

METRIC

MIL-DTL-24441/38B(SH)

27 August 2009

SUPERSEDING

MIL-DTL-24441/38A(SH)

19 May 1999

DETAIL SPECIFICATION SHEET

PAINT, EPOXY-POLYAMIDE, BLACK, FORMULA 160, TYPE IV

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

FORMULA: This formula covers black epoxy-polyamide paint designated Navy Formula 160, Type IV for interior or exterior use. The paint shall consist of the ingredients specified in the quantities specified.

Component A^{11/}

| Ingredients | Kilograms | Pounds |
|--------------------------------|-----------|--------|
| Thixatrop ^{1/} | --- | --- |
| Polyamide ^{2/} | 13.61 | 30.0 |
| Polyamide adduct ^{3/} | 214.55 | 473.0 |
| Silica ^{4/} | 46.27 | 102.0 |
| Mineral spirits ^{5/} | 49.90 | 110.0 |
| Butyl alcohol ^{6/} | 47.17 | 104.0 |

Component B^{11/}

| Ingredients | Kilograms | Pounds |
|--------------------------------|-----------|--------|
| Thixatrop ^{7/} | --- | --- |
| Epoxy resin ^{8/} | 321.6 | 709.0 |
| Silica ^{4/} | 28.124 | 62.00 |
| Black iron oxide ^{9/} | 57.15 | 126.0 |
| Naphtha ^{10/} | 94.35 | 208.0 |

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 (%) | 11.5 | 15.5 | 15.7 | 19.7 | --- | --- |
| Volatiles, % | 38.0 | 42.0 | 12.0 | 16.0 | --- | --- |
| Nonvolatile vehicle, % | 44.5 | 49.5 | 65.3 | 69.3 | --- | --- |
| Water, % | --- | 1.5 | --- | 0.5 | --- | --- |
| Coarse particles, % | --- | 0.3 | --- | 0.3 | --- | --- |
| Consistency, grams | --- | 205 | --- | 205 | --- | --- |
| Kilograms per liter (kg/L) (pounds per gallon (lb/gal)) | 0.95 (7.9) | 0.99 (8.3) | 1.22 (10.2) | 1.34 (11.2) | --- | --- |
| Set to touch, hours | | | | | | |
| a. at 4.4 °C (40 °F) | --- | --- | --- | --- | --- | 3 |
| b. at 23 °C (73 °F) | --- | --- | --- | --- | --- | 3 |
| Dry-hard, hours | | | | | | |
| a. at 4.4°C (40°F) | --- | --- | --- | --- | --- | 24 |
| b. at 23°C (73°F) | --- | --- | --- | --- | --- | 6 |
| Fineness of grind, NS | 3 | --- | 2 | --- | --- | --- |
| Flash point, °C (°F) | 35.6 (96) | --- | 37.8 (100) | --- | 35.6 (96) | --- |
| Pot life, hours at 23 °C (73 °F) | --- | --- | --- | --- | 4 | --- |
| Sag resistance, micrometers (mils) | --- | --- | --- | --- | 300 (12) | --- |
| Weight per epoxy vehicle | --- | --- | 175 | 195 | --- | --- |
| Contrast ratio, 3-mil dry film thickness | --- | --- | --- | --- | 0.98 | --- |
| VOC, grams per liter (g/L) (lb/gal) | --- | --- | --- | --- | --- | 340 (2.8) |

- ^{1/} Thixatropes to be used is the manufacturer's choice. In the development of component A, 4.54 kilograms (10 pounds) (5.3 liters (1.4 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.
- ^{2/} GENAMID 2000, Cognis Corp.; ANCAMIDE 507, Air Products Chemical Corp.; EPOTUF SF7791, REICHHOLD Chemical.
- ^{3/} VERSAMID 280B75, Cognis Corp.; ANCAMIDE 700B75, Air Products Chemical Corp.; EPOTUF SF7792, REICHHOLD Chemical.
- ^{4/} Quso WR-55, PQ Corp.
- ^{5/} Conforming to MIL-PRF-680, Type I.
- ^{6/} Butyl alcohol conforming to ASTM D304.

- ^{7/} Thixatropes to be used is the manufacturer's choice. In the development of component B, 4.54 kilograms (10 pounds) 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.
- ^{8/} EPON 828, Hexion Chemical Co.; ARALDITE 6010, Huntsman Advanced Materials; DER 331, Dow Chemical Corp.; EPO-TUF 37-140, REICHHOLD Chemical Corp.
- ^{9/} Bayferrox Black Iron Oxide 318M, Lanxess Pigments.
- ^{10/} Conforming to ASTM D3734, Type I. In the development of component B, AMSCO Super High Flash Naphtha was used.
- ^{11/} For VOC calculations, component A makes approximately 386 liters (102 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 8010-2009-022)

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>.