MIL-C-16173D
20 OCTOBER 1966
SUPERSEDING
MIL-C-16173C
7 MAY 1962
(SEE 6.9)

MILITARY SPECIFICATION

CORROSION PREVENTIVE COMPOUND, SOLVENT CUTBACK, COLD-APPLICATION

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers solvent-dispersed corrosion preventive compounds which deposit thin, easily removable films after evaporation of solvent.

1.2 Classification. Corrosion preventive compound shall be of the following grades, as specified (see 6.2):

Grade 1 — Hard film (175-degrees F. minimum flow point of solvent deposited film).

Grade 2 — Soft film.

Grade 3 — Water displacing, soft film.

Grade 4 — Transparent, non-tacky film.

Grade 5 — Hot water-low pressure steam removable film.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

O-M-232	— Methanol (Methyl Alcohol).
P-D-680	— Dry Cleaning Solvent.
NN-P-515	— Plywood, Container Grade.
QQ-A-250/4	— Aluminum Alloy 2024, Plate and Sheet.
QQ-B-626	— Brass, Leaded and Non-Leaded; Rod, Shapes, Forgings, and Flat Products With Finished Edges (Bar, Flat Wire, and Strip).
QQ-A-671	— Anodes, Cadmium.
QQ-M-44	— Magnesium Alloy, Plate and Sheet (AZ31B).

FSC 8030

FEDERAL

QQ–S–698 — Steel, Sheet and Strip, Low-Carbon.

QQ–Z–285 — Zinc; Anodes.

RR–S–366 — Sieves, Standard For Testing Purposes.

SS–R–406 — Road and Paving Materials; General Specifications (Methods of Sampling and Testing).

TT–E–485 — Enamel, Semi-Gloss, Rust-Inhibiting.

TT–N–95 — Naphtha, Aliphatic.

UU–T–101 — Tape, Gummed, Mending, and Reinforcing, (Paper and Cloth).

PPP–B–576 — Box, Wood, Cleated, Veneer, Paper Overlaid.

PPP–B–585 — Boxes, Wood, Wirebound.

PPP–B–591 — Boxes, Fiberboard, Wood-Cleated.

PPP–B–601 — Boxes, Wood, Cleated Plywood.

PPP–B–621 — Boxes, Wood, Nailed and Lock-Corner.

PPP–B–636 — Box, Fiberboard.

PPP–C–96 — Cans, Metal, 28 Gage and Lighter.

PPP–D–729 — Drums: Metal, 55–Gallon (for Shipment of Noncorrosive Materials).

PPP–P–704 — Pails, Shipping, Steel (1 through 12 Gallon).

MILITARY

MIL–L–6082 — Lubricating Oil; Aircraft-Reciprocating Engine (Piston).

STANDARDS

FEDERAL

FED–STD–141 — Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.

FED–STD–791 — Lubricants, Liquid Fuels, and Related Products; Methods of Testing.

MILITARY

MIL–STD–105 — Sampling Procedures and Tables for Inspection by Attributes.

MIL–STD–290 — Packaging, Packing and Marking of Petroleum and Related Products.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless

otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING MATERIALS

ASTM
D–1748–62T — Method of Test For Rust Protection By Metal Preservatives In The Humidity Cabinet.

(Application for copies should be addressed to the American Society For Testing And Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

OFFICIAL CLASSIFICATION COMMITTEE

Uniform Freight Classification Rules.

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York, N. Y. 10016.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Qualification. The cold-application, solvent cutback corrosion preventive compound furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.2 and 6.4).

3.1.1 Any change in the formulation of a qualified product will necessitate its requalification. The material supplied under contract shall be identical, within manufacturing tolerances, to the product receiving qualification.

3.2 Material. The corrosion preventive compound shall be composed of nonvolatile base material dispersed in petroleum solvent so as to form a fluid formulation conforming to this specification. The compound shall be homogeneous, free from grit, abrasives, water, chlorides, or other impurities, and shall not be injurious in any way to personnel employing it if reasonable procedures and safety precautions are employed. Benzol or chlorinated hydrocarbons shall be used.

3.3 Film characteristics.

3.3.1 *Grades 1, 2, 3, 4, and 5.* The compounds shall readily wet the surfaces of the test panels and upon evaporation of the solvent the resultant coating shall be continuous. Upon completion of the accelerated weathering (grade 1) and shed storage (grades 2, 3, 4, and 5), tests the specimens shall show no evidence of cracking. Specimens that show evidence of checking, alligatoring, or other irregularities shall be evaluated as specified in 4.6.8.7. (Refer to FED–STD–141 for definition of terms.)

3.3.2 *Grade 4.* The compound shall be transparent during the protective life of the coating (see 4.6.13).

3.4 Nonvolatile content. The nonvolatile content percent by weight for each product will be established when qualification tests are conducted. The nonvolatile content of any succeeding lot of the product shall be not more than 5 percent lower nor 10 percent higher than the established value, based on the nonvolatile as received as being 100 percent (see 4.6.2. and 6.6).

3.5 Solvent. The solvent employed shall possess a maximum distillation end point of 410°F. (see 4.6.1).

3.6 Discernibility. Grades 1 and 2 shall be permanently discernible on the preserved item and grades 3 and 5 shall be discernible for at least two weeks after application when allowed to stand in a well lighted and ventilated room. The color of

the finished compound shall be black or brown. An oil soluble dye may be used.

3.7 Stability. The compound shall be stable and homogeneous (see 4.6.3).

3.8 Sprayability. The compound shall be sprayable at temperatures of 40°F. and above (see 4.6.4).

3.9 Corrosion. The compound shall not produce visually evident pitting, etching, or a weight change in excess of the following, when tested in accordance with 4.6.5.1 and 4.6.5.2. In addition, the specimens tested in accordance with 4.6.5.2 shall show no dark discoloration.

Metal	*Milligrams per square centimeter*
Brass	1.0
Cadmium	5.0
Zinc	7.5
Magnesium	0.5
Aluminum	0.2
Steel	0.2
Lead-calcium alloy (applicable to grade 2 only)	5.0

3.10 Sulphated residue. The sulphated residue of each product will be established when qualification tests are conducted. When the established value of the accepted sample is 0 to 0.50 percent, the sulphated residue of any succeeding lot shall be ± 0.05 (absolute value) with a zero minimum. When the established value of the accepted sample is 0.51 percent and up, the sulphated residue of any succeeding lot shall be plus or minus 10 percent of the established value (see 4.6.1). The deviations permitted herein are manufacturing tolerances and are separate from those indicated in 4.6.1 which latter deviations reflect the accuracy of the method (see 4.6.1 and 6.6).

3.11 Requirements applicable to individual grades.

3.11.1 When tested as specified in 4.6, the rust preventive compound shall conform to table I:

TABLE I. *Requirements for individual grades.*

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Test paragraph
Flash point, °F. (min)	100	100	100	100	100	4.6.1
Penetration of nonvolatile fraction	.....	200 (min)	.....	.....	.....	4.6.1
Miscibility with lubricating oil	.....	complete	.....	.....	.....	4.6.6
Removability after exposure, cycles (max.)	30	15	6	15	.....	4.6.7.1
Hot water removability, residue, g/sq. ft. (max.)	.....	.....	.....	.....	0.15	4.6.7.2.2.1
Low pressure steam removability, residue, g/sq. ft. (max.)	.....	.....	.....	.....	0.15	4.6.7.2.2.2

TABLE I. *Requirements for individual grades*—Continued

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Test paragraph
Protection tests:						
Film thickness, mils (max.)	4.0	2.0	1.0	2.0	1.0	4.6.8.2
Humidity, days (min.)	———	30	30	30	30	4.6.8.3
Salt spray, days (min.)	14	7	———	14	———	4.6.8.4
Weathering, accelerated, operating hours (min.)	600 1200	——— ———	——— ———	——— ———		4.6.8.5 4.6.8.5.1
Shed storage, years (min.)	———	1	½	1	½	4.6.8.6
Flow point, °F. (min.)	175	———	———	175	———	4.6.12

3.11.2 *Low-temperature adhesion (grades 1, 2, and 4).* Grade 1 compound shall adhere to metal at 0.°F. and grade 2 and 4 compounds shall adhere to metal at minus 40°F. (see 4.6.9).

3.11.3 *Drying (grades 1, 2, 3, and 5).* Grade 1 compound shall be sufficiently dry within 4 hours to permit handling without injury to the coating (see 4.6.10). Films of grades 2, 3, and 5 shall remain soft on drying and exposure.

3.11.3.1 *Grade 4.* The coating shall be sufficiently dry in 4 hours to permit handling without injury to film, and after 24 hours, it shall be tack free as determined by 4.6.10.1.

3.11.4 *Water displacement (grade 3 and 5).* The grade 3 and 5 compounds, (1) after storage in contact with water, and (2) upon 1:1 dilution with paraffin oil, shall satisfactorily displace water (see 4.6.11).

