AEROSPACE MATERIAL SPECIFICATION

AMS-C-19853™	REV. A
Issued 1998-07 Stabilized 2021-05 Superseding AMS-C-19853	

Carbon Removing Compound (For Use in Agitated Tank)

RATIONALE

AMS-C-19853A has been reviewed and determined to contain straightforward and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE AMS J Aircraft Maintenance Chemicals and Materials Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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NOTICE

This document has been taken directly from U.S. Military Specification MIL-C-19853D and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-C-19853D. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualifications requirements and associated qualified products lists are mandatory to DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this technical report.

1. SCOPE:

1.1 Scope:

This specification covers requirements for the acquisition of two types and two classes of material that will remove or loosen carbon from components of internal combustion engines and compressor sections of jet engines.

1.2 Classification:

The carbon removing compound is to be furnished in the following types and classes as specified (see 6.2c):

Type I - Phenolic
Type II - Non-phenolic

Class 1 - Unsealed (Single layer)
Class 2 - Sealed (Two layers)

2. APPLICABLE DOCUMENTS:

The following publications, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-M-3171	Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on
MIL-L-6082	Lubricating Oil, Aircraft Piston Engine (Non Dispersant Mineral Oil)
MIL-S-7952	Steel, Sheet and Strip, Uncoated, Carbon (1020 & 1025) (Aircraft Quality)
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-T-9046	Titanium and Titanium Alloy, Sheet, Strip, and Plate
MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-290	Packaging of Petroleum and Related Products
QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
QQ-A-250/13	Aluminum Alloy Alclad 7075, Plate and Sheet
QQ-P-416	Plating, Cadmium (Electrodeposited)
FED-STD-313	Material Safety Data Sheet, Transportation Data, and Disposal Data for Hazardous Materials Furnished to Government Activities

2.2 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 4375	Sheet and Plate, Magnesium Alloy, 3.0A1-1.0Zn-0.20Mn, (AZ31B-0), Annealed and Recrystallized

2.3 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 891 Specific Gravity, Apparent, Liquid Industrial Chemicals
ASTM E 70 pH of Aqueous Solutions With the Glass Electrode

2.4 U.S. Pharmacopeial Convention, Inc:

Available from Mack Publishing Company, Easton, PA 18042.

United States Pharmacopeia (USP)

3. REQUIREMENTS:

3.1 Qualification:

The carbon removing compound furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable Qualified Products List at the time of award of contract (see 4.3 and 6.3).

3.2 Materials:

The carbon removing compound shall be liquid at 25°C (77°F). Its composition shall be optional with the manufacturer but shall be restricted by other requirements specified herein. The compound shall contain no benzene.

3.3 Toxicity:

The material shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertaining to the toxic effect shall be referred by the acquiring activity to the appropriate departmental medical service who will act as an advisor to the acquiring activity. Material safety data sheets shall be prepared and submitted in accordance with FED-STD-313. One copy of which shall be forwarded to the preparing activity of the specification, one copy to the acquiring activity, and one copy to the Naval Environmental Health Center (see 6.5).

3.4 pH of Seal:

The carbon removing compound seal shall have a pH value not less than 9.00 nor more than 12.00 when determined in accordance with 4.5.1.

3.5 Specific gravity:

The specific gravity of the carbon removing compound shall be not less than 1.15 for the organic layer and not more than 1.09 for the aqueous layer when determined in accordance with 4.5.2.

3.6 Flammability:

Class 1 compound and the solvent layer of class 2 compound shall continue to burn no longer than 3 seconds after the removal of the flame when tested in accordance with 4.5.3.

3.7 Volatility:

The volatility of the class 1 compound and the solvent layer of the class 2 carbon removing compound, as received, shall be no greater than the volatility of the lower layer of the control formula product when the compound is tested in accordance with 4.5.4.

3.8 Separation of layers (class 1 only):

When the class 1 compound is tested as specified in 4.5.5, the resulting mixture, after standing two hours, shall separate sharply into two distinct layers with no evidence of clots, curd, or precipitate. The aqueous layer shall be uppermost and the aqueous volume for each type shall be:

Type I (upper layer) - 25 ± 2 ml
Type II (upper layer) - 20, + 7, - 2 ml.

3.9 Phenolic content (type II only):

The type II, class 1, compound and the solvent layer of Type II, class 2, shall contain less than 0.03 percent by weight of phenol and/or cresol when tested as specified in 4.5.6.

3.10 Storage stability:

The carbon removing compound shall show no sediment, curd, or scum in the solvent layer or interface or any other evidence of deterioration and shall conform to the requirement of 3.12 when tested as specified in 4.5.10, after being stored as specified in 4.5.7.

3.11 Oil removal:

The carbon removing compound shall exhibit oil removal effectiveness equal to or greater than that shown by the control formula product similarly tested when tested as specified in 4.5.9.

3.12 Carbon removal:

The carbon removing compound shall possess carbon removal capability and speed of carbon removal equal to or greater than the control formula product when tested as specified in 4.5.10.

3.13 Corrosiveness:

The carbon removing compounds shall cause no visible trace of corrosion, oxidation, or discoloration of steel or anodized aluminum alloy and shall cause no visual corrosion and not more than slight discoloration of polished aluminum alloy, cadmium plated steel, or chrome pickled magnesium alloy when tested as specified in 4.5.11.

3.14 Rinsing properties:

The carbon removing compound shall be completely rinsed from the surface of the anodized aluminum alloy panel when tested as specified in 4.5.12. The panel shall show no evidence of a sticky film, soap, lime, curd, or physical dirt after it has been rinsed. The final rinse water on the panel surface shall form a smooth layer free from water break.

3.15 Compatibility (type I only):

After mixing the carbon removing compound with an equal volume of control formula product in accordance with 4.5.13, the combined volume of the upper and lower layers thus formed shall be respectively equal to the sum of the original volumes of the upper and lower layers of the material prior to mixing. The resulting mixture shall be equal to or better than the control formula product in carbon removing capability.

3.16 Emulsification:

The emulsion formed when the carbon removing compound is shaken with 12-1/2 grain hard water in accordance with 4.5.14, shall show no sediment, curd, scum, or clear solvent. Creaming shall be acceptable.

3.17 Cold stability:

The carbon removing compound shall return to its original condition after being exposed to a temperature of -18° ± 5°C (0°± 9°F) for one hour in accordance with 4.5.15.

3.18 Temperature cycle (stability):

After the carbon removing compound, with a steel strip partially immersed, has been stored in a glass bottle for five days as specified in 4.5.16, the compound shall show no marked variation in appearance compared to the original compound stored at room temperature in the dark. The immersed portion of the steel strip shall show no evidence of pitting, corrosion, or uneven darkening. The unexposed portion of the strip shall show no evidence of corrosion. There shall be no difference in appearance between the carbon removing compound that has undergone the temperature cycle (stability) test and an unexposed sample one hour after each has been shaken for one minute. The sample which has been heated shall meet the requirements of carbon removal capability (see 3.12).

3.19 Seal content (class 2 only):

The seal content of class 2 compounds shall be not less than 10 percent nor greater than 15 percent of the total volume of the two-layer compound when determined in accordance with 4.5.17.

3.20 Workmanship:

The carbon removing compound ingredients shall be intimately blended and processed in a manner that will produce the high quality compound necessary to meet the requirements of this specification.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for inspection:

Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance: All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Inspection conditions: Unless otherwise specified, all tests shall be performed at room temperature of 21° to 32°C (70° to 90°F). In case of dispute, unless otherwise specified, the test specimens shall be conditioned for a minimum of 3 hours and tested in an atmosphere of 50 ± 4% relative humidity and a temperature of 23° ± 1.1°C (73.4 ± 2°F).

4.2 Classification of inspections:

The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.3).

b. Quality conformance inspection (see 4.4).

4.3 Qualification inspection:

The qualification inspection shall consist of all the examinations and tests (see table I) required under this specification.

4.3.1 Retention of qualification: In order to retain qualification of a product approved for listing on the Qualified Products List (QPL), the manufacturer shall verify by certification to the qualifying activity that the manufacturer's product complies with the requirements of this specification. The time of periodic verification by certification shall be in two-year intervals from the date of original qualification and shall be initiated by the Government. The Government reserves the right to re-examine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specification requirements.

4.3.2 Qualification samples: The qualification sample shall consist of 2 gallons of the carbon removing compound. The samples shall be forwarded to the Commanding Officer, Naval Air Warfare Center, Aircraft Division Warminster, Attention: Code 6064, P. O. Box 5152, Warminster, PA 18974-0591. The samples shall be plainly identified by securely attached durable tags or labels marked with the following information:

Sample for qualification inspection.
CARBON REMOVING COMPOUND (FOR USE IN AGITATED TANK)
Type
Name of manufacturer.
Product code number.
Bath or lot number.
Date of manufacture.
Submitted by (name) (date) for qualification inspection in accordance with the requirements of MIL-C-19853D under authorization of (reference authorizing letter (see 6.3)).

4.3.3 Inspection report and other data: The manufacturer shall submit a report, in duplicate, to accompany the qualification inspection samples. This report shall include the results of the manufacturer's tests, reported quantitatively, where applicable, in the units specified for all of the requirements specified herein, except storage stability. Tests not conducted due to lack of special test facilities or materials shall be so noted in the report. In addition, a statement of the complete formulation of the finished material shall be furnished. Each ingredient shall be identified by a definite chemical name. Trade names alone will not be considered satisfactory. The formulation shall be clearly identified by the manufacturer's formula number. The percent of each ingredient shall also be furnished. In addition, the report shall include toxicological data and formulations required to evaluate the safety of the material for proposed use.

4.4 Quality conformance inspection:

The quality conformance inspection shall consist of examination of filled containers for conformance to the packaging, packing, and marking requirements and examining and testing of the quality conformance samples (see 4.4.1.1) for all the requirements of this specification except storage stability.

4.4.1 Sampling and acceptability criteria:

4.4.1.1 Lot-by-lot sampling: Each case or large container shall be carefully identified by manufacturer's batch or control lot number. Individual samples shall not be mixed. Samples shall be placed in separate airtight and watertight containers, which shall be nearly filled, covered and sealed to prevent atmospheric effects, and shall be labeled completely with information on the lot or batch number, date of sampling, contract number, and specification number.

4.4.1.2 Size of lot: For the purpose of sampling, a lot of carbon removing compound shall consist of a manufacturer's batch. If the material cannot be identified by batch, a lot shall consist of not more than 2,000 gallons of carbon removing compound offered for delivery at one time. A batch is defined as the end product of all raw materials mixed or blended in a single operation within a 24 hour period.

4.4.1.3 Sampling for tests:

4.4.1.3.1 Class 1: A 1-gallon sample of carbon removing compound shall be taken from each of two containers selected at random from each lot.

4.4.1.3.2 Class 2: Two, 1-gallon samples of carbon removing compound shall be taken from the agitating tank just prior to filling shipping containers.

4.4.1.3.3 Instructions: Each sample shall be clearly identified by the product code number as specified in 4.4.1.1 and shall be subjected to all tests in this specification except storage stability. The contractor shall retain in his possession and available for inspection for each lot a certificate to the effect that the material has been processed in the same manner and degree and using the same base ingredients as the approved qualification sample. The tests shall be performed in duplicate, one determination from each sample. Where applicable, the average of the two determinations shall be reported as the test result. The lot shall be unacceptable if any test fails to meet the requirement.

4.4.2 Inspection of the end item: Inspection of the end item shall be as specified in 4.4.2.1 and 4.4.2.2.

4.4.2.1 Visual examination: The sample unit for this examination shall be one filled unit container. The content shall be examined for the defects listed below. The samples for this examination shall be selected at random in accordance with MIL-STD-105, inspection level S-3 and an acceptable quality level (AQL) 1.0 defects per hundred units.

Examine	Defect
Material	Not as specified
Appearance	Presence of foreign matter
	Not homogeneous

4.4.2.2 Net content: The sample unit for this examination shall be one filled container. The sample size shall be as specified in table II. The lot shall be unacceptable if the average net content per container for all units examined is less than specified. The volume shall be corrected to 15.6°C (60°F).

4.4.2.3 Packaging inspection: The sampling and inspection of the preservation-packaging, packing, and marking shall be in accordance with the requirements of MIL-STD-290.

4.5 Test methods:

4.5.1 pH of seal: The pH of the aqueous layer of class 2 carbon removing compounds shall be determined in accordance with ASTM E70.

4.5.2 Specific gravity: The specific gravity of the carbon removing compound, as received, shall be determined by any suitable procedure specified in ANSI/ASTM D891.

4.5.3 Flammability:

4.5.3.1 Preparation of panel: One end of a clean metal panel, 1.0 by 6.0 inch (in.) (25.4 by 152.4 millimeter (mm)), shall be held at an angle of approximately 45 degrees. Class 1 compound and the organic layer of class 2 compound, as received, shall be poured along the upper edge of the panel, allowing the liquid to drain freely over the surface. The liquid wetting the reverse side of panel shall be wiped clean before proceeding with the test.

4.5.3.2 Procedure: A microburner flame, not exceeding a length of 3/16 in. (4.8 mm), shall be passed back and forth along the lower edge of the panel within a 2 second period. This operation shall be repeated three times at 3 second intervals. If the liquid ignites, the burner shall be removed and observation made to determine whether the liquid continues to burn. If the liquid continues to burn, the duration of burning shall be noted.

4.5.4 Volatility: One Petri dish, diameter of 9 centimeters (cm) and depth of 1.5 cm, shall be placed on each pan of a two pan beam balance. Sufficient carbon removing compound shall be added to cover the bottom of one of the dishes to a depth of approximately 1.0 cm. The control formula product, before water is added, shall be carefully poured into the other dish until the dishes are counter-balanced. The balance with the Petri dish on the pans shall be exposed for 30 minutes in a draft-free atmosphere having a temperature of 24° ± 3°C (75° ± 5°F). At the end of the exposure period, the comparative loss in weights shall be observed.

4.5.5 Separation of layers (class 1 only): Seventy-five milliliters (ml) of the carbon removing compound, as received, shall be placed in each of three 100 ml glass stoppered graduated cylinders. 25 ml of 12 1/2 grain per gallon hard water, prepared as described in 4.5.14.1, shall be added to one of the cylinders. 25 ml of distilled water shall be added to the second cylinder, 25 ml of a 1.0 percent by weight sodium chromate solution shall be added to the third cylinder. Each cylinder shall be stoppered and shaken vigorously for 30 seconds. The mixture shall then be allowed to stand undisturbed for two hours. At the end of two hours the volume of the separated upper layers shall be noted as well as the formation of clots, curds, or precipitates.

4.5.6 Phenol content (type II only):

4.5.6.1 Qualification test:

4.5.6.1.1 Apparatus: A liquid chromatography apparatus capable of quantitative separation of phenol and cresol shall be used. One such apparatus is the Hewlett-Packard Model 1084-A equipped with a reverse phase column (RP-8-.64x25 cm), an internal UV detector (254 mm), an automatic variable injector, an integrating recorder, and optionally, an external variable absorbency detector. Any apparatus that is capable of quantitatively discerning phenol and cresol may be used.

4.5.6.1.2 Procedure: A weighed portion of type II compound shall be diluted in a methyl alcohol (liquid chromatography grade): demineralized water (4:1) solution to yield an approximate 4.5 to 5.0 mg/ml solution. 20 microliters of the solution shall be injected into the apparatus in operation under the following conditions:

Flow rate	1.0 ml/min
Column Temp.	40°C (104°F)
Pressure	140 bar
Recorder chart speed	0.5 cm/min
Attenuation	7 (equivalent to 0.0128 A-U/cm)

Under these conditions, phenol and cresol are eluted at 14.06 and 17.61 minutes respectively, from time of injection. The percent of weight totals shall not exceed those specified in 3.9.

4.5.6.1.3 Column purging: Prior to next sample injection, the column shall be purged as follows:

Demineralized water for 4.9 minutes, then
30% methyl alcohol for 15 minutes, then
95% methyl alcohol for 5 minutes, then
demineralized water for 5 minutes.

4.5.6.2 Quality conformance test: The manufacturer shall submit a certificate of compliance for the phenol content requirement. The certificate shall be signed by an authorized representative of the manufacturer and shall state that the compound is in conformance with 3.9.

4.5.7 Storage stability: One gallon of the carbon removing compound, as received, shall be placed in a glass container. Add a clean steel strip conforming to MIL-S-7952. The strip shall have been polished with 320 or 400A silicon carbide paper and cleaned as specified in 4.5.11.1. The surface area of both sides of the steel strip shall be equivalent to 100 in^2 (650 cm^2). The closed container shall be stored in the dark for six months at 24° ± 3°C (75° ± 5°F) following which the carbon removing compound shall be examined for sediment, curd, or scum in the solvent layer or at the interface for other evidence of deterioration. If the carbon removing compound proves satisfactory, it shall be subjected to the carbon removal test (see 4.5.10).

4.5.8 Samples for test:

4.5.8.1 Test sample: Add sufficient 1% sodium chromate solution to the class 1 carbon removing compound, as received, to provide 15 percent of the sample. Mix the solution thoroughly. Cover the container and allow the solution to stand for two hours. Class 2 compounds shall be tested as received.

4.5.8.2 Control formula product: The control formula product shall be prepared in strict conformance with the formula specified in table III.

4.5.9 Oil removal: A 0.020 by 3.0 by 6.0 in. (0.51 by 76.2 by 152.4 mm) anodized aluminum alloy panel shall be coated with grade 1065 or 1100 oil conforming to MIL-L-6082 and completely immersed in the lower layer of the test sample (see 4.5.8.1). Another panel shall be similarly immersed in the lower layer of the control formula product. After 30 minutes, the panels shall be removed and rinsed thoroughly under tap water at 25°C (77°F). The effectiveness of the oil removal exhibited by the test sample shall be compared to that shown by the control formula product.

4.5.10 Carbon removal: An area of 2 by 2 in. (51 by 51 mm) on one end of a titanium test panel (dimension of 0.040 by 2.0 by 6.0 in. (1.0 by 51 by 152 mm) conforming to MIL-T-9046 shall be abraded on the long dimension with 280 grit carborundum paper or cloth. The panel shall be solvent wiped with methyl ethyl ketone on bleached cheesecloth. The panel shall be dried, then weighed to the nearest 0.1 g (W_1). The abraded area shall be coated with SAE 80 motor oil and positioned vertically on absorbent paper for one minute. The panel shall be baked in a muffle furnace at 600° ± 20°F (316° ± 10°C) for 20 minutes minimum, then removed, cooled to ambient, and brushed with a stiff nylon bristle brush to remove any particulates. The panel shall be reweighed (W_2). The panel shall be immersed in the remover undergoing test for one hour, then rinsed in hot tap water while scrubbing with the stiff nylon bristle brush. Following this, the panel shall be rinsed in distilled water, dried for one hour at 212° ± 2°F (100° ± 1°C), cooled to ambient, and reweighed (W_3). Carbon removal efficiency shall be calculated as follows:

Carbon removal efficiency (%) = $((W_3 - W_1)/(W_2 - W_1)) \times 100$

4.5.11 Corrosiveness:

4.5.11.1 Preparation of test panels: Test panels, 1.0 by 6.0 by 0.05 in. (25.4 by 152 by 1.3 mm), shall be made from each of the metals specified in table IV. The panels shall be cleaned with CP acetone using a swab of absorbent cotton. The panels shall then be wiped with a paper towel, dipped in absolute ethyl alcohol, and again wiped with a paper towel.

4.5.11.2 Procedure: One each of the cleaned panels prepared as specified in 4.5.11.1 shall be placed in a tall form beaker in such a way that no two panels touch each other. Add sufficient test sample (see 4.5.8.1) to completely cover the panels so that the top of the panels are beneath the upper layer and totally submerged in the bottom layer. Following an immersion time of 18 hours at room temperature, the panels shall be removed, rinsed with tap water, distilled water, and then with absolute alcohol. The panels shall then be examined for evidence of corrosion, oxidation, or discoloration.

4.5.12 RInsing properties: A 1.0 by 6.0 by 0.05 in (25.4 by 152 by 1.3 mm) anodized aluminum panel shall be completely immersed in the lower layer of the test sample (see 4.5.8.1) for 5 minutes. The panel shall be removed and thoroughly rinsed in a beaker containing water at 82 °C (180 °F). After removing the panel, it shall be examined immediately for the presence of water breaks, a sticky film, soap, lime, curd, or physical dirt. The above procedure shall be repeated using kerosene at room temperature as the rinsing agent.

4.5.13 Compatibility (Type I only): Thoroughly shake 100 ml of the test sample (see 4.5.8.1) and 100 ml of the control formula product. Pour the two into a 250 ml glass stoppered graduated cylinder. The mixture shall be thoroughly shaken and allowed to remain undisturbed for one hour. It shall be noted if the volume of the separated layers is equivalent to the sum of the volumes of the respective layers of the components. If the mixture separates satisfactorily, a sufficient volume of the same mixture shall be prepared to ascertain the effectiveness of the mixture as a carbon remover by subjecting it to test described in 4.5.10.

4.5.14 Emulsification:

4.5.14.1 Preparation of synthetic 12-1/2 grain hard water: Dissolve 250 milligrams (mg) of USP grade calcium acetate and 176 mg of USP magnesium sulfate in one liter of distilled water which has been boiled and cooled immediately prior to use.

4.5.14.2 Procedure: 10 ml of the lower layer of the test sample shall be placed in a glass stoppered graduated cylinder and 90 ml of the hard water added. The cylinder shall be closed and shaken vigorously for 30 seconds. The emulsion shall then be allowed to stand for 4 hours. It shall be noted if there is any sediment, curd, scum, or clear solvent, or if creaming has resulted.

4.5.15 Cold stability: Approximately 100 ml of the thoroughly shaken test sample (see 4.5.8.1) shall be poured into a suitable size test tube and cooled to -18° ± 5°C (0° ± 9°F). The remover shall then be allowed to return to room temperature. The test tube and contents shall be inverted 10 times and then allowed to stand undisturbed for 1 hour. It shall then be noted if the test sample returns to its original condition.

4.5.16 Temperature cycle (stability):

4.5.16.1 Preparation of test sample: A 5 ounce (oz) portion of well shaken test sample (see 4.5.8.1) shall be poured into each of two chemically clean 12 oz pressure resistant, clear glass bottles which shall be 9 1/2 in. (241 mm) high and 2 1/2 in. (63.5 mm) outside diameter with shoulders 5 in. (127 mm) from the base. One bottle shall be capped and stored in the dark for at least 6 days at room temperature. A strip of steel, 0.020 by 1/2 by 6 in. (0.51 by 13 by 152 mm), conforming to MIL-S-7952, shall be polished with 320 or 400A silicon carbide paper to remove surface contamination. The steel strip shall then be cleaned as specified in 4.5.11.1. The steel strip shall then be partially immersed in the test sample contained in the other test bottle and the bottle shall be capped.

4.5.16.2 Procedure: The capped bottle containing the steel strip shall be placed in an oil bath and heated at a uniform rate to a temperature of 60° ± 2°C (140° ± 4°F) in 5 hours. This temperature shall be maintained for 3 hours. No heat shall be applied to the bath overnight with the bottle being allowed to return to room temperature while in the bath. The above heating and cooling cycle shall be repeated for 5 days. On the morning of the sixth day, the bottle shall be removed from the bath, uncapped, and the steel strip carefully withdrawn from the test sample. The strip shall be rinsed first with tap water and then with distilled water and dried. The portion of the steel strip which had been immersed in the test sample shall be examined for evidence of pitting, corrosion, and uneven darkening. The part of the strip above the surface of the test sample shall be examined for evidence of corrosion. The test sample which has undergone testing with the steel strip shall be compared to the test sample in the bottle which has been stored in a dark place. Any difference in appearance shall be noted. The opened bottle shall be capped and the two bottles shall be thoroughly shaken for 1 minute, allowed to stand undisturbed for 2 hours at room temperature, then examined. If considered satisfactory, the compound which had been heated shall also be tested for carbon removal capability in accordance with 4.5.10.

4.5.17 Seal content (class 2 only): One hundred ml of thoroughly shaken class 2 compound shall be placed in a 100 ml graduated cylinder equipped with a ground glass stopper. The cylinder with stopper in place shall stand undisturbed overnight. The volume of the upper and lower layers shall be determined. The percent by volume of the seal (upper layer) shall be calculated.

5. PACKAGING:

5.1 Packaging, packing, and marking:

The carbon removing compounds shall be packaged, packed, and marked in accordance with the provisions of MIL-STD-290. Unless otherwise specified by the acquiring activity (see 6.2e), the carbon removing compound shall be packed in 5-gallon containers and level A packaging and packing shall be employed.

5.1.1 Label: In addition to any marking required by MIL-STD-290 or the contract or order, each container shall have a label marked with the following precautions.

PRECAUTIONS

1. Carbon removing compound contained herein is harmful to skin and eyes and contains the following toxic ingredients (list ingredients):
2. Avoid contact of carbon removing compound with rubber, asphaltic base floors, and walkways.
3. Avoid use in enclosed and unventilated areas.
4. Store carbon remover indoors or in an area well-protected against weather conditions.
5. Store below 27°C (80°F)
6. Discard any bulging or distorted containers.
7. Content may be under pressure in storage. Open cautiously to avoid injury.

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 carbon removing compounds covered by this specification are intended for removing or loosening carbon from components of internal combustion engines and compressor sections of jet engines by means of immersion at room temperature in agitated tanks. These compounds may be used effectively in conjunction with ultrasonic cleaning devices. A 1.0 percent sodium chromate solution should be added to class 1 products to retard evaporation.

6.1.1 Type I: The use of type I should be limited to activities that are equipped for the disposal of phenols.

6.1.2 Type II: Type II is designed for use at all activities.

6.2 Acquisition requirements:

Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Type and class desired (see 1.2).
c. Quantity of carbon removing compound in terms of U.S. Gallons at 15.6°C (60°F).
d. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
e. Type and capacity of containers in which carbon removing compound is to be furnished (see 5.1).
f. Applicable levels of packaging and packing, if not as specified in 5.1 (see 6.2.1).

6.2.1 Options: In the preparation of contracts or orders, it must be noted that various options, choices and alternatives, as indicated in MIL-STD-290, may be exercised in the preparation of this carbon removing compound for delivery.