

INCH-POUND  
MIL-C-85054B(AS)  
5 November 1993  
SUPERSEDING  
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## MILITARY SPECIFICATION

### CORROSION PREVENTIVE COMPOUND, WATER DISPLACING, CLEAR (AMLGUARD)

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

#### 1. SCOPE

1.1 Scope. This specification covers a clear water displacing corrosion preventive compound which may be applied from gas pressurized containers, brushing or spraying (see 6.1). The compound furnished under this specification has been reformulated and the propellant for the pressurized container has been changed to eliminate the use of fully halogenated chlorofluorocarbons (CFC's).

Classification. The compound shall be classified by types and classes as follows (see 6.2b).

##### 1.2.1 Types.

- Type I - Pressurized spray container (for spray application)
- Type II - Bulk form

##### 1.2.2 Class. Type I shall be furnished in the following classes:

- Class 134A - Hydrofluorocarbon (HFC) propellant
- Class CO<sub>2</sub> - Carbon dioxide (CO<sub>2</sub>) propellant

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Warfare Center Aircraft Division Lakehurst, Systems Requirements Department (Code SR3), Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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AMSC N/A

FSC 8030

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## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2c).

## SPECIFICATIONS

## FEDERAL

A-A-51126	-	Anodes, Cadmium
QQ-A-250/4	-	Aluminum Alloy 2024, Plate and Sheet
TT-I-735	-	Isopropyl Alcohol
TT-N-95	-	Naptha, Aliphatic
TT-T-291	-	Thinner, Paint, Mineral Spirits, Regular and Odorless
PPP-C-96	-	Cans, Metal, 28 Gage and Lighter

## MILITARY

MIL-S-7952	-	Steel, Sheet and Strip, Uncoated, Carbon (1020 and 1025) (Aircraft Quality)
MIL-A-18001	-	Anodes, Corrosion Preventive, Zinc; Slab Disc and Rod Shaped
MIL-S-22805	-	Spray Kit, Self Pressurized

## STANDARDS

## FEDERAL

FED-STD-313	-	Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
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## MILITARY

MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-290	-	Packaging of Petroleum and Related Products

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(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issue shall be those in effect on the date of the solicitation.

## DEPARTMENT OF TRANSPORTATION

## CODE OF FEDERAL REGULATIONS

49 CFR 171-190	-	Department of Transportation Rules and Regulations for the Transportation of Explosives and Other Dangerous Articles
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(Application for copies should be addressed to the Superintendent of Documents, US Government Print Office, Washington, DC 20402.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2c).

## SOCIETY OF AUTOMOTIVE ENGINEERS, INC.

AMS 4375	-	Magnesium Alloy Sheet and Plate 3.0Al-1.0Zn (AZ 31 B-O) Annealed and Recrystallized
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(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z129.1	-	Hazardous Industrial Chemicals Precautionary Labeling
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(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

## AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM B36	-	Standard Specification for Brass Plate, Sheet, Strip and Rolled Bar
ASTM B152	-	Standard Specification for Copper Sheet, Strip, Plate and Rolled Bar
ASTM D740	-	Standard Specification for Methyl Ethyl Ketone

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ASTM D1719

- Standard Specification for Isobutyl Alcohol

(Application for copies should be addressed to the American Society of Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. The compound furnished under this specification shall be subjected to first article inspection (see 6.4) in accordance with 4.3.

#### 3.2 Materials.

3.2.1 Contents, type I container. The contents of type I containers shall consist of 11 ounces of the corrosion preventive compound formulated as listed in table I and sufficient propellant to completely exhaust, by spraying, the entire contents of the container in a satisfactory manner. (Paragraph 6.5 references table VII which lists a source of materials that meets the formulation requirements of this specification.)

3.2.1.1 Class CO<sub>2</sub> propellant. The propellant for Class CO<sub>2</sub> shall consist of Carbon dioxide. The propellant shall contain no chlorinated solvents, hydrochlorofluorocarbons, or fully halogenated chlorofluorocarbons.

3.2.1.2 Class 134A propellant. The propellant for Class 134A shall consist of hydrofluorocarbons or a blend containing hydrofluorocarbons. Class 134A propellant blends shall contain no chlorinated solvents, Hydrochlorofluorocarbons, or fully halogenated chlorofluorocarbons.

3.2.2 Contents, type II container. The contents of each quart size container of type II shall consist of the corrosion preventive compound formulated as listed in table I. (Paragraph 6.5 references table VII which lists a source of materials that meets the formulation requirements of this specification.)

3.2.3 Compound ingredients. The ingredients used in the manufacture of the compound shall conform to the applicable specification or be chemically identical to spectrums listed in table I. The compound shall be homogeneous, free from grit, abrasives, water, chlorides and other impurities.

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TABLE I. Compound ingredients.

Ingredients	Specification or infrared spectrum	Percent by weight
Isopropanol	TT-I-735	17.0
Barium petroleum sulfonate	Figure 1	2.2
Alkyl ammonium organic phosphate	Figure 2	3.5
Silicone resin	Figure 3	17.2
Silicone alkyd resin	Figure 4	8.6
Acrylic resin	Figure 5	17.3
Isobutyl alcohol	ASTM D1719	8.6
VM&P Naphtha	Figure 6	17.0
Propylene glycol monomethylether	Figure 7	8.6
Solvent blue 36 1/		2.5 mg/100 ml

1/ Oil blue A - E. I. Dupont de Nemours and Company or equal.

3.2.4 Color. The blue dye is added to the corrosion preventive compound to give a bluish hue.

3.2.5 Material Safety Data Sheets. A Material Safety Data Sheet shall be prepared and submitted in accordance with FED-STD-313. Questions pertinent to the effect of the corrosion preventive on the health of personnel when used for its intended purpose shall be referred by the acquiring activity to the appropriate medical service who will act as adviser to the acquiring activity (see 3.3, and 4.3.1).

3.3 Toxicological data. The supplier shall furnish the toxicological data and the safety requirements of the material used (see 4.3.2.1) to the Commanding Officer, Naval Air Warfare Center Aircraft Division Warminster, P. O. Box 5152, Code 6062, Warminster, PA 18974-0591.

3.4 Properties. The corrosion preventive compound, when tested as specified in Section 4, shall conform to the requirements of table II.

3.4.1 Appearance. The applied compound shall form a uniform transparent film that appears light blue when applied on a white surface.

3.5 Pressurized containers. The pressurized container shall meet the following additional requirements:

3.5.1 Leakage. The pressurized cans shall not leak or become distorted when tested as specified in 4.8.7.1.

3.5.2 Fill. Pressurized cans for Class CO<sub>2</sub> shall contain 11 ounces and Class 134A shall contain 14 ounces each by weight of the compound when tested as specified in 4.8.7.2.

3.5.3 Performance of pressurized containers. Compound packaged in pressurized containers shall spray satisfactorily, adhere to the panel and shall not foam excessively or "sag" when tested as specified in 4.8.7.3.

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TABLE II. Properties.

Property	Requirement	Test Procedure
Dryness	0.0100g (max)	4.8.1
Synthetic sea water-sulfurous acid spray	No visible corrosion on carbon steel after 12 cycles	4.8.2
Synthetic sea water displacement	No visible corrosion	4.8.3
Abrasives	None present	4.8.4
Sprayability	Sprayable	4.8.5
Corrosivity	No visible pitting, etching, or dark discoloration. No weight change (mg/cm <sup>2</sup> ) greater than 0.5 for magnesium, cadmium and zinc nor greater than 0.2 for aluminum, copper and brass.	4.8.6
Pressurized container leakage	No leakage or distortion	4.8.7

3.6 Workmanship. The workmanship shall be in accordance with the best commercial practice covering this type of material. The ingredients shall be uniformly processed to produce the quality of product established by this specification. The finished product shall be clean and uniform and free of any defects that might impair its use, such as sediment, metal or other foreign particles in the pressurized containers, eduction tubes and valve assemblies. The exterior orifice of the pressurized containers shall be symmetrical and free of ragged edges and, if drilled, shall be symmetrical and in direct alignment with angle of discharge.

3.7 Additional unit Pack markings. In addition to those markings required in Section 5, unit pack markings shall contain use, mixing, handling and precautionary markings as well as noting any protective clothing and equipment required.

#### 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

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any of the inspections set forth in this 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.

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

- a. First article inspection (4.3).
- b. Quality conformance inspection (4.4).

4.3 First article inspection. First article inspection shall consist of the examinations and tests specified in table III.

TABLE III. First article inspection.

Inspection	Method	Requirement
Visual, Color	---	3.2.4
Dryness	4.8.1	3.4
Synthetic sea water sulfurous acid spray	4.8.2	3.4
Synthetic sea water displacement	4.8.3	3.4
Abrasives	4.8.4	3.4
Sprayability	4.8.5	3.4
Corrosivity	4.8.6	3.4
Pressurized container	4.8.7	3.5
Specialized tests Leakage	4.8.7.1	3.5.1
Fill	4.8.7.2	3.5.2
Performance	4.8.7.3	3.5.3



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**4.3.1 First article test samples.** Samples for first article inspection shall consist of at least five 16 ounce (fluid ounces) gas pressurized cans of the compound, five quarts of the compound exclusive of propellants, and three ounces of each ingredient to determine conformance to table I. Samples shall be selected at random from materials which have been manufactured or used for filling the contract. (Pressurized containers shall not be required when only quarts are purchased.) Samples shall be forwarded to and tested at a laboratory approved by the Naval Air Warfare Center Aircraft Division Warminster for conducting first article inspection tests. Information on approved test laboratories may be obtained from the Commanding Officer, Naval Air Warfare Center Aircraft Division Warminster, P.O. Box 5152, Code 6062, Warminster, PA 18974-0591. Samples shall be plainly identified by securely attached durable tags marked with the following information:

CORROSION PREVENTIVE COMPOUND, WATER  
DISPLACING, CLEAR

Samples of material subjected to first article  
Name of manufacturer (plant in which material is  
manufactured)

Manufacturer's designation

Date of manufacture

Submitted by (name) (date) for contract no. \_\_\_\_

The manufacturer shall submit a copy of test results with the samples showing conformance with all the requirements of this specification and the applicable requirements of the Department of Transportation. The manufacturer shall submit a certified statement specifically identifying each ingredient in the compound by chemical name, source and percentage of weight. The manufacturer shall include data on the percent by weight and the composition of the propellant furnished in type I containers. One copy of the Material Safety Data Sheet shall accompany the samples being submitted for test (see 3.2.5, 3.3 and 6.2).

**4.3.2 Data to accompany test samples.** Two copies of the manufacturer's test report shall be submitted simultaneously with the samples of 4.3.1. The report shall contain numerical test data, where applicable, showing that the material submitted for the first article inspection conforms to the requirements of this specification. In addition, two copies of the manufacturer's instructions for the application of the compound shall accompany the report.

**4.3.2.1 Submission of material safety data sheets.** The contractor shall furnish to the contracting activity the toxicological data and formulations required to evaluate the safety of the material for the proposed use through the submission of the Material Safety Data Sheet detailed in FED-STD-313 (see 3.3.1).

**4.3.3 First article sample and inspection for a subsequent contract.** If a contractor has previously furnished the compound in accordance with the requirements of this specification and his product has been found to be satisfactory, the requirement for a first article sample and its submittal for any subsequent contract or order may be waived at the discretion of the Naval Air Warfare Center Aircraft Division Warminster.

**4.4 Quality conformance inspection.** Quality conformance inspection shall consist of the tests and examinations in Table IV.



4.4.1 Inspection lot. An inspection lot shall consist of all material produced during a single batch operation and offered for acceptance at one time.

4.4.2 Certification. The manufacturer shall certify that there has been no formulation or process change from that which resulted in the production of the first article inspection sample. Each ingredient material shall be identified with the name of its manufacturer and that manufacturer's trade name and formula number.

TABLE IV. Quality conformance inspection.

Inspection	Method	Sample size MIL-STD-105	Acceptance Criteria
Color	----	Inspection level 1	No defects
Packaging and marking	4.4.3.2.1	Inspection level S-2	AQL 2.5 percent
Palletization	4.4.3.2.2	Inspection level S-1	AQL 4.0 percent
Dryness	4.8.1	Inspection level S-3	No defects
Synthetic sea water displacement	4.8.2	Inspection level S-3	No defects
Sprayability	4.8.5	Inspection level S-3	No defects
Fill	4.8.7.2	Inspection level S-3	No defects

4.4.3 Sampling and inspections. Sampling for inspection shall be in accordance with MIL-STD-105, except where otherwise indicated herein.

4.4.3.1 Sampling for visual inspection. A random sample of filled containers shall be selected from each inspection lot in accordance with MIL-STD-105 at Inspection Level I and an AQL of 2.5 to verify conformance to all requirements of this specification regarding material (3.2).

4.4.3.2 Packaging inspection.

4.4.3.2.1 Examination of packaging and marking. An examination shall be made to determine that packaging, packing and marking comply with the requirements of Section 5 of this specification. Defects shall be scored in accordance with the table V. The sample unit for this examination shall be one shipping container fully prepared for delivery except that it shall not be palletized and need not be sealed. Shipping containers fully prepared for delivery that have not been palletized shall be examined for defects of

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closure. The lot size shall be the number of shipping containers in the end item inspection lot. The samples for this examination shall be selected at random in accordance with MIL-STD-105, inspection level S-2 and acceptable quality level (AQL) 2.5.

4.4.3.2.2 Examination for palletization. An examination shall be made to determine that palletization complies with the requirements of Section 5 of this specification. Defects shall be scored in accordance with table VI. The sample unit shall be one palletized unit load fully prepared for delivery. The lot size shall be the number of palletized unit loads in the end item inspection lot. The samples for this examination shall be selected at random in accordance with MIL-STD-105, inspection level S-1 and acceptable quality level (AQL) 4.0.

TABLE V. List of defects for packaging.

Examine	Defect
Packaging	Container not as specified, closures not accomplished by specified or required methods or materials. Leakage or seepage of contents. Non-conforming component, component missing, damaged or otherwise defective. Bulged or distorted container.
Markings	Data, including directions for use, omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements.

TABLE VI. List of defects for palletization.

Examine	Defect
Finished dimension	Length, width or height exceeds specified maximum requirement.
Palletization	Not as specified. Pallet pattern not as specified. Interlocking of loads not as specified. Load not bonded with required straps as specified.
Weight	Exceeds maximum load limits.
Marking	Omitted, incorrect, illegible, or improper size, location, sequence or method of application.

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4.4.3.3 Samples for test. Samples shall be selected in accordance with MIL-STD-105, Inspection Level S-3. The sample unit shall be one 11 (plus propellant) ounce gas pressurized container and one quart of the compound from which these samples were filled, exclusive of the propellant. The samples selected shall be examined to the applicable requirements of Table IV. There shall be no defects.

4.5 Test conditions. In general, physical tests contained in this specification shall be made under controlled atmospheric conditions having a relative humidity of  $50 \pm 10$  percent and a temperature range of from 68° to 78°F. Waiver of this requirement may be permitted where proper conditioning facilities are not available for control testing. However, for referee purposes, the specified tests shall be made upon the compound under the specified atmospheric conditions.

4.6 Test disks and panels required. Panels, 2 by 4 by 0.125 inch, and disks, 2.125 inch diameter by 0.063 inch thick, shall be prepared from carbon steel conforming to FS 1020 of MIL-S-7952. The panels and disks shall have all sharp edges and burrs removed and shall have all holes chamfered to prevent injury in handling. The panels and disks shall be surface ground and hand polished with a 240 grit silicon carbide or aluminum oxide cloth or paper to produce a surface finish of 10 to 20 microinches (rms). Iron oxide or wet or dry papers or cloths shall not be used. The number of disks and panels required for individual tests shall be as follows:

<u>Test</u>	<u>Disks</u>	<u>Panels</u>
4.8.1	3	0
4.8.2	3	0
4.8.3	0	3
4.8.7.3	0	3

#### 4.7 Specimen preparation for tests.

4.7.1 Cleaning of test panels and disks. The utensils and cloths used in the cleaning of test panels and disks shall be clean and free of contamination. Solvents shall be fresh and renewed frequently. In all stages of treatment the handling of panels and disks with the bare hands shall be avoided. The panels and disks shall not be permitted to contact contaminated surfaces during the cleaning procedure and shall be handled by tongs and hooks during and after dipping. After polishing, they shall be cleaned with a surgical gauze swab in a beaker of hot mineral spirits conforming to grade I of TT-T-291. Cleaning and scrubbing shall be followed by dipping in (1) a second container of hot mineral spirits, (2) boiling 95 percent methanol and (3) boiling absolute methanol. The panels and disks shall be allowed to dry and shall then be stored in a desiccator until ready for use. If storage of more than 24 hours occurs, the surface preparation shall be repeated starting with the hand polishing.

4.7.2 Coating of the test disks. Application of the compound to the test disks shall be carried out under the atmospheric conditions of 4.6. The

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disks shall be held at an angle of 30° from the horizontal. A coating of the compound shall be sprayed on the disks from a pressurized container or a container conforming to MIL-S-22805 held 12 inches away. After ten minutes a second coating is sprayed on. The combined thickness of the two coats after drying shall be 1.2 - 1.5 mils. After application, they shall be conditioned for 24 hours under the atmospheric conditions of 4.6 in a draft, dust and fume free atmosphere.

