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 SUPERSEDING
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MILITARY SPECIFICATION

PACKAGING MATERIALS, VOLATILE CORROSION INHIBITOR TREATED, OPAQUE

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

1. SCOPE

1.1 Scope. This specification covers treated carriers coated or impregnated with a corrosion inhibitor. The vapor from the inhibitor passes onto and protects adjacent metal surfaces. The treated carrier shall be used in accordance with MIL-1-8574 (see 6.1).

1.2 Classification. Treated carriers shall be furnished in the following classes, styles and forms, as specified. Unless a specific style of treated carrier is indicated in the contract or order, style A or B and Class 1 shall be furnished (see 6.2).

Classes

1	Heavy duty
2	Medium duty
3	Light duty

Styles

A	Kraft, flat
B	Kraft, creped or embossed
C	Greaseproof, waterproof, moldable
G	Creaseproof, waterproof
H	Kraft, flat, cohesive coated
J	Paperboard, wrapping and cushioning, cohesive coated
K	Paperboard, wrapping and cushioning

Form

a	Carrier coated with corrosion inhibitor
b	Carrier impregnated with corrosion inhibitor

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Systems Engineering and Standardization Department (Code 53), Naval Air Engineering Center, Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MISC N/A

FSC 9135

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1.3 Specification part number Specification part numbers for the items described in this specification will be formulated as shown in 3.8

2 APPLICABLE DOCUMENTS

2.1 Government documents

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

SPECIFICATIONS

FEDERAL

V-T-295	Thread, Nylon
QQ-A-1876	Aluminum Foil
QQ-C-576	Copper Flat Products With Slit, Slit and Edge-Rolled, Sheared, Sawed, or Machined Edges, (Plate, Bar, Sheet, and Strip)
TT-T-291	Thinner Paint, Mineral Spirits, Regular and Odorless
MMM-A-260	Adhesive, Water-Resistant, (for Sealing Water-proofed Paper)
PPP-B-601	Boxes, Wood, Cleated Plywood
PPP-B-621	Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	Box, Shipping, Fiberboard
PPP-D-723	Drums, Fiber
PPP-F-320	Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes
PPP-P-291	Paperboard, Wrapping and Cushioning
PPP-T-60	Tape, Packaging, Waterproof
PPP-I-76	Tape, Pressure Sensitive Adhesive, Packaging, Paper (for Carton Sealing)

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SPECIFICATIONS (Continued)

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MIL-B-121	Barrier Material, Greaseproofed, Waterproofed, Flexible
MIL-B-131	Barrier Material; Watervaporproof, Greaseproof, Flexible, Heat-Sealable
MIL-I-8574	Inhibitors, Corrosion, Volatile, Utilization of
MIL-B-22191	Barrier Materials, Transparent, Flexible, Heat Sealable

STANDARDS

FEDERAL

FED-STD-101	Test Procedures for Packaging Materials
FED-STD-313	Material Safety Data Sheets, Preparation and Submission of

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MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

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

CODE OF FEDERAL REGULATIONS

29 CFR 1910.1200 Hazard Communication

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

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. The issue of the document which is indicated as DOD adopted shall be the issue listed in the current DODISS and the supplement thereto, if applicable.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D130	Test for Detection of Copper Corrosion From Petroleum Products by the Copper Strip Tarnish Test
D689	Test for Internal Tearing Resistance of Paper
D3951	Standard Practice for Commercial Packaging

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

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 specification shall take precedence

3 REQUIREMENTS

3.1 Qualification The treated carriers 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 6.3)

3.2 Materials Treated carriers shall be made from such materials and by such processes as to assure compliance with this specification

3.2.1 Composition Material covered by this specification shall consist of a carrier treated with a volatile corrosion inhibitor (VCI) in the form of a coating or an impregnation

3.2.2 Carrier The carrier shall have a pH value between 6 and 8. The pH value shall be as close to 7 as possible

3.2.3 Moisture content The moisture content of treated carriers shall be a value sufficient to prevent water vapor condensation when sealed in a polyethylene bag (see 5.1.2)

3.3 Classification requirements

3.3.1 Class The various classes of treated carriers shall comply with the requirements listed in table I

3.3.2 Style The various styles of treated carriers shall comply with the following

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TABLE 1. Properties.