4. QUALITY ASSURANCE PROVISIONS

4.1 **Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 assure supplies and services conform to prescribed requirements.

4.1.1 The supplier shall test each lot of compound (see 4.4.1), for compliance with the requirements as indicated in 4.5.1.

4.1.2 The supplier shall maintain an effective and economical quality control system which shall control (a) receipt of ingredient material, (b) equipment and procedure for sampling materials, (c) storage of ingredient materials, (d) methods and routes of handling materials, (e) processing equipment and delivery points of product materials, (f) processing procedures and controls and (g) procedures and equipment for conducting the tests prescribed herein.

4.1.3 Inspection method 9601 of FED–STD–791 applies.

4.1.4 In verification of the adequacy of the suppliers quality control system the Government inspector shall periodically select samples of the solvent, nonvolatile material and finished compound (see 4.4.2) for verification of acceptance test in a Government Laboratory.

4.2 **Qualification tests**[1]. Qualification tests shall be conducted at a laboratory satisfactory to the Naval Ship Engineering Center. Qualification tests shall consist of the tests specified in 4.6.

4.3 **Comparison tests.** Products shall be subject to comparison inspection which comprises all the tests of this specification. These tests may be conducted at intervals of three years or less from the date of original qualification, and failure to comply with the requirements will be considered as a basis for removal of the product from the Qualified Products List. These tests may be conducted on samples taken at time of inspection or on samples requested from the manufacturer.

4.4 **Sampling.**

4.4.1 *Lot.*

4.4.1.1 *Compound.* Unless otherwise specified in the contract or order, all corrosion preventive compound of the same grade but not more than 50,000 gallons manufactured as one batch shall be considered a lot for purposes of inspection.

4.4.1.2 *Solvent and nonvolatile materials.* All solvent and nonvolatile material from which a lot of compound is manufactured shall be considered a lot for purposes of inspection.

4.4.2 *Sampling for tests.* Sampling shall be in accordance with method 8001 of FED–STD–791 and as specified herein.

4.4.2.1 Samples for verification and comparison tests shall consist of the following:

4.4.2.1.1 *Solvents.* From each lot a two pint sample of solvent shall be selected and placed in clean, dry, metal containers with the top sealed.

4.4.2.1.2 *Nonvolatile material.* From each lot a two pound sample of the nonvolatile material shall be selected and placed in a clean, dry metal container with the top sealed.

4.4.2.1.3 *Finished compound.* From each lot four separate one-gallon samples of the finished compound shall be selected for verification tests and placed in clean, dry, metal containers with the tops sealed. Two 5-gallon filled containers shall be selected for comparison tests.

4.4.2.1.4 *Disposition of samples.* Two containers of finished compound and one container each of solvent and nonvolatile compound shall be forwarded to the test laboratory designated by the bureau or agency concerned. A duplicate set should be retained by the inspector. The containers shall be plainly marked with the following:

Sample for verification of acceptance, or comparison tests, as applicable.

Applicable specification number.

Grade_____.

Lot number_____.

Finished compound, solvent or nonvolatile.

Name of manufacture.

Manufacturer's code number.

Date_____.

[1] Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification" (see 6.4 and 6.5).

The samples shall be accompanied with a copy of the manufacturers laboratory test report.

4.4.3 *Sampling for examination of containers.* A random sample of filled containers shall be selected in accordance with MIL–STD–105 at inspection level S–1 and acceptable quality level =2.5 percent defective to verify compliance with all requirements regarding fill, closure, marking, and other requirements not requiring tests.

4.5 Inspection.

4.5.1 Inspection shall consist of all the tests of this specification with the exception of storage stability (see 4.6.3), removability (see 4.6.7.2), shed storage (see 4.6.8.6), and accelerated weathering (1200 hours) (see 4.6.8.5.1). Removability after 600 hours exposure, (25 days accelerated weathering, see 4.6.8.5), but not shed storage, shall be conducted on grade 1 only.

4.5.2 *Rejection.* If any sample fails to pass any of the tests, it shall be cause for rejection of the lot represented by the sample.

4.5.3 *Examination of containers.* Each sample filled container shall be examined for defects of construction of the container and the closure, for evidence of leakage, and unsatisfactory marking; each filled container shall also be weighed to determine the amount of contents. Any container in the sample having one or more defects or under required fill shall be cause for rejection, and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL–STD–105, the lot represented by the sample shall be rejected.

4.5.4 *Inspection for preparation for delivery.* The packaging and packing of the corrosion preventive compound shall be inspected to determine compliance with the requirements of Section 5 of this specification.

4.6 Test procedures.

4.6.1 The following test procedures shall conform to the applicable methods specified in FED–STD–791:

Test procedure	*Method No.*	
Solvent distillation	1101	
Flash point (for grades 2, 3, and 5)	1102	
Flash point (for grades 1 and 4)	1102	(Flash point of cutback asphalts and other viscous materials and suspension of solids use stirring rate of 250 r.p.m.)
Sulphated residue	5611	(Method 5422 may be used provided lead and phosphorus are known to be absent.)
Penetration (for grade 2)	312	

4.6.2 *Nonvolatile content.* Approximately 2 gm. of the compound shall be weighed to the nearest milligram in a tared aluminum foil dish 2.0 to 2.5 inches in diameter. The dish shall be placed in an explosionproof, gravity convection oven maintained at 105 to 110°C. (221 — 230°F.) for a period of 3 hours. The non-volatile content shall be determined as follows:

$$\text{Non-volatile content, percent} = \frac{A \times 100}{B}$$

Where: A = Weight grams of residue

B = Original weight, in grams of sample.

4.6.3 *Stability.*

4.6.3.1 *Recovery from low temperature.* Fifty ml. of the compound, in a cork stoppered test tube 8 inches by 1 inch, shall be elevated 130° ± 2°F. and maintained at that temperature for 8 hours. At the end of this period the tube and its contents shall be transferred immediately to a suitable cold chamber maintained at minus 40 ± 2°F. and allowed to remain at that temperature for 16 hours, care being taken to avoid physical disturbance of the compound. This cycle shall be performed for a total of four times ending at the expiration of the last exposure at minus 40° ± 2°F. The test tube shall be allowed to remain upwright at room temperature (77° ± 2°F.) for 24 hours.

4.6.3.1.1 The test tube shall be then tilted through an angle of 180 degrees and held in that position for 5 seconds. The compound shall be considered as meeting the requirement if it does not show any gelling, solidification, or more than a slight haze or precipitate. If the material indicates evidence of gelling, slight haze, or separation, the tube shall then be shaken vigorously (by hand) for 1 minute. The compound shall be considered as meeting the requirement for recovery from low temperature when the tube is inverted and the compound flows and does not show any lumps suggesting permanent solidification or more than a slight haze or precipitate.

4.6.3.1.2 *Confirmatory test for recovery from low temperature.* Material requiring shaking (see 4.6.3.1.1) shall be further examined by a sprayability test. A one-quart spray gun can, as used for the sprayability test (see 4.6.4), shall be filled 1/2 to 2/3 full with the compound and closed with a rubber stopper or other airtight closure. The temperature cycling procedure of 4.6.3.1 shall then be applied. At the expiration of the last exposure at minus 40°F., the can shall be allowed to remain upright at room temperature (77° ± 2°F. for 24 hours. The can, standing upright, shall then be shaken horizontally with a stroke amplitude of approximately 2½ inches for 1 minute at the rate of 260 strokes per minute.[2] The spray gun can with its contents shall be placed in a suitable cold chamber and held at a temperature of 40° ± 2°F. for a period of 24 hours. At the end of this period, while contents are still maintained at this temperature, a determination shall be made of the fluid flow rate from a spray gun as specified in 4.6.4. The compound shall pass the sprayability test specified in 4.6.4 to be considered acceptable.

4.6.3.1.3 *Homogeneity.* Materials passing the test specified in 4.6.3.1, shall be examined for precipitates and haziness in the solution. If the precipitate cannot be re-dissolved into the compound or the haziness dispelled by shaking, the supernatant liquid shall be tested to determine its ability to protect steel panels in the salt spray test for grades 1, 2 and 4 (see 4.6.8.4). The supernatant liquid shall pass the salt spray protection test. For grade 3 and 5, the supernatant liquid shall pass the humidity cabinet test (see 4.6.8.3). The panels for the exposure tests may be coated by dipping them in a small dish filled with the supernatant liquid. It may be necessary to repeat the low temperature cycle using a larger sample in order to obtain sufficient supernatant liquid for test.

4.6.3.2 *Storage.* A 0.9 gallon sample of the compound in a 1-gallon round metal container shall be stored for a total of 9 months consisting of a 3-month storage period at each of the following temperatures and in the order given: 100° ± 2°F., 77° ± 2°F., and 40° ± 2°F. At the expiration of the storage period, the compound shall be allowed to remain at room temperature (77° ± 2°F.) for 24 ± 1 hour, and the container and con-

[2] The shaker used in this test is a platform-type manufactured by the Precision Scientific Company, catalog number 5855, or equal.

tents shall then be rolled at approximately 50 revolutions per minute (r.p.m.) for 5 minutes without reversing direction. The compound shall be considered as meeting the requirements of storage stability after performing satisfactorily as follows:

Film thickness. Not greater than the maximum film thickness specified in 3.11.1 for each grade plus 20 percent.

Exposure tests. Panels which meet the film thickness requirement shall be exposed to the following tests:

Grade 1 — 600 hours and 1200 hours in weatherometer.

Grade 2 — 7 days in the salt spray.

Grade 3 and 5 — 30 days in the humidity cabinet.

Grade 4 — 14 days in the salt spray.

Sprayability. As specified in 4.6.4.

4.6.4 *Sprayability.* A spray gun[3] (see figure 1) shall be filled one-half to two-thirds full with the compound under test, placed in a suitable cold chamber, and held at a temperature of 40° ± 2°F. for a period of 24 hours. At the end of this period, while still maintained at the temperature, a determination shall be made of the fluid flow rate from the gun, using a pressure of 35 pounds per square inch, gage (p.s.i.g.), on the fluid container. For this determination the atomizing pressure valve shall be closed and the needle travel regulator adjusted for maximum travel of the gun's trigger. A small tared weighing bottle shall be placed in front of the nozzle of the gun in position to catch the stream of fluid which flows from the gun when the trigger is pulled. After a measured time of flow the weight of fluid in the beaker shall be determined, and the flow rate in grams per second calculated. Following this, the atomizing pressure valve shall be opened, the pattern valve turned completely in, the atomizing pressure adjusted to 40 p.s.i.g maximum, and fluid pressure to a constant 35 p.s.i.g. The chilled compound shall then be sprayed on a glass plate which is held vertically and is approximately 12 inches away from the nozzle of the gun. The gun shall make one pass over the panel at the rate of one inch per second. The sprayed panel shall be allowed to dry for 24 hours at 40°F. in a horizontal position. The film shall then be examined for continuity. A material shall be considered sprayable at 40°F. if it flows at the rate of 1.0 gm. per second and the film on the sprayed glass panel is continuous.

4.6.5 *Corrosion.* Specimens of the following metals shall be used in this test:

Brass, QQ–B–626, composition 22 (leaded brass).

Anodes, cadmium, QQ–A–671.

Zinc, QQ–Z–285.

Magnesium, QQ–M–44.

Aluminum, QQ–A–250/4.

Steel, QQ–S–698, open hearth.

Metal specimens may be obtained from the Precision Scientific Company. (Suggested specimen size is ¼ by ⅞ by 2 inches.)

[3] The spray gun used in this test is a pressure type manufactured by the DeVilbiss Company, Toledo, Ohio, or equal.
The gun and component parts are identified as follows:
Gun: MBC510 765 FF
Fluid Needle: MBC–444–FF
Air Cap: AV 1239 No. 704
Reservoir: Screwtoptype, 1 qt. capacity, KN–519
Fluid Nozzle: AV–15–FF inside diameter of orifice 0.055
length 0.055

Lead-calcium alloy (nominal composition: Lead 98 percent, Tin 1 percent, Calcium 0.5 percent, — American Bearing Corporation, 429 S. Harding St., Indianapolis, Ind.)

4.6.5.1 *Immersion.* Prepare two sets of seven specimens each as specified herein. Drill a small hole near one corner in each specimen of the set for tests of 4.6.5.2. The immersion test shall be conducted as follows: The seven specimens shall be polished to remove pits, burrs, and irregularities from all faces and edges, finishing with a 240-grit polishing medium. The use of a slow speed horizontal metallurgical polishing wheel is convenient, with the final polishing being done with 240-grit aluminum oxide paper or cloth moistened with kerosene. The use of "wet or dry" cloths or "wet or dry" papers is prohibited. Specimens shall be cleaned by swabbing in hot naphtha with a final rinse in warm anhydrous methanol conforming to grade A of O–M–232 (use 95 percent methanol for the magnesium specimen). The specimens shall be held in a manner to avoid contact with the operator's hands. After weighing, place the specimens in a 3 inch diameter screw cap ointment or widemouth jar, arranging the specimens in the order as listed above along one diameter of the jar. Stand the specimens on one of their narrow ends and separate them from each other by glass-rod separators. The specimens shall be covered with enough compound (approximately 300 ml.) so that the tops of the specimens are at least ¼ inch below the surface of the compound. The sealed jar shall then be placed in an oven at 130° ± 2°F. for 7 days. Upon completion of the test, remove the compound and any loose corrosion products from the specimens by swabbing with surgical gauze pads moistened with naphtha, then with methanol (use 95 percent methanol for the magnesium specimen), and follow by clean solvent rinses. Reweigh the specimens and calculate the weight loss or gain in milligrams per square centimeter. (The suggested specimen size is ¼ by ⅞ by 2 inches.

4.6.5.2 *Coating.* The seven specimens polished and cleaned in accordance with 4.6.5.1 shall be coated with the compound as specified in 4.6.8.1.3. After a 24-hour drying period the specimens shall be placed in a gravity convection oven maintained at 120° ± 2°F. for 7 days. Upon completion of the test, remove the compound and any loose corrosion products from the specimens by swabbing with surgical gauze pads moistened with naphtha, then with methanol (use 95 percent methanol for the magnesium specimen), and follow by clean solvent rinses. Reweigh the specimen and calculate the weight loss or gain in milligrams.

4.6.6 *Miscibility with lubricating oil (grade 2).* To 95 ml. of grade 1100 lubricating oil of MIL–L–6082 in a 100 ml, cone-shaped centrifuge tube add 5 ml. of the rust preventive under test. Stopper the tube and shake by hand until the mixture appears homogeneous. Loosen the stopper and place the tube in a beaker (to keep it upright) and then place the beaker into an explosion-proof oven at 170°F. ± 2°F. for 15 minutes. Remove the tube and examine the contents for separation or sediment. Allow to cool to room temperature and examine again. Allow the tube to remain at room temperature for an additional 24 hours and examine again.

4.6.7 *Removability.*

4.6.7.1 *(Grades 1, 2, 3, and 4).* The apparatus for determining removability shall be essentially as shown on figure 2. Removability shall be determined on the test specimens that have completed the exposure period for accelerated weathering and shed storage tests. The specimens shall be placed in a position one at a time in the apparatus so that a felt pad wiper saturated with dry cleaning solvent conforming to type I of P–D–680, can wipe a streak 4¼ inches long, in a forward and backward motion, on the center of the specimen. The wiper shall consist of a 2-inch long wick made from an all wool felt (weighing approximately 190

ounces per square yard in a ¾-inch thickness) which shall be packed tightly into the lower end of a tube (wiper holder) 10 inches long and 5/16 inch inside diameter, and shall protrude ¼ to ½ inch outside. One or more indentations shall be made approximately 2 inches from the bottom of the wiper holder tube to prevent the wiper from being forced further into the tube. A rim supporting a weight sufficient to increase the weight of the wiper holder assembly to 200 grams shall encircle the holder tube approximately 2 inches from the top. The wiper holder shall fit into a supporting tube 4 inches long and 7/16 inch inside diameter, which is fixed in position and acts as a sleeve or guide. The wiper holder tube shall be filled with solvent tightly corked. It shall be uncorked and vented before each run so that the wiper felt is filled with solvent in an amount sufficient to make the run but without allowing the solvent to flow freely over the specimen. The length of the wiping stroke shall be 4 inches and the speed of the machine shall be regulated to 40 ± 5 cycles per minute. A complete wiping cycle shall consist of a stroke of approximately 4 inches in one direction with a return stroke to starting position. At the completion of the required number of cycles, the compound under the wiper should be completely removed (as determined visually) over an area ¼ inch wide and the entire length of the stroke.

4.6.7.2 *(Grade 5).*

4.6.7.2.1 *Preparation of specimens.* Steel panels ⅛ inch x 2 inches x 2 inches shall be fabricated from open hearth, cold finish, dead soft temper, low carbon steel conforming to QQ–S–698. The panels shall have a ⅛-inch hole centered ⅛ inch from one edge, as shown on figure 8. Panels shall be finished and cleaned as specified in paragraph 4.6.8.1.2, weighed to the nearest milligrams, and the corrosion preventive compound applied in accordance with paragraph 4.6.8.1.3. The coated panels shall be aged in a draft-, dust- and fume-free indoor atmosphere for 9 months before performing the hot water and low pressure steam removability tests.

4.6.7.2.2 *Removability apparatus.* The apparatus for determining the hot water and low pressure steam removability tests shall be essentially as shown on figure 8. It consists of a rectangular box 17 inches long, 2 inches wide and 2¼ inches deep with a removable cover and gasket. Welded to a hole in each end of the box are 1½-inch IPS pipe fittings to which are attached a 1½-inch valve and 1½-inch flange. The cover contains lugs for holding nine test panels perpendicular to the cover and at a 45° angle to the direction of flow. A pressure gage and a thermometer are fitted in the box.

4.6.7.2.2.1 *Flowing hot water test.* Secure eight aged panels to the cover of the removability apparatus (figure 8) with a blank panel to act as a baffle plate, at the bottom, to baffle the inlet flow. Attach the cover to the box. Mount the apparatus vertically with the valve at the bottom. Recirculate 180°F. hot water through the box from the bottom at a rate of 20 gallons per minute for three hours. Although the quantity of hot water used for this test is not critical, a 50 gallon reservoir is recommended for convenience. Remove the panels, dry, and weigh to the nearest milligram. Calculate the amount of corrosion preventive compound remaining as follows:

$$\text{Residue (g/sq ft)} = 16\,(A - B)$$

Where: A = Final weight of panel in grams

B = Uncoated weight of panel in grams

4.6.7.2.2.2 *Wet steam test.* Secure eight aged panels to the cover of the removability apparatus (figure 8) with a blank panel at the top. Attach the cover to the box. Mount

the box vertically with the steam entering from the top. Wet steam at 25 p.s.i.g. is piped to a 3/16-inch sharp-edged orifice placed in the flange at the top of the apparatus. The pressure in the apparatus is throttled to 15 psig by the valve at the bottom and the steam flowed through for three hours. Remove the panels, dry and weigh to the nearest milligram. Calculate the amount of corrosion preventive compound remaining as follows:

$$\text{Residue (g/sq ft)} = 16\,(A - B)$$

Where: A = Final weight of panel in grams

B = Uncoated weight of panel in grams

4.6.8 *Protection tests.*

4.6.8.1 *Preparation of specimens.*

4.6.8.1.1 *Panel composition and size.* Steel panels shall be fabricated from open hearth, cold finished, dead soft temper, low carbon steel conforming to QQ–S–636. The panels shall be ⅛ by 2 by 4 inches, conforming to the description contained in ASTM D–1748.

4.6.8.1.2 *Panel finish and cleaning.* The panel test surfaces shall be cleaned and finished as follows:

(a) After rounding the edges of the panel, reaming out the holes used for suspension, wipe the surfaces as clean as possible by use of solvent soaked rags (P–S–661 or TT–N–95).

(b) Scrub the panel with a clean cotton or surgical gauze swab in a beaker of hot petroleum naphtha (P–S–661 or TT–N–95).

(c) Rinse in hot petroleum naphtha.

(d) Rinse in hot anhydrous methanol (grade A of O–M–232) at least 10 seconds and allow the panel to dry. If the panels are not processed at once, preserve them in a desiccator.

(e) Buff the panel test surface by means of 240 grit aluminum oxide abrasive with cloth or paper backing so as to produce a surface finish of 10–20 microinches (r.m.s.). The use of "wet or dry" cloths or "wet or dry" papers is prohibited. The final abrasion marks shall be in the direction parallel to the length of the panel.

(f) Wipe off superficial dusts from the abrasion operation, using a clean, dry, absorbent tissue or cloth.

(g) Scrub abraded face of panel thoroughly with a clean, lint-free cloth until there is no dark stain on a clean section. Three-inch wide surgical gauze held in a blotter holder is convenient for this operation.

(h) Spray the panel with hot naphtha using a wash bottle or a spray gun. The panel should be held in a rack at 20° ± 5° from the vertical. The spray should be directed vertically down on the panel flushing the test surface progressively downward. Spray the test surface, back face, and finally the test surface again.

(i) Finally rinse the panel in fresh boiling anhydrous methanol allowing the panel to be immersed for at least 10 seconds to permit the panel to reach temperature of methanol before withdrawal.

(j) Permit the panel to dry and preserve in a desiccator, using it on the day of preparation.

4.6.8.1.2.1 The following precautions shall be observed in carrying out the cleaning and finishing procedure:

(a) The utensils and cloths used in the preparation of the panels shall be clean and free of contamination. Solvents shall be clean and renewed frequently.

(b) In all stages of treatment beginning with step (a), handling of equipment with bare hands shall be avoided. The panels shall be handled with hooks, forceps, or similar devices, care being taken to prevent contact of the panels with contaminated surfaces during the cleaning procedure.

4.6.8.1.3 *Application of corrosion preventive compound.* The procedures shall be performed at an ambient temperature controlled at 77° ± 2°F. and relative humidity of 50 percent or below. A tightly closed 0.9 full can of the compound shall be rolled at approximately 50 r.p.m. for 5 minutes without reversing direction and the coating chamber filled with the compound. Means shall be taken to assure that the compound is practically free from entrapped air bubbles, and any accumulation of air bubbles shall be skimmed from the surface of the compound prior to immersing the panels. The coating chamber shall be large enough to accommodate simultaneously the protection, film thickness, low temperature adhesion, and drying test panels. The panels shall be coated by suspending them vertically in the chamber containing sufficient compound to immerse the panels completely. The panels shall be allowed to remain immersed for one minute and then separated from the compound at a rate of 4 inches per minute. The coated panels shall be dried for 24 ± 1 hour in a draft, dust, and fume-free atmosphere prior to making film thickness measurements or other tests. During this drying period the panels shall be hung vertically by both hooks.

4.6.8.2 *Film thickness.* The average film thickness produced by the compound shall be determined on a panel prepared as specified in 4.6.8.1.3. The film thickness shall be calculated using the following formula:

$$\text{Film thickness (mils)} = \frac{1{,}000 \times W \times 0.061}{D \times A}$$

Where:

1 mil = 0.001 inch.

W = weight of film (grams).

0.061 cubic inch = 1 cubic centimeter

D = density of the film (grams per cubic centimeter c.c). Density is determined on the nonvolatile portion (see 4.6.2.) by means of pycnometer.

A = total surface area of the panel (square inches).

4.6.8.3 *Humidity test (grades 2, 3, 4, and 5).* Three specimens prepared as described in 4.6.8.1.3, suspended by 18–8 corrosion resisting steel or nickel-copper alloy metal hooks, shall be exposed for 30 days in a humidity cabinet constructed and operated in accordance with ASTM D–1748. At the completion of the exposure period the compound shall be considered as having passed this test if after removal of the compound no one of the panels shows more than a trace of corrosion on the leading test surface of the panel. A trace of corrosion is defined as not more than three dots of rust, no one of which is larger than one millimeter in diameter. Only corrosion within significant areas as outlined in ASTM D–1748 shall be considered.

4.6.8.4 *Salt spray test (grades 1, 2, and 4).* Three specimens prepared as specified in 4.6.8.1.3 shall be exposed for the specified time in accordance with salt spray (fog) procedure specified in method 4001 of FED–STD–791. No stop-off material shall be used on the edges. The panels shall be examined at the end of the exposure period and evaluated as specified in 4.6.8.3.

4.6.8.5 *Accelerated weathering test (grade 1 only).* Six specimens prepared as specified in 4.6.8.1.3 shall be exposed to an accelerated weathering test. The apparatus shall conform to and shall be operated as specified in method 6151 of FED–STD–141 except that the water temperature shall be maintained at 70 ± 10°F., and the pH of the water shall be 8 ± 1. The atlas Model XW Sunshine Arc Weatherometer is acceptable for this test. At the end of 600 hours of exposure removability as specified in paragraph 4.6.7 shall be determined on three (3) panels. Upon completion of the removability test, the panels shall be evaluated for resistance to accelerated weathering as specified in 4.6.8.3.

4.6.8.5.1 At the end of 1200 hours of exposure, the remaining 3 panels shall be examined for evidence of rust break through on the surface of the coating. Following this examination, removability shall be determined as specified in 4.6.7.

4.6.8.6 *Shed storage (grades 2, 3, 4, and 5).* Three specimens prepared as specified in 4.6.8.1.3 shall be subjected to the shed exposure test for the time specified in table I. The exterior construction of the shed is shown on figure 3. The interior of the shed box shown on figure 4 provides for 12 rows of wooden platforms to support the panels during exposure. As shown on figure 4, the panels rest in a groove cut in each of the platforms and lean at an angle of 15 degrees from the vertical against the back of the platform. A copper pan containing water 4 inches deep, covers the floor of the box. The panels are held 4 inches above the surface of the water. The sheds are not faced in any particular direction. At the end of the exposure period, the panels shall be tested for removability of the film as specified in 4.6.7 (not applicable to grade 5), and protection shall be evaluated as in 4.6.8.3. Unless otherwise designated by the qualifying activity, the shed exposure tests shall be performed by the San Francisco Bay Naval Shipyard, Mare Island Division.

4.6.8.7 *Film characteristic (grades 1, 2, 3, 4, and 5).* Specimens prepared in accordance with 4.6.8.1.3 shall be examined to determine whether the coating is continuous. Upon completion of the accelerated weathering (grade 1) and shed storage (grades 2, 3, 4, and 5) tests, specimens that exhibit cracking shall be considered as having failed. Specimens that exhibit checking, alligatoring, or other irregularities shall be considered satisfactory if there is no etching, pitting, or other evidence of corrosion on the significant areas of the panel as specified in ASTM D–1748, upon removal of the compound.

4.6.9 *Low-temperature adhesion (grades 1, 2, and 4).* One specimen each for grades 1, 2 and 4 shall be prepared, coated, and dried in accordance with 4.6.8.1.3, after which the specimen shall be cooled to a temperature of 0° ± 2°F. for grade 1 and to a temperature of minus 40° ± 2°F. for grades 2 and 4, and maintained at that temperature for one hour. While the specimens are at this temperature, four parallel scratches approximately ⅛ inch apart and 1 inch long shall be made on the film with the low-temperature scratch tool (see figure 5). Four similar scratches shall be made in a direction perpendicular to that of the first four. Unsatisfactory adhesion is characterized by flaking of the film within the areas bounded by the scratches. Chipping of the coating extending more than 1/32 inch from either side of the scratch marks shall be considered flaking.

4.6.10 *Drying (grades 1, 2, 3, and 5).* The coating on a test panel prepared in

accordance with 4.6.8.1.3 shall be allowed to drain and dry in a vertical position at room temperature 77°F. ± 2°F. for 4 hours for grade 1 and 24 hours for grades 2, 3 and 5. At the end of these times, examine grade 1 coating and determine whether they can be handled without injury to the film, and grades 2, 3 and 5 films to determine whether they are soft.

4.6.10.1 *Tackiness (grade 4).* The apparatus used for the tackiness test is shown on figure 6. The procedure is conducted at 77° ± 2°F. and a relative humidity not exceeding 50 percent.

4.6.10.1.1 *Apparatus.* The apparatus shall be as follows:

(a) Bottom (coated) specimen—(see figure 6). A 3 by 6 by ¼ inch steel panel, ground flat on each 3 by 6 inch side, with a beveled edge and hook. The unbevelled side shall be finished to 10 to 20 r.m.s. by polishing in accordance with 4.6.8.1.2(e).

(b) Top (uncoated) specimen—(see figure 6). A 2 by 3 by ¼ inch steel panel, ground flat on one side. Panel weight approximately 190 grams and finished on polished side to 5 to 10 r.m.s. by polishing with 210 emery grit paper. The panel shall be fitted with a removable pulley hook to be affixed to the unpolished side.

(c) Pulley—(see figure 6)—A 3 inch diameter pulley is mounted on a ball bearing supported shaft so that it is free to turn. The pulley shall be balanced and the diameter oriented vertically. The pulley groove must be sufficiently wide so that wire, figure 6, does not touch the pulley tips.

4.6.10.1.2 *Procedure.* The procedure shall be as follows:

(a) By means of the thin, relatively inelastic 0.012 inch diameter chrome-alloy resistance wire (25 pound test), hang equal weights to either side of the pulley. Determine what additional weight is required on one side to overcome the pulley inertia and cause it to turn (this additional weight should not exceed 10 grams if the pulley is properly prepared). Record this additional weight as W_1.

(b) Determine the weight necessary to lift the top panel by one edge at the lifting hook. Record this weight as W_2.

(c) Weigh the weight pan, (see figure 6) supporting wires and damping spring scale (see figure 6). Record this combined weight as W_3.

(d) Coat the lower panel, in accordance with 4.6.8.1.3. Allow the coated panel to drain and dry vertically at 77°F. After 4 hours the coating should be sufficiently dry to permit handling without injury to the film. Allow to dry for an additional 20 hours.

(e) Thoroughly degrease the top panel and place it polished surface down in the center of the lower coated panel.

(f) Line up the top panel pulley hook beneath the pulley to insure a vertical pull. (A plumb bob can be used to locate the hook in line with the vertical pull.)

(g) Place a 1600 gram weight as shown on figure 6, on top of the

top panel. Immediately, thereafter, by means of the pulley wire attached to the hook, load the opposite side of the pulley with the damping spring scale and the scale pan containing sufficient weights to provide a net upward force on the upper test panel of 600 grams. (To calculate the weight to be placed in the scale pan do the following: Scale pan load = 600 gms. $+W_1 +W_2 -W_3$.) The weights shall be carefully added to the the scale pan to avoid oscillation, swing or jarring.

(h) After a 5 minute loading period, the 1600 gm. loading weight is removed and the clocking of time for top panel break-away is begun.

(i) A compound is considered as passing this test if break-away occurs before 5 seconds have elapsed. Four determinations shall be made and passing values shall be obtained in at least 3 instances.

4.6.11 *Water displacement and water stability (grades 3 and 5).*

4.6.11.1 *Preparation of test panels.* Test panels approximately 2 by 3 inches by 1/16 inch with well rounded edges shall be prepared from open hearth, low carbon steel. The surfaces shall be uniformly abraded by sandblasting with sharp white silica sand which is free from organic matter. The sand shall pass the following fineness requirements (see RR–S–366):

	Percent
Through No. 10 U.S. standard sieve, minimum	100
Retain on No. 20 U.S. standard sieve, maximum	10
Through No. 50 U.S. standard sieve, maximum	10

Badly rusted panels shall not be used, and any oil or inorganic residue on the panels shall be removed with hot naphtha and hot methyl alcohol rinses prior to sandblasting.

4.6.11.2 After each panel is sandblasted. it shall be immediately placed in a container of commercial anhydrous methyl alcohol conforming to grade A of O–M–232. Just prior to the final cleaning procedure, the methyl alcohol and panels shall be heated so that upon withdrawal of each panel it will be well above the dew point of the room. The panels shall be cleaned by spraying with naphtha, rinsing in hot naphtha and rinsing in hot methyl alcohol. Immediately after cleaning, the panels shall be stored in a calcium chloride desiccator and shall be used the same day as prepared. The panels shall be handled with forceps or other instruments at all times during and after the sandblasting operation to avoid fingerprint corrosion.

4.6.11.3 *Preparation of compound.* Fifty c.c. of the compound shall be placed in a 125-c.c. Erlenmeyer flask, 5 c.c. of distilled water added, and the mixture thoroughly shaken. The stoppered flask shall be stored overnight at 130° ± 2°F. and cooled to 77° ± 2°F. for testing.

4.6.11.4 *Water displacement procedure.* Each of three panels, prepared as specified in 4.6.11.1 and 4.6.11.2, shall be dipped in distilled water momentarily and drained in a vertical position for not more than five seconds, with the bottom edge in contact with absorbent paper. The panel shall be immersed horizontally and without agitation for 15 seconds in a petri or evaporating dish containing the compound previously prepared as specified in 4.6.11.3. After draining momentarily, the panel shall be placed in a static humidity cabinet (for example, a de-

siccator body containing some distilled water) for one hour at 77° ± 2°F. The compound shall be considered as having passed the water displacement test, if at the end of one hour in test and after removal of the compounds, the panels show no evidence of rusts, mottling, or other abnormal surface strains and defects.

4.6.11.5 *Dilution.* The compound 1:1 shall be diluted with paraffin base oil (a neutral noninhibited petroleum oil of 90–100 S. U.S. viscosity at 100°F.) and the water displacement test performed as specified in 4.6.11.4 evaluating the test results in a similar manner.

4.6.12 *Flow resistance (grades 1 and 4).* A steel panel as specified in 4.6.8 shall be finished and clean according to the procedure of 4.6.8.1.2. A line shall be scribed parallel to and 7/8 inch from the bottom long edge of the panel as shown on item (a) of figure 7. A 1-inch wide strip of cellulose adhesive tape conforming to type II of UU–T–101 shall be applied to the bottom half of the panel on both sides (see item (b) of figure 7). The panel shall then be coated as specified in 4.6.8.1.3. After the 24-hour drying period, the tape shall be carefully removed. The bottom edge of the 1-inch strip of coating should then be parallel to the long edge of the panel and at right angles to the panel surface. The line previously scribed on the panel should now be 1/8 inch below and parallel to the bottom edge of the film (see item (c) of figure 7). The panel shall then be suspended vertically, with the uncoated area downward for 4 hours in a forced convection oven maintained at 175° ± 2°F. The panel shall be removed from the oven and allowed to cool to room temperature. The position of the edge of the coating relative to the reference line scribed on the panel shall be observed. The compound shall be considered to fail the flow resistance requirement if any movement of the coating toward the reference line has occurred as a result of heating.

4.6.13 *Transparency (grade 4)* On the panels to be used for shed exposure tests (see 4.6.8.1.1) fine markings no more than 3/16 inch high shall be scratched on the reverse (nonevaluated) side. These markings may be the numbers or letters normally used in identifying the panel. A well-sharpened scratch-awl is adequate for marking. The markings shall be legible after the 4 hour drying period and after the shed exposure test.

5. PREPARATION FOR DELIVERY

5.1 Packaging. The corrosion preventive compound shall be furnished in one-gallon cans, 5-gallon pails, or 55-gallon drums as specified (see 6.2). Packaging shall be level A or C, as specified (see 6.2).

5.1.1 *Level A.*

5.1.1.1 *Cans.* The one gallon cans shall conform to type V, class 2 of PPP–C–96. Exterior coating shall be plan B.

5.1.1.2 *Pails.* The 5-gallon pails shall conform to type II, class 1 or 3 of PPP–P–704. Exterior coating of the pails shall be required. Wire handles or bails shall be treated to resist corrosion.

5.1.1.3 *Drums.* The 55-gallon drums shall conform to type III of IV, as specified (see 6.2) of PPP–D–729. Exterior coating of the drums shall be required. Unless otherwise specified in the contract or order, the coating shall conform to TT–E–485.

5.1.2 *Level C.* The compound shall be packaged in accordance with manufacturer's commercial practice.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.2.1 *Level A.* The compound, packaged in cans in accordance with level A or C as specified (see 6.2), shall be packed in overseas type wood-cleated fiberboard, nailed

wood, wirebound wood (style 3 for type 2 load), corrugated or solid fiberboard, wood-cleated paper overlaid or wood-cleated plywood boxes conforming to PPP–B–591, PPP–B–621, PPP–B–585 PPP–B–636, class 3, PPP–B–576 or PPP–B–601, respectively. Plywood shall be type II, class 1 of NN–P–515. Box closures shall be as specified in the applicable box specification or appendix thereto. The gross weight of wood boxes shall not exceed 200 pounds; that of fiberboard boxes shall not exceed the weight limitations of the applicable box specification. Five-gallon and 55-gallon drums will require no packing.

5.2.2 *Level B.* The compound, packaged in cans in accordance with level A or C as specified (see 6.2), shall be packed in domestic type wood-cleated fiberboard, nailed wood, wirebound wood, (for type 2 load), wood-cleated-plywood, or wood-cleated paper overlaid boxes conforming to PPP–B–591, PPP–B–621, PPP–B–585, PPP–B–601, or PPP–B–576, respectively, or in overseas type corrugated or solid fiber boxes conforming to class 2 of PPP–B–636. Closures shall be as specified in the applicable box specification or appendix thereto. Fiberboard boxes shall conform to the special requirements of the applicable box specification. Five-gallon and 55-gallon drums will require no packing.

5.2.3 *Level C.* The compound, packaged in cans in accordance with level A or C as specified (see 6.2), shall be packed in containers in a manner to insure safe delivery and acceptance at destination. Containers and packing shall comply with the Uniform Freight Classification Rules or other carrier regulations applicable to the mode of transportation. Five-gallon and 55-gallon drums will require no packing.

5.3 **Marking.** In addition to any special marking specified in the contract or order, each unit and intermediate package and shipping container shall be marked in accordance with MIL–STD–290. Each container shall be marked as follows:

CAUTION

1. Agitate well before using.
2. Contains combustible petroleum thinners of 100° F. minimum flash point.
3. Avoid use near open flames, sparks, or welding or cutting operations.
4. Avoid prolonged or repeated contact with the skin, or breathing of vapors.

When prolonged exposures are necessary, use protective clothing and proper masks.

6. NOTES

6.1 Intended use. The corrosion preventive compound covered by this specification is intended for the following uses:

Grade 1:

(a) For protection of metals when exposed to outdoor weather conditions.

(b) For general purpose preservation, indoor or outdoor, with or without cover, for domestic and overseas shipment where a "dry-to-touch" film is required.

Grade 2:

(a) For extended undercover protection of interior or exterior surfaces of machinery, instruments, bearings or material with or without use of supplementary barrier materials.

(b) For outdoor protection of material for limited periods where metal temperatures do not reach levels which produce prohibitive flow of the corrosion preventive film.

Grade 3:

(a) For use where water or saline solution must be displaced from corrodible surfaces and the corrosion prevented or arrested.

(b) For protection of interior surfaces of machinery, instruments, or material under cover for limited periods.

(c) For protection of critical bare steel or phosphated surfaces for extended periods when packaged with satisfactory barrier materials.

Note: Use grade 5 on metal(s) which may be attacked by an alkaline treatment during the preservative removal stage. The chemical "boil-out" is alkaline and its use should be avoided with such materials as aluminum and magnesium alloys.

Grade 4:

(a) For general purpose indoor and limited outdoor preservation of corrodible metals with or without an overwrap and where handling, stacking and counting requires a tack-free coating.

(b) Where a transparent coating is required in addition to properties indicated in item (a) above.

(c) Where there is no requirement for miscibility with lubricating oil and where ease of removal with stoddard's solvent is important.

Grade 5:

(a) For use in place of grade 3 corrosion preventive compound where chemical "boil-out" cannot be used for removal (see grade 3).

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.

(b) Grade required (see 1.2).

(c) Container required (see 5.1).

(d) Level of packaging and level of packing required (see 5.1 and 5.2).

(e) Type of drum required (see 5.1.1.3).

6.3 The material should be purchased by volume, the unit being a U.S. gallon at 15.5°C.

6.4 With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in Qualified Products List QPL–16173. The attention of the suppliers is called to this 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. The activity responsible for the qualified products list is the Naval Ship Engineering Center, Department of the Navy, Washington, D.C. 20360, and information pertaining to qualification of products may be obtained from that activity. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification" (see 6.5).

6.5 Copies of "Provisions Governing Qualification" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

6.6 The manufacturer's trade name or designation which identifies the finished product is regarded as a permanent and unique identification of the material tested and cannot be applied to any other material submitted for qualification. Therefore, during qualification, it is advisable to identify the compound by a code number rather than by the trade name which may be desired for

permanent identification of the material. The use of the specification number in the trade name or designation is prohibited.

6.7 Qualification approval test data on approved products required for carrying out tests is available upon request. This information may be obtained from the Commander, Naval Ship Engineering Center, Department of the Navy, Washington, D.C. 20360.

6.8 Grades 1, 2 and 3 are listed in MIL-P-116 as P-1, P-2, and P-3, respectively.

6.9 CHANGES FROM PREVIOUS ISSUE. THE EXHIBIT OF CHANGES (DELETIONS, ADDITIONS, ETC.) PRECLUDE THE ANNOTATION OF THE INDIVIDUAL CHANGES FROM THE PREVIOUS ISSUE OF THIS DOCUMENT.

Custodians:

Army—MR

Navy—SH

Air Force—69

Review activities:

Army—MR, EL, MO, WC

Navy—SH, AS, OS, YD

Air Force—69, 11

User activities:

Navy—MC

Preparing activity:

Navy—SH

(Project No. 8030-0179)

FIGURE 1. *Sprayability test apparatus and setup.*

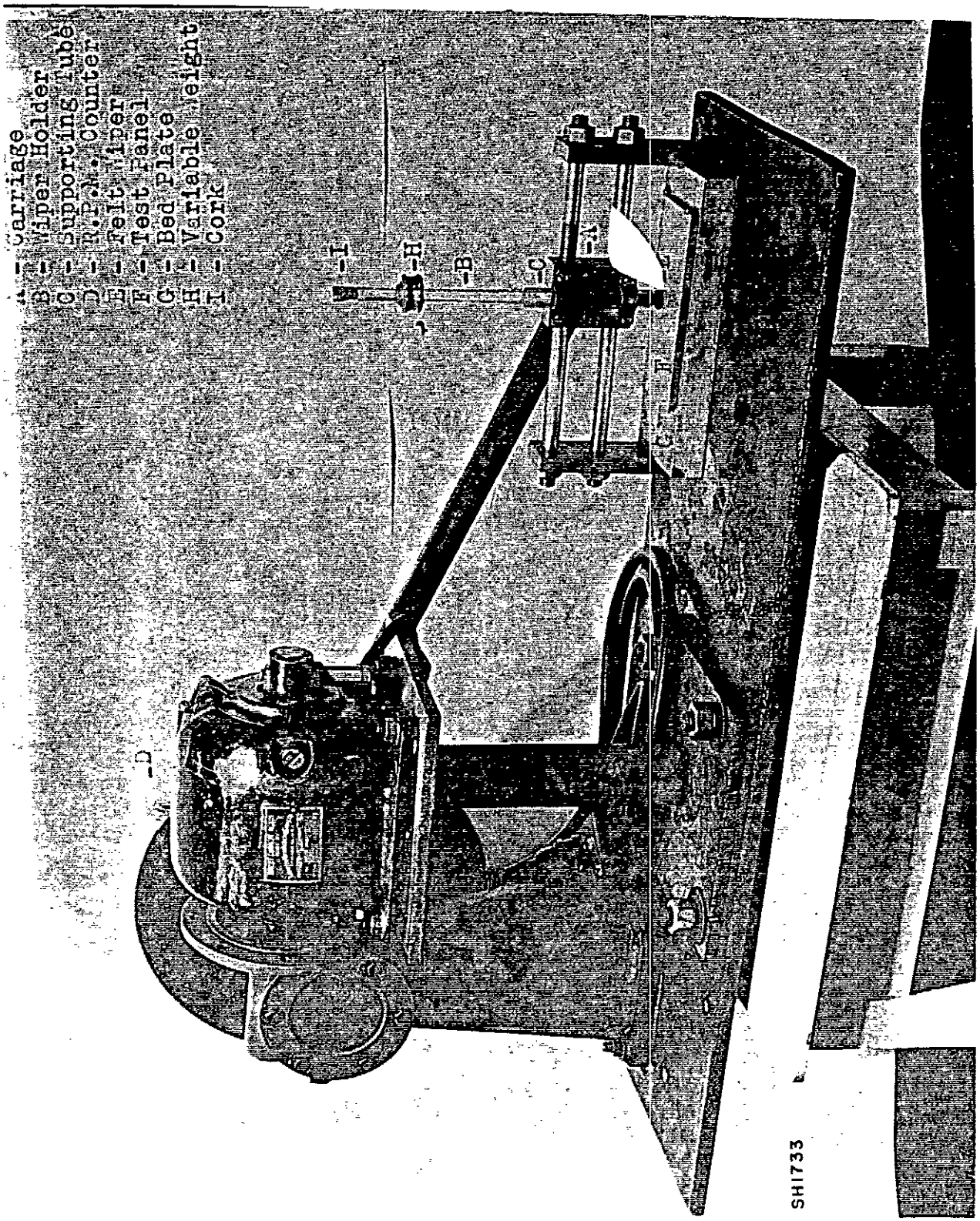


FIGURE 2. *Apparatus for determining removability.*

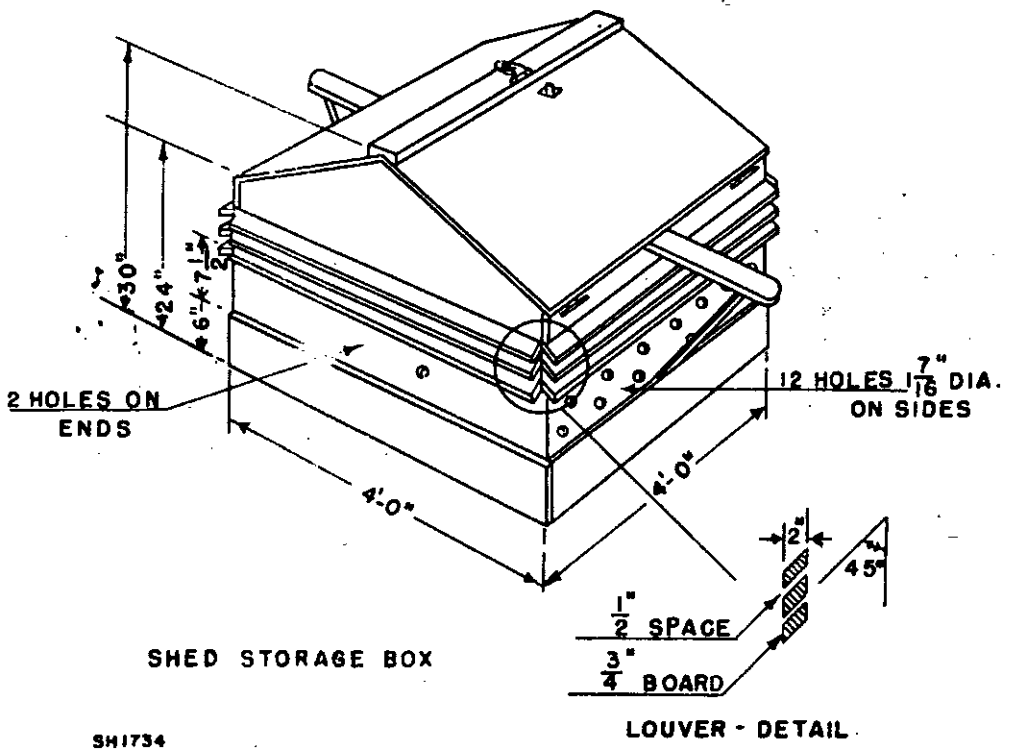


FIGURE 3. *Shed storage box.*

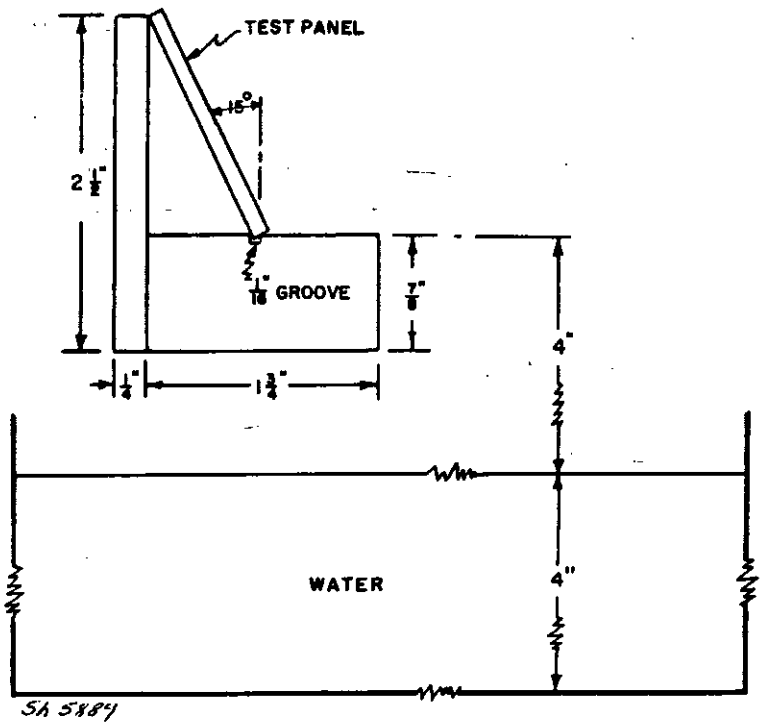
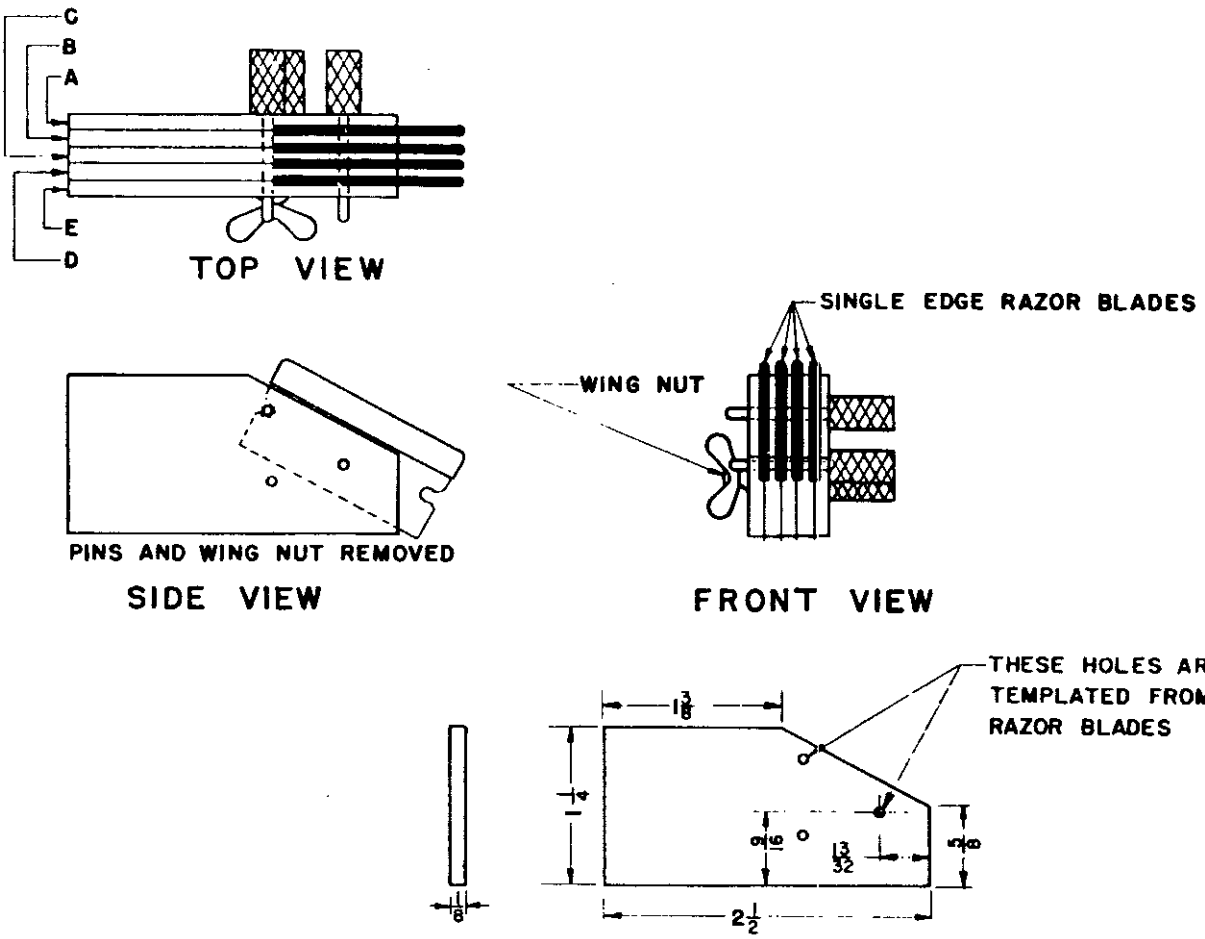


FIGURE 4. *Design of panel platform in shed.*



PARTS A, B, C, D, E, (SEE TOP VIEW), ARE IDENTICAL EXCEPT THAT AREAS ARE SPOT FACED AS REQUIRED TO ACCOMMODATE THICKNESS OF RAZOR BLADE.

9H1735

FIGURE 5. *Low temperature scratch tool.*

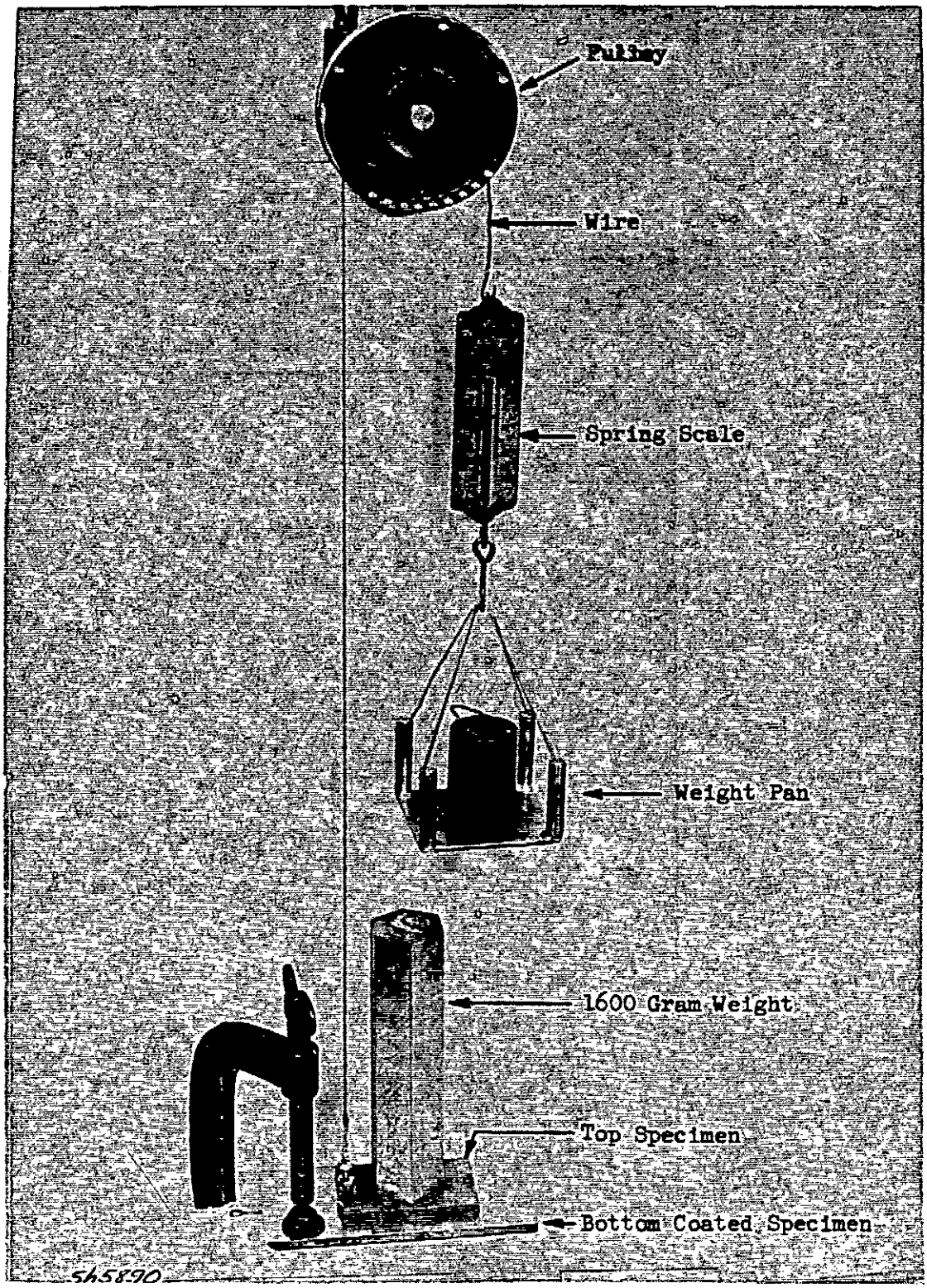


FIGURE 6. *Tackiness test apparatus.*

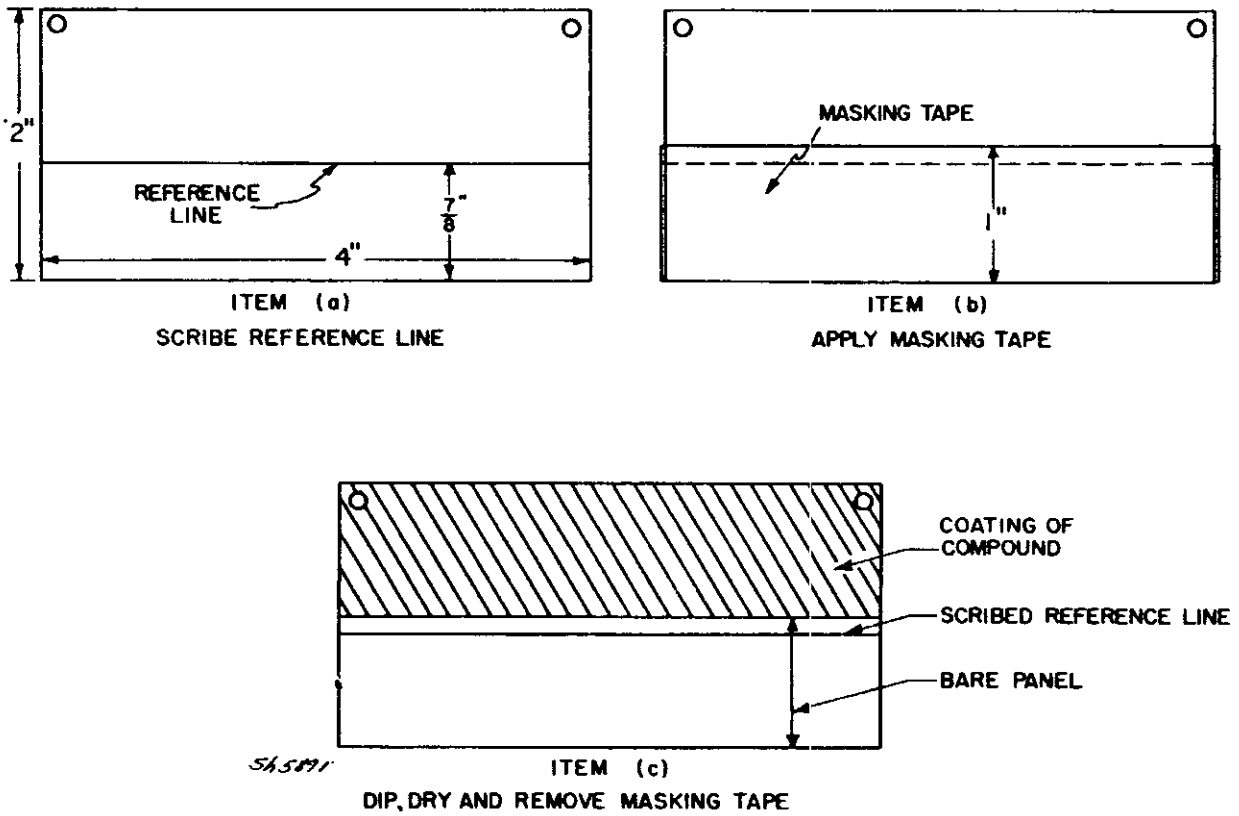


FIGURE 7. *Flow resistance test.*

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NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document*(s)* or to amend contractual requirements.

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(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: _____
b. ADDRESS *(Street, City, State, ZIP Code)*	

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426

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