

METRIC

MIL-DTL-24441/23B(SH)

27 August 2009

SUPERSEDING

MIL-DTL-24441/23A(SH)

19 May 1999

DETAIL SPECIFICATION SHEET

PAINT, EPOXY-POLYAMIDE, DARK GRAY R<sub>0</sub>1.8, FORMULA 153, TYPE III

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-24441.

FORMULA: This formula covers dark gray epoxy-polyamide paint designated Navy Formula 153, Type III for interior or exterior use. The paint shall consist of the ingredients specified in the quantities specified.

Component A<sup>11/</sup>

Ingredients	Kilograms	Pounds
Thixatropo <sup>1/</sup>	---	---
Polyamide <sup>2/</sup>	9.53	21.0
Polyamide adduct <sup>3/</sup>	134.72	297.0
Titanium dioxide <sup>10/</sup>	---	---
Magnesium silicate <sup>4/</sup>	177.81	392.0
Black iron oxide <sup>5/</sup>	49.44	109.0
Butyl alcohol <sup>6/</sup>	121.119	267.0

Component B<sup>11/</sup>

Ingredients	Kilograms	Pounds
Thixatropo <sup>7/</sup>	---	---
Epoxy resin <sup>8/</sup>	240.41	530.0
Magnesium silicate <sup>4/</sup>	120.20	265.0
Naphtha <sup>9/</sup>	100.25	221.0

See footnotes on next page.

QUANTITATIVE REQUIREMENTS: The paint shall meet the following quantitative requirements and the qualitative requirements of section 3 of the general specification. The components A and B shall be mixed 1:1 by volume for mixed component tests. Tests shall be performed in accordance with the general specification.

Requirements	Component A		Component B		Mixed components	
	Min	Max	Min	Max	Min	Max
Pigment content, percent (%)	44.9	48.9	24.8	28.8	---	---
Volatiles, %	28.0	32.0	19.6	23.6	---	---
Nonvolatile vehicle, %	20.1	24.1	49.6	53.6	---	---
Water, %	---	1.5	---	0.5	---	---
Coarse particles, %	---	0.3	---	0.3	---	---
Consistency, grams	---	460	---	275	---	---
Kilograms per liter (kg/L) (pounds per gallon (lb/gal))	1.29 (10.8)	1.34 (11.2)	1.20 (10.1)	1.32 (11.0)	---	---
Set to touch, hours						
a. at 4.4 °C (40 °F)	---	---	---	---	---	2
b. at 23 °C (73 °F)	---	---	---	---	---	2
Dry-hard, hours						
a. at 4.4 °C (40 °F)	---	---	---	---	---	24
b. at 23 °C (73 °F)	---	---	---	---	---	6
Fineness of grind, NS	5	---	5	---	---	---
Flash point, °C (°F)	35.6 (96)	---	37.8 (100)	---	35.6 (96)	---
Pot life, hours at 23 °C (73 °F)	---	---	---	---	5	---
Sag resistance, micrometers (mils)	---	---	---	---	225 (9)	---
Color of wet film, R <sub>w</sub> %	---	---	---	---	0.8	1.02
Weight per epoxy vehicle	---	---	175	195	---	---
Contrast ratio, 3-mil dry film thickness	---	---	---	---	0.98	---
Gloss, 60 degree specular, %	---	---	---	---	---	30
VOC, grams per liter (g/L) (lb/gal)	---	---	---	---	---	340 (2.8)

<sup>1/</sup> Thixatropes to be used is the manufacturer's choice. In the development of component A, 6.80 kilograms (15 pounds) (7.95 liters (2.1 gallons)) of Disparlon NS-30 made by King Industries were used. Manufacturer is responsible for choosing a thixatropes that meets all the requirements herein, including shelf life. Thixatropes is a pigment for calculation purposes.

<sup>2/</sup> GENAMID 2000, Cognis Corp.; ANCAMIDE 507, Air Products Chemical Corp.; EPOTUF SF7791, REICHHOLD Chemical.

<sup>3/</sup> VERSAMID 280B75, Cognis Corp.; ANCAMIDE 700B75, Air Products Chemical Corp.; EPOTUF SF7792, REICHHOLD Chemical.

<sup>4/</sup> Nicron 503, Luzenac, Inc.

<sup>5/</sup> Black Iron Oxide Bk-599, Elementis Pigments ; Bayferrox Iron Oxide Black 318M, Lanxess Pigments

<sup>6/</sup> Butyl alcohol conforming to ASTM D304.

- <sup>7/</sup> Thixatropes to be used is the manufacturer's choice. In the development of component B, 6.80 kilograms (15 pounds) (6.81 liters (1.8 gallons)) of Disparlon 6500 made by King Industries were used. Manufacturer is responsible for choosing a thixatropes that meets all the requirements herein, including shelf life. Thixatropes is a pigment for calculation purposes.
- <sup>8/</sup> EPON 828, Hexion Chemical Co.; ARALDITE 6010, Huntsman Advanced Materials; DER 331, Dow Chemical Corp.; EPO-TUF 37-140, REICHHOLD Chemical Corp.
- <sup>9/</sup> Conforming to ASTM D3734, Type I. In the development of component B, AMSCO Super High Flash Naphtha was used.
- <sup>10/</sup> Titanium dioxide conforming to ASTM D476, Type IV. In the development of component A, DuPont Tioxide R960 was used. Use sufficient titanium dioxide to achieve color. Estimated titanium oxide needed as less than 0.60 kilograms per 100 liters (5 pounds per 100 gallons).
- <sup>11/</sup> For VOC calculations, component A makes approximately 379 liters (100 gallons) and component B makes approximately 386 liters (102 gallons).

Use of alternate ingredients in this formula must have prior approval of the Naval Sea Systems Command. Approval will be based on review of data demonstrating equivalent physical, chemical and performance characteristics of paint manufactured with the proposed alternate material and the requirements as specified in 3.4.1 of MIL-DTL-24441. Paint incorporating the proposed alternate ingredient shall conform to all the requirements of this military specification sheet and the general specification.

CHANGES FROM PREVIOUS ISSUE: Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Preparing Activity  
Navy – SH  
(Project 8010-2009-007)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.