#### 4.8 Test methods.

4.8.1 Dryness. Three test disks prepared as specified in 4.6 and 4.7 shall be coated using compound conditioned as in 4.8.2.1.2 and allowed to hang in a vertical position for two hours. They shall then be weighed and completely immersed vertically in talcum powder and withdrawn immediately. They shall then be reweighed to the nearest 0.0001 gram. The average change in weight shall be recorded. This procedure shall be repeated with test panels which have not been coated. These shall be used as controls. The average weight increase of the coated panels as compared with the weight increase of the uncoated panels shall be the measure of dryness.

#### 4.8.2 Synthetic sea water-sulfurous acid spray test.

##### 4.8.2.1 Materials.

4.8.2.1.1 Test solution. The spray test solution shall consist of a solution made by adding 2 milliliters of the sulfurous acid (6.4% assay as  $\text{SO}_2$ ) to each liter of synthetic sea water. The pH shall be measured and shall be between 3.3 and 3.5. If it is not, additional acid or synthetic sea water must be added to adjust the pH to this range. The synthetic sea water shall be prepared by adding 50 grams of sodium chloride ( $\text{NaCl}$ ); 22 grams of magnesium chloride ( $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ ), 3.2 grams of calcium chloride ( $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$ ) and 8.0 grams of sodium sulfate ( $\text{Na}_2\text{SO}_4$ ) to a liter of distilled or demineralized water. One liter of fresh test solution shall be used for each cycle.

4.8.2.1.2 Conditioning of compound sample. A container of the compound shall be exposed to the following cycle four times without physical disturbance of the compound:

Eight hours at  $130^\circ \pm 2^\circ\text{F}$   
Sixteen hours at  $-40^\circ \pm 2^\circ\text{F}$

At the end of this cyclic exposure the contents of the sealed container shall be allowed to remain at  $75^\circ \pm 5^\circ\text{F}$  for 24 hours.

4.8.2.1.3 Apparatus. The apparatus used in this test should conform to figures 6 through 9.

4.8.2.1.4 Procedure. Test disks prepared as specified in 4.6 and 4.7 shall be coated using compound conditioned as in 4.8.2.1.2, allowed to dry overnight in a horizontal position on a level surface and then placed in the disk holders. The disk holders shall be placed in the turntable and the turntable started. The air, regulated to a flow of one  $\pm 0.1$  cubic foot per minute, shall be supplied to the nozzle to effect the spray. The spray shall continue for one hour at which time the spray is shut off, and the disk holders containing the test disks shall be moved to a position away from the

spray apparatus where they can air dry for three hours. The combination of one hour spray and three hours of drying shall be defined as one cycle. At the completion of the twelve cycles, the disks shall be cleaned in mineral spirits conforming to grade 1 of TT-T-291 after which they shall be examined for any visible corrosion, pitting or staining under 10X magnification.

#### 4.8.3 Synthetic sea water displacement.

4.8.3.1 Procedure. Panels prepared as in 4.6 and 4.7.1 shall be placed so that one 2-inch end shall be raised one inch above a horizontal surface. The panels shall then be sprayed with the synthetic sea water of 4.8.2.1.1 so that the entire upper surface of the specimen is covered with tiny droplets. Within one minute after spraying, one milliliter of the test compound shall be poured along the upper two-inch edge of the panels and allowed to run slowly down the specimen so as to completely cover the test panel. After another minute, a second milliliter of the test compound shall be poured and allowed to run down the panels in a like manner. After waiting an additional minute, the panels shall be picked up and held in a vertical position for one minute and shall then be placed flat (test side up) above distilled water at 72°F in a closed desiccator. After 4 hours they shall be removed and cleaned with mineral spirits, and then evaluated for presence of visible corrosion.

4.8.4 Abrasives. Mix approximately 75 milliliters of the compound with 200 milliliters of xylene and stir until all soluble matter is in solution. Allow to stand for one hour at room temperature to permit any insoluble matter to settle. Carefully decant, wash the residue with 100 milliliters of xylene and again carefully decant. Repeat the procedure with successively smaller portions of xylene until the solution is practically colorless. The residue after the last decantation shall be rubbed between two pieces of flat clean glass plate. The appearance of scratches on the glass plate shall be considered evidence of the presence of abrasive material.

#### 4.8.5 Sprayability.

4.8.5.1 Pressurized container. A filled pressurized container shall be cooled to 0°F and held at that temperature for 3 hours then stored at 40°F for 20 hours. Immediately after conditioning, shake vigorously for 15 seconds and spray the material for 30 seconds. The material shall be considered as having passed the test if it can be satisfactorily sprayed.

#### 4.8.6 Corrosivity.

4.8.6.1 Preparation of specimens. Specimens of the following metals shall be used in this test:

Magnesium	AMS 4375
Cadmium	A-A-51126
Zinc	MIL-A-18001
Aluminum	QQ-A-250/4
Copper	ASTM B152
Brass	ASTM B36

Suggested specimen size is 3 by 0.5 by 0.063 inches.

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4.8.6.2 Test procedure. Three specimens of each of the above metals shall be polished to remove pits, burrs and irregularities from all faces and edges. The panels shall be finished and cleaned as specified in 4.7 and 4.7.4. After weighing, the specimens shall be coated as in 4.7.2. After a one hour drying period, the specimens shall be placed in a chamber maintained at  $130^{\circ} \pm 2^{\circ}\text{F}$  and 75% R.H. for seven days. Upon completion, the coating and any loose corrosion products shall be removed by cleaning in acetone. Reweigh the specimens and calculate the weight loss or gain in milligrams per square centimeter.

#### 4.8.7 Specialized tests for pressurized containers.

4.8.7.1 Leakage. The pressurized container shall be completely submerged for five minutes in water maintained at a minimum of  $130^{\circ} \pm 2^{\circ}\text{F}$  during which it shall be observed for the emission of bubbles. Distortion of the container or the emission of bubbles from any part of the container shall be considered evidence of leakage.

4.8.7.2 Fill. A sample can shall be weighed and then shall be sprayed at three minute periods with one minute intervals until the can is exhausted. The container shall be reweighed, and the net difference determined. The net weight of the compound shall be computed by multiplying the net difference by the fraction of the contents which has been identified in 4.3.1 as compound.

4.8.7.3 Performance of pressurized containers. Panels as described in 4.6 shall be used. A panel shall be supported such that the longer dimension forms a  $45^{\circ}$  angle with the horizontal. Corrosion preventive compound packaged in accordance with 5.1 shall be sprayed on the panel from a distance of 12 inches. The panel shall be examined for uniformity, volume and pattern of spray, foaming and adherence to the substrate. After a 10 second pause the same panel shall be resprayed and examined for adhesion and sagging. After a five second pause the same panel shall be resprayed again and likewise examined.

### 5. PACKAGING

5.1 Preservation and unit packing. Preservation and unit packing shall be level B or commercial as specified in the contract in accordance with MIL-STD-290 (see 6.2g). Pressurized containers shall conform to type IX, class 2 of PPP-C-96 with a valve opening diameter suitable for the valve necessary for proper dispensing. Nonpressurized containers shall conform to PPP-C-96. Neither the container nor any component thereof (closure, lining, etc.), shall interact with or alter the contents in any way so as to adversely affect their purity or quality.

5.2 Packing. Packing shall be level B or commercial in accordance with MIL-STD-290 as specified in the contract or order (see 6.2f).

5.3 Marking. Marking of the containers shall be in accordance with MIL-STD-290, except as specified herein (see 6.2h). Marking shall be legible, shall be accomplished by lithographing or silkscreen process and shall be white on an orange label or as specified in the contract. Paper coated labels on pressurized containers are not acceptable; any special marking specified in the contract or order shall also be included. In addition, the following information shall be included on each gas pressurized container and quart container as applicable (when not already required by MIL-STD-290 or the contract or order):



Front Face:

(Stock no.)  
CORROSION PREVENTIVE COMPOUND,  
WATER DISPLACING, CLEAR (AMLGUARD)  
MIL-C-85054B(AS)  
Lot \_\_\_\_\_ Date mfg \_\_\_\_\_  
(Contract no.)  
(Manufacturer's name)  
(Manufacturer's address)  
(Manufacturer's product no.)  
(Net wt) (Includes \_\_\_\_\_ % by weight of propellant)

Important: For best results follow instructions on reverse side of container.

Rear face:

USES

This material will displace salt water and moisture leaving a clear, corrosion preventive film. It is intended for use on areas which are unpainted metal, where the paint has cracked or been damaged such as: around fasteners, seams, access panels, etc. It is not intended for use on moving parts which require a lubricated surface.