Property	Test Paragraph	Requirement
Compatibility with copper	4.6.1	No pitting, etching or severe discoloration of vapor exposed copper surface. Discount attacks within 1/16 inch of specimen. <u>1/</u>
Vapor inhibitor ability (VIA)	4.6.2	No corrosion, etching or pitting of polished surface of steel panel. <u>1/</u>
Vapor inhibitor ability after exhaustion	4.6.2	Comply with requirements of VIA test. <u>1/</u>
Contact corrosivity	4.6.2	No corrosion, etching or pitting of contact area of panel.
Blocking resistance	4.6.2	No delamination, tearing or flaking when the sheets are separated.
Water resistance of markings	4.6.2	No adverse effects of water on the markings.
Strength:		Bursting Strength Tearing Strength
Bursting	4.6.2	(PSI MIN) <u>2/</u> (GMS MIN)
Tearing (machine and cross directions)	4.6.2	Class 1 60 110
		Class 2 40 40
		Class 3 20 12
Compatibility with MIL-B-131 barrier material	4.6.2	No delamination, swelling, embrittlement, dissolution, effect on the sealability or other deterioration to impair usefulness of barrier material.
Long term protection	4.6.3	No corrosion of steel panels.
Seam strength: As received Sealed after aging	4.6.4	Separation shall not exceed 50%. Separation shall not exceed 50%.

1/ Discount crystalline haze or stain readily removed with methanol saturated gauze.

2/ On crepe material, bursting strength value shall be obtained with specimen stretched. Crepe requirement shall be 50 percent of flat.

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<u>Style</u>	<u>Construction Characteristics</u>
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- | | |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A and B | May be single ply kraft or laminated kraft |
| C | Material conforming with classes 1, 2 or 3 shall be laminated to material conforming to QQ-A-1876 |
| C | Material conforming with classes 1, 2 or 3 shall be constructed to conform to MIL-B-121, type I or type II, grade A |
| H | May be single ply or laminated kraft with cohesive coating |
| J | Material conforming with classes 1, 2 and 3 shall be constructed to conform to PPP-P-291, type III, style 1 with the addition of a cohesive coating on one side |
| K | Material conforming with classes 1, 2 and 3 shall be constructed to conform to PPP-P-291, type III, style 1 |

3.4 Size Unless otherwise specified (see 6.2), rolls shall be 36 inches wide by 200 linear yards long. Unless otherwise specified (see 6.2), flat cuts shall be 24 by 36 inches. The tolerance on the width of the roll and the sheet size in either direction shall be +1/4 inch and -1/8 inch. Roll length shall not be less than 200 yards.

3.4.1 Utility rolls Unless otherwise specified (see 6.2), utility rolls shall be 18 inches wide by 10 linear yards long. Tolerance on roll width shall be +1/4 inch and -1/8 inch, tolerance on roll length shall be +6 inches and -0 inches.

3.5 Identification of material If the material is treated on one side only, it shall be marked on the untreated side wherever surface conditions permit. If both sides are treated, printing on either side will be permissible. The letters and figures, which shall be made with a water-resistant ink, shall be clear and legible, with a minimum height of 1/8 inch. A group of markings shall contain the following information:

- a. Precautionary note DO NOT USE WITH FOODSTUFFS
- b. Specification number.
- c. Specification part number (see 3.8 and 6.2)
- d. Manufacturer's name.
- e. Manufacturer's designation
- f. Month and year of manufacture
- g. Notation of "OTHER SIDE TREATED" (This notation shall be used when only one side has been treated)

