Finishes	79

LIST OF TABLES

TABLE I	CORROSION RESISTANCE OF MATERIALS Page No. 10
TABLE II	METALS COMPATIBILITY Page No. 11
TABLE III	AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES Page No. 19 thru 24
TABLE IV	AEROSPACE VEHICLE EQUIPMENT - ASSEMBLY AND INSTALLATION FINISHES Page No. 25 thru 27
TABLE V	COLORS AEROSPACE GROUND EQUIPMENT Page 28 thru 32
TABLE VI	AEROSPACE GROUND EQUIPMENT - BASIC FINISHES Page No. 34 thru 45
TABLE VII	AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES Page No. 46 thru 53
TABLE VIII	ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISHES Page No. 57 thru 63
TABLE IX	FINISHES FOR RFI DESIGN Page No. 64 thru 71



1. SCOPE

This document presents the finish, color and marking requirements for the WS-133A weapons system Aerospace Vehicle and Ground Equipment.

The emphasis of the requirements section is toward finishing of substrate materials for corrosion resistance, proper decoration (color), and marking of equipment "and items" when exposed to their "use" environments. For convenience the equipment is divided into the following subdivisions:

- A. Aerospace Vehicle Equipment (AVE) - This category was formerly called Airborne Vehicle.
- B. Aerospace Ground Equipment (AGE and MGE) - This category was formerly Operational Ground Equipment and Test Support Equipment.
- C. Electronic and Electrical Equipment - Former designation of this equipment was the same as (B.) above.

Since this document contains the requirements for the entire WS-133A weapons system, finishes are included for R and D phases of development and for the Mobile (WS 133A-M) model. Where finishes were required to meet a design problem which was peculiar to these phases and should not be used on future designed operational equipment, they have been segregated and so labeled.

Because of similarity between WS-133A and WS-133B R and D test hardware used at AER, this document shall be applicable for defining the finish requirements of this hardware. D2-30157, "Finish, Marking and Color Control for WS-133B", shall be used to define all other WS-133B system finish requirements.

R



2. REFERENCES

The exact issue, as specified below, of the following references or applicable portions thereof shall form a part of this document as indicated herein.

2.1 SPECIFICATIONS

2.1.1 Federal

1. AA-F-791(5) - Furniture and Cabinet; Offices, Sectional, Steel
2. QQ-C-320(1) - Chromium Plating; Electrodeposited
3. QQ-N-290 - Nickel Plating; Electrodeposited
4. QQ-P-416A(2) - Plating; Cadmium, Electrodeposited
5. TT-C-490 - Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
6. TT-C-520(1) - Coating Underbody, for Motor Vehicles
7. TT-E-489 - Enamel; Gloss, Synthetic (For Exterior and Interior Surfaces)
8. TT-E-527A - Enamel; Synthetic, Lusterless
9. TT-E-529A - Enamel; Synthetic, Semi-Gloss
10. TT-P-95(1) - Paint, Rubber Base
11. TT-F-636B - Primer Coating, Synthetic, Wood and Ferrous Metals
12. TT-V-119 - Varnish, Spar, Phenolic-Resin

2.1.2 Military

1. JAN-A-669 - Anti-Seize Compound; White Lead Base, General Purpose (for Threaded Fittings)
2. MIL-T-152A - Treatment, Moisture and Fungus-Resistant, of Communications, Electronic and Associated Electrical Equipment



2.1.2 Military (continued)

3. MIL-M-3171A(1)-Magnesium Alloy; Processes for Corrosion Protection of
4. MIL-S-5002(2) - Surface Treatments (Except Priming and Painting)
5. MIL-W-5044A(1) - Walkway, Coating and Matting, Nonslip, Aircraft
6. MIL-C-5541(1) - Chemical Films for Aluminum and Aluminum Alloys
7. MIL-C-6796 - Coatings, Protective, for Wood
8. MIL-P-6808A - Primer, Zinc Chromate, for Aircraft Use; Application of
9. MIL-G-7118A - Grease; Aircraft and Instrument
10. MIL-L-7870A - Lubricating Oil, Low Temperature, General Purpose
11. MIL-C-8507B(1)-Coating, Wash Primer (pretreatment) for Metals Application of
12. MIL-S-8514A - Coating Compound; Metal Pretreatment Resin Acid
13. MIL-P-8585A - Primer Coating, Zinc Chromate, Low Moisture Sensitivity
14. MIL-A-8625A - Anodic Coatings, for Aluminum and Aluminum Alloys
15. MIL-M-10578B - Metal Conditioner and Rust Remover, Phosphoric Acid Base
16. MIL-T-10727 - Tin Plating, Electrodeposited or Hot Dipped for Ferrous and Non-Ferrous Metals
17. MIL-C-11436 - Chromium, Gray Plated
18. MIL-C-11796A(1) - Corrosion Preventive, Petrolatum, Hot Application
19. MIL-S-13518B - Sealer, Surface, Wood Preservative
20. MIL-E-15090B(2) - Enamel, Equipment, Light Gray (Formula No. 111)
21. MIL-P-15147B - Primer and Enamel, Cold Tar
22. MIL-C-15328A - Coating, Pretreatment (Formula 117 for Metals)
23. MIL-P-15930A - Primer, Paint Vinyl-Zinc Chromate Type (Formula No. 120)
24. MIL-P-15932A - Paint, Outside, Gloss Black (Vinyl-Alkyd) (Formula 122-1)
25. MIL-P-15933A - Paint, Outside, Dull Black (Vinyl-Alkyd) (Formula No. 122-3)



2.1.2 Military (continued)

26. MIL-P-15934A - Paint, Outside, Gray No. 7 (Vinyl-Alkyd)
(Formula No. 122-7)
27. MIL-P-15935A - Paint, Outside, Gray No. 11 (Vinyl-Alkyd)
(Formula No. 122-1)
28. MIL-P-15936A - Paint, Outside, Gray No. 27 (Vinyl-Alkyd)
(Formula No. 122-27)
29. MIL-P-16232B - Phosphate Coating, Heavy, Manganese and Zinc
Base, for Ferrous Metals
30. MIL-A-17871A - Zinc Coatings (Hot Dip Galvanizing)
31. MIL-C-18480 - Coating Compound, Bituminous, Solvent, Coal Tar
Base
32. MIL-P-21563 - Paint System, Fluorescent, for Aircraft Appli-
cations
33. MIL-L-25504A - Lubricant, Solid Film
34. MIL-C-26074A - Coating, Nickel Phosphorus, Electroless Nickel,
Requirements for
35. MIL-G-45204 - Gold Plating, Electrodeposited

2.1.3 Standards

1. Federal Standard 595 - Colors
2. MIL-STD-130 - Identification Marking of U.S. Military Property
3. MIL-STD-143 - Specifications and Standards, Use of
4. MIL-STD-803 - Human Engineering Criteria for Aircraft, Missile
and Space Systems (GSE)

2.1.4 Air Force - Navy Bulletins

1. ANA Bulletin 157d - Colors List, of Standard Aircraft, Camouflage
2. ANA Bulletin 166d - Color; List of Standard Aircraft, Glossy

2.1.5 Other Publications

1. AFEM Exhibit 58-20A - Gas, Fluid and Electrical Conduit Line
Identification for use in Missile and
Space Systems.



2.1.5 Other Publications (continued)

2. AFBM Exhibit 59-31 - Color Requirements for Ballistic Missile and Space System Ground Equipment and Facility Items

2.2 THE BOEING COMPANY DOCUMENTS AND SPECIFICATIONS

2.2.1 Documents

1. D2-4062-5 - Environmental Design Criteria for Minuteman
2. D2-5000 - Protective Finish Codes

2.2.2 Process Specifications

1. BAC 5019 - Anodizing
2. BAC 5306 - Manufacture of Decalcomanias and for Marking Panels with Silk Screen
3. BAC 5307 - Part Numbering and Identification Marking
4. BAC 5308 - Application of Stencil and Insignia Markings
5. BAC 5312 - Application of Plastic Film Decalcomanias
6. BAC 5313 - Photoengraving
7. BAC 5400 - Application of Epoxy Polyamide Ablation Insulation Material
8. BAC 5486 - Application of Friction Finish
9. BAC 5700 - Zinc Plating
10. BAC 5701 - Bright Cadmium Plating
11. BAC 5706 - Application of Organic Finishes (Protective)
12. BAC 5709 - Hard Chromium Plating
13. BAC 5710 - Application of Special Organic Finishes
14. BAC 5714 - Electroplating on Aluminum Alloys
15. BAC 5715 - Silver Plating
16. BAC 5716 - Preparation of Colored Anodic Films



2.2.2 Process Specifications (continued)

17. BAC 5717 - Tin Coating
18. BAC 5718 - Low Embrittlement Cadmium Plating
19. BAC 5719 - Alodizing
20. BAC 5720 - Protection of the Interior of Structural Tubing
21. BAC 5722 - Copper Plating
22. BAC 5725 - Stripping Organic Finishes
23. BAC 5734 - Anodizing of Magnesium Alloys
24. BAC 5736 - Application of Chemical and Solvent Resistant Finishes
25. BAC 5740 - Application of Battery Electrolyte Resistant Finish
26. BAC 5742 - Surface Treatment for Magnesium
27. BAC 5748 - Abrasive Cleaning
28. BAC 5751 - Cleaning, Desealing and Surface Preparation of Ferrous Alloys
29. BAC 5754 - Fast Dry Semigloss Lacquer
30. BAC 5761 - Gold Plating
31. BAC 5771 - Stripping Inorganic Finishes
32. BAC 5774 - Application of Synthetic Primer
33. BAC 5775 - Application of Synthetic Enamels
34. BAC 5776 - Application of Zinc Chromate Primer by Spray or Brush
35. BAC 5777 - Application of Wash Primer
36. BAC 5778 - Application of Vinyl Zinc Chromate Primer
37. BAC 5779 - Application of Vinyl-Alkyd Enamels
38. BAC 5780 - Fungus and Moisture Resistant Varnish, Application of
39. BAC 5781 - Sealer Preservative for Wood, Application of
40. BAC 5782 - Application of Bituminous Coating
41. BAC 5783 - Application of Rubber Base Paints to Concrete Surfaces
42. BAC 5785 - Hot Dip Galvanizing



2.2.2 Process Specifications (continued)

44. BAC 5791 - Application of Chlorosulfonated Polyethylene Coating

2.2.3 Materials Specifications

1. BMS 3-3C - Bonded Solid Film Dry Lubricants
2. BMS 8-78B - Epoxy Polyamid Ablative Insulation Material
3. BMS 10-5A - Fast Dry Semi-Gloss Lacquer
4. BMS 10-6B - Aluminum Hard Coating
5. BMS 10-11F - Chemical and Solvent Resistant Finishes
6. BMS 10-16A - Battery Electrolyte Resistant Finish (Air Drying)
7. BMS 10-36 - Nickel Plating (Electrodeposited)
8. BMS 10-51A - Chlorosulfonated Polyethylene Coatings



3. GENERAL REQUIREMENTS

The requirements of this section are applicable to all equipment design of the WS-133A weapons system. These requirements are to supplement those of the equipment sections which are the specific finish requirements and drawing callouts.

3.1 CLASSIFICATION OF ENVIRONMENTAL EXPOSURES

Finishes have been selected to give corrosion protection to equipments when exposed to various environments as classified below:

- 3.1.1 Class 1 - These equipments are those which will be exposed only to conditions of controlled environments during transport, handling, storage and use. Such equipments as critical electronics will require special handling, storage and packaging. Those equipments formerly represented by sheltered, controlled conditions are included.
- 3.1.2 Class 2 - These equipments are those which will be exposed to aboveground uncontrolled extremes of natural and induced environments either during transport, handling and storage operations for unspecified periods of time or during use operations. This classification and level of finish represent the environments of D2-4062-5 and shall be used for all new design, except for equipment designed to uncontrolled underground environments and buried in soil environments. This classification was formerly represented by Above Ground, Unsheltered, Uncontrolled and Above Ground, Sheltered Uncontrolled.
- 3.1.3 Class 3 - These equipments are those which will be exposed to the long term, very high humidity conditions found in uncontrolled underground installations. This classification was formerly represented by Below Ground, Uncontrolled (Inside Compartments).
- 3.1.4 Class 4 - These equipments are those which will be exposed to soil contact. This classification was formerly represented by Below Ground Soil Contact.

Best Available Copy

3.2 DESIGN CONSIDERATIONS

The prevention of corrosion shall be considered in the design of WS-133A equipment. The following areas shall be considered in this design.

3.2.1 Future Design

Equipment designed after the release of this revision shall be finished for corrosion protection to at least the environmental Class 2 requirements regardless of the end "use" environment.

3.2.2 Trapping and Absorption of Corrosive Media

Adequate provision shall be made to preclude the absorption and trapping of corrosive media such as water or chemicals. Dead-end holes and difficult to rinse recesses shall be avoided or shall be planned so that the finishes are applied before assembly operations, except for welded assemblies, to avoid trapping of chemicals in faying surfaces. Welded assemblies shall be carefully rinsed and dried to minimize the entrapment of solutions.

3.2.3 Corrosion Resistant Materials

The corrosion resistance of a material is defined in terms of the need for a finish to prevent corrosion in a given environmental exposure in Table I.

Note: An entry of "No" in Table I indicates that for the environmental exposure the material is considered corrosion resistant and does not need a finish for corrosion protection. It may however require a finish for other design reasons or to eliminate a dissimilar metal couple.

3.2.4 Metals Compatibility

Only metals which are compatible with each other as defined by Table II shall be used in direct contact with each other. The following shall be used as a guide to the use of Table II.

1. Only the surface metal shall be considered in the selection of a compatible metal couple. Thus gold plated copper shall be considered as gold and not copper.
2. The interface between a substrate and a plated metal is not considered a dissimilar metal couple.
3. To find the right compatibility data in Table II for a given couple, follow the downward arrow from the top metal group and the upward arrow from the lower metal group. See the circled example on the table.