Instructions - For best results

1. Wipe off dirt and excess moisture from surface to be protected prior to applying the corrosion preventive compound.
2. Apply a thin uniform coat of corrosion preventive compound directly on area to be protected.
3. Allow to dry for one half hour.
4. Apply a second uniform coat of corrosion preventive compound.
5. Application by wiping is not recommended. Reapplication of compound is necessary after solvent cleaning or where coating has been damaged by abrasion.

Note: May be removed with methyl ethyl ketone ASTM D740 or aliphatic naphtha TT-N-95.

WARNING - CONTENTS FLAMMABLE

CAUTION (for spray cans)

Contents pressurized. Do not puncture, incinerate or store above 120° F. Do not place can near open flame or other heat source. Use with adequate ventilation and avoid breathing spray. Harmful if swallowed. Shake before using.



5.4 Palletization. When specified, unit packs of corrosion preventive compound packed as specified in 5.2 will be palletized in accordance with MIL-STD-290 (see 6.21).

## 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 corrosion preventive compound covered by this specification can be used on any metal surfaces. It is primarily intended for in-service treatment. It should not be used around liquid oxygen fittings. The ability of this material to prevent corrosion, to displace water, and its ease of application from pressurized spray cans make it particularly suited for service use. This compound is intended for use on non-moving parts not requiring a lubricated surface, such as fasteners, seams, access panels, joints, unpainted metal and where paint is cracked or damaged.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification, including any amendments.
- b. Type and, if applicable, class.
- c. 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).
- d. Quantity (specify number of cans).
- e. Addresses for submission of MSDSs (see 3.2.5, 4.3.1).
- f. Packing required (see 5.2).
- g. Applicable levels of preservation, packaging, and packing (see 5); including marking requirements (see 5.3).
- h. Labeling or other special marking required (see 5.3).
- i. Specify if palletization is required.

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
4.3 - 4.3.2	DI -NDTI-80809A	Test/Inspection Report	

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The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory, and the number of items to be tested as specified in 4.3.1. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 Ingredients. The ingredients of table VII when properly processed produce a corrosion preventive compound meeting the requirements of this specification. The list of approved proprietary raw materials is not to be construed as an endorsement thereof or as precluding similar materials from other proprietary sources. Such products may prove equivalent or even superior in performance to the ones listed.

6.6 Transportation charges. Samples shall be furnished at no cost to the Government and the manufacturer shall pay the transportation charges to and from the designated point where tests are to be made.

6.7 Department of Transportation. Section 173.306 of the Department of Transportation (DOT) specifies that each completed metal container filled for shipment must be heated until the contents reaches a minimum temperature of 130° F without evidence of leakage, distortion or other defects.

6.8 Product retest after failure. In the case of failure of the sample or samples submitted, consideration will be given to the request of the manufacturer for additional tests only after it has been clearly shown that changes have been made in the product which the Government considers sufficient to warrant additional tests, and a new designation is given the material by the manufacturer.

6.9 Supersession data. Type I, Class A and Type I, Class B of MIL-C-85054A(AS) have been deleted from this document.

6.10 Subject term (key word) listing.

- Carbon dioxide propellant
- Coating
- Hydrofluorocarbon
- Methylethyl ketone
- Penetrant
- Rust proofing
- Sealer
- Waterproofing

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TABLE VII. Ingredients.

Ingredients	Trade name	Source
Isopropanol	Isopropyl alcohol	TT-I-735
VM+P naphtha	2429 naphtha	Esso Chemical Canada PO Box 4029, Terminal A Toronto, Ontario M5W 1K3
Barium petroleum sulfonate	NaSUL BSN	King Industries, Inc. PO Box 588 Norwalk, CT 06855
Alkyl ammonium organic phosphate	Rust preventive #2	E. I. DuPont de Nemours and Company Petroleum Chemical Div. Wynwood, PA
Silicone resin	SR-80M	General Electric Co Silicone Products Div. Waterford, NY 12188
Silicone alkyd resin	Varkyd 385-50E	McWhorter, Inc, 7600 State Road Philadelphia, PA 19101
Acrylic resin	B67	Rohm and Haas Company Independence Mall West Philadelphia, PA 19105
Isobutanol	Isobutyl alcohol	ASTM D1719
Propylene glycol Monomethylether	Dowanol PM	Dow Chemical 2020 Dow Center Midland, MI 48640
Solvent blue 36	Oil blue A Organic dye	E. I. DuPont de Nemours and Company Petroleum Chemical Div. Wilmington, DE 19898

6.11 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Preparing activity:  
Navy - AS  
(Project No. 8030-N117)

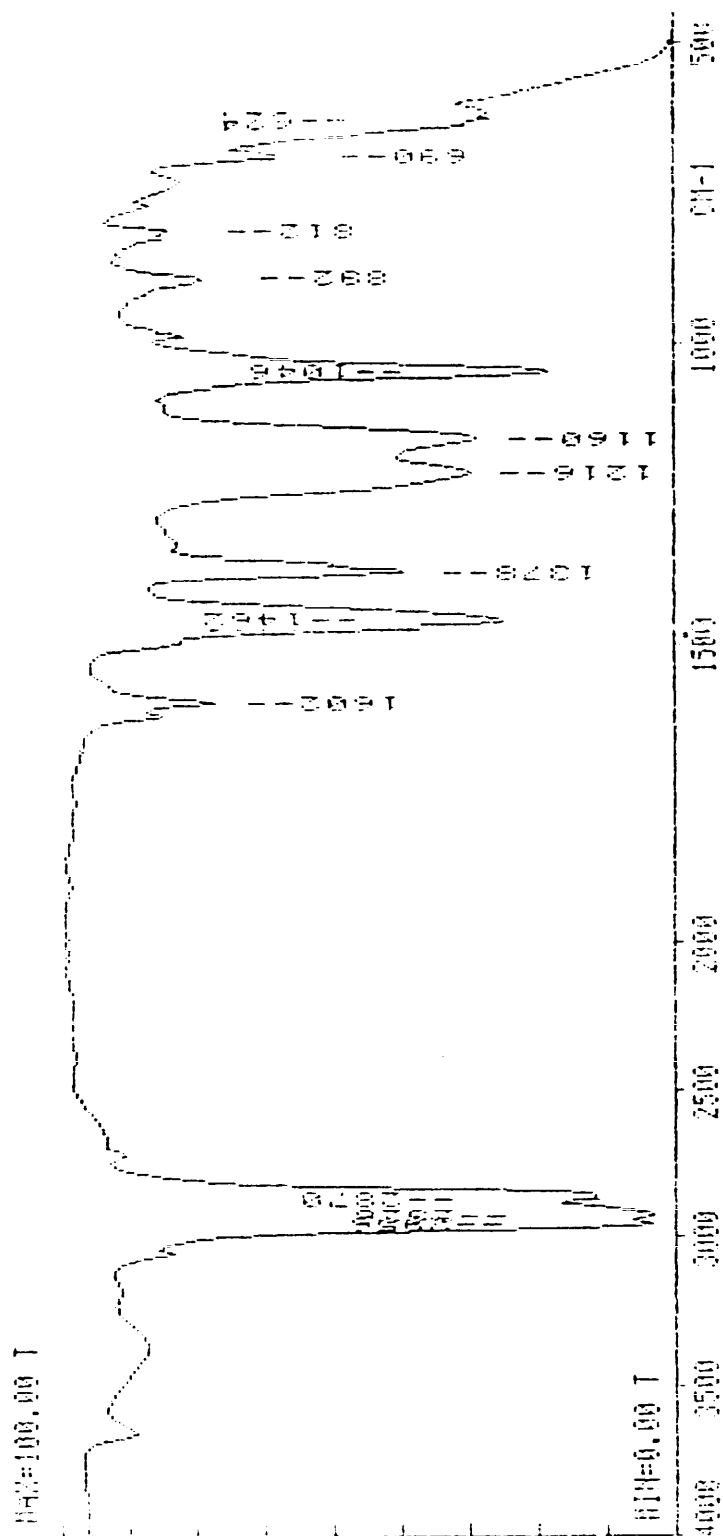


FIGURE 1. Infrared spectrum of barium petroleum sulfonate.

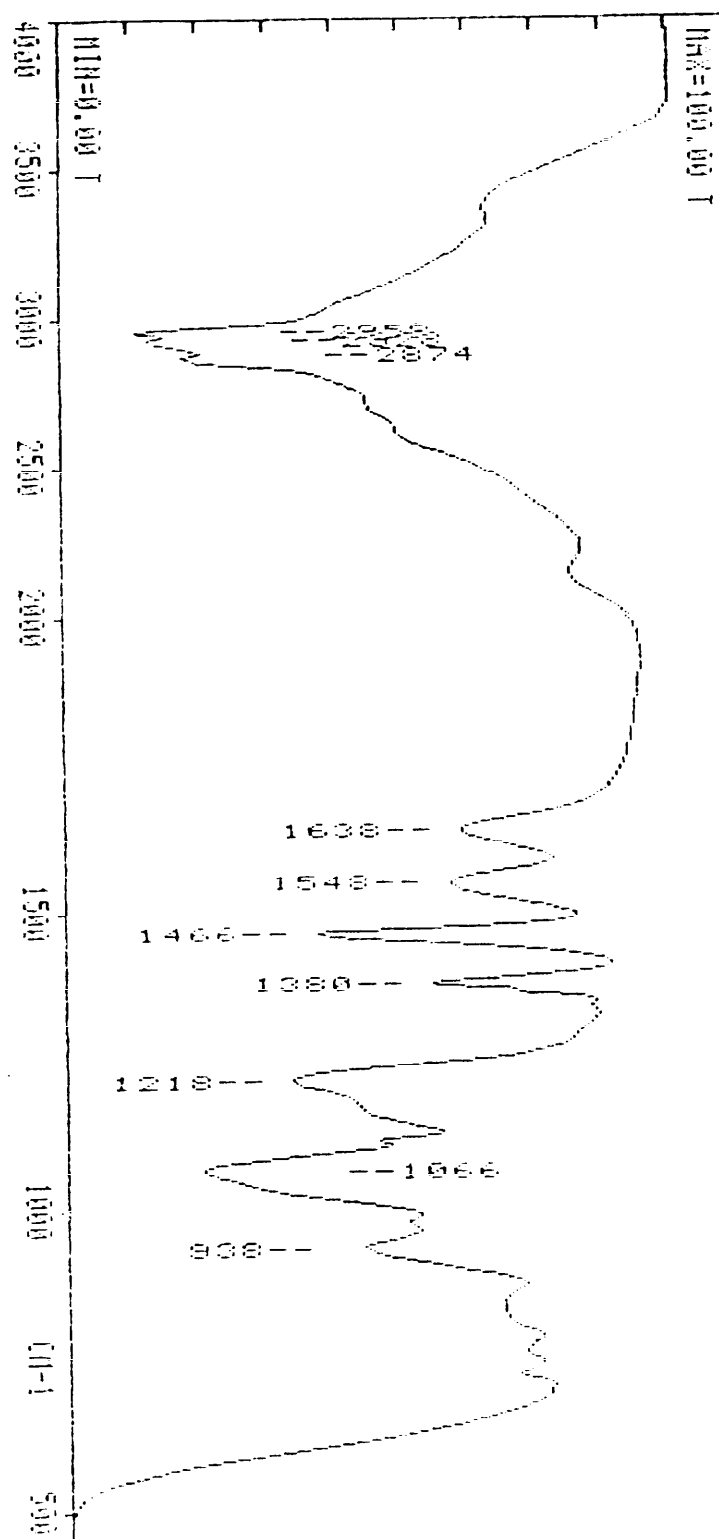


FIGURE 2. Infrared spectrum of alkyl ammonium organic phosphate.

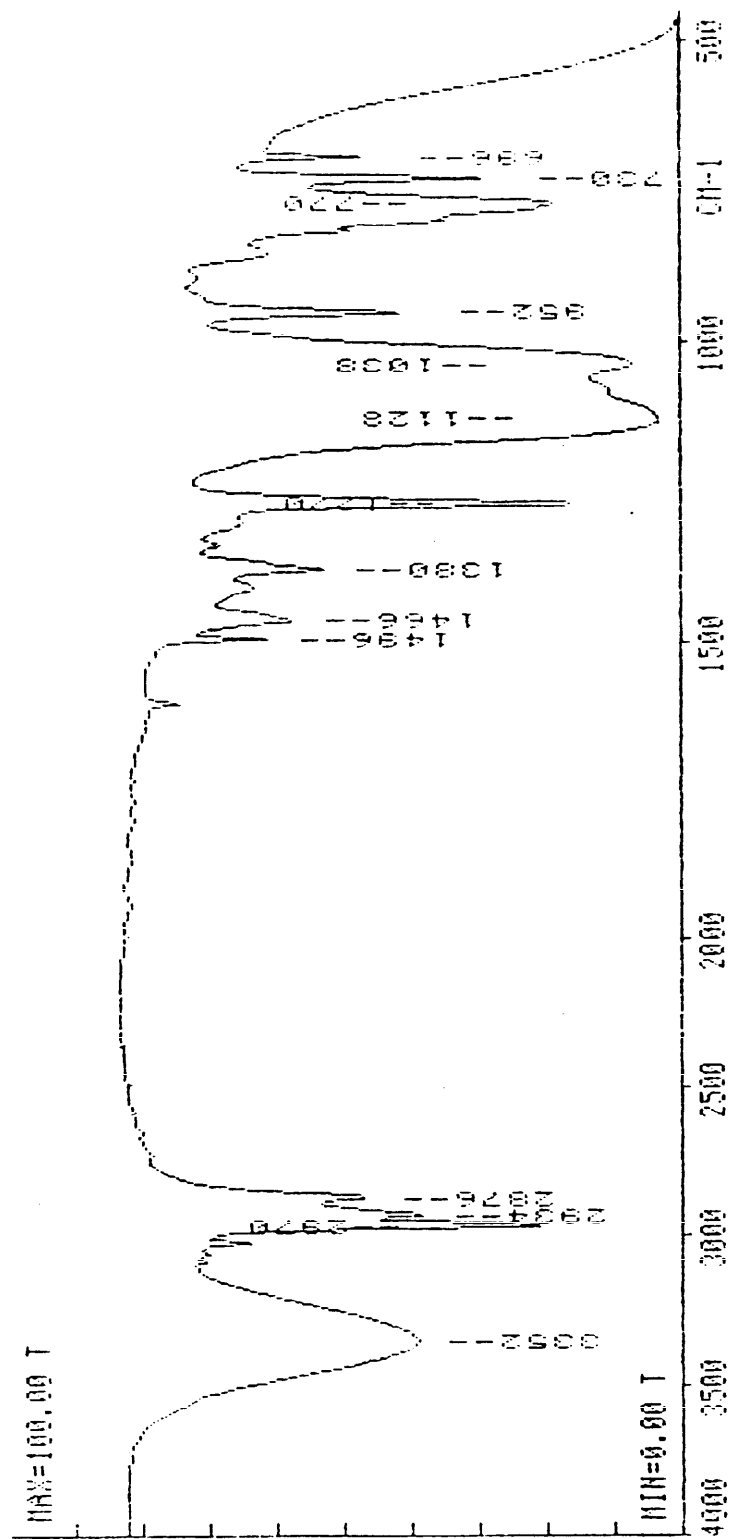


FIGURE 3. Infrared spectrum of silicone resin.

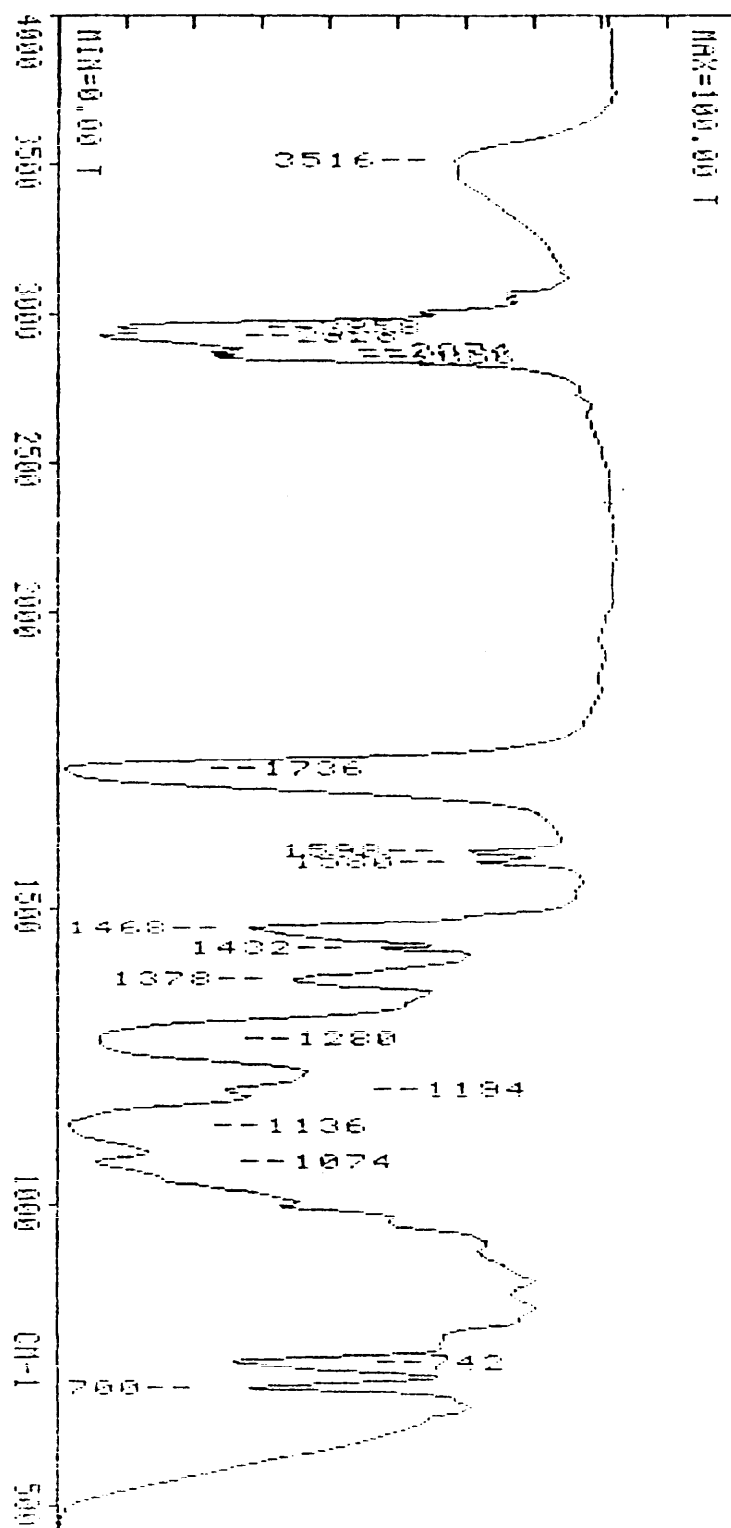


FIGURE 4. Infrared spectrum of silicone alkyd resin.



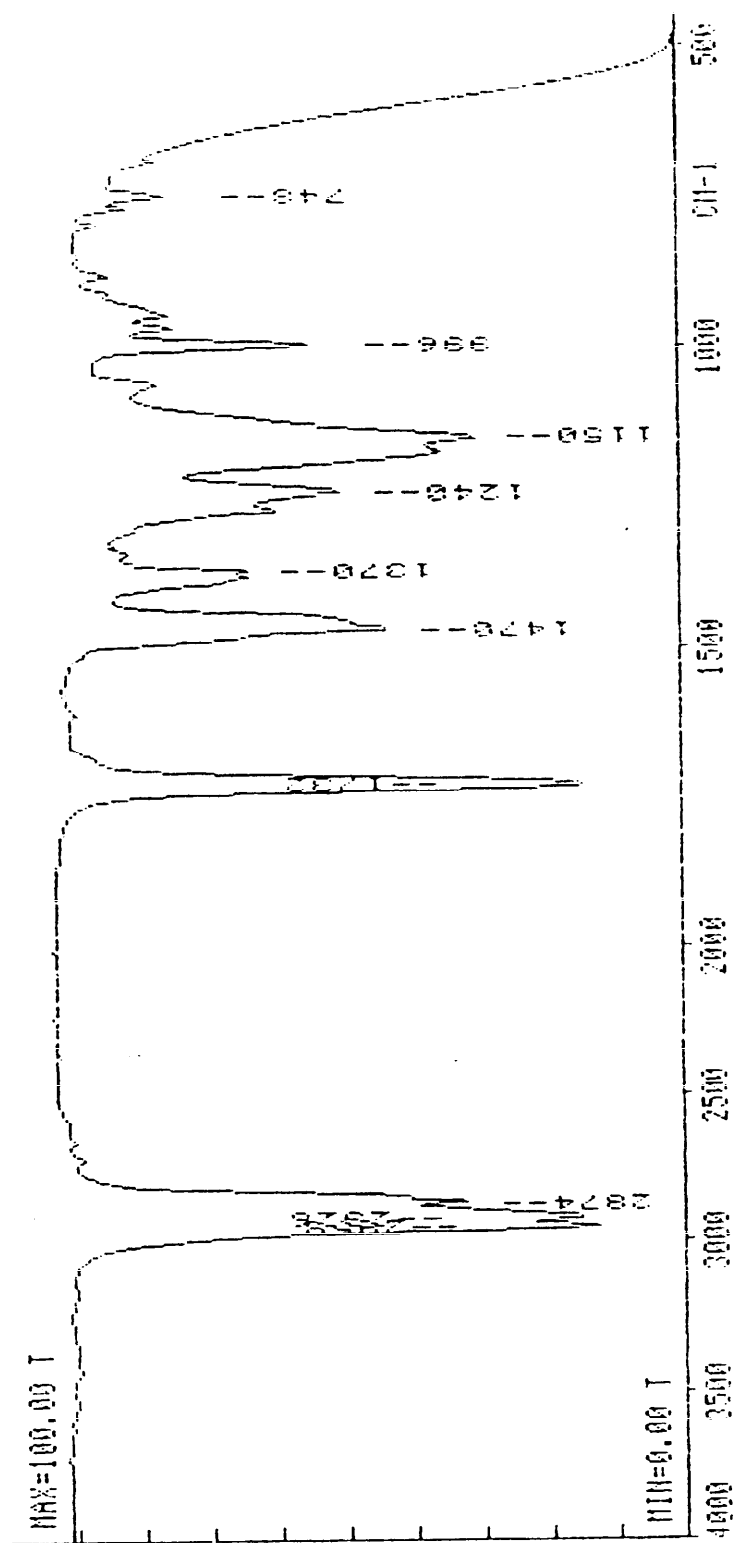


FIGURE 5. Infrared spectrum of acrylic resin.

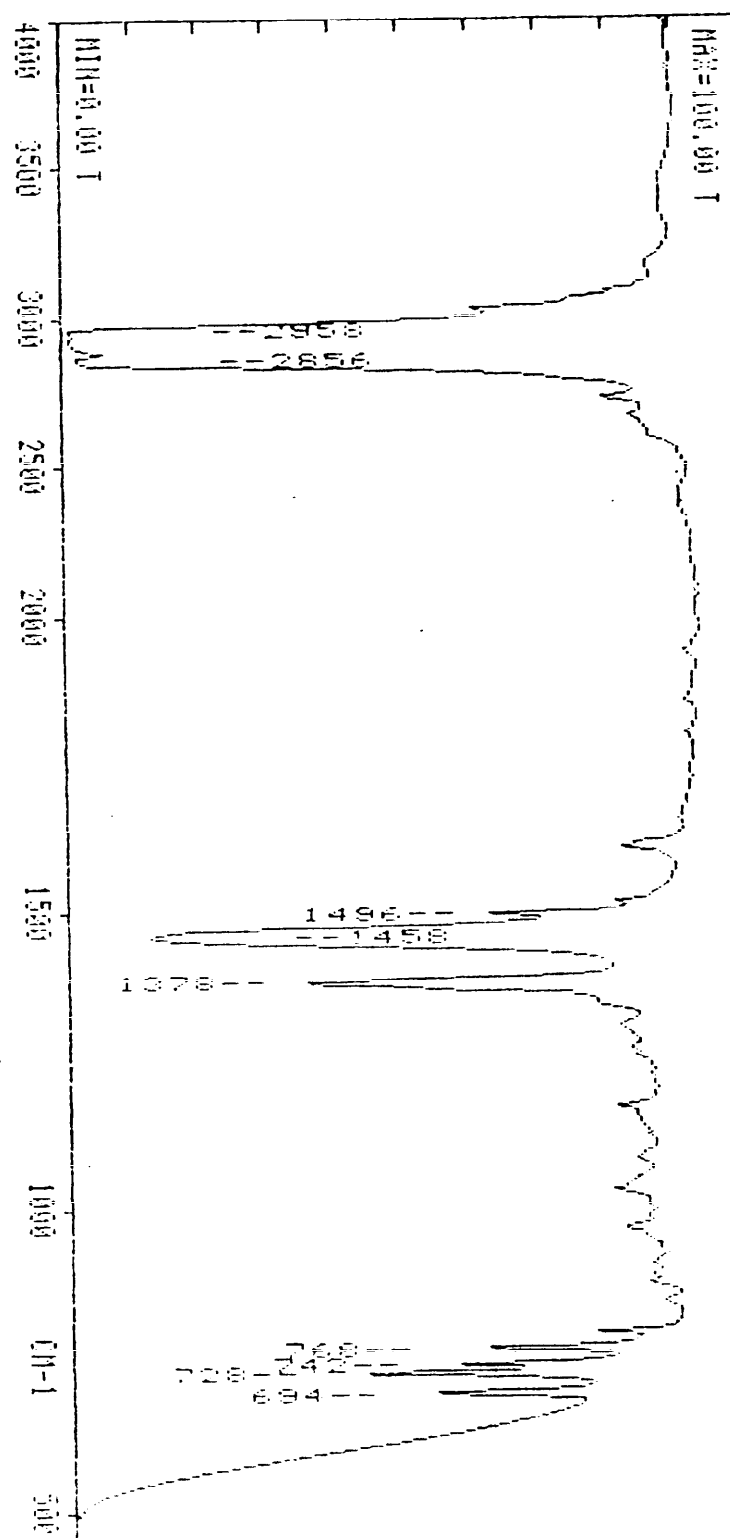


FIGURE 6. Infrared spectrum of VM+P naphtha.

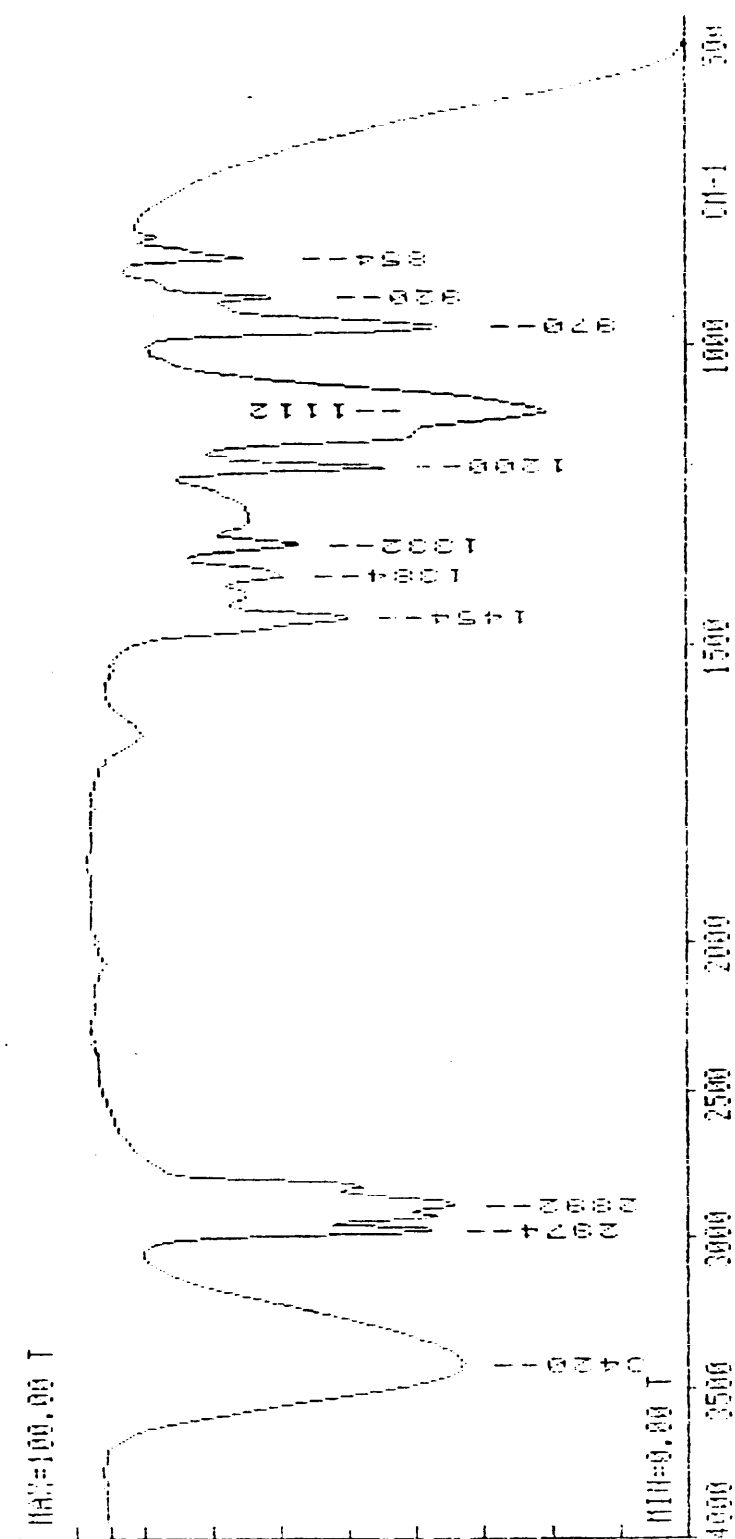
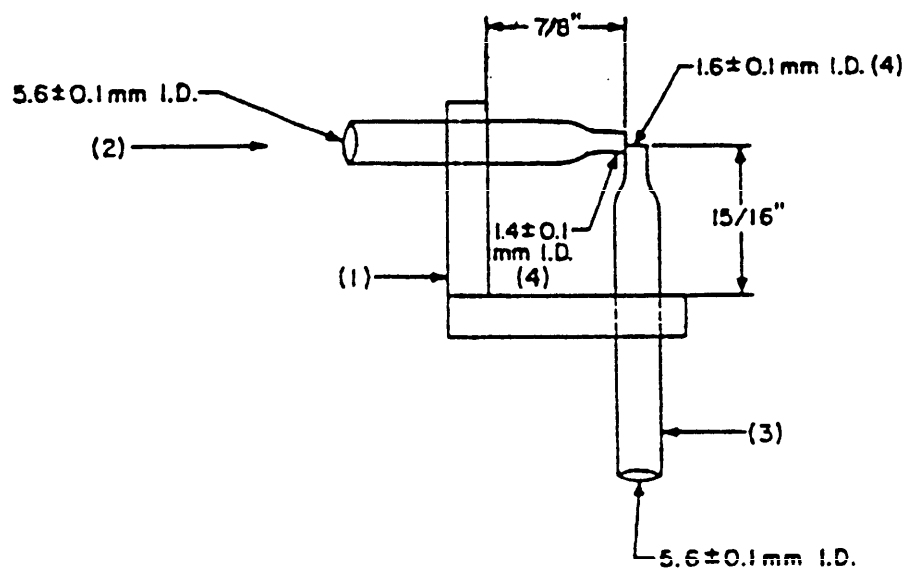


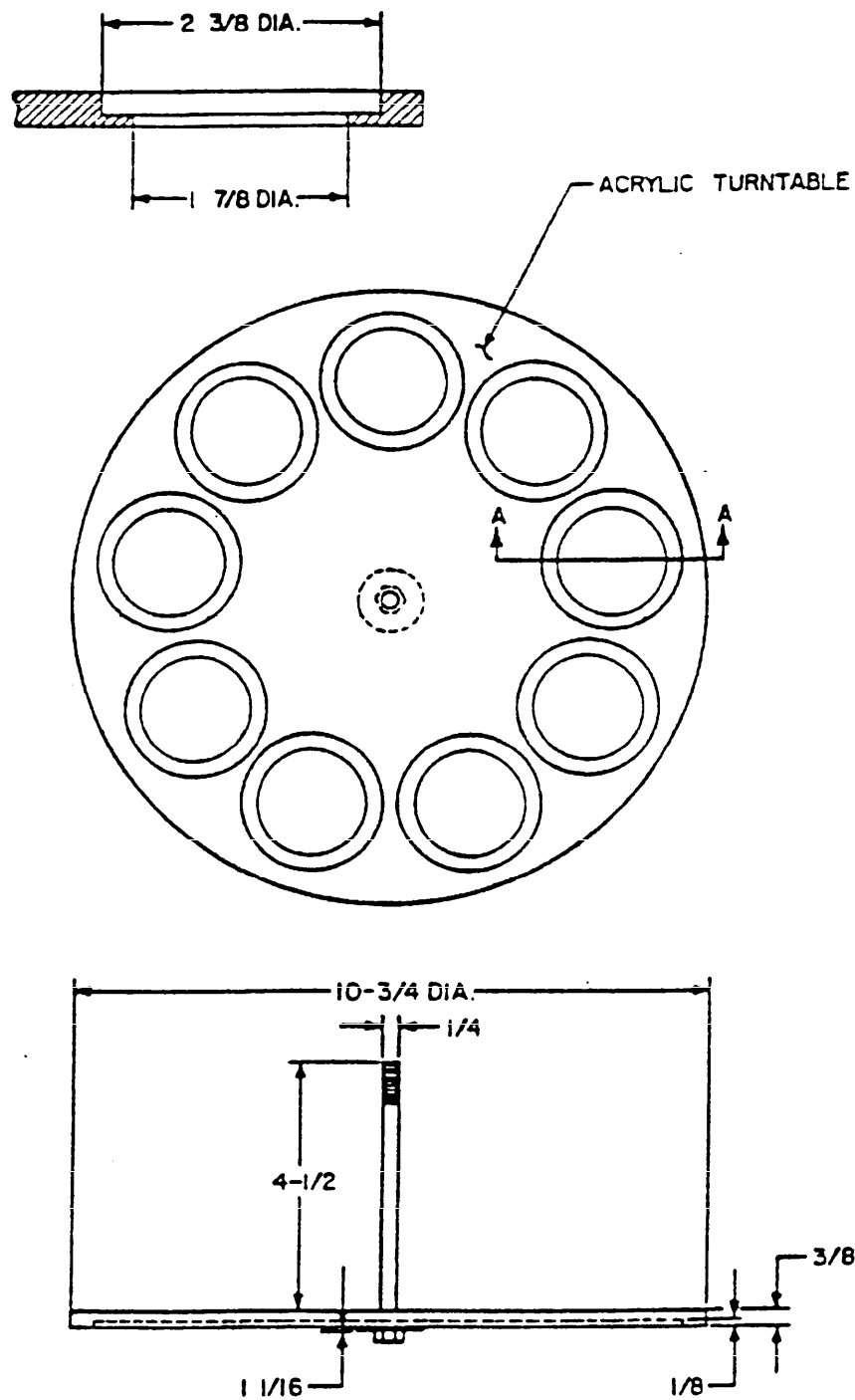
FIGURE 7. Infrared spectrum of propylene glycol monomethylether.



NOTES:

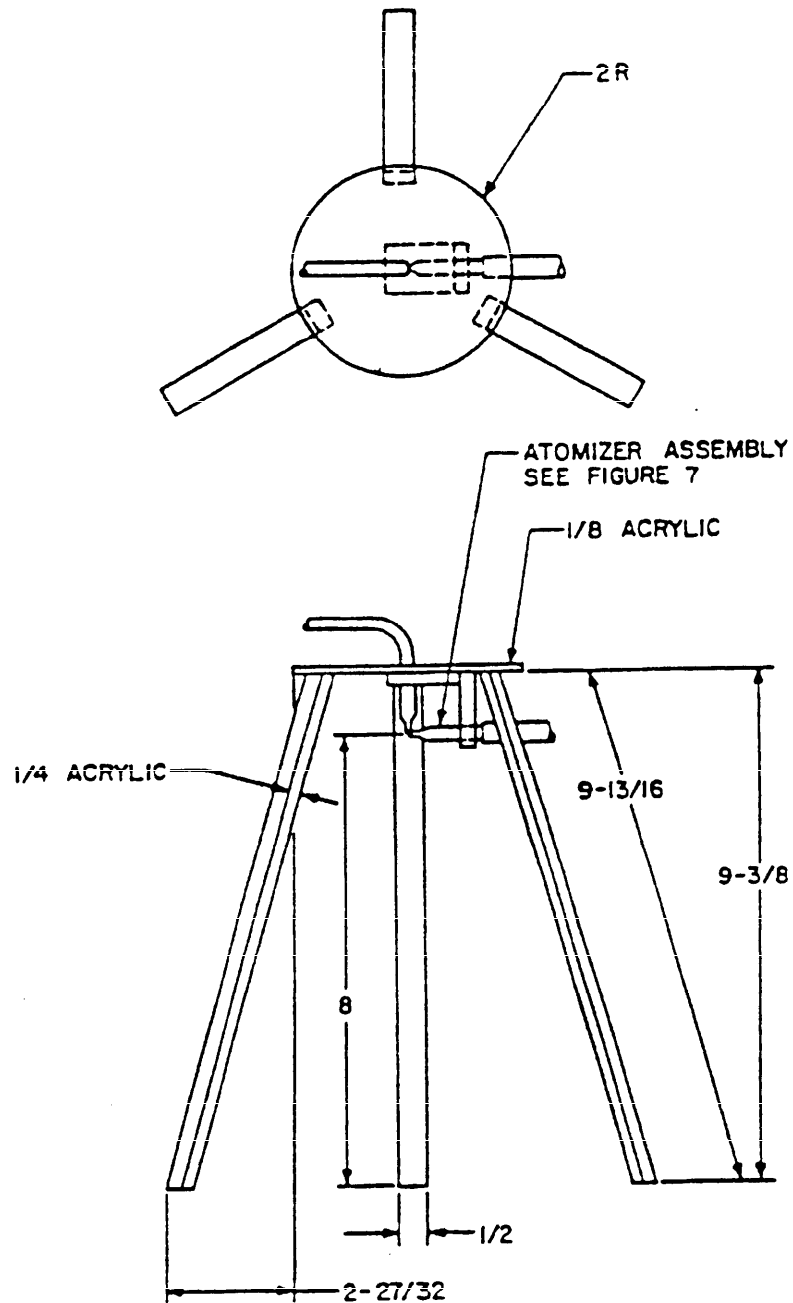
1.  $1/4$ " Acrylic Material
2. Filtered Air Source
3. Liquid Pick-Up Tube
4. Orifice

FIGURE 8. Spray nozzle.



DIMENSIONS ARE IN INCHES

FIGURE 9. Acrylic turntable detail.



DIMENSIONS ARE IN INCHES

FIGURE 10. Atomizer support assembly.

# LEGEND

1. Acrylic Turntable, positioned with the lower surface 1-1/2 inches above the jar rim. The turntable (see Figure) is provided with holes for the mounting of the test disk holders. The turntable is mechanically rotated, driven by the electric motor (2) encased in a protective acrylic box, mounted above the jar.
2. Electric Drive Motor
3. Jar, 12 inches diameter, 12 inches high
4. Liquid Pickup Tube
5. Compressed Air Inlet, 12 psi, 1 ft.<sup>3</sup>/ min.
6. Acrylic Atomizer Support - See Figure 10
7. Atomizer Assembly - See Figure 10

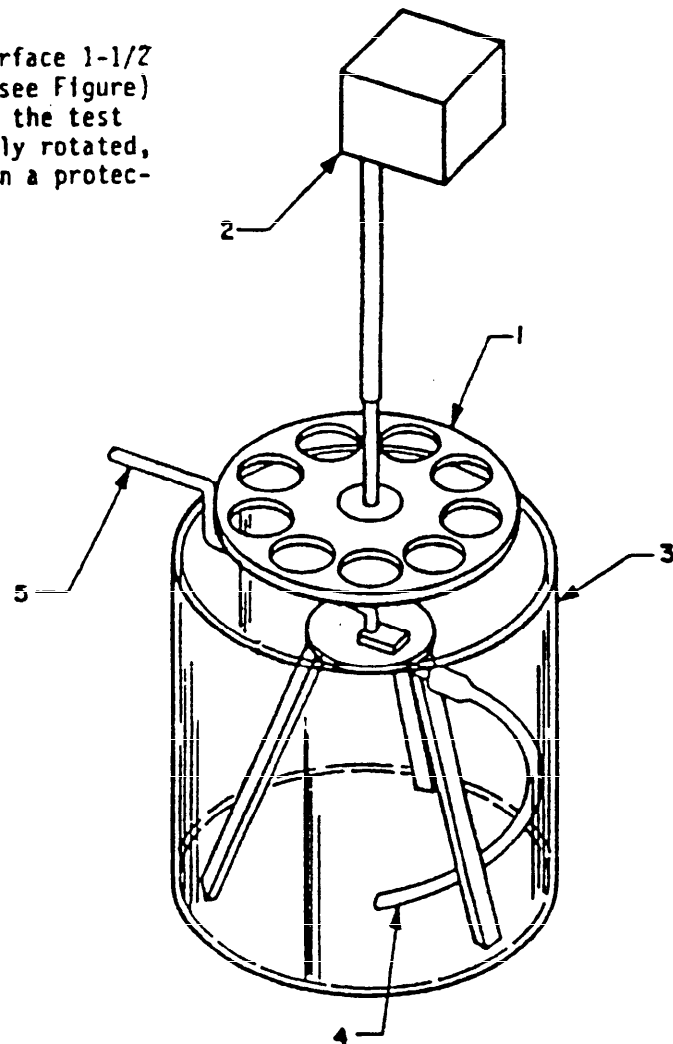


FIGURE 11. Synthetic sea water - sulfurous acid spray test apparatus.



# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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### I RECOMMEND A CHANGE:

#### 1. DOCUMENT NUMBER

MIL-C-85054B (AS)

#### 2. DOCUMENT DATE (YYMMDD)

931105

#### 1. DOCUMENT TITLE

CORROSION PREVENTIVE COMPOUND, WATER DISPLACING, CLEAR (AMYL GUARD)

#### 1. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

### REASON FOR RECOMMENDATION

### SUBMITTER

NAME (Last, First, Middle Initial)

#### b. ORGANIZATION

ADDRESS (Include Zip Code)

#### d. TELEPHONE (Include Area Code)

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(2) AUTOVON

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UNECOMMANDING OFFICER, NAVAL AIR  
WARFARE CENTER AIRCRAFT DIVISION LAKEHURST  
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