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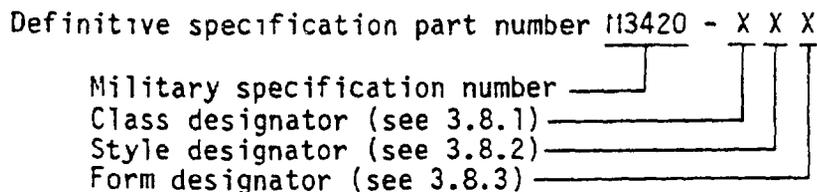
For material on rolls, the lines of print shall be perpendicular to the longer sides of the material (see figure 1). The group of markings shall be repeated laterally on 10-inch centers. There shall be a maximum of 2 inches between the bottom line of one group of markings and the top line of the next group. When marking is not possible due to surface conditions, tags which show the above information, except for notation g, shall be utilized. In the case of flat units, a sheet showing the same information shall be inserted in the package. Tags or sheets shall be visible upon opening the roll or package.

3.5.1 Sealing conditions (styles H and J). A sheet containing the manufacturer's recommended sealing conditions for use with cold seal packaging machinery shall be provided with each roll or bundle of sheets of styles H and J materials.

3.6 Properties. When tested as specified in Section 4, the treated carrier shall comply with the requirements indicated in table I.

3.7 Workmanship. Finished material supplied under this specification shall be a coated or impregnated treated carrier and shall, in the case of a coated carrier, show no appreciable loss of coating as evidenced by the non-uniform appearance of voids in the coating or substrates. Finished material shall be uniformly constructed and free from defects that would impair its usefulness.

3.8 Definitive specification part number. The specification part number is a definitive part number which will be formulated to identify each item covered by this specification. The part number will be formulated by selecting from the requirement options available in this specification as follows:



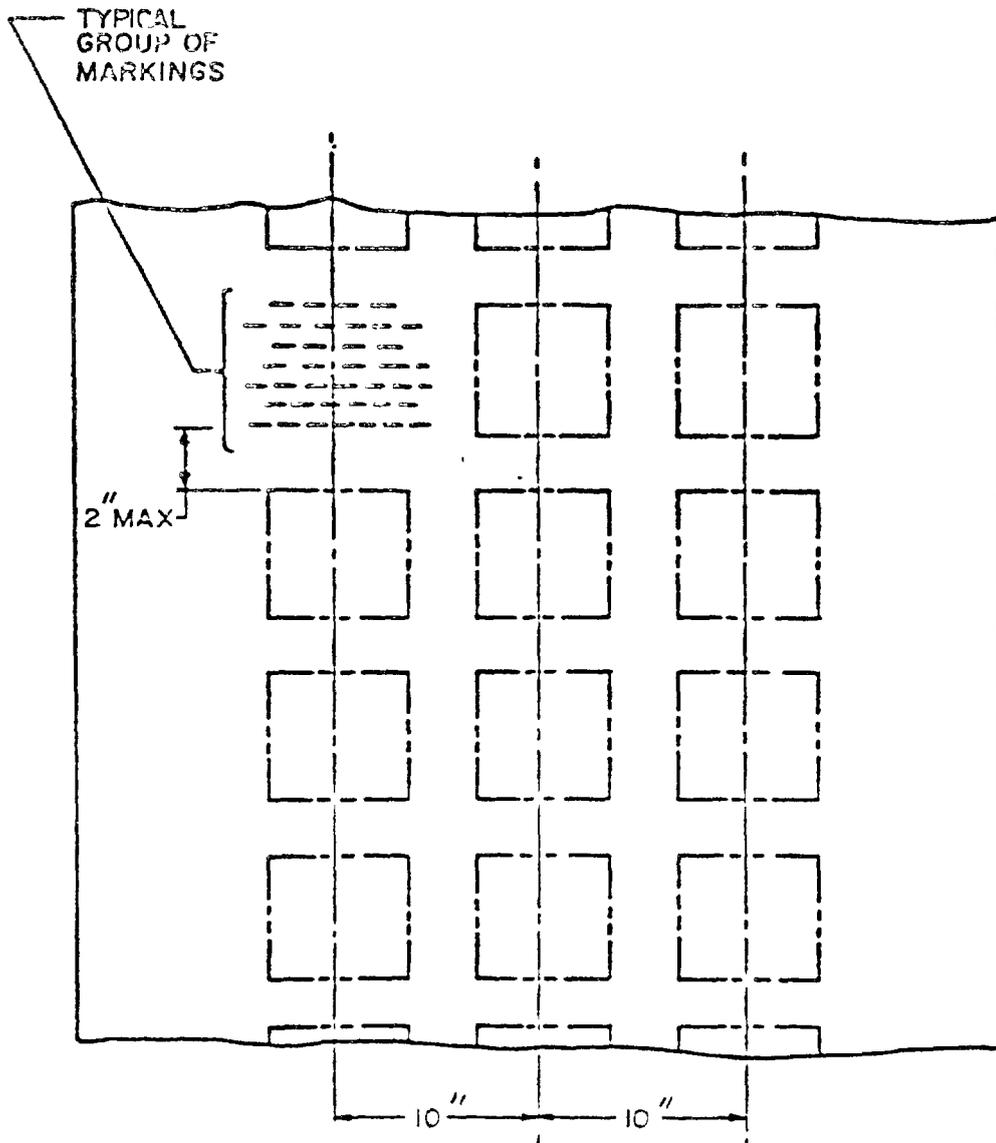
3.8.1 Class designator. A one position field used to designate the class of volatile corrosion inhibitor treated packaging material required (see table II).