TABLE I CORROSION RESISTANCE OF MATERIALS

MATERIALS	ENVIRONMENTAL EXPOSURE			
	CLASS 1	CLASS 2	CLASS 3	CLASS 4
Aluminum Alloys - Clad	None	None	None	Finish
Aluminum Alloys - Corrosion Resistant 1	None	None	None	Finish
Aluminum Alloys - Non-Corrosion Resistant 2	Finish	Finish	Finish	Finish
Beryllium	Finish	Finish	Finish	Finish
Brass Alloys	None	Finish	Finish	Finish
Bronze Alloys	None	Finish	Finish	Finish
Cadmium	None	Finish	Finish	Finish
Chromium	None	None	None	Finish
Concrete	None	None	None	None
Copper 3	Finish	Finish	Finish	Finish
Elastomers (Non Fungus Resistant) 4	Finish	Finish	5	5
Fabric (Non Fungus Resistant) 4	Finish	Finish	5	5
Glass & Glass Filled Plastic Laminate	None	None	None	None
Gold	None	None	None	6
Graphite	None	None	Finish	6
Iron (Cast)	Finish	Finish	Finish	Finish
Lead	None	None	None	None
Magnesium	Finish	Finish	Finish	Finish
Monel	None	None	Finish	Finish
Nickel	None	None	None	Finish
Nickel-Copper Alloys	None	None	None	Finish
Plastic (Non Fungus Resistant) 4	Finish	Finish	5	5
Platinum	None	None	None	6
Rhodium	None	None	None	6
Rubber (Non Fungus Resistant) 4	Finish	Finish	5	5
Silver	None	None	None	6
Solder (Silver & Lead-Tin Base)	None	None	None	Finish
Steel (Alloy & Carbon) 7	Finish	Finish	Finish	Finish
Steel (Corrosion Resistant) 8	None	None	None	None
Tin	None	None	None	None
Titanium	None	None	None	Finish
Wood	Finish	Finish	Finish	Finish
Zinc	None	None	None	None 9

1 Types - 3003, 5052, 5056, 5086, 5456, 6061, 6063, 356

2 Types - 2014, 2024, 2219, 7075, 7079, 7178

3 No Finish Required on electrolytic, phosphor, and tough pitch copper

4 No Finish Required for fungus resistant materials

5 Because of low moisture resistance NOT NORMALLY USED

6 NOT NORMALLY USED

7 Steel with less than 14 % chromium

8 AISI 300 Series and AISI 431 and 440

9 Use Galvanize ONLY

METALS COMPATIBILITY

TABLE II

LEGEND

X - COUPLE NOT COMPATIBLE

C - COUPLE IS COMPATIBLE

P - COUPLE IS COMPATIBLE IF NOT EXPOSED WITHIN TWO MILES OF ANY BODY OF SALT WATER

▨ - COMPATIBLE ONLY WHEN FINISHED PER. ⚠

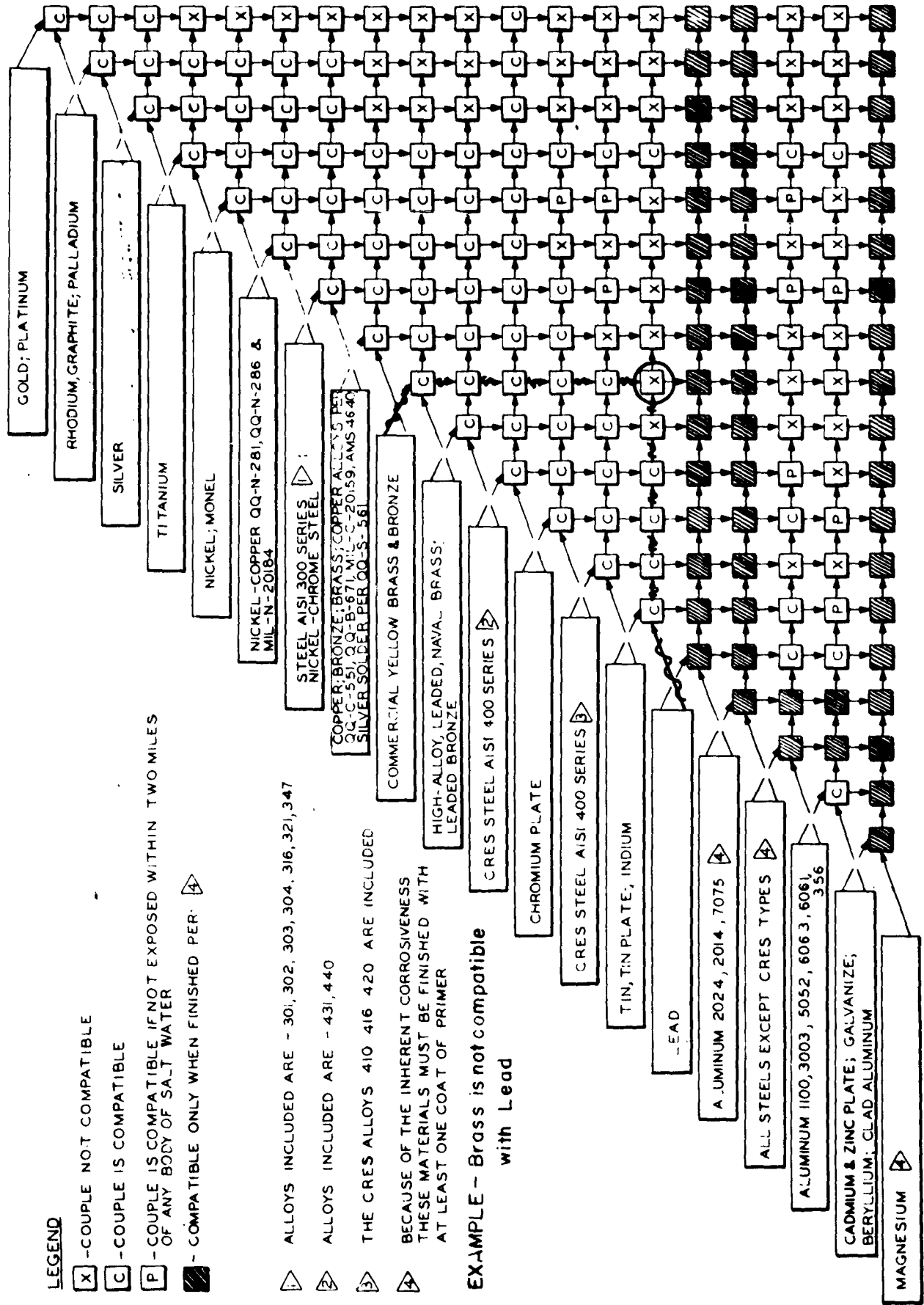
⚠ ALLOYS INCLUDED ARE - 301, 302, 303, 304, 316, 321, 347

⚡ ALLOYS INCLUDED ARE - 431, 440

⚡ THE CRES ALLOYS 410 416 420 ARE INCLUDED

⚡ BECAUSE OF THE INHERENT CORROSIVENESS THESE MATERIALS MUST BE FINISHED WITH AT LEAST ONE COAT OF PRIMER

EXAMPLE - Brass is not compatible with Lead



12 1-2



3.2.5 Surface Roughness

A metal to be finished by plating shall have a surface roughness no greater than RHR 125, except for cast or forged surfaces. The plating thickness shall be increased by 1/2 that normally required for RHR 125 surfaces for "as-cast" or "as-forged" surfaces.

3.2.6 Painting Versus Plating

All surfaces requiring corrosion protection shall be painted instead of plated when painting will not interfere with the functions, maintainability or manufacturing of the part.

3.2.7 Fungus Resistance

Fungus Resistant materials shall be used to the greatest extent possible in the design of WS-133A equipment. Where fungus resistant materials cannot be used they shall be treated with or finished with a material which renders them fungus-inert. Specific finishes to accomplish fungus resistance are specified in the detailed finishes tables.

• 3.3 SERVICE LIMITATIONS OF FINISHES

The following limitations are placed upon finishes for the reasons listed in the following paragraphs.

3.3.1 Temperature Limitation of Finishes

For continued corrosion protection, the finishes shall be limited to the following maximum temperature exposures.

<u>Finish</u>	<u>Maximum Temperature</u>
1. Cadmium Plate	500°F.
	Note: To avoid the possibility of stress corrosion of <u>Loaded</u> , cadmium plated parts, maximum usage temperatures should be limited to 400°F.
2. Cadmium/Nickel Alloy Plate	750°F.
3. Nickel Plate (including electroless)	1000°F.
4. Chromium Plate	1000°F.
5. Zinc Plate (including Galvanize)	700°F.
6. Organic Finishes	250°F.

3.3.2 Hydrogen Embrittlement

To eliminate the possibility of hydrogen embrittlement, the following steels heat treated in the ranges given shall be plated only with approved processes as indicated.

<u>Steel</u>	<u>Heat Treatment</u>	<u>Finish</u>
All steels	220,000 psi to 240,000	Cadmium per BAC 5718, or Chromium per BAC 5709
AISI 4340, 4130	240,000 to 280,000	Cadmium per BAC 5718, or Chromium per BAC 5709
BMS 7-26	240,000 psi to 300,000	Cadmium per BAC 5718, or Chromium per BAC 5709

Finish codes for the application of these finishes are found in the detailed finish section of this document.

3.3.3 High Vibration (sonic) Parts

Do not use Electroless Nickel on parts which are subject to high vibration or subject to high dynamic loading.

3.3.4 Hydraulic Parts

The internal surfaces of hydraulic equipment shall not be painted, cadmium or zinc plated.

3.3.5 Priming and Painting of Functional Surfaces

Organic Finishes shall not be used on any surface where they will interfere with proper operation of the part. These surfaces would include but are not limited to, sliding surfaces and adjustable or removable bolts.

3.4 SEQUENCING OF FINISHING OPERATIONS

To aid in the manufacture of equipment, finishes shall be called out on the drawing level where the finishing should be accomplished. The following operations sequencing may be used in generally selecting the proper drawing level. Where finishes are specifically intended to be applied to assemblies or upon assembly they are so indicated in the detail finish tables.

Best Available Copy

3.4.1 Cleaning and Decontamination

Detailed parts shall be cleaned and/or decontaminated just prior to finishing operations. Part design shall be such that cleaning solutions can be removed from the parts. It is not necessary to call out these operations on a drawing if parts are to be subsequently finished. Where cleaning and/or decontamination only is to be accomplished on a part such as a part made of corrosion resistant steel or corrosion resistant aluminum these operations shall be called out on the drawing. Such codes have been provided in the detailed tables.

3.4.2 Plating

Wherever possible, plating shall be accomplished after forming and fabrication has been completed and prior to assembly. If plating cannot be accomplished prior to assembly, the design shall be such that cleaning and plating solutions can be completely removed by rinsing.

3.4.3 Anodizing

Anodizing shall be accomplished prior to assembly, and prior to the installation of dissimilar metal inserts whenever possible. Assemblies may be sulfuric acid anodized only if complete rinsing is possible.

3.4.4 Chemical Conversion Coating

A. Plated Metals. Phosphate and chromate chemical conversion coatings shall be applied after magnetic or penetrant inspections when such inspections are required.

B. Aluminum. Chemical conversion coatings shall be applied to detailed parts, or assemblies when rinsing is assured, prior to final finishing and not prior to storage of parts. Corrosion Resistant steel inserts may be installed prior to conversion coatings, except that CRES Helicoils shall be installed after coating.

3.4.5 Priming

Parts which are to be topcoated with 3.0 mils of enamel over zinc chromate primer shall be primed so that topcoating can be accomplished within 24 hours. This normally means that zinc chromate shall generally be applied to assembled parts. Faying surfaces can be primed at the time of assembly when such priming is required.

3.4.5 Priming (continued)

Parts requiring any primer except zinc chromate should be primed as details.

3.4.6 Topcoating

Topcoating shall be applied to assemblies or when details are topcoated the assemblies shall be touched up in such a way as to make the assembly appear uniformly finished.

3.4.7 Castings and Pipes

Castings and piping which require pressure and leak checking shall be topcoated after pressure and leak testing have been completed.

3.4.8 Masking

The following areas of parts and all other areas of parts where the finish should not be applied shall be marked on the drawing. See typical note below.

1. Points for electrical contact.
2. Points for heat transmission.
3. Plastics
4. Rubber
5. Working parts of machinery.

Typical Note:

1 ▷ F-1.1929 EXCEPT AREAS AS NOTED.

3.5 REPAIR PROCEDURES

Where it is necessary for engineering to control the removal; change or replacement of a finish on a part, the following drawing callout shall be used.

3.5.1 Removal of Finishes

- A. Organic finishes shall be removed per BAC 5725. The repair or rework drawing shall call out this specification by Flag note.
- B. Plated and Inorganic Finishes shall be removed per BAC 5771. The repair or rework drawing shall call out this specification by Flag note.



3.5.2 Refinishing of Parts

Refinishing shall be called out using the same finish as the original design. These finishes are controlled by the detailed finish codes. This requirement does not cover the touchup and repair treatments normally required by manufacturing or Quality Control.

U3-4071-1000 12-1-2

BOEING

NO. D2-4051

PAGE 16



4. AEROSPACE VEHICLE EQUIPMENT REQUIREMENTS

Detail Finish Codes for specified finishes, markings and colors to be used on the WS-133A Aerospace Vehicle Equipment are included in this section.

4.1 COLOR REQUIREMENTS

4.1.1 External Color Selection

The external areas of the Aerospace Vehicle shall be the unchanged color of the external insulation.

4.1.2 Internal Color Selection

No color requirements for the internal areas have been established.

4.1.3 Special Color Selection

Where special color requirements exist, such as the painting white of Ground Test Missiles, they shall be established for the specific item of hardware.

4.2 MARKING REQUIREMENTS

4.2.1 External Marking Selection

- A. External Markings for Ground Test Missiles (GTM) and Flight Test Missiles (FTM) shall be selected from Drawing Number 25-15975
- B. External Markings for Operational Aerospace Vehicle Equipment shall be selected from Interface Control Drawing Number 25-26335.
- C. Pressure sensitive scotchcals are preferred for all external markings. Use transparent films with black lettering on insulation.



4.2.1 External Marking Selection (continued)

- D. Maintenance operations instructions, ground handling instructions, equipment locations and nomenclature markings may be applied by stencilling.
- E. Ordnance Marking - Marking of ordnance devices shall be in accordance with CM-60-7650.3-3124.
- F. Tracking Identification (R and D only) marking shall be black enamel applied over a special primer. For drawing call use F-12.68 FOLLOWED BY F-12.656 No. 37038 Per Fed.-STD-595.

4.2.2 Internal Marking Selection

- A. Pressure sensitive scotchcals, wiring diagrams, instructions and reference designations shall preferably be pressure sensitive scotchcals.
- B. Paint Film Decals. For small assemblies, wiring diagrams and where face down application is required use paint film decals overcoated with lacquer.

4.2.3 Marking Colors

<u>Background</u>	<u>Color</u>
A. Blue	Yellow No. 13538 per Fed. Std. 595
B. Olive Drab	Yellow No. 13538 per Fed. Std. 595
C. Black	White No. 17875 per Fed. Std. 595
D. Green, including zinc chromate and Epoxy primers	Black No. 17038 per Fed. Std. 595
E. White	Black No. 17038 per Fed. Std. 595 for standard mark Red No. 11136 per Fed. Std. 595 for warning.
F. Cork	White No. 17875 per Fed. Std. 595



SUBSTRATE	PURPOSE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>A. STEEL (ALLOY AND CARBON)</p> <p>1. Heat Treatment below 180,000 psi</p>	<p>1. Corrosion protection up to 500°F.</p> <p>2. Can be used to couple steel and aluminum see Table II.</p> <p>3. Parts with controlled dimensions</p>	<p>Cadmium plate, Q-P-416 Type I, class 3 (0.0002 to 0.0004 inch)</p>	<p>F-1.1914</p>
<p>1. Corrosion protection up to 500°F.</p> <p>2. Can be used to couple steel to aluminum see Table II.</p> <p>3. Parts with uncontrolled dimensions</p>	<p>Cadmium plate, Q-P-416 Type II class 2 (0.0003 inch minimum)</p>	<p>F-1.1929</p>	

4.3 BASIC FINISHES

Detailed finishes which give the necessary protection from corrosion to the Aerospace Vehicle Equipment are given in Table III with the necessary codes for drawing callout. The environmental conditions for Class 2 exposures have been assumed for all finishes.

Table III is oriented toward providing finishes for substrate materials. The finishes given, provide for corrosion resistance where Table I indicates that a finish is required and provides the commonly required finishes to eliminate dissimilar metal contacts.

4.3.1 Government Specifications

Wherever Federal or Military specifications or standards or service bulletins are applicable and adequate for finishing materials, finished parts or finish processes, they have been specified in the individual finish requirements. Where military specifications either do not exist or do not adequately cover the specific requirements, Boeing Material and Process specifications have been used.

4.3.2 Table III AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES



4.3.2 Table III AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	PURPOSE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>A. STEEL (ALLOY AND CARBON) (continued)</p> <p>2. Heat Treatment between 180,000 and 220,000 psi</p>	<p>1. Corrosion protection up to 500°F. 2. May be used to couple steel to aluminum see Table II. 3. Parts with controlled dimensions</p>	<p>Cadmium plate, QQ-F-416 Type I, class 3 (0.0002 to 0.0004 inch). Bake 3 hours at 375 ± 25°F after plating.</p>	<p>F-1.1913</p>
	<p>1. Corrosion protection up to 500°F. 2. May be used to couple steel to aluminum see Table II 3. Parts with uncontrolled dimensions</p>	<p>Cadmium plate, QQ-F-416 Type II, class 2 (0.0003 inch minimum). Bake 3 hours at 375 ± 25°F. after plating.</p>	<p>F-1.1923</p>
<p>3. Heat Treatments up to 220,000 psi</p>	<p>1. Corrosion protection up to 1000°F. 2. Use on irregular shaped parts or parts with recesses where a uniform plating thickness is required. 3. Do not use in vibration areas.</p>	<p>Electroless Nickel plate and bake, MIL-C-26074, class 1. (0.0015 inch minimum).</p>	<p>F-1.801</p>
	<p>1. Corrosion protection up to 1000°F. 2. Use on parts subject to high vibration and high loading.</p>	<p>Nickel plate, S3S 10-36, (0.0015 inch minimum). Bake 3 hours at 375 ± 25°F after plating.</p>	<p>F-1.822</p>
	<p>1. Parts subject to wear, up to 1000°F. exposure. 2. Use on irregular shaped parts or parts with recesses which require uniform plating thickness</p>	<p>Electroless Nickel plate and bake, MIL-C-26074, class 2. (0.0015 inch minimum).</p>	<p>F-1.804</p>

01-4071 1088



4.3.2 Table III AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES (continued)			
SUBSTRATE	PURPOSE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. STEEL (ALLOY AND CARBON) continued 3. Heat Treatments up to 220,000 psi (continued)	1. Parts subject to wear 2. Corrosion protection up to 1000°F 3. Bearing surfaces	Chromium plate, QQ-C-320, class 2 (0.002 inch minimum).	F-1.842
	1. Parts requiring electrical conductivity such as RFI control. 2. May be used to couple steel to aluminum see Table II.	Tin plate, MIL-T-10727, Type I or Type II (0.0003 inch minimum)	F-1.22
	4. Heat Treatment above 220,000 psi	1. Corrosion protection up to 500°F 2. May be used to couple steel to aluminum see Table II. 3. Controlled dimensions and threaded areas	Cadmium plate per BAC 5718 and bake 23 hours at 375 ± 25°F. (0.0002 to 0.0004 inch)
5. All Heat Treatments	1. Corrosion protection up to 500°F 2. May be used to couple steel to aluminum see Table II 3. Uncontrolled dimensions.	Cadmium plate, apply chromate conversion coat and bake for 23 hours at 375 ± 25°F per BAC 5718 (0.003 minimum)	F-1.1922
	1. Corrosion protection up to 1000°F 2. Hard, wear resistant surface	Chromium plate, QQ-C-320, class 2 (0.002 inch). Bake 23 hours at 375 ± 25°F. after plating	F-1.843 For BMS 7-26 Steel use F-1.844
	General corrosion protection up to 250°F for parts which do not have requirements for metallic surfaces.	Clean per TT-C-490 Method II or III and prime with one coat of BMS 10-11 Type I, per BAC 5736	F-1.16

4.3.2 Table III AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES (continued)			
SUBSTRATE	PURPOSE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
B..STEEL (CORROSION RESISTANT)	Removal of heat treatment and/or forming contamination	Clean per MIL-S-5002 or BAC 5751	F-8.05
	Where a metallic surface other than the corrosion resistant steel is needed such as for dissimilar metal couples or bearings	Apply electroplate as for low alloy or carbon Steel - Section A of this table.	Same Codes as in A.
C. ALUMINUM ALLOYS			
1. All Alloys	<ol style="list-style-type: none"> 1. Very hard surfaces for wear resistance 2. Provides high dielectric strength 3. May be coupled to any dissimilar metal without further finishing 4. Do not use on parts subject to sharp bending or severe flexures.. 	Hardcoat per BMS 10-6	F-2.204
	<ol style="list-style-type: none"> 1. Bearing surfaces 2. Hard surfaces subject to flexure or peening. 	Chromium plate per BAC 5709	F-2.33
	<ol style="list-style-type: none"> 1. Low electrical contact resistance such as required for electro-interference requirements 2. Finish is solderable 	Tin coat per BAC 5717	F-2.23
	Parts and structure which will be insulated with BMS 8-78 or Cork	Chemically clean per BAC 5765, Method 2, and apply primer coat of BMS 8-78 per BAC 5400 or optionally apply 1-2 mills dry film thickness of BMS 10-53 in a limited contamination area per BAC 5807.	F-2.27

R

U3-4071-1000

REVISED 8-23-63

BOEING

NO. D2-4051

PAGE 22

4.3.2 Table III AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	PURPOSE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>C. ALUMINUM ALLOYS (cont)</p> <p>1. All Alloys -(cont.)</p>	<p>For uninsulated areas of parts which will be partly insulated, such as the inside of the raceway covers.</p>	<p>Chemical clean per BAC 5765, Method 2 and apply one coat of EMS 10-11, Type I, per BAC 5736 or optionally apply .4-.6 mils dry film thickness of EMS 10-53 per BAC 5307.</p>	<p>F-2.28</p>
<p>2. Non-Clad and Non-Corrosion Resistant Alloys.</p>	<p>Corrosion protection of parts and structure which do not require plating for reasons given in C.1 above.</p>	<p>Chemical treat per MIL-C-5541 using colored inspectable coating and apply one coat of EMS 10-11, Type 1, Primer per BAC 5736.</p>	<p>SRF-2.31</p>
<p>3. Clad and Corrosion Resistant Alloys</p>	<p>Corrosion protection of parts which cannot be entirely primed because primer would interfere with the function of the part.</p>	<p>Anodize per MIL-A-8625, Type 1, Prime with one coat of EMS 10-11, Type 1, primer per BAC 5736. Note the areas to be primed on the drawing.</p>	<p>F-2.20 Followed by SRF-12.205</p>
<p>D. MAGNESIUM</p>	<p>Corrosion protection</p>	<p>No finish required</p>	<p>F-2.10</p>
	<p>Corrosion protection</p>	<p>Dow 17 anodize per BAC 5734 and apply one coat of EMS 10-11, Type 1, primer per BAC 5736.</p>	<p>SRF-3.305</p>

R

U3-4071-1000

REVISED 8-23-63

BOEING

NO. D2-4051

PAGE 23



4.3.2 Table III AEROSPACE VEHICLE EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	PURPOSE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
E. COPPER, COPPER ALLOY (Brass and Bronze), NICKEL and NICKEL ALLOYS	<ol style="list-style-type: none"> 1. Corrosion protection where no other finish is specified. 2. Use for coupling to dissimilar metals 	Clean per MIL-S-5002, pre-treatment coat with one coat of MIL-C-8514 per MIL-C-8507 or BAC 5777. Overcoat with one coat of MIL-P-6585 per BAC 5776	F-4.36
	<ol style="list-style-type: none"> 1. Corrosion protection where the parts are also required to conduct electricity 2. Finish is solderable 	Tin plate, MIL-T-10727, Type 1 or Type II, minimum thickness 0.0003 inch.	F-4.21
	Wear requirements such as light loaded bearings or bushings	Nickel plate, QQ-N-290, class 2 Note: callout minimum thickness on the drawing.	F-4.91



ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>4.4 ASSEMBLY AND INSTALLATION FINISHES</p> <p>Detailed finishes and finish codes for finishing of hardware items and finishes which are to be applied only at the time of assembly or installation are given in Table IV. These finishes are intended to supplement those of Table III. Commonly required finishes to eliminate dissimilar metal contacts as they apply to assembly and installation operations are given.</p> <p>4.4.1 Table IV AEROSPACE VEHICLE EQUIPMENT ASSEMBLY AND INSTALLATION FINISHES</p> <p>A. TUBULAR and HOLLOW PARTS - OPEN and PARTIALLY CLOSED</p> <p>1. Steel</p>	<p>Corrosion protection of both interior and exterior surfaces</p> <p>Where insulation will be used on the exterior surfaces.</p>	<p><u>Exterior Surface</u> - Cadmium plate, RO-P-416, Type II, Class 2.</p> <p><u>Interior Surface</u> - Apply two coats of EMS 10-11, Type 1, per BAC 5736</p>	<p>SRF-1.611</p>
<p>2. Aluminum</p>	<p>Corrosion protection of both interior and exterior surfaces.</p>	<p><u>Exterior Surface</u> - Apply no finish except as required to prevent corrosion during shop operations.</p> <p><u>Interior Surface</u> - Apply one coat of MIL-P-8585 per BAC 5720</p>	<p>Exterior F-1.10 Interior F-1.67</p>
<p>B. TUBULAR and HOLLOW PARTS - CLOSED</p> <p>1. Steel</p>	<p>Corrosion protection</p>	<p>Chemical treat interior and exterior surfaces per MIL-C-5541 colored inspectable coating or anodize per MIL-A-8625; Apply one coat of EMS 10-11 Type 1 to the exterior surface.</p> <p><u>Interior</u> - No finish <u>Exterior</u> - Treat as required by Table III.</p>	<p>SRF-2.71</p>



4.4.1 Table IV AEROSPACE VEHICLE EQUIPMENT - ASSEMBLY AND INSTALLATION FINISHES (continued)

ITEM REQUIRING FINISH	USE OF THIS FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>3. TUBULAR and HOLLOW PARTS - CLOSED (cont)</p> <p>1. Steel (Continued)</p>	<p>Where insulation will be used on the exterior surface.</p>	<p>Interior - No finish Exterior - No finish except as required to prevent corrosion during shop operations</p>	<p>F-1.10</p>
<p>2. Aluminum</p>	<p>Corrosion protection</p>	<p>Interior - No finish Exterior - Chemical treat, MIL-C-5541 colored inspectable coating, or anodize per MIL-A-8025 and apply one coat of EMS 10-11, Type 1 per BAC 5736</p>	<p>SRF-2.301</p>
<p>C. MATING AND FAYING SURFACES (Installation or assembly of)</p>	<p>Metals are compatible per Table II</p> <p>Metals are not compatible per Table II</p>	<p>No finish required other than normal part finish.</p> <p>Apply one coat of MIL-P-8585 primer to one member of the couple Note: not required when the basic part has been primed as a detail.</p>	<p>F-12.2052</p>
<p>D. HARDWARE ITEMS (Installation of)</p> <p>1. Permanently Installed</p>	<p>Threaded inserts, threaded sleeves, bolts, nut plates, small hardware, press fits</p>	<p>Apply MIL-P-8585 primer or MIL-C-11796 class 3 corrosion preventive compound to all areas of the part and/or hole or counter-wink and install immediately</p>	<p>F-12.40</p>



4.4.1 Table IV AEROSPACE VEHICLE EQUIPMENT - ASSEMBLY AND INSTALLATION FINISHES (continued)

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>D. HARDWARE ITEMS (Installation of) cont</p> <p>2. Movable and Re-movable</p>	<p>Slip joints, slip fits, bolts and small hardware</p>	<p>Apply corrosion preventive compound, MIL-C-11796 class 3 and install immediately.</p>	<p>F-12.44</p>
<p>3. Bearings</p>	<p>Antifriction, spherical</p>	<p>Install with light film of MIL-G-7118 grease on all surfaces</p>	<p>F-12.423</p>
<p>4. Interstage Friction Fits (Missile Inter-Stage)</p>	<p>Sintered</p> <p>To increase friction</p>	<p>Install with a light film of MIL-L-7870 oil on all surfaces</p> <p>Apply friction finish per BAC 5486. Note: Drawing shall call out the member of the joint to receive the finish.</p>	<p>F-12.2091</p>
<p>E. SURFACES TO BE ELECTRICAL BONDED</p> <p>1. R and D only - Do not use for future design</p> <p>2. Future Design</p>	<p>Galvanic corrosion protection</p> <p>Galvanic corrosion protection</p>	<p>None Note: The arrangement of dissimilar metals in contact to accomplish bonding or grounding shall be in accordance with BAC 5117.</p> <p>If metals are compatible per Table II, No Finish Required. If metals are not compatible per Table II, Apply compatible finish from Table III.</p>	

34
01-67-188 12 1-7



5. AEROSPACE GROUND EQUIPMENT - (MECHANICAL GROUND EQUIPMENT AND OPERATIONAL GROUND EQUIPMENT)



Detailed Finish codes for specific finishes, markings and colors to be used on the WS-133A, AGE are contained in this section.

5.1 COLOR REQUIREMENTS

All colors of organic (paint) finishes for AGE are in accordance with AFPM Exhibit 59-71 except as noted in Table V by flag-note. Deviations so noted are to provide for special Engineering requirements. Colors are in accordance with Federal Standard 595 unless otherwise indicated in the Table.

5.1.1 TABLE V COLORS AEROSPACE GROUND EQUIPMENT

EQUIPMENT	COLOR	COLOR GLOSS	COLOR NUMBER	USE WITH FINISH CODES
A. STORAGE CABINETS				
1. Outside Surfaces	Green	Semigloss	24300	F-12.653; F-12.654; F-12.655
2. Inside Surfaces				
(a) Where maintenance will be performed	Gray	Semigloss	26622	F-12.653; F-12.654; F-12.655
(b) No maintenance will be performed	Green	Semigloss	24300	F-12.653; F-12.654; F-12.655
B. PANELS				
1. Used Outdoors	Gray	Semigloss	26250	F-12.653; F-12.654; F-12.655
2. Lettering on panels used outdoors	White	Semigloss	27875	Add to drawing by flag-note - see 6.1.2 for marking information
3. Used Indoors	Gray	Semigloss	26492	F-12.653; F-12.654; F-12.655
4. Lettering on panels used indoors	Black	Semigloss	514-ANA Bulletin 166d	Add to drawing by flag-note - see 5.1.2 for marking information

5.1.1 Table V COLORS AEROSPACE GROUND EQUIPMENT					
EQUIPMENT	COLOR	COLOR GLOSS	COLOR NUMBER	USE WITH FINISH CODES	
C. VANS AND TRAILERS 1. Interior (inside)					
	a. Floors	Semigloss	26440	F-12.653; F-12.654; F-12.655	
	b. Walls	Semigloss	24670	F-12.653; F-12.654; F-12.655	
	c. Ceilings	Semigloss	27886	F-12.653; F-12.654; F-12.655	
d. Pipes, Conduit, ducts, etc., which are attached to van or trailer structure or to equipment installed in the van or trailer					Same color as the equipment to which it is attached
2. Exterior (outside)					
	a. Basic structure	Gloss	516-ANA Bulletin 166d	F-12.650; F-12.6501; F-12.651 F-12.652	
	b. Under body and painted running gear	Lusterless	37038	F-12.656; F-12.657; F-12.658 F-12.6581	
c. Entrance Stairways and bumper plates or corresponding front and rear flat surfaces	White, 17875, (Gloss)				Strata Blue, 516-ANA Bulletin 166d, (Gloss) bands 4 inches wide, included 45° left and right of vertical starting at upper center of the surface so as to simulate and inverted vee (Λ) pattern.
D. UHF GROUND ANTENNA 	White	High Gloss	BAC 700 - per D-14080 Boeing Color Standard		Applied by Flag Note
E. ADAPTER KIT; RAILROAD; TRANSPORTER-ERECTOR 	Red-Orange	High Visibility	633 per MIL-F-21563		F-12.998

U3-4971-1000



BOEING

NO. D2-4051






PAGE 29



5.1.1 Table V COLORS AEROSPACE GROUND EQUIPMENT






EQUIPMENT	COLOR	COLOR GLOSS	COLOR NUMBER	USE WITH FINISH CODE
F. LAUNCH CONTROL STAND AND ASSOCIATED PARTS  1. Items not subject to corrosion such as concrete 2. Items subject to corrosion	Leave unpainted			
	Strata Blue	Gloss	516 per ANA Bulletin 166d	F-12.650; F-12.6501; F-12.651 F-12.652
G. TRANSPORT VANS -(SECOND AND THIRD STAGE ENGINES)	Leave unpainted			
H. TRANSPORTER - ERECTOR  1. Exterior (outside) (a) Basic structure (b) Front and Rear Doors: 1 ft. wide alternate stripes inclined 45° from vertical across the doors	White	Gloss	17875	F-12.650; F-12.6501; F-12.651; F-12.652
	White and Blue	Gloss	17875 15045	F-12.650; F-12.6501; F-12.651; F-12.652
2. Interior (inside) (a) Basic structure	White	Gloss	17875	F-12.650; F-12.6501; F-12.651; F-12.652
	Blue	Gloss	15045	F-12.650; F-12.6501; F-12.651; F-12.652
3. Tractor and Rear Carriage (a) Basic Structure (b) Front Area of Tractor: 1 ft. wide alternate stripes inclined 45° from vertical	White and Blue	Gloss	17875	F-12.650; F-12.6501; F-12.651; F-12.652
	Blue	Gloss	15045	F-12.650; F-12.6501; F-12.651; F-12.652



5.1.1 Table V COLORS AEROSPACE GROUND EQUIPMENT				
EQUIPMENT	COLOR	COLOR GLOSS	COLOR NUMBER	USE WITH FINISH CODE
I. FIRST STAGE ENGINE CONTAINER 1. Exterior (outside)  (a) Basic structure (b) Front and Rear Doors: 1 ft. wide alternating stripes inclined 45° from vertical	White	Gloss	17875	F-12.650; F-12.651; F-12.652
	White and Blue	Gloss	17875	F-12.650; F-12.6501; F-12.651; F-12.652
	Blue	Gloss	15045	F-12.650; F-12.6501; F-12.651; F-12.652
2. Interior	White	Gloss	17875	F-12.650; F-12.6501; F-12.651; F-12.652
3. Carriage	Blue	Gloss	15045	F-12.650; F-12.6501; F-12.651; F-12.652
J. FIRE PROTECTION EQUIPMENT	Red	Gloss	11136	F-12.650; F-12.6501; F-12.651; F-12.652
K. HAND TOOLS USED DIRECTLY ON THE AEROSPACE VEHICLE 	Red- Orange	High Visibility	633-per MIL-P-21563	F-12.998
L. UNDERGROUND EQUIPMENT USED IN HIGH HUMIDITY AREAS 	Gray	Lusterless	#27 per MIL-P-15936	F-12.668; F-12.669
M. SUITCASE TYPE CONTAINERS 1. Containers for non- sensitive equipment and tool boxes  2. Containers for sensi- tive equipment and equipment requiring periodic calibration 	Gray	Gloss	#111 per MIL-E-15090	F-12.659
	Blue	Gloss	BAC540 per D-14080	

13-4071 1000



5.1.1 Table V COLORS AIRSPACE GROUND EQUIPMENT				
EQUIPMENT	COLOR	COLOR GLOSS	COLOR NUMBER	USE WITH FINISH CODE
N. ALL GROUND EQUIPMENT NOT COVERED ABOVE	Strata Blue	Gloss	516 per ANA Bulletin 166d	F-12.650; F-12.6501; F-12.651; F-12.652
THE FOLLOWING COLORS ARE FOR R AND D AND THE MOBILE PROGRAM				
O. TEST SUPPORT EQUIPMENT AND EQUIPMENT WHICH WILL NOT BE SUPPLIED AS END ITEMS 	Same as operational equipment except that a 1 x 4 inch stripe of international orange 12246, Gloss, tape or paint shall be applied at the top edge of the equipment. The lower right hand 1 sq. inch of each drawer may be painted international orange.			
P. ORDNANCE CABLES 	Sheathing shall be yellow plastic tubing with 3/4 inch wide red (Minnesota Mining and Manufacturing Color #471 plastic tape applied parallel to the axis of the cable over its entire length.			
Q. RAILROAD CARS				
1. Interior				
(a) Floors 	Gray	Semigloss	26440	F-12.653; F-12.654; F-12.655
	NOTE: Commercial floor covering materials (vinyls, etc.) shall be as near as possible to 26440 gray. Small off color flecks are allowed.			
(b) Walls	Green	Semigloss	24670	F-12.69
(c) Ceilings	White	Semigloss	27886	F-12.69
(d) Ceilings of personnel quarters cars	White	Lusterless	37886	F-12.69
2. Exterior				
(a) Basic structure	Strata Blue	Gloss	516 per ANA Bulletin 166d	F-12.650; F-12.6501; F-12.651; F-12.652
(b) Underbodies and painted running gear	Black	Lusterless	37038	F-12.656; F-12.657; F-12.658; F-12.6581
	Exceptions to AFEM Exhibit 59-31			
	Not covered in AFEM Exhibit 59-31			



5.2 MARKING REQUIREMENTS

All marking shall meet the requirements of MIL-STD-130

5.2.1 Part Marking

Marking of individual parts shall be accomplished by any method applicable to the part including rubber stamping, steel stamping and tagging.

5.2.2 Equipment Marking

Marking of equipment shall be as follows:

- A. Assemblies and sub-assemblies which maintain separate Identity shall be marked with a screw down nameplate meeting the requirements of MIL-STD-130 and the applicable equipment specification.
- B. Instructional Type Markings such as nomenclature, maintenance instructions shall be marked preferably with scotchcals. Stencilling and silk screening may be used when applicable and more economical than decals.
- C. Equipment panels, display panels and drawer fronts shall be by machine engraving and filling the engraving with paint.
- D. Items requiring face down markings shall be marked by paint film decals only.
- E. Highway unidirectional markings shall be scotchlight only.

5.2.3 Piping and Line Identification

All fluid lines, piping and electrical conduit shall be marked for identification accordance with AFPM Exhibit 58-20A.



5.3 BASIC FINISHES

Detailed finishes which give the necessary protection from corrosion to the Aerospace Ground Equipment are given in Table VI, with the necessary codes for drawing callout. The environmental condition except for Class 1, listed for a finish is assumed to be the worst condition the equipment will see, therefore, no special consideration need be given for handling, storage or transportation operations. Finishes which will withstand only Class I environmental exposures should not be used for future design unless precautions are taken to protect the equipment during transportation, handling and storage.

Table VI is oriented toward providing finishes for substrate materials. The finishes given provide for corrosion resistance where Table I indicates that a finish is necessary and provides the commonly required finishes to eliminate dissimilar metal contacts.

5.3.1 Government Specifications

Wherever Federal or Military specifications or standards or service bulletins are applicable and adequate for finishing materials, finished parts or finish processes they have been specified in the individual finish requirements. Where Military specifications either do not exist or do not adequately cover the specific requirements, Boeing Material and Processes specifications have been used.

5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES

SUBSTRATE	EXPOSURE CLASS	USE OF FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. STEEL (ALLOY AND CARBON) 1. Heat Treated below 180,000 psi	2	1. Corrosion protection of internal structure, not open to view, and which requires the properties of a metallic surface. 2. Uncontrolled tolerances 3. General compatibility with aluminum.	Cadmium plating, QQ-P-416 Type II Class 1. Optional: Zinc plate, Q-Q-325 Type II, Class 2.	F-1.1930 F-1.205



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES				
SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENT	DRAWING CALLOUT
A. STEEL (ALLOY AND CARBON) continued 1. Heat Treatment below 180,000 psi	2	1. Corrosion protection of internal structure, not open to view, and which requires the properties of a metallic surface.	Cadmium plate, QQ-P-416, Type 1 Class 3 (0.0002 to 0.0004 inch).	F-1.1914
	2	Hard wear resistant surfaces such as sliding contacts on bearings.	Chrome plate per QQ-C-320, Type 2	F-1.841
	2	1. Corrosion protection of internal structure, not open to view, and which requires the properties of a metallic surface. 2. Uncontrolled tolerances 3. General compatibility with aluminum.	Cadmium plate, QQ-P-416, Type 1, Class 2 (0.0003 inch minimum). Bake 3 hr. at 375±25°F.	F-1.923
2. Heat Treatment between 180,000 and 220,000 psi	2	1. Corrosion protection of internal structure, not open to view, and which requires the properties of a metallic surface. 2. Controlled tolerances 3. General compatibility with aluminum	Cadmium plate, QQ-P-416, Type 1, Class 3 (0.0002 to 0.0004 inch) and bake 3 hr. at 375±25°F. Optional: Cadmium plate; QQ-P-416, Type II, Class 3 (0.0004 to 0.0004 inch) and bake 3 hr. at 375± 25°F	F-1.1913 F-1.1926
	2	1. Use where a relatively hard, wear resistant metallic surface is required. 2. Use on part with shapes such that electroplating is difficult and where uniform plating thickness is required	Electroless nickel plate. MIL-C-26074, Class 1. Minimum thickness 0.0015 inch.	F-1.801
3. Heat Treatments up to 220,000 psi except as shown in A.1 and A.2	2			



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (continued)				
SUBSTRATE	EXPOSURE CLASS	- USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
3. Heat Treatment up to 220,000 psi, except as shown in A.1 and A.2 (continued)	2	1. Use for corrosion protection where a relatively hard, wear resistant metallic surface is required. 2. Use on parts of uniform shape where electroplating is conventional.	Nickel plate, AMS 10-36.	F-1.821
			Parts above 160,000 psi use	F-1.822
	2	For very hard, wear resistant metallic surfaces such as sliding contacts or bearings	Chrome plate, C-C-320, class 2, Bake 3 hr. at 375±25°F. after plating. Minimum thickness must be called out	F-1.842
			Tin plate, IL-T-10727 Type 1 or Type 2. Minimum thickness 0.0003 inch	F-1.22
4. Heat Treatment above 220,000 psi	2	1. Large massive parts and sheet metal to be used outdoors such as in roofs. 2. May be used in class 4 exposures	Hot Dip Zinc, MIL-A-17871	F-1.207
			1. Corrosion protection of internal structure, not open to view, and which requires the properties of a metallic surface. 2. Uncontrolled tolerances 3. General compatibility with aluminum	F-1.1922

U3-4871-1000



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENT	DRAWING CALLOUT
4. Heat Treatments above 220,000 psi (continued) -	2	<ol style="list-style-type: none"> 1. Corrosion protection of internal structure, not open to view, and which requires the properties of a metallic surface. 2. Controlled tolerances 3. General compatibility with aluminum 	Cadmium plate, apply chromate conversion coating, bake 23 hrs. at 375±25°F. (0.0002 to 0.0004 in.)	F-1.1915
	2	For very hard wear resistant metallic surfaces such as sliding contacts or bearings	Chromium plate per BAC 5709 and bake 23 hrs. at 375±25°F.	F-1.846
5. All Heat Treatments	2	Corrosion protection of internal structure which does have requirements for metallic surfaces.	Clean per TT-C-490 Method 1 or Method VI and apply one coat (0.0004 to 0.0006 inch dry film) of TT-P-636, per BAC 5774.	F-1.11
	1	Decorative finishing of external structure or internal structure which may be viewed such as insides of cabinets or racks.	<p>Clean per TT-C-490 Method I or Method VI and apply one coat (0.0004 to 0.0006 inch, dry film) of TT-P-636 per BAC 5774.</p> <p>Topcoat with 0.0013 minimum dry film of enamel per BAC 5775</p> <p>Gloss enamel per TT-P-489</p> <p>Semi-gloss enamel per TT-P-529</p> <p>Lusterless enamel per TT-P-527</p>	<p>F-1.11</p> <p>Followed by one topcoat code of process per gloss</p> <p>F-12.651</p> <p>F-12.654</p> <p>F-12.657</p>

U3-4971-1088

12 1-4



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (continued)				
SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
5. All Heat Treatments (continued)	2	Corrosion protection and decorative finishing of external structure.	Clean per TT-C-490 Method I or Method VI and apply one coat (0.0004 to 0.0006 inch, dry film) of TT-P-636, per BAC 5774. Topcoat with 0.003 inch minimum dry film of enamel per BAC 5775. Gloss enamel per TT-F-489	F-1.11 Followed by one topcoat code of pro- per Gloss
			Sem gloss enamel per TT-F-529	F-12.650
			Lusterless enamel per TT-F-527	F-12.653 F-12.656
	3	Corrosion protection - Note: Required finish for equipment such as Blast Valves	Clean per TT-C-490 Method I or Method VI. Apply (0.0002 to 0.0004 inch dry film) of MIL-C-15128 per MIL-C-8507 or BAC 5777. Overcoat with (0.0006 to 0.0011 inch dry film) of MIL-F-15930 per BAC 5778. Topcoat with 0.003 inch minimum (dry film) of MIL-P-15936 per BAC 5779. (Color gray No. 27)	F-1.13 Followed by F-12.668
	4	Corrosion protection	Apply 3 or more coats of MIL-C-18480 per BAC 5782. Optional Clean per TT-C-490 Method I. Prime with one coat of MIL-P-151473 primer followed by 3/16 inch of MIL-P-151473 topcoat.	F-12.675

12.1.2
11-4071-1000



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALL-OUT
B. STEEL (CORROSION) RESISTANT	1	Decorative finish only	Clean per TT-C-490 Method I or Method VI. Apply pre-treatment coat, MIL-C-15328 per MIL-C-8507 or BAC 5777. Topcoat with (0.001 inch dry film) of enamel per BAC 5775 Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-8.60 Followed by one topcoat of proper gloss. F-12.652 F-12.655 F-12.658
	2	Decorative finish only	Clean per TT-C-490 Method I or Method VI. Apply pretreatment coat, MIL-C-15328 per MIL-C-8507 or BAC 5777. Topcoat with (0.0013 inch dry film) of enamel per BAC 5775. Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-8.60 Followed by one topcoat code of pro- per gloss F-12.651 F-12.654 F-12.657
	2	1. No decorative finish required. 2. Use where removal of heat treat scale or forming contamination must be removed.	No finish except cleaning per TT-C-490 Method I or Method VI, when required to remove heat treat scale or forming contamination.	F-8.06
	2	For electroplated surface such as required for metal compatibility with aluminum.	Use the same codes as required for low alloy steel.	---

46

U3-4071-1000

12. 1-2

BOEING

NO. D2-4051

PAGE 39



5.3.2 TABLE VI AIRSPACE GROUND EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
C. ALUMINUM ALLOYS 1. Corrosion Resistant Alloys	2	Corrosion protection	No finish required	F-2.10
	2	Decorative finish	Apply pretreatment coat, MIL-C-15328 per MIL-C-8507 or BAC 5777, (0.0002 to 0.0003 inch dry film). Topcoat with 0.001 inch (dry film) of enamel per BAC 5775 Gloss enamel per MIL-E-489 Semigloss enamel per MIL-E-529 Lusterless enamel per MIL-E-527	F-2.954 Followed by a topcoat code of process per gloss F-12.652 F-12.655 F-12.658
	1	Internal structure not open to view.	Apply pretreatment coat, MIL-C-15328 per MIL-C-8507 or BAC 5777, (0.0002 to 0.0003 inch dry film). Overcoat with MIL-P-8585 per BAC 5776, (0.0003 to 0.0004 inch dry film).	F-2.951
2. Non-Corrosion Resistant	2	Internal structure not open to view	Chromic Acid clean per MIL-S-5002 or chemical treat (color inspec-table) per MIL-C-5541 or chromic acid-anodine per MIL-A-8625. Apply MIL-P-8585 primer per MIL-C-6808 or BAC 5706.	F-2.115



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (Continued)				
SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
2. Non-Corrosion Resistant (Cont.)	1	External structure and internal structure which will be opened to view.	Chromic Acid clean per MIL-S-5002, or chemical treat (color inspectable) per MIL-C-5541 or chromic acid anodize per MIL-A-8625.	F-2.115 followed by a topcoat code of proper gloss.
			Apply MIL-P-8585 primer (0.0003 to 0.0004 inch dry film) MIL-6808 or BAC 5706 topcoat with 0.0013 inch (dry film) of enamel per BAC 5775.	
			Gloss enamel per TT-E-489. Semigloss enamel per TT-E-529. Lusterless enamel per TT-E-527.	F-12.651 F-12.654 F-12.657
3. All Alloys	2	External structure and internal structure which will be opened to view.	Anodize per MIL-A-8625, Type I, or chemical treat per MIL-C-5541 (color inspectable). Apply MIL-P-8585 per MIL-P-6808 or BAC 5776, (0.0003 to 0.0004 inch dry film). Topcoat with 0.003 inch (dry film) of enamel per BAC 5775.	F-2.950 followed by a topcoat code of proper gloss.
			Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-12.650 F-12.653 F-12.656
			Chrome plate per BAC 5709.	F-2.33
	2	Parts which have mild wear requirements or parts which will be painted only in certain areas. Do not use on alloys with more than 7 1/2% alloying element.	Chrome acid anodize per MIL-A-8625	F-2.20

103-1071-100



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (Continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
3. All Alloys (Cont.)	2	<p>1. Parts which have mild wear requirements or parts which will be painted only in certain areas.</p> <p>2. Use on parts with 7/8% or more alloying elements.</p>	Sulfuric Acid anodize per MIL-A-8625	F-2.201
	2	Use for anodizing when the drawing allows material substitutions of alloys which contain more and less than 7/8% alloying element.	Anodize per MIL-A-8625, Type I, chromic acid or Type II sulfuric acid.	F-2.202
	3	Corrosion protection	<p>Anodize per MIL-A-8625, Type I or Type II, or chemical treat per MIL-C-5541 (color inspectable). Apply pretreatment coat, MIL-C-15328, per MIL-C-8507 or BAC 5777, (0.0002 to 0.0003 inch (dry film)). Overcoat with MIL-P-15930 (0.0006 to 0.0011 inch dry film) per BAC 5778. Topcoat with 0.003 inch minimum dry film thickness of MIL-P-15936, color Gray #27.</p>	F-2.952 followed by F-12.668

U3-61-108



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (Continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
D. MAGNESIUM	2	Corrosion protection	Dow 17 anodize per BAC 5734. Prime with 2 coats of MIL-P-8585 (0.6 to 0.8 inch total dry film thickness) per MIL-P-6808 or BAC 5776. Topcoat with 0.003 inch minimum of enamel per BAC 5775. Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-3.22 followed by one topcoat code of proper gloss F-12.650 F-12.653 F-12.656
E. COPPER AND COPPER ALLOYS; NICKEL AND NICKEL ALLOYS	2	For dissimilar metal contact with aluminum	Cadmium plate per QQ-P-416, Type II, Class 2.	F-4.201
	2	1. Solderability 2. Dissimilar metal contact with aluminum	Tin plate per MIL-T-10727, Type I or II, 0.0003 inch minimum thickness.	F-4.21
	2	Decorative finish to match other equipment	Apply pretreatment coating, MIL-C-15328 per MIL-C-8507 or BAC 5777, 0.0002 to 0.0003 inch (dry film). Topcoat with 0.0013 inch minimum (dry film) of enamel per BAC 5775. Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-12.12 followed by one topcoat code of proper gloss F-12.651 F-12.654 F-12.657
F. CONCRETE	2	Corrosion protection	No finish needed.	F-9.05

01-871 088



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (Continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
F. CONCRETE (Continued)	2	Decorative finish	Etch surface with 10% commercial hydrochloric acid, rinse and dry. Apply 0.002 inch minimum (dry film) of TT-P-95 per BAC 5783.	F-9.740
G. WOOD	2	Deterioration protection and decorative finish	Sand to smooth surface; seal with MIL-S-1518, Type II; prime with 0.0008 inch minimum (dry film) of TT-P-636 per BAC 5774. Topcoat with enamel 0.0013 inch minimum (dry film) per BAC 5775. Gloss enamel per TT-E-489. Semigloss enamel per TT-E-529. Lusterless enamel per TT-E-527	F-5.92 followed by one top-coat code of proper gloss F-12.651 F-12.654 F-12.657
H. FIBERGLASS	2	To add fungus resistance to wood which is not otherwise finished	Apply two coats of TT-V-119 per MIL-C-6796; first coat hand brushed or dipped.	F-5.50
	2	Decorative finish to match equipment in the same complex	Apply enamel per BAC 5775, 0.0001 inch (dry film). Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-12.652 F-12.655 F-12.658
	2	To prevent moisture absorption	Apply 0.015 inch minimum (dry film) of EMS 10-51 per BAC 5791.	F-12.38

U3-4071-188

12-1-2



5.3.2 TABLE VI AEROSPACE GROUND EQUIPMENT - BASIC FINISHES (Continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
I. PLASTIC AND PLASTIC FOAM	2	Corrosion protection	No finish required.	F-6.10
	2	To add resistance to shedding and scuffing	Apply 0.002 to 0.004 inch (dry film) of BMS 10-51, white, per BAC 5791.	F-6.70
	2	To prevent moisture absorption	Apply 0.015 inch minimum (dry film) of BMS 10-51 per BAC 5791.	F-12.38

U3-471-188



5.4 INSTALLATION AND HARDWARE FINISHES

Detailed finishes and finish codes for finishing of Hardware Items and finishes which are to be applied only at the time of assembly or installation are given in Table VII. These finishes are intended to supplement those of Table VI. Commonly required finishes to eliminate dissimilar metal contacts as they apply to assembly and installation operations are given.

5.4.1 TABLE VII AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. TUBULAR and HOLLOW PARTS - OPEN and PARTIALLY CLOSED 1. Steel	2	Corrosion protection of both interior and exterior surfaces	<u>Exterior Surface</u> - Cadmium plate, QQ-P-416, Type II, Class 2. <u>Interior Surface</u> - Apply two coats of MIL-P-8585 per MIL-P-6808 or BAC 5706.	F-1.611
2. Aluminum	2	Corrosion protection of both interior and exterior surfaces	Chemical treat interior and exterior surfaces per MIL-C-5541, colored inspectable coating or anodize per MIL-A-8625; apply one coat of MIL-P-8585 per MIL-P-6808 or BAC 5706. Topcoats may be applied as required.	F-2.71 Use appropriate F-12 code for top-coat.



5.4.1 TABLE VII AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>B. TUBULAR and HOLLOW PARTS - CLOSED</p> <p>1. Steel</p>	2	Corrosion Protection	<p><u>Exterior Surfaces</u> - treat as required for alloy and carbon steel per Table VI.</p> <p><u>Interior Surfaces</u> - No finish</p>	
2. Aluminum	2	Corrosion Protection	<p><u>Exterior Surfaces</u> - Chemical treat, MIL-C-5541, colored inspectable coating or anodize per MIL-A-8625 and apply one coat of MIL-P-8585 per MIL-P-6808 or BA9 5706. Topcoat for decorative purposes as required.</p>	P-2.115 followed by P-12 code as required
C. MATING and PAYING SURFACES (installation and/or assembly of)	2	Metals are compatible per Table II	No finish	
	2	Metals are not compatible for Table II and not otherwise finished	Apply one coat of MIL-P-8585 primer to one member of the couple.	P-12.2091
D. INSTALLATION OF HARDWARE ITEMS	2	Permanently installed	Apply MIL-P-8585 primer or MIL-C-11796 Class 3 Corrosion Preventive Compound to all areas of the part and/or hole and countersink and install immediately.	P-12.40
1. Threaded inserts, threaded sleeves, bolts, nut plates, small hardware, press fits				

01-401-188

BOEING

NO D2-4051

PAGE 51



5.4.1 TABLE VII AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>D. INSTALLATION OF HARDWARE ITEMS (Continued)</p> <p>1. (Continued)</p>	2	Non-permanent and removable	Apply Corrosion Preventive Compound, MIL-C-11796, Class C, and install immediately.	F-12.44
2. Slip joints, slip fits, other movable installations	2	Corrosion protection and aid in installation	Apply Corrosion Preventive Compound, MIL-C-11796, Class C, and install immediately.	F-12.44
3. Bearings	2	Installation of antifrictional or spherical	Install with a light coat of MIL-G-7118 grease on all surfaces	F-12.423
4. Threaded parts for use in aluminum	2	Sintered	Install with a light film of MIL-L-7870 oil on all surfaces	F-12.43
4. Threaded parts for use in aluminum	2	To prevent seizing	Coat threads with anti-seize compound JAN-A-669 before installation	F-12.405
<p>E. HARDWARE ITEMS (SPECIAL FINISHES FOR)</p> <p>1. Welded overhead handling equipment</p> <p>a) Permanently installed in assembly buildings, trailers, vans</p>	2	Where visual inspection of weld areas is required for safety reasons	Clean per TT-C-490, Method 1 or Method 6. Apply two coats of TT-F-119 Spar Varnish.	F-1.952

99 21-471-188

10 1-2



5.4.1 TABLE VII AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>E. HARDWARE ITEMS (SPECIAL FINISHES FOR) (Continued)</p> <p>1.b) Non-permanently installed</p>	2	<p>Items not requiring visual inspection such as slings and handling harness</p>	<p>Clean and prime per Table VI for the given substrate. Top-coat with 0.003 inch minimum (dry film) of enamel per BAC 5775.</p> <p>Gloss Enamel per <u>TF-E-489</u> Semigloss Enamel per <u>TF-E-529</u> Lusterless Enamel per <u>TF-E-527</u></p>	<p>Primer Code followed by proper gloss top-coat code</p> <p>F-12.650 F-12.653 F-12.657</p>
<p>2. Large, massive (alloy steel) hardware items</p>	2	<p>To increase the friction and decrease handling damage to equipment for such equipment as handling harness and slings</p>	<p>Apply "rubber" coating (Gao N-85) per BAC 5767</p>	<p>F-12.2095</p>
<p>3. Small hardware such as handles, hinges, latches, thumb screws, wing nuts, etc.</p>	2	<p>For hardware which does not require decorative finishing and hardware commercially produced with galvanized coatings</p>	<p>Hot Dip Zinc Coat per MIL-Z-17871</p>	<p>F-1.207</p>
	2	<p>Parts installed in view</p>	<p>Matte Nickel Plate per QQ-N-290, Type II, over 0.00065 inch of copper plate</p>	<p>For Steel, F-1.911. For Copper, F-4.91</p>
		<p>Parts installed internally or not in view</p>	<p>Cadmium plate per QQ-P-416, Type I, Class 3</p>	<p>For Steel, F-1.1914. For Copper, F-4.202</p>

03-671-188



5.4.1 TABLE VI AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)				
ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
B. HARDWARE FINISHES (SPECIAL FINISHES FOR) (Continued) 4. Rails and Tracks installed in transporters, vans, trailers	2	Moderate rust will not cause detrimental effects	Apply corrosion-inhibiting compound, MIL-C-11796, Class C.	F-12.44
5. Battery Storage Racks a. Steel	2	Protection from battery chemicals	Clean per IT-C-490, Method 1. Prime with 0.0003 to 0.0007 inch of RMS 10-16, Type 1, and topcoat with 0.002 inch minimum of RMS 10-16, Type 2, Grade A, per BAC 5740	F-1.96
b. Wood	2	Protection from battery chemicals	Sand smooth. Prime with one coat of RMS 10-16, Type 1. Sand smooth and apply a second coat of RMS 10-16, Type 1. Topcoat with 0.002 inch minimum of RMS 10-16, Type 2, Grade A.	F-5.60
6. Fasteners, nuts, bolts, washers, etc., for which no standard exists	2	1. Corrosion protection 2. For use with aluminum	Cadmium plate per QQ-P-416, Type I, Class 3 (0.0002 to 0.0004 inch)	F-1.1913
7. Springs a. Less than 1/4 inch diameter wire	2	Special handling required	Cadmium plate per BAC 5701, Method 2, and apply MIL-P-8585 primer per MIL-P-6808 or BAC 5776.	F-1.92

U1-471188

BOEING

NO. 02-4051

PAGE 50



5.4.1 TABLE VII AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
E. HARDWARE ITEMS (SPECIAL FINISHES (SFC)) (Continued)	2	Corrosion protection of parts not exposed to view	Clean, prime with 0.0008 inch minimum of TT-P-636.	F-1.11
	2	Corrosion protection and decorative finish of parts which are exposed to view	Clean, prime with 0.0008 inch minimum of TT-P-636. Topcoat with 0.003 inch minimum with enamel per BAC 5775. Gloss Enamel per TT-E-489. Semi-gloss Enamel per TT-E-529. Lusterless Enamel per TT-E-527.	F-1.11 followed by proper gloss top-coat code. F-12.650 F-12.653 F-12.656
8. Cables and Wire Rope	2	Commercial tin or zinc coated	No finish	--
	4	Commercial tin or zinc coated	Apply coating, TT-C-520, to minimum thickness of 1/16 inch	F-12.360
9. Parts with wearing surfaces other than bearings	2	Uncoated cable subject to flexing such as over pulleys	Install with a light film of grease MIL-C-7118	F-12.423
	2	Parts will be lubricated in service	Phosphate coat with MIL-C-16232, Type M, Class 2	F-1.945
	2	Parts which require lubrication but cannot use oil or grease because of dust or organic finishes	Cadmium plate, QQ-P-416, Type 1, Class 2. Apply solid film lubricant per MIL-L-25504.	F-1.191 followed by F-12.52

5.4.1 TABLE VII. AIRSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
E. HARDWARE ITEMS (SPECIAL FINISHES FOR) (Continued) 9.b. Other metals	2	Parts which require lubrication but cannot use oil or grease because of dust or organic finishes	Apply solid film lubricant per MIL-L-25504	F-12.52
10. Undercarriages and chassis of automotive and highway equipment including trailers and vans	2	1. Protection from road damage 2. Noise suppression	Clean per MIL-S-5002. Apply coating FT-C-520 to a minimum dry film thickness of 1/16 inch.	F-12.560
11. Inner walls of vans, trailers and for R and D Mobile MS-133A-1	2	Noise suppression	Apply sound dampening materials per BAC 5782	F-12.18
12. Walkway and Equipment Ramps	2	Subjected to foot traffic	Clean and prime substrate materials in accordance with Table VI. Apply walkway, non-slip coating, MIL-W-5044A, Type II, Class I, per BAC 5705.	Prime Code followed by F-12.2093
		Subjected to vehicular traffic	Clean and prime substrate materials in accordance with Table VI. Apply non-skid coating per BAC 5764.	Prime Code followed by F-12.2094

Best Available Copy



5.4.1 TABLE VII AEROSPACE GROUND EQUIPMENT - INSTALLATION AND HARDWARE FINISHES (Continued)

ITEM REQUIRING FINISH	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>E. HARDWARE ITEMS (Special Finishes For) (Continued)</p> <p>13. "Special Tool" Boxes and Equipment Cases</p> <p>a. Made of wood, rigid plastic or fiberglass</p>	2	To prevent damage from rough handling	Clean by sanding. Apply Equipment Enamel, MIL-E-15090, Type II or Type III (0.002 inch dry film)	P-12.659
<p>b. Metallic surfaces</p>	2	To prevent damage from rough handling	Clean and prime as required for the base material by Table VI. Apply Equipment Enamel, MIL-E-15090, Type II or Type III, (0.002 inch dry film).	Prime code followed by F-12.659
<p>14. Special tools to be used around high voltages</p>	2	Electrical insulation required	Clean per MIL-S-5002. Apply Unichrome 219-PX prime and Unichrome 4032 pastisol coating.	F-12.370
<p>15. Items which must be easily seen</p>	2	Equipment loading chalks, hold down pins, etc.	Clean per MIL-S-5002. Apply one coat of fluorescent paint per MIL-P-21563.	F-12.998

U3 471 1000

12-1-2



6. ELECTRONIC AND ELECTRICAL EQUIPMENT REQUIREMENTS

Detail Finish codes for specified finishes, markings and colors to be used on WS-133A Ground Electronic Equipment are included in this section.

6.1 COLOR REQUIREMENTS

All colors of organic (paint) finishes for electronic and electrical equipment are in accordance with AFM Exhibit 59-31. Only semigloss colors in accordance with Federal Standard 595 are used for electronic equipment. The color number must be called out on the drawing with the finish code for the finish.

6.1.1 Specific Equipment Colors

A.	Equipment Type	Operational Equipment Color	Color Number	Test Support Equipment Colors
A.	Cabinets - Consolés - Equipment Racks			
	1. Outside Surfaces	Green	24300	Test support equipment shall be the same colors as the operational equipment with the following additions:
	2. Inside Surfaces - where detailed maintenance is not expected.	Green	24300	1. A one-inch-wide, 4-inches-long strip on International Orange colored plastic tape shall be applied to the top of each piece of equipment. 4
	3. Inside Surfaces - where detailed maintenance will be performed.	Gray	26622	2. A one square inch piece of International Orange plastic tape shall be applied to the lower left hand corner of each drawer facing, flush with the edge of the drawer.
B.	Panels 4		26250	
	1. Equipment normally used outdoors.	Gray	26492	
	2. Equipment normally used indoors.	Gray	27875	
C.	Lettering of Panels 4			
	1. Equipment normally used outdoors.	White	Mo. 514 per ANA Bulletin 157d	
	2. Equipment normally used indoors.	Black		

6.1.1 Specific Equipment Colors (continued)

1. Test support equipment is defined as equipment which is the same as operational equipment but is used in a testing application and as such will not become operational. Equipment such as that of 6.1.2 is not included in this definition.
2. A panel is described as a removable front section of a cabinet, a drawer, a console or an equipment rack; a drawer facing; front-hinged doors. Back sections, back access doors, back-hinged doors are considered as outside structure.
3. Equipment used both indoors and outdoors shall be lettered with the outdoor colors.
4. Number 3650 Scotch-Cal coated with 3913 International Orange Scotch-Cal paste applied per BAC 5312, Type F is recommended.

6.1.2 Color Exceptions

- (a) Primary or intenance end/or test devices such as individual meters, oscilloscopes and common Government-furnished equipment shall be gray Formula Number 111, per MIL-E-15090K. (There is no Fed. Std. 595 color equivalent.)

6.2 MARKING REQUIREMENTS

Equipment marking shall conform to or meet the requirements of MIL-STD-130.

6.2.1 Equipment Marking

- A. Panels - Front Face Markings
 1. Preferred -- Machine engraving with letters filled with enamel conforming to TT-E-529 colors shall conform to paragraph 6.1.1.c.
 2. Alternate -- to be used where, because of physical considerations, machine engraving cannot be used -- Silk screen per BAC 5306. Lettering colors and enamels shall be the same as for machine engraving.

Best Available Copy

6.2 MARKING REQUIREMENTS (continued)

B. Racks, Chassis, Drawers and Structural Parts other than panels

1. Preferred -- Silk screen per BAC 5306. Background and lettering colors, in accordance with Fed. Std. 595, shall be called out on the drawing. Gloss enamels shall conform to MIL-E-7729 or TT-E-489; semi-gloss enamels shall conform to TT-E-529.
2. Alternate -- Machine engraving with letters filled with enamel.
3. Alternate -- Where the marking must conform to a contour of the equipment use Scotch-Cals, edge-sealed only. Scotch-Cals shall conform to BAC 5312.

C. Wiring Diagrams, Nameplates and Instruction-Type Markings located on the inside of cabinets, consoles, drawers and on chassis.

1. Preferred -- Pressure sensitive Scotch-Cals per BAC 5312 (edge-sealed only).
2. Alternate -- Paint film decals overcoated with clear lacquer per BAC 5308 for areas covering less than two square inches.
3. Alternate -- Paint film decals per BAC 5308 on transparent material where face-down application or transparent background is required.

6.2.2 Drawing Callout for Marking

Marking information shall be called out on the drawing by Flag Note. The note should be complete in that it should call out the military or BAC Process Specification, the background color (in the case of Scotch-Cals), lettering color and the paint material control specification.

Example:



SILKSCREEN PER BAC 5306. USE ENAMEL PER TT-E-529, COLOR BLACK NUMBER 514 PER ANA BULLETIN 157D; Letter Color White 17875 per Fed. Std. 595.

6.3 BASIC FINISHES

Detailed finishes which give the necessary protection from corrosion for electronic and electrical equipment are given in Table VIII with the necessary codes for drawing callout. Class 1 and Class 2 environmental conditions are specified, however, only the Class 2 condition should be used for future design unless packaging or the equipment is known to be such that the Class 1 environment is assured.

Table VIII is oriented toward providing finishes for substrate materials. The finishes given provide for corrosion resistance where Table I indicates that a finish is required and provides the commonly required finishes to eliminate dissimilar metal contacts.

6.3.1 Government Specifications

Wherever Federal or Military specifications or standards or service bulletins are applicable and adequate for finishing materials, finished parts or finish processes, they have been specified in the individual finish requirements. Where military specifications either do not exist or do not adequately cover the specific requirements, Boeing Material and Process specifications have been used.

6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISHES

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENT	DRAWING CALLOUT
A. STEEL (ALLOY AND CARBON)	2	Corrosion protection of internal structure where no decorative finish is required.	Clean per TT-C-490 Method I or Method VI. Apply 0.008 inch min. (dry film) of TT-P-636 per BAC 5776	F-1.11
	2	Corrosion protection and decorative finish for external structure and internal structure which will be viewed.	Clean per TT-C-490 Method I or Method VI. Apply 0.008 inch min. (dry film) thickness of TT-P-636. Topcoat with 0.003 inch minimum (dry film) of TT-E-529 enamel per BAC 5775	F-1.11 followed by F-12.653



6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISHES (Continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. STEEL (ALLOY AND CARBON) (Continued)	1	1. Decorative finish and mild corrosion protection.	Clean per TT-C-490, Method I or Method VI; apply 0.008 inch minimum (dry film) of TT-P-636. Topcoat with 0.001 inch minimum (dry film) of TT-E-529 enamel per BAC 5775.	F-1.111 followed by F-12.655
	2	1. Corrosion protection of internal structure where primers would interfere with function. 2. General compatibility with aluminum.	Cadmium plate per QQ-P-416, Type 2, Class 2, and bake as required: For heat treatments below 180,000 psi For heat treatments between 180,000 psi and 220,000 psi	F-1.1929 F-1.1923
	2	1. Corrosion protection of steels above 220,000 psi heat treatment used internally where primers would interfere with function. 2. General compatibility with aluminum.	Cadmium plate per BAC 5718 and apply chromate post plate treatment. Bake 23 hours at 375 ± 25°F (0.0003 inch minimum plating thickness).	F-1.1922
	2	1. Wear and corrosion resistance of irregular shaped parts. 2. Uniform plating over the entire part.	Electroless Nickel plate per MIL-C-26074, Class 1.	F-1.801
	2	1. Hard, wear resistant surfaces for part of irregular shape. 2. May be used for low speed bearings.	Electroless Nickel plate per MIL-C-26074, Class 2.	F-1.804



6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISHES (continued)				
SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. STEEL (ALLOY AND CARBON) (continued)	2	Wear and bearing surfaces of regular (easily electroplated) shaped parts	Chromium plate per QQ-C-320, Class 2. (0.002 inch minimum plating thickness).	F-1.842
	2	Decorative plating of parts exposed to view.	Matte Nickel plate per QQ-N-290, Type II over an intermediate plate of 0.00065 inch copper plate	F-1.911
	2	Corrosion protection of structures not requiring decorative finishing	No finish	F-6.05
B. STEEL (CORROSION RESISTANT)	2	Decorative finish	Apply pretreatment coat, MIL-C-15328, (0.0002 to 0.0003 inch dry film) per MIL-C-8707 or BAC 5777. Topcoat with 0.001 inch minimum (dry film) of TT-E-529, enamel per BAC 5775.	F-12.12 followed by F-12.655
	2	Where an electroplated metallic surface is required.	Use applicable code from Section A of this table.	
C. ALUMINUM ALLOYS	2	Wear resistance for parts not subject to flexure.	Hardcoat per BMS 10-6	F-2.204

66 12-1-4



6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
C. ALUMINUM ALLOYS (continued) 1. All Alloys (continued)	2	Wear resistance of parts subject to flexure and/or point or local loading.	Preferred Chromium plate per BAC 5709 Alternate Electroless Nickel plate per BMS 10-50	F-2.53
	2	Solderability	Tin plate per BAC 5717	F-2.34
	2	Thermal emittance and decorative finish	Anodize and dye black per BAC 5716	F-2.23
	2	To decoratively match various forms of aluminum such as matching a forging and sheet material.	Clean to produce a 60° specular gloss of 10 to 35% by dry blasting per BAC 5748 or chemically etching per BAC 5786.	F-2.29
	2. Non-Clad and Non Corrosion Resistant Alloys	2	Corrosion protection of internal structure where no decorative finish required.	Chronic Acid dip per MIL-S-5002, Colored inspectable-chemical treat per MIL-C-5541 or anodize per MIL-A-8625. Apply one coat of MIL-P-8585 per MIL-P-6808 or BAC 5706.

Best Available Copy

6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISHES (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
C. ALUMINUM ALLOYS (continued) 2. Non-clad and Non-corrosion Resistant Alloys (continued)	1	Decorative finish	Clean, chemical treat or anodize and prime. Topcoat with 0.001 inch minimum (dry film) of TT-E-529 enamel per BAC 5775	F-2.115 followed by F-12.655
	2	Decorative finish	Clean, chemical treat or anodize and prime. Topcoat with 0.003 inch minimum (dry film) of TT-E-529 enamel per BAC 5775.	F-2.115 followed by F-12.653
3. Clad and Corrosion Resistant	1	Corrosion protection	No finish required	F-2.10
	2	Decorative-24300 green or 26492 gray colors only.	Apply 0.0002 to 0.0003 inch (dry film) of MIL-C-15328 per MIL-C-8507 or BAC 5777; Topcoat with one coat of EMS 10-5 lacquer per BAC 5754.	12.12 followed by F-12.17
	2	Decorative Enamel (all colors).	Apply 0.0002 to 0.0003 inch (dry film) of MIL-C-15328 per MIL-C-8507 or BAC 5777. Topcoat with 0.001 inch (dry film) enamel per BAC 5775 Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-12.12 followed by one topcoat; code of pro per gloss F-12.652 F-12.655 F-12.658

12.1-2



6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISH (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
D. COPPER AND NICKEL ALLOYS	2	Decorative finish to match other equipment in an assembly or an equipment complex.	Apply 0.0002 to 0.0003 inch (dry film) of MIL-G-15328 per MIL-C-8507 or BAC 5777. Topcoat with 0.001 inch (dry film) of enamel per BAC 5775 Gloss enamel per TT-E-489 Semigloss enamel per TT-E-529 Lusterless enamel per TT-E-527	F-12.12 followed by one topcoat code of process per gloss F-12.652 F-12.655 F-12.658
	2	1. Electrically conductive finish for compatibility with aluminum 2. Solderability	Tin plate, MIL-T-10727 Type 1 or Type 11 (0.0003 inch minimum thickness)	F-4.21
	2	General compatibility with aluminum and cadmium or zinc coated hardware - uncontrolled tolerances	Cadmium plate QQ-P-416, Type 11 Class 2	F-4.201
	2	1. General compatibility with aluminum and cadmium or zinc coated hardware - controlled tolerances 2. Bolts or threaded parts	Cadmium plate, QQ-P-416, Type 1 Class 3 (0.0002 to 0.0004 inch)	F-4.202
	2	1. Electrical contacts depending upon electrical load, pressure or friction 2. Solderability	Silver plate per BAC 5715	F-4.70

6
12-1-2



6.3.2 TABLE VIII ELECTRONIC AND ELECTRICAL EQUIPMENT - BASIC FINISH (continued)

SUBSTRATE	EXPOSURE CLASS	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
D. COPPER AND NICKEL ALLOYS (continued)	2	Corrosion free low-resistance contacts such as pins and connectors	Gold plate MIL-C-45204 type 1, class 2.	F-4.80
	2	Easily platable parts with wear requirements.	Nickel plate per QQ-N-290, Class 2	F-4.91
	2	Irregular shaped parts with wear requirements	Electroless Nickel plate per MIL-C-26074, class 1	F-4.92

12-1-2



6.4 ASSEMBLY AND INSTALLATION FINISHES

Finishes for assembly and installation operations are the same as for Aerospace Ground Equipment Table VII except for finishes for RFI Design which are contained in Table IX.

6.4.1 Finishes for RFI

Table IX contains finishes which will maintain low electrical resistance contacts. The finishes, however, will not assure an RFI tight design but will serve to maintain a joint which is free of galvanic corrosion. The Class 2 environment only has been assumed for this table.

6.4.2 TABLE IX FINISHES FOR RFI DESIGN

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>A. Mating and Paying Surfaces Fastened Mechanically or by Pressure Contacts</p> <p>1. Metals are Similar</p> <p>a. Clad and corrosion resistant aluminum</p>	<p>1. Low contact resistance.</p> <p>2. Structural strength is assured.</p> <p>3. For designs used in controlled and partially controlled environments - storage temperatures and humidities may be uncontrolled.</p> <p>NOTE: Machined contacting surfaces shall be 125 RHR or finer.</p>	<p>Clean and deoxidize per BAC 5765, Method 3, or Method 1 if parts can be immersed in cleaning solutions.</p>	<p>F-2.211</p>

6.4.2 TABLE IX FINISHES FOR RFI DESIGN

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. 1. Metals are similar (cont.)			
b. Non corrosion resistant aluminum	Same as A.1.a	Chemical Treat per MIL-C-5541, colored inspectable coating to both members of the couple.	F-2.21
c. Steel (alloy and carbon)	Same as A.1.a	If entire sheet or part is finished Plate with tin, MIL-T-10727, Type 1 or Type 11.	F-1.22
d. Corrosion resistant steel	Same as A.1.a	If only faying surface area is finished: Plate with tin per BAC 5717 using brush plating method.	F-2.33
e. Copper and copper alloys	Same as A.1.a	Clean per RT-C-490 Method 1 (mechanical or Method VI (acid etch) for machined surfaces.	F-8.06
		If entire part is finished: Plate with tin, MIL-T-10727, Type 1 or Type 11.	F-4.21
		If only faying surface area is finished: Plate with tin per BAC 5717 using brush plating method.	F-4.22

12.1.2

6.4.2 TABLE IX FINISHES FOR RFI DESIGN (Continued)

ITEM REQUIRING FINISH	USE OF FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>A. 2. Metals are Dissimilar</p> <p>a. Corrosion resistant aluminum coupled with the following metals.</p>	<p>1. Low contact resistance.</p> <p>2. Structural strength is assured.</p> <p>3. For designs used in controlled and partially controlled environments - storage temperature and humidity may be uncontrolled.</p>	<p>Clean and deoxidize the clad or corrosion resistant aluminum per BAC 5765, Method 3 or Method I. If parts can be immersed in cleaning solutions.</p>	<p>F-2.211</p>
<p>(a) Non-corrosion resistant aluminum</p>		<p>Chemically treat the non-corrosion resistant aluminum per MIL-C-5541, colored inspectable coating.</p>	<p>F-2.21</p>
<p>(b) Steel (alloy and carbon)</p>		<p>If the entire alloy steel part or sheet is to be finished: Plate with tin, MIL-T-10727, Type 1, or Type 11. If only the faying surface area of alloy steel is to be finished for <u>EMI</u> bonding: <u>Plate</u> with tin per BAC 5717 using brush plating method.</p>	<p>F-1.22</p>
<p>(c) Copper and copper alloys</p>		<p>If the entire copper part is to be finished: <u>Plate</u> with tin, MIL-T-10727, Type 1 or Type 11.</p>	<p>F-1.23</p>

12-1-2



6.4.2 TABLE IX FINISHES FOR RFI DESIGN (Continued)

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
A. 2. (a. (c) (continued).)		If only the faying surface area of the copper part is to be finished: <u>Plate with tin per BAC 5717 using brush plating method.</u>	F-4.22
(d) Corrosion resistant steel		Clean the corrosion resistant steel per <u>TT-C-490, Method I (abrasive) or Method IV (phosphoric acid etch).</u>	F-8.06
b. Non-corrosion resistant aluminum coupled with the following	1. Low contact resistance. 2. Structural strength assured. 3. For designs used in controlled and partially controlled environments - storage temperatures and humidities may be uncontrolled.	Chemical Treat the non-corrosion resistant aluminum per <u>MIL-C-5541 color inspectable coating.</u>	F-2.21
(a) Steel (alloy and carbon)		If the entire alloy steel part is to be finished: <u>Plate with tin, MIL-T-10727, Type 1 or Type 11.</u>	F-1.22
(b) Copper and copper alloy		If only the faying surface of the alloy steel is finished: <u>Plate with tin per BAC 5717 using brush plating method.</u>	F-1.23
(c) Corrosion resistant steel		If the entire copper part is to be finished: <u>Plate with tin, MIL-T-10727, Type 1 or Type 11.</u> If only the faying surface of the copper is finished: <u>Plate with tin per BAC 5717 using brush plating method.</u>	F-4.21
		Clean the corrosion resistant steel per <u>TT-C-490 Method I (abrasive) or Method VI (phosphoric acid etch).</u>	F-4.22
			F-8.06

74 01-401-100

10.1-2

BOUND

NO. D2-4051

PAGE 67



6.4.2 TABLE IX FINISHES FOR RFI DESIGN (Continued)

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>A. 2. (continued) c. Steel (alloy and carbon) coupled with the following metals:</p>	<p>1. Low contact resistance. 2. Structural strength assured. 3. For designs used in controlled and partially controlled environments - storage, temperatures and humidity may be uncontrolled.</p>	<p>If the entire alloy steel part is finished: Plate with tin, MIL-T-10727, Type 1 or Type 11. If only the faying surface of the alloy steel is finished: Plate with tin per BAC 5717, using brush plating method.</p>	<p>F-1.22</p>
<p>(a) Copper and copper alloy</p>		<p>If the entire copper part is to be finished: Plate with tin, MIL-T-10727, Type 1 or Type 11. If only the faying surface of copper parts is to be finished: Plate with tin per BAC 5717, using brush plating method.</p>	<p>F-4.21</p>
<p>(b) Corrosion resistant steel</p>		<p>Clean the corrosion resistant steel per IT-C-490 Method 1 (abrasive) or Method VI (phosphoric acid etch)</p>	<p>F-8.06</p>
<p>d. Copper and copper alloys</p>	<p>1. Low contact resistance. 2. Structural strength assured. 3. For designs used in controlled and partially controlled environments - storage temperature and humidities may be uncontrolled.</p>	<p>If the entire copper part is to be finished: Plate with tin, MIL-T-10727, Type 1 or Type 11. If only the faying surface of copper parts is to be finished: Plate with tin per BAC 5717, using brush plating method.</p>	<p>F-4.21</p>
			<p>F-4.22</p>

12-1-2



6.4.2 TABLE IX FINISHES FOR RFI DESIGN (Continued)

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>A. 2 d. (continued) (a) Corrosion resistant steel</p>	<p>(continued)</p>	<p>Clean the corrosion resistant steel per TT-C-490 Method 1 (abrasive) or Method VI (phosphoric acid etch).</p>	<p>F-8.06</p>
<p>B. Installation of Electro-Interference Gaskets</p>	<p>1. Low contact resistance. 2. Finish required to eliminate galvanic corrosion and resistance growth through dissimilar metallic contact.</p>	<p>No finish required on the monel gasket.</p>	
<p>a. Clad or corrosion resistant aluminum</p>		<p>Clean and deoxidize the aluminum per BAC 5765 Method 3 (hand) or Method 1 if parts can be immersed in cleaning solutions.</p>	<p>F-2.211</p>
<p>b. Non-corrosion resistant aluminum</p>		<p>Plate the non-corrosion resistant aluminum with nickel, QQ-N-290, Class 2, over a zincate immersion coating and an intermediate copper electroplate.</p>	<p>F-2.212</p>
<p>c. Steel (alloy and carbon)</p>		<p>Plate the steel with tin, MIL-T-10727, Type 1 or Type 11. If only faying surface is finished: Plate with tin per BAC 5717, using brush plating methods.</p>	<p>F-1.22 F-1.23</p>
<p>d. Copper and copper alloy</p>		<p>Plate the copper with tin, MIL-T-10727, Type 1 or Type 11. If only faying surface is finished: Plate with tin per BAC 5717, using brush plating method.</p>	<p>F-4.21 F-4.22</p>

12-1-2



6.4.2 TABLE IX FINISHES FOR RFI DESIGN (Continued)

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
B. 1. (continued) e. Corrosion resistant steel	(continued)	<u>Clean</u> the corrosion resistant steel per TT-C-490 Method 1 (abrasive) or Method VI (phosphoric acid etch).	F-8.06
2. Tin Coated Mesh, Coupled With: a. Clad or corrosion resistant aluminum	1. Low contact resistance. 2. Finish required to eliminate galvanic corrosion and resistance growth through dissimilar metallic contact.	No further finishing required for the gasket Clean and deoxidize the aluminum per BAC 5765 Method 3 (hand) or Method 1 if parts can be immersed in cleaning solutions.	F-2.211
b. Non-corrosion resistant aluminum		<u>Chemical Treat</u> the non-corrosion resistant aluminum per MIL-C-5541, using colored inspectable coatings.	F-2.21
c. Steel (alloy and carbon)		<u>Plate</u> the steel with tin, MIL-T-10727 Type 1 or Type 11. If only the faying surface is finished: <u>Plate</u> with tin per BAC 5717, using brush plating method.	F-1.22 F-1.23
d. Copper and copper alloy		<u>Plate</u> the copper with tin MIL-T-10727, Type 1 or Type 11. If only faying surface is finished: <u>Plate</u> with tin per BAC 5717, using brush plating method.	F-4.21 F-4.22
e. Corrosion resistant steel		Clean the corrosion resistant steel per TT-C-490, Method 1, (abrasive) or Method VI (phosphoric acid etch).	F-8.06

12-1-2

6.4.2 TABLE IX FINISH FOR RFI DESIGN (Continued)

ITEM REQUIRING FINISH	USE OF THE FINISH	FINISH REQUIREMENTS	DRAWING CALLOUT
<p>B. (Continued)</p> <p>3. Beryllium copper finger contact gaskets coupled with:</p> <p>a. Clad or corrosion resistant aluminum</p>	<p>1. Low contact resistance. 2. Finish required to eliminate galvanic corrosion and resistance growth through dissimilar metallic contact.</p>	<p>Plate the gasket with tin, MIL-T-10727, Type 1.</p>	<p>F-4.21</p>
<p>b. Non-corrosion resistant aluminum</p>		<p>Clean and deoxidize the aluminum per BAC 5765, Method 3 (hand) or Method 1 if parts can be immersed in cleaning solutions.</p>	<p>F-2.211</p>
<p>c. Steel (alloy and carbon)</p>		<p>Chemical Treat the non-corrosion resistant aluminum per MIL-C-5541, using colored inspectable coatings.</p>	<p>F-2.21</p>
<p>d. Copper and copper alloy</p>		<p>Plate the steel with tin, MIL-T-10727 Type 1 or Type 11. If only the faying surface is finished: Plate with tin per BAC 5717, using brush plating methods.</p>	<p>F-1.22</p>
<p>e. Corrosion resistant steel</p>		<p>Plate the copper with tin, MIL-T-10727, Type 1 or Type 11. If only faying surface is finished: Plate with tin per BAC 5717, using brush plating method.</p>	<p>F-4.21</p>
		<p>Clean the corrosion resistant steel per TT-C-490, Method I (abrasive) or Method VI (phosphoric acid etch).</p>	<p>F-4.22</p>

12-1-2



7. FINISH CODE SUMMATION

The finish codes in the following summation are in accordance with D2-5000. These codes shall be used for finish callout on all drawings of the WS-133A weapons system. If additional codes are required contact the Minuteman Materials and Processes Unit.

7.1 FERROUS MATERIALS INCLUDING CORROSION RESISTANT STEEL REQUIRING PLATING

7.1.1 Codes for Cleaning and Priming

- F-1.10 Apply no finish, except that temporary coatings may be applied as required for protection during handling, transportation and storage.
- F-1.11 Clean per TT-C-490 Method I, Abrasive, or Method VI, Phosphoric Acid, when conditions are unsatisfactory for blasting. Apply TT-P-636 per BAC 5774 to a minimum dry film thickness of 0.8 mil (0.0008"). Alternate. For fast dry apply MIL-P-8585 per MIL-P-6808 or BAC 5776 to a dry film thickness of 0.3 to 0.4 (0.0003" to 0.0004").
- F-1.13 Clean per TT-C-490 Method I, abrasive, or Method VI, phosphoric acid, when conditions are unsatisfactory for blasting. Apply MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777 to a dry film thickness 0.2 to 0.3 mil (0.0002" to 0.0003"). Overcoat with MIL-P-15930 per BAC 5778 to a dry film thickness of 0.6 to 1.1 mils. (0.0006" to 0.0011").
- F-1.16 Clean per TT-C-490, Method II or Method III and apply coat of BMS 10-11, Type I according to BAC 5736.
- F-1.952 Clean per TT-C-490, Method 1, abrasive, and apply two coats of TT-V-119 Varnish.
- F-1.96 Clean per TT-C-490, Method 1. Apply BMS 10-16 Type I to a dry film thickness of 0.3 to 0.7 mils and overcoat with BMS 10-16 Type 2 Grade A, white enamel to a minimum dry film thickness of 2 mils according to BAC 5740.

7.1.2 Codes for Cadmium Plating

- F-1.1913 Cadmium plate (0.0002" to 0.0004") according to QQ-P-416 Type I, Class 3 and bake 3 hours minimum at 375±25°F.
- F-1.1914 Cadmium plate (0.0002" to 0.0004") according to QQ-P-416 Type I, Class 3.
- F-1.1915 Cadmium plate (0.0002" to 0.0004") and bake 23 hours minimum at 375±25°F according to BAC 5718, applying no chromate post plate treatment.
- F-1.1922 Cadmium plate and bake 23 hours minimum at 375±25°F according to BAC 5718, applying chromate post plate treatment.

- F-1.1923 Cadmium plate according to QQ-P-416 Type II, Class 2 and bake 3 hours minimum at $375 \pm 25^\circ\text{F}$.
- F-1.1926 Cadmium plate (0.0002" to 0.0004") according to QQ-P-416 Type II, Class 3 and bake 3 hours minimum at $375 \pm 25^\circ\text{F}$.
- F-1.1928 Cadmium plate (0.0002" to 0.0004") and bake 23 hours minimum at $375 \pm 25^\circ\text{F}$ according to BAC 5718, applying chromate post plate treatment.
- F-1.191 Cadmium plate according to QQ-P-416 Type I, Class 2 and bake 3 hours minimum at $375 \pm 25^\circ\text{F}$.
- F-1.1929 Cadmium plate according to QQ-P-416 Type II, Class 2.
- F-1.1930 Cadmium plate according to QQ-P-416 Type II, Class 1.
- F-1.2041 Cadmium plate according to QQ-P-416 Type III, Class 2.
- F-1.92 Cadmium plate according to BAC 5701, Method 2 and apply two coats of MIL-P-8585 primer.

7.1.3 Codes for Nickel and Electroless Nickel Plating

- F-1.801 Electroless nickel plate per MIL-C-26074, Class 1 (0.0015 inch minimum).
- F-1.804 Electroless Nickel plate per MIL-C-26074, Class 2 (0.0015 inch minimum).
- F-1.821 Electrodeposited nickel plate per BMS 10-36.
- F-1.822 Electrodeposited nickel plate per BMS 10-36 and bake 3 hours at $375 \pm 25^\circ\text{F}$.
- F-1.911 Dull nickel plate per QQ-N-290, Type II (matte finish), intermediate plate 0.00065" copper.

7.1.4 Codes for Chromium Plating

- F-1.841 Chromium plate per QQ-C-320, Class 2.
- F-1.842 Chromium plate per QQ-C-320, Class 2 and bake 3 hours at $375 \pm 25^\circ\text{F}$.
- F-1.843 Chromium plate per QQ-C-320, Class 2 and bake 23 hours minimum at $375 \pm 25^\circ\text{F}$. Parts stripped and replated must be baked 23 hours minimum at $375 \pm 25^\circ\text{F}$ prior to replating.
- F-1.844 Chromium plate per QQ-C-320, Class 2 and bake 3 hours minimum at $500 \pm 25^\circ\text{F}$. Parts stripped and replated must be baked for 3 hours minimum at $550 \pm 25^\circ\text{F}$ prior to replating.
- F-1.846 Chromium plate per BAC 5709 and bake 23 hours minimum at $375 \pm 25^\circ\text{F}$.
- F-1.9112 Gray Chromium plate per MIL-C-11436, intermediate plated, 0.00060" nickel over 0.00065" copper.

7.1.5 Codes for Tin and Zinc Plating

- F-1.205 Zinc plate and bake as required per QQ-Z-325, Type II, Class 2.
- F-1.207 Hot dip zinc per MIL-Z-17871.
- F-1.22 Tin plate per MIL-T-10727 Type I or Type II, 0.0003" minimum thickness.

7.1.6 Codes for Brush Plating

- F-1.23 Brush plate with tin per BAC 5717, 0.00025" minimum thickness.
- F-1.281 Brush cadmium plate per BAC 5701 Method 3.

7.1.7 Codes for Finishing of Hollow and/or Tubular Structures

- F-1.611 Finish open tubular and hollow parts as follows: Exterior surfaces - cadmium plate and bake as required per QQ-P-416 Type II, Class 2. Interior surfaces - Clean per MIL-S-5002 and apply two coats of MIL-P-8585 per MIL-P-6808 or BAC 5706.
- SRF-1.611 Finish open tubular and hollow parts as follows: Exterior surfaces - Cadmium plate and bake as required per QQ-P-416 Type II Class 2. Interior - Clean per MIL-S-5002 and apply two coats of BMS 10-11, Type 1 per BAC 5736.
- F-1.67 Apply to interior surfaces of open structural tubing one coat of MIL-P-8585 per BAC 5720.

7.1.8 Codes for Surface Treatments and Special Finishes

- F-1.945 Apply phosphate coating according to MIL-P-16232, Type M, Class 2.

7.2 ALUMINUM ALLOYS

7.2.1 Codes for Cleaning, Surface Treatments and Priming

- F-2.10 Apply no finish, except that temporary coatings may be applied as required for protection during handling, transportation and storage.
- F-2.115 Chromic acid dip per MIL-S-5002, or chemical treat MIL-C-5541, or chromic acid anodize per MIL-A-8625; apply one coat of MIL-P-8585 per 6808 or BAC 5706.



7.2.1 Codes for Cleaning, Surface Treatments and Priming (Continued)

- SRF-2.115 Chemical treat per MIL-C-5541 or chromic acid anodize per MIL-A-8625 and apply one coat of EMS 10-11, Type 1, per BAC 5736.
- F-2.20 Chromic acid anodize per MIL-A-8625.
- F-2.201 Sulfuric Acid anodize per MIL-A-8625.
- F-2.202 Anodize per MIL-A-8625 Type 1, Chromic Acid or Type Sulfuric Acid
- F-2.204 Apply hard coat per EMS 10-6.
- F-2.21 Chemical treatment per MIL-C-5541 to all surfaces, using colored (inspectable) films.
- F-2.211 Clean and deoxidize per BAC 5765 Method 3 (preferred) or Method 1 if parts can be immersed.
- F-2.24 Anodize per MIL-A-8625 and dye black per BAC 5716.
- F-2.27 Chemically clean per BAC 5765 Method 2 and apply primer coat of EMS 8-78 per BAC 5400 or optionally apply 1-2 mils dry film thickness of EMS 10-53 in a limited contamination area per BAC 5807. R
- F-2.28 Chemically clean per BAC 5765, Method II and apply one coat of EMS 10-11, Type I per BAC 5736 or optionally apply .4 to .6 mils dry film thickness of EMS 10-53 per BAC 5807. R
- F-2.29 Clean to produce a 60° specular gloss of 10 to 35 percent by either:
1. Dry blasting according to BAC 5748 or TT-C-490, Method I using either 300 mesh abrasive glass beads or other equivalent non-metallic abrasives.
 2. Chemically etch according to BAC 5786.
- SRF-2.301 Chemical treat per MIL-C-5541 using colored (inspectable) film or anodize per MIL-A-8625 Type I chromic acid or Type 2 sulfuric acid. Apply one coat of EMS 10-11 type 1 per BAC 5736.
- SRF-2.31 Chemical treat per MIL-C-5541 using colored (inspectable) film and one coat of EMS 10-11, Type 1 per BAC 5736.
- F-2.52 Chemical treat per MIL-C-5541 using colored (inspectable) film or chromic acid anodize per MIL-A-8625. Apply one coat of EMS 10-16, Type 1 per BAC 5740.
- F-2.71 Chemical treat exterior surface per MIL-C-5541 using only colored inspectable coatings or chromic acid anodize per MIL-A-8625. Interior surfaces of parts which permit thorough drainage shall be surface treated to the extent possible during the above chemical treatment or anodizing of the exterior surfaces and shall not require plugging. Apply one coat of primer MIL-P-6889 or MIL-P-8585 to exterior only.

7.2.1 Codes for Cleaning, Surface Treatments and Priming (continued)

- SRF-2.71 Chemical treat exterior surfaces per MIL-C-5541 using only colored (inspectable) coatings or chromic acid anodize per MIL-A-8625. Interior surfaces of parts which permit thorough drainage shall be surface treatment or anodizing of the exterior surfaces and shall not require plugging for the exclusion of acid solution. Apply one coat of BMS 10-11, Type 1 primer per BAC 5736 on exterior only.
- F-2.950 Anodize per MIL-A-8625 Type 1 (preferred) or chemical treat per MIL-C-5541 using colored (inspectable) film. Apply MIL-P-8585 per MIL-P-6808 or BAC 5776 to a dry film thickness of 0.3 to 0.4 mil (0.0003" to 0.0004").
- F-2.951 Apply MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777 to a dry film thickness of 0.2 to 0.3 mils (0.0002" to 0.0003"). Overcoat with MIL-P-8585 per MIL-P-6808 or BAC 5776 to a dry film thickness of 0.3 to 0.4 mil (0.0003" to 0.0004").
- F-2.952 Apply MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777 to a dry film thickness of 0.2 to 0.3 mils (.0002" to .0003").
- F-2.953 Anodize per MIL-A-8625 Type I or II (preferred) or chemical treat per MIL-C-5541 using colored (inspectable) films. Apply MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777 to a dry film thickness of 0.2 to 0.3 mil (0.0002" to 0.0003"). Overcoat with MIL-P-15930 per BAC 5778 to a dry film thickness of 0.6 to 1.1 mils (0.0006" to 0.0011") or a total of 0.9 to 1.3 mils (0.0009" to 0.0013") including pretreatment coating.
- F-2.954 Apply one coat, 0.2 to 0.3 mil (0.0002" to 0.0003") dry film thickness of MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777. Degrease only; omit conversion coat before painting.

7.2.2 Codes for Electroplating and Hot Dipping

- F-2.212 Plate nickel per QQ-N-290. Prepare surface and apply zincate immersion treatment per BAC 5714 prior to nickel plate.
- F-2.23 Hot tin dip per BAC 5717.
- F-2.53 Chromium plate according to BAC 5709.
- F-2.331 Cadmium plate according to BAC 5701 to meet the requirements of QQ-P-416, Type II, Class 2.
- F-2.332 Cancelled use F-2.34
- F-2.34 Electroless nickel plate and bake 55 to 65 minutes at 260°±15°F to meet the requirements of BMS 10-50.

7.3 MAGNESIUM AND MAGNESIUM ALLOYS

7.3.1 Codes for Cleaning, Surface Treatments and Priming

F-3.22 Dow 17 anodize per BAC 5734. Apply MIL-P-8585 per BAC 5776 to a dry film thickness of 0.6 to 0.8 mil (0.0006" to 0.0008").

SRF-3.305 Dow 17 anodize per BAC 5734 and apply two coats of HMS 10-11, Type I primer per BAC 5736.

7.4 COPPER AND NICKEL BASE ALLOYS

7.4.1 Codes for Cleaning and Priming

F-4.10 Apply no finish.

F-4.36 Clean per MIL-S-5002 and apply one coat of MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777. Overcoat with one coat of MIL-P-8585 per MIL-P-6808 or BAC 5776.

F-4.37 Clean per MIL-S-5002 and apply one coat of MIL-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777. Overcoat with one coat of enamel as specified.

7.4.2 Codes for Electroplating and Hot Dipping

F-4.201 Cadmium plate per QQ-P-416 Type II, Class 2.

F-4.202 Cadmium plate per QQ-P-416 Type I, Class 3 (thickness 0.0002" to 0.0004").

F-4.21 Plate with tin, MIL-T-10727, Type I or Type II, 0.0003 inch minimum thickness.

F-4.22 Brush plate with tin per BAC 5717, 0.00025 inch minimum thickness.

F-4.60 Hot tin dip per BAC 5717.

F-4.70 Silver plate per BAC 5715.

F-4.80 Gold plate per MIL-G-45204 Type 1, Class 2.

F-4.91 Nickel plate per QQ-N-290, Class 2.

F-4.92 Electroless nickel plate per MIL-C-26074, Class 1.

7.5 WOOD

F-5.10 Apply no finish.

F-5.50 Two coats of varnish TT-V-119 applied in accordance with MIL-C-6796. First coat hand brushed or dipped.

7.5 WOOD (continued)

F-5.60 Clean and sand until smooth. Apply one coat of BMS 10-16, Type 1 primer. Sand to smooth grain, and apply a second coat of BMS 10-16, Type 1 primer. Apply two coats of BMS 10-16, Type II, Grade A white enamel, minimum dry film thickness of 2.0 mils (0.002") total thickness.

F-5.92 Sand to a smooth surface. After grinding, seal with clear preservative per MIL-S-13518, Type II, using one extra coat on end grains. Apply TT-P-636, per BAC 5774 to a minimum dry film thickness of 0.8 mils (0.0008").

7.6 PLASTICS AND PLASTIC FOAMS

F-6.10 Apply no finish.

F-6.70 Apply BMS 10-51, white, according to BAC 5791 to a dry film thickness 0.002 to 0.004 inches.

7.7 RUBBER AND RUBBER LIKE SYNTHETICS

F-7.10 Apply no finish.

7.8 CORROSION RESISTANT STEEL

7.8.1 Codes for Cleaning, Surface Treatments and Priming

F-8.05 Clean surfaces, when required per MIL-S-5002. (Detailed cleaning procedure at Boeing Facilities controlled by BAC 5751).

F-8.06 Clean per TT-C-490 Method I or Method VI if conditions are not satisfactory for blasting.

F-8.60 Clean per TT-C-490, Method I or Method VI. Apply MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777 to a dry film thickness of 0.2 to 0.3 mil (0.0002" to 0.0003").

F-8.61 Clean per TT-C-490, Method I or Method VI. Apply MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777 to a dry film thickness of 0.2 to 0.3 mil (0.0002" to 0.0003"). Overcoat with MIL-P-15930 to a dry film thickness of 0.6 to 1.1 mils (0.0006" to 0.0011") for a total dry film thickness of 0.9 to 1.3 mils (0.0009" to 0.0013").



7.8.2 Codes for Electroplating and Hot Dipping

Where electroplating or hot dipping used the applicable code from Section 7.1.

7.9 SPECIAL PURPOSE FINISHES

This section covers finish codes for materials not otherwise covered.

F-9.05 Apply no finish.

F-9.40 Etch with 10% commercial hydrochloric acid, rinse thoroughly with water. Dry. Apply TT-P-95 per BAC 5783 to a dry film thickness of 2.0 mils (0.0002").

7.10 MULTIPAL SUBSTRATE FINISHES

This section contains the finish codes which are applicable to more than one substrate material.

7.10.1 Codes for Cleaning, Surface Treatments and Priming

F-12.12 Apply one coat of MIL-C-15328 or MIL-C-8514 per MIL-C-8507 or BAC 5777.

F-12.205 Apply one coat of MIL-P-8585 per MIL-P-6808 or dip primer per BAC 5706 or spray prime per BAC 5776.

SRF-12.205 Apply one coat of BMS 10-11, Type 1 in accordance with BAC 5736.

F-12.206 Apply two coats of MIL-P-8585 per MIL-P-6808 or BAC 5706.

7.10.2 Codes for Special Purpose Organic Finishes

F-12.17 Apply BMS 10-5 lacquer per BAC 5754.

F-12.18 Apply sound dampening materials according to BAC 5782.

F-12.2091 Apply friction finish according to BAC 5486.

F-12.2093 Apply aircraft walkway, non-slip coating according to MIL-W-5044A, Type II, Class 1 or BAC 5705.



7.10.2 Codes for Special Purpose Organic Finishes (continued)

- F-12.2094 Apply non-skid coating according to BAC 5764.
- F-12.2095 Apply Gaco N-83 (to MIL-R-6130, BMS 1-11 or BMS 1-33 rubber) according to BAC 5767 .
- F-12.27 Apply Gacoflex, Federal Standard 595 Color No. 24300, by brush or roller to obtain dry film thickness for hiding.
- F-12.29 Apply two coats of BMS 10-16, Type 2, Grade A, Fed. Std. 595 Color #17815 according to BAC 5740.
- F-12,360 Solvent clean according to MIL-S-5002. Apply undercoating according to TT-C-520, dry film thickness 1/16 inch, dry time 24 hours.
- F-12.370 Clean according to MIL-S-5002. Apply one coat of unichrome 219-PX primer, allow 5-10 minutes air dry followed by 20 minutes bake at 360°F to 365°F. Apply one coat of unichrome 4032 plastisol coating. Bake plastisol after application 20 minutes at 360+5°F, minimum dry film thickness 7 mils.
- F-12.38 Apply BMS 10-51 to a minimum thickness of 15 mils (0.015") according to BAC 5791.
- F-12.52 Apply solid film lubricant per MIL-L-25504.
- F-12.680 Apply one coat of DuPont Dulux Marine Primer No. 649 to 1.0 mil minimum dry film thickness. Minimum dry time 6 hours before topcoating.
- F-12.69 Apply Glidden NU-PON Coat 6985-3A per BAC 5736.
- F-12.998 Clean per MIL-S-5002. Apply one coat of florescent paint per MIL-P-21563 by spray, brush or dip application.

7.10.3 Codes for Installation Finishes

- F-12.40 Apply wet primer according to MIL-P-8585 or corrosion preventative compound MIL-C-11796; Class 3 to all areas of the hole and countersink, and install fastener or insert immediately.
- F-12.405 Coat threads with JAN-A-669 anti-seize compound, before installation.
- F-12,41 Install with primer MIL-P-8585 wet or dry.
- F-12.423 Install with a light film of MIL-G-7118 grease on both surfaces.



7.10.3 Codes for Installation Finishes (continued)

- F-12.43 Install with a light film of MIL-L-7870 oil on both surfaces.
- F-12.44 Install with MIL-C-11796, Class 3 corrosion preventative compound on both surfaces or press fits (including scarf joints) and other surfaces requiring corrosion preventative compound only.

7.10.4 Codes for the Application of Topcoat Materials

- F-12.650 Apply TT-E-489 Type A or B per BAC 5775 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.6501 Apply TT-E-489 Type A per BAC 5775 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.651 Apply TT-E-489 Type A or B per BAC 5775 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.652 Apply TT-E-489 Type A or B per BAC 5775 to a dry film thickness which provides complete hiding. The minimum thickness shall be 1.0 mil (.001").
- F-12.653 Apply TT-E-529 Type A or B per BAC 5775 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.654 Apply TT-E-529 Type A or B per BAC 5775 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.655 Apply TT-E-529 Type A or B per BAC 5775 to a dry film thickness which provides complete hiding. The minimum thickness shall be 1.0 mil (.001").
- F-12.656 Apply TT-E-527 per BAC 5775 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.657 Apply TT-E-527 per BAC 5775 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.658 Apply TT-E-527 per BAC 5775 to a minimum dry film thickness of 1.0 mil (.001").
- F-12.6581 Apply TT-E-527 per BAC 5775 to a dry film thickness providing complete hiding.
- F-12.659 Apply MIL-E-15090 Class 2, Formula III enamel, Type II or III to a minimum dry film thickness of 2.0 mils (.002").
- F-12.660 Apply MIL-P-15932 gloss black (nearest Federal Standard color number is 27038) per BAC 5779 to a minimum dry film thickness of 3.0 mils (.003").



7.10.4 Codes for the Application of Topcoat Materials

- F-12.661 Apply MIL-P-15932 gloss black (nearest Federal Standard Color number is 2703A) per BAC 5779 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.662 Apply MIL-P-15933, dull black nearest Federal Standard color number is 3703B) per BAC 5779 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.663 Apply MIL-P-15933, dull black nearest Federal Standard color number is 3703B) per BAC 5779 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.664 Apply MIL-P-15934, Gray No. 7 (nearest Federal Standard color number is 36076) per BAC 5779 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.665 Apply MIL-P-15934, Gray No. 7 (nearest Federal Standard color number is 36076) per BAC 5779 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.666 Apply MIL-P-15935, Gray No. 11 (nearest Federal Standard color number is 36118) per BAC 5779 to a minimum dry film thickness of 3.0 mils (.003").
- F-12.667 Apply MIL-P-15935, Gray No. 11 (nearest Federal Standard color number is 36118) per BAC 5779 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.668 Apply MIL-P-15936, Gray No. 27 (nearest Federal Standard color number is 36293) per BAC 5779 to a minimum film thickness of 3.0 mils (.003").
- F-12.669 Apply MIL-P-15936, Gray No. 27 (nearest Federal Standard color number is 36293) per BAC 5779 to a minimum dry film thickness of 1.3 mils (.0013").
- F-12.675 Apply MIL-P-15147B per BAC 5782 or blast clean per MIL-C-4906 and apply one coat of MIL-P-15147B primer ~~by spray or brush~~ followed by hot spraying one heavy coat of MIL-P-15147B enamel to a minimum total dry film thickness of 3/16 inch including primer.