

## METRIC

MIL-PRF-009000K(SH)

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USED IN LIEU OF

MIL-PRF-9000J(SH)

07 January 2010

## PERFORMANCE SPECIFICATION

LUBRICATING OIL, SHIPBOARD INTERNAL COMBUSTION ENGINE,  
HIGH-OUTPUT DIESEL

This specification is approved for interim use by the Naval Sea Systems Command, Department of the Navy. Other activities in the Department of Defense may use this interim revision or may continue using MIL-PRF-9000J.

## 1. SCOPE

1.1 Scope. This specification covers one grade (SAE 40) of lubricating oil for use in advanced design high-output shipboard main propulsion and auxiliary diesel engines using fuel conforming to MIL-DTL-16884 and MIL-DTL-5624. This lubricating oil is identified as Military Symbol 9250 and NATO Code 0-278.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## BUREAU OF MEDICINE AND SURGERY (BUMED)

BUMED INST 6270.8 - Procedures for Obtaining Health Hazard Assessments Pertaining to Operational Use of a Hazardous Material

(Copies of this document are available from the Bureau of Medicine and Surgery, Department of the Navy, 2300 E Street, NW, Washington, DC 20372-5300 or online at <http://navymedicine.med.navy.mil>.)

## NAVAL SEA SYSTEMS COMMAND (NAVSEA)

S9510-AB-ATM-010 - Nuclear Powered Submarine Atmosphere Control Manual

(Copies of this document are available from the Naval Logistics Library, 5450 Carlisle Pike, Mechanicsburg, PA 17055 or online at <http://nll.ahf.nmci.navy.mil>.)

Comments, suggestions, or questions on this document should be addressed to: Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [CommandStandards@navy.mil](mailto:CommandStandards@navy.mil), with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil>.

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2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attributes (DoD adopted)

(Copies of this document are available from the American National Standards Institute, 25 W. 43rd St, 4th Floor, New York, NY 10036 or online at <http://webstore.ansi.org/>.)

## AMERICAN PETROLEUM INSTITUTE (API)

API 1509 - API Base Oil Interchangeability Guidelines for Passenger Car Motor Oils and Diesel Engine Oils

(Copies of this document are available from API Publications, Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO 80112-5776 or online at <http://global.ihs.com/>.)

## ASTM INTERNATIONAL

ASTM D92 - Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester (DoD adopted)

ASTM D97 - Standard Test Method for Pour Point of Petroleum Products (DoD adopted)

ASTM D129 - Standard Test Method for Sulfur in Petroleum Products (General Bomb Method) (DoD adopted)

ASTM D130 - Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test (DoD adopted)

ASTM D287 - Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method) (DoD adopted)

ASTM D445 - Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity) (DoD adopted)

ASTM D874 - Standard Test Method for Sulfated Ash from Lubricating Oils and Additives (DoD adopted)

ASTM D892 - Standard Test Method for Foaming Characteristics of Lubricating Oils (DoD adopted)

ASTM D1091 - Standard Test Methods for Phosphorus in Lubricating Oils and Additives (DoD adopted)

ASTM D1298 - Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method (DoD adopted)

ASTM D1552 - Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method) (DoD adopted)

ASTM D2270 - Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40 and 100°C (DoD adopted)

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ASTM D2622	-	Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry (DoD adopted)
ASTM D2896	-	Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration (DoD adopted)
ASTM D3228	-	Standard Test Method for Total Nitrogen in Lubricating Oils and Fuel Oils by Modified Kjeldahl Method (DoD adopted)
ASTM D4047	-	Standard Test Method for Phosphorus in Lubricating Oils and Additives by Quinoline Phosphomolybdate Method (DoD adopted)
ASTM D4052	-	Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter (DoD adopted)
ASTM D4057	-	Standard Practice for Manual Sampling of Petroleum and Petroleum Products (DoD adopted)
ASTM D4485	-	Standard Specification for Performance of Engine Oils
ASTM D4628	-	Standard Test Method for Analysis of Barium, Calcium, Magnesium, and Zinc in Unused Lubricating Oil by Atomic Absorption Spectrometry (DoD adopted)
ASTM D4629	-	Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection (DoD adopted)
DELETED	-	DELETED
DELETED	-	DELETED
ASTM D4927	-	Standard Test Methods for Elemental Analysis of Lubricant and Additive Components - Barium, Calcium, Phosphorus, Sulfur, and Zinc by Wavelength-Dispersive X-Ray Fluorescence Spectroscopy (DoD adopted)
ASTM D4951	-	Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (DoD adopted)
ASTM D5182	-	Standard Test Method for Evaluating the Scuffing Load Capacity of Oils (FZG Visual Method)
DELETED	-	DELETED
ASTM D5762	-	Standard Test Method for Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence
ASTM D5949	-	Standard Test Method for Pour Point of Petroleum Products (Automatic Pressure Pulsing Method)
ASTM D5950	-	Standard Test Method for Pour Point of Petroleum Products (Automatic Tilt Method)
DELETED	-	DELETED
ASTM D6443	-	Standard Test Method for Determination of Calcium, Chlorine, Copper, Magnesium, Phosphorus, Sulfur, and Zinc in Unused Lubricating Oils and Additives by Wavelength Dispersive X-ray Fluorescence Spectrometry (Mathematical Correction Procedure)

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| ASTM D6481 | - | Standard Test Method for Determination of Phosphorus, Sulfur, Calcium, and Zinc in Lubrication Oils by Energy Dispersive X-ray Fluorescence Spectroscopy |
| ASTM D6557 | - | Standard Test Method for Evaluation of Rust Preventive Characteristics of Automotive Engine Oils   |
| ASTM E29   | - | Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications (DoD adopted)                                   |

(Copies of these documents are available from ASTM International, 100 Barr Harbor Dr., PO Box C700, West Conshohocken, PA 19428-2959 or online at [www.astm.org](http://www.astm.org).)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Qualification. The lubricating oil furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.1.1 Requalification. The continued qualification of products shall be verified every 5 years by submission of a signed statement by the oil supplier attesting that no formulation changes have been made in the qualified product. Any changes in the formulation of the product submitted for qualification testing shall be approved by NAVSEA. Minor changes, such as an increase in pour point additive, may require only notification; however, the extent of supporting test data required is at the discretion of NAVSEA.

3.2 Material. The oil shall consist of refined mineral oil blended with additives as necessary to conform to this specification.

3.3 Lubrication. The oil shall lubricate oil-lubricated high-output marine diesel engine parts, engine-driven generator bearings, and associated equipment.

3.4 Performance. The oil shall perform when used with all types of diesel engine bearing materials, shall cause neither excessive ring sticking nor clogging of oil channels, shall keep cylinder and ring wear down to a minimum, and shall not cause excessive lacquer, carbon, or sludge deposits on any part of the engines in which it is intended for use. Oils qualified under this specification shall comply with the acceptance criteria in ASTM D4485 for CF and DDC 6V-92TA tests (see 4.6.2).

3.5 Compatibility. The addition of a new diesel engine lubricating oil to any other new lubricating oil conforming to this specification shall not cause separation of components (see 4.6.3).

3.6 Homogeneity. Additive agents, when used, shall remain uniformly distributed throughout the oil at all temperatures above the pour point up to 180 °C. If the oil is cooled below its pour point, it shall regain its homogeneity at a temperature of 6 °C above its pour point within 24 hours (see 4.6.4).

3.7 Chemical and physical requirements. The oils shall conform to the chemical and physical requirements shown in [table I](#).

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TABLE I. Chemical and physical requirements.

Characteristics	Requirements	Methods (ASTM unless otherwise noted)
Appearance	Clear, homogenous, and free from visible water, particles, and sediments	Visual examination
Ash, sulfated, %	<sup>1/</sup>	D874
Corrosion test at 100 °C, (copper strip) appearance, maximum	1b	D130 <sup>2/</sup>
Flash point, °C, minimum	225	D92
Foam (stability only), mL maximum Sequences I & III (at 24 °C) Sequence II (at 93.5 °C)	30 5	ASTM D892 <sup>3/</sup>
Gravity, degree API	<sup>1/</sup>	D287, D1298, D4052
Metals/Elements Barium, ppm Calcium, ppm Magnesium, ppm, maximum Nitrogen, ppm Phosphorus, ppm  Zinc, ppm	<sup>1/</sup> <sup>1/</sup> 100 <sup>1/</sup> <sup>1/</sup>  <sup>1/ 4/</sup>	D4628, D4927, D4951 D4628, D4927, D4951, D6443, D6481 D4628, D4927, D4951, D6443 D3228, D4629, D5762 D1091, D4047, D4927, D4951, D6443, D6481 D4628, D4927, D4951, D6443, D6481
Pour point, °C, maximum	-12	D97, D5949, D5950
Rust prevention, rating, minimum	100	D6557
Scuffing load capacity (FZG), failure load stage, minimum	11	D5182
Sulfur	<sup>1/</sup>	D129, D1552, D2622, D4927, D6443, D6481
Total base number, mg KOH/g, minimum	12	D2896
Viscosity index, minimum	90	D2270
Viscosity, cSt at 100 °C	12.5 to 16.3	D445
Viscosity, cSt at 40 °C, minimum	120	D445
NOTES:		
<sup>1/</sup> No limiting requirements. In conformance testing, values are compared to qualification results (see 4.5).		
<sup>2/</sup> Test shall be run for 3 hours at specified temperature.		
<sup>3/</sup> Option A shall not be used. A ring of bubbles around the edge of the graduate shall be considered complete collapse or 0 mL.		
<sup>4/</sup> The contractor shall certify that if zinc is present, it is present as zinc dialkyl dithiophosphate, as zinc diaryl dithiophosphate, or as a combination of the two.		

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TABLE II. Chemical and physical requirements (SAE 15W40 Grade). DELETEDTABLE III. Conformance tests with tolerances.

Test	Tolerances, if applicable
Appearance	-
Gravity, API	$\pm 1.0$
Viscosity, cSt at 100 °C	$\pm 0.5$ <sup>1/</sup>
Viscosity, cSt at 40 °C	$\pm 10$ <sup>1/</sup>
Viscosity index	-
Flash point, °C	$+8$ <sup>1/</sup>
Pour point, °C	-
Foam test, mL	-
Sulfur, mass %	$\pm 20\%$ of original value
Phosphorus, ppm	$\pm 10\%$
Zinc, calcium, and magnesium, ppm	$\pm 10\%$
Total base number, mg KOH/g	-
NOTE: <sup>1/</sup> Shall meet specification requirements.	

3.8 Toxicity. When evaluated in accordance with 4.6.5, the oil shall have no adverse effect on the health of personnel when used for its intended purpose. The oil shall be assessed by the Navy and Marine Corps Public Health Center (NMCPHC) using the administrative Health Hazard Assessment (HHA). A flowchart for this process can be found as enclosure (1) of BUMEDINST 6270.8. The HHA is a review of the oil based on information submitted by the manufacturer to assess health hazards associated with the handling, application, use, and removal of the product. The oil shall not cause any environmental problems during waste disposal (see 4.6.5 and 6.8).

3.9 Off-gassing. The oil shall be certified for and assigned a usage category of "Limited" in accordance with NAVSEA S9510-AB-ATM-010 chapter titled "Material Control Program" (see 4.6.6 and 6.9).

3.10 2,6-Di-tert-butylphenol (DTBP). The addition of DTBP (Chemical Abstract Service Number 128-39-2) in any lubricating oil produced under this specification is prohibited. This applies to both surface ship and submarine use. DTBP shall not be intentionally added to the oil. The level of DTBP, if detected, shall not exceed 10 parts per million. (see 4.6.7)

3.11 Ozone depleting substances (ODS). The use of ODS in the composition of the lubricating oil under this specification directly or referenced in any federal test method is hereto prohibited. Environmentally safe and non-ODS alternative solvents shall be substituted in test methods for any previously specified ODS.

#### 4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.5).

4.2 Qualification inspection. Qualification tests shall be conducted at a laboratory satisfactory to the Naval Sea Systems Command. This inspection shall include the applicable tests delineated in [table I](#) and 4.6.2 to 4.6.7.

4.3 Sampling for conformance.

4.3.1 Lot. For purposes of sampling, a lot shall consist of all lubricating oil manufactured as one batch and offered for delivery at one time.

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4.3.2 Sampling for examination of filled containers. A random sample of filled containers shall be selected from each lot in accordance with ANSI/ASQC Z1.4 at inspection level II to verify compliance regarding fill, closure, marking, and other requirements not involving tests.

4.3.3 Sampling for tests.

4.3.3.1 Blending tank. A composite sample sufficient for testing with at least 1 gallon to be retained for possible future testing shall be taken from each lot in accordance with the applicable procedure of ASTM D4057.

4.4 Examination of filled containers. Each sample filled container selected in accordance with 4.3.2 shall be examined for defects of the container and the closure, for evidence of leakage, and for unsatisfactory markings. Each container shall also be weighed to determine quantity. Any container in the sample having one or more defects or under required fill shall be cause for rejection of the container.

4.5 Conformance tests. Each sample selected as specified in 4.3.3.1 shall be tested for those parameters listed in [table III](#) and according to methods in [table I](#). To ensure that the material is essentially the same as that given qualification under this specification, it is required that, in addition to conforming to this specification, the results of conformance tests listed in [table III](#) shall not vary from the analysis of the sample submitted for qualification to an extent greater than the tolerances, if any, shown.

4.5.1 Rejection of lots. If a sample of lubricating oil fails any of the tests, the entire lot represented by that sample shall be rejected.

4.6 Test procedures.

4.6.1 Tests. Tests shall be run as specified in [table I](#) and the following procedures. For purposes of determining conformance with each requirement, an observed value or calculated value shall be rounded off to the nearest unit in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off procedure given in ASTM E29.

4.6.2 Engine tests. Engine tests for lubricating oils shall be conducted and results evaluated to determine compliance with API category CF and DDC 6V-92TA tests. These test methods are found in ASTM D4485. Documentation showing previous satisfactory performance of qualifying product(s) in CF category testing using 1.0 percent sulfur fuel will be accepted as proof of meeting these respective engine testing requirements.

4.6.3 Compatibility. Precipitation or separation of insoluble materials from mixtures of the test oil with representative (see 6.10) approved SAE 40 Grade (MS 9250) reference oil shall be determined as follows:

- a. Create five different mixes of the test oil and the representative approved SAE 40 (MS 9250) oil: one at 100:0, one at 50:50, one at 90:10, one at 10:90, and one at 0:100, and place each mixture in a separate 100 mL centrifuge tube.
- b. The tubes containing the mixtures of oils shall be placed in a vibrator machine or manually shaken for 15 minutes at room temperature.
- c. At the completion of the shaking period, all of the tubes shall be placed in an oven and heated at 60 °C for a period of up to two weeks, in accordance with 4.6.3d.
- d. Examine the tubes not less than once per two calendar days for evidence of separation in the oil such as a haze or sediment. Continue the test until evidence of separation occurs or 2 weeks have passed.

4.6.4 Homogeneity. After determining the pour point of the oil, allow the oil to sit at 6 °C above the pour point and examine test oil visually for sediment or separation of insoluble material. The oil shall regain homogeneity within 24 hours. Next, place jar and oil in oil bath, bring temperature of bath to 180 °C and hold at test temperature for 1 hour. Examine test oil visually during this process for sediment or separation of insoluble material. (see 3.6)

4.6.5 Toxicity. The oil shall be evaluated by the Navy and Marine Corps Public Health Center (NMCPHC) using the administrative Health Hazard Assessment (HHA). Sufficient data to permit an HHA of the product shall be provided by the manufacturer/distributor to the NMCPHC. To obtain current technical information requirements specified by the NMCPHC, see 6.8.

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4.6.6 Off-gassing. The oil shall be tested by a Government-approved testing facility in accordance with NAVSEA S9510-AB-ATM-010 chapter titled "Material Control Program". The results shall be submitted to the Government for evaluation and approval for use (see 3.9 and 6.9).

4.6.7 2,6-Di-tert-butylphenol (DTBP). Analytical data with the method documented from a NAVSEA-approved laboratory shall be submitted to document relative absence of DTBP, and, if detected, shall not exceed 10 ppm (see 3.10).

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The lubricating oils covered by this specification are intended for use in advanced design high-output shipboard main propulsion and auxiliary diesel engines using fuel conforming to MIL-DTL-16884 (with sulfur content of 0.5 mass percent or less) and MIL-DTL-5624.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Packaging requirements (see 5.1).
- c. The size of container required (see 5.1).
- d. Quantity in gallons. The material should be purchased by volume, the unit being a U.S. gallon at 15.6 °C.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL 9000 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [commandstandards@navy.mil](mailto:commandstandards@navy.mil). An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.daps.dla.mil>.

6.3.1 Oil tests. Requests for tests of oil will be considered only under the conditions that the manufacturer submits the following information regarding composition of the oil proposed for qualification:

- a. Crude source, manufacturing process for each stock, types of base or blending stocks, and percentages used in the finished oil.
- b. Type of additive agents, typical chemical analysis, and percentages used in the finished oil.
- c. Typical analysis of the blending stocks, the base oil, and the finished oil, including percentage of metallic elements contributed by the additive.

6.3.2 Oil sample. Each sample of oil, rebrand or experimental, submitted for qualification should be designated by the exhibitor by a different name, number, or letter to denote any changes in base oil components or the amounts or type of additive percent.

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6.4 Supersession data. This specification includes the requirements of MS 9250 of MIL-L-9000F(SHIPS). Future acquisition of lubricating oil formerly covered by MS 9110 and MS 9500 of MIL-L-9000F(SHIPS) should be made under the applicable grade of MIL-L-2104. The requirements for MS 9170 of MIL-L-9000F(SHIPS) are not included due to limited usage.

6.5 Subject term (key word) listing.

Engine oil  
Main reduction gears  
Marine diesel engines  
Petroleum-base  
Qualification  
SAE 40

6.6 International standardization agreement implementation. This specification implements international standardization agreement NATO STANAG 1135. When amendment, revision, or cancellation of this specification is proposed, the preparing activity must coordinate the action with the U.S. National Point of Contact for the international standardization agreement, as identified in the ASSIST database at <https://assist.daps.dla.mil>.

6.7 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

6.8 Toxicity evaluation. The Navy and Marine Corps Public Health Center (NMCPHC) requires sufficient information to permit an HHA of the product. Any questions concerning toxicity and requests for HHA should be addressed to the Commanding Officer, Navy and Marine Corps Public Health Center (NMCPHC), ATTN: Industrial Hygiene Department, Acquisition Technical Support Division, 620 John Paul Jones Circle, Suite 1100, Portsmouth, VA 23708-2103. Upon receipt of the HHA, a copy should be provided to the Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Ave., SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [commandstandards@navy.mil](mailto:commandstandards@navy.mil).

6.9 Material certification. Materials to be installed in submarines are to be controlled to prevent off-gassing, which contaminates the atmosphere and can result in health hazards to personnel or deleterious effects on machinery. These controls are accomplished through the Submarine Material Control Program, which is described in the Nuclear Powered Submarine Atmosphere Control Manual, NAVSEA S9510-AB-ATM-010 chapter titled "Material Control Program". Under the Submarine Material Control Program, all materials considered for use on submarines require certification and assignment of a usage category. Under the certification process, candidate materials are selected by Navy activities or contractors, and a request for certification is submitted to the Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Ave., SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [commandstandards@navy.mil](mailto:commandstandards@navy.mil). The certification request is accompanied by detailed information, including descriptions of the material, method of application, usage, and storage. A chemical analysis is conducted, which is normally accomplished through off-gas testing. The off-gas test is required to be conducted in a Government-approved laboratory designated by the preparing activity. Information pertaining to this test requirement may be obtained from the Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Ave., SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [commandstandards@navy.mil](mailto:commandstandards@navy.mil). Based on the chemical analysis results, a usage category is assigned to the material defining whether, and to what extent, the material may be used on submarines.

6.10 Compatibility testing. Representative samples for compatibility testing are provided on request and are shipped to an approved laboratory or contractor at Government expense. Information pertaining to obtaining representative samples may be obtained from Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [commandstandards@navy.mil](mailto:commandstandards@navy.mil).

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6.11 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodian:  
Navy – SH

Preparing Activity:  
Navy – SH  
(Project 9150-2011-010)

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