TABLE II. Class designator.

Class designator	Remarks
1	Heavy duty
2	Medium duty
3	Light duty

3.8.2 Style designator. A one position field used to designate the style of volatile corrosion inhibitor treated packaging material required (see table III).

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DIMENSIONS IN INCHES

FIGURE 1. Marking of rolled packaging materials.

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TABLE III Style designator

Style designator	Remarks
A	Kraft, flat
B	Kraft, creped or embossed
C	Greaseproof, waterproof, moldable
G	Greaseproof, waterproof
H	Kraft, flat, cohesive coated
J	Paperboard, wrapping and cushioning, cohesive coated
K	Paperboard, wrapping and cushioning

3.8.3 Form designator. A one position field used to designate the form of volatile corrosion inhibitor treated packaging material required (see table IV)

TABLE IV Form designator

Form designator	Remarks
a	Carrier coated with corrosion inhibitor
b	Carrier impregnated with corrosion inhibitor

3.9 Material Safety Data Sheets. A Material Safety Data Sheet (MSDS) shall be prepared and submitted in accordance with FED-STD-313 and 29 CFR 1910.1200. Questions pertinent to the effect of volatile corrosion inhibitor treated packaging materials 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 advisor to the acquiring activity (see 4.7, 6.2 and 6.8).

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

4.1.1 Responsibility for compliance. All items must 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 requirement in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

- a. Qualification inspection - The qualification inspection of the treated carrier shall consist of all the tests of this specification (see 4.2).
- b. Quality conformance inspection (see 4.3).

4.2 Qualification.

4.2.1 Qualification inspection samples. Qualification inspection samples shall consist of 10 square yards of untreated and 25 square yards of treated carrier, which is the basic sheet for the manufacturer's entire line of VCI materials. Samples of the treated carrier and the untreated carrier shall be encased in separate packages. Samples shall be forwarded to the Naval Air Development Center, Warminster, PA 18974, marked Attention: Aircraft and Crew Systems Technology Directorate (Code 60622). Samples shall be plainly identified by securely attached, durable tags marked with the following information:

Packaging Materials, Volatile Corrosion Inhibitor Treated, Opaque.

Samples for Qualification Inspection

Name of Manufacturer (plant where material is manufactured)

Class _____ Style _____ Form _____

Material Designation _____

Date of Manufacture _____

Submitted by (Name) (Date) for qualification inspection in accordance with the requirements of MIL-P-3420F under authorization (reference authorizing letter)

The contractor shall submit with the qualification samples a certified copy of test results showing conformance with all the requirements of this specification except the long term protection test. The report of tests shall specify: identification of inhibitor, treated carrier and sequence of fabrication.

4.2.2 Retention of qualification. In order to retain qualification of a product approved for listing on the Qualified Products List (QPL), the manufacturer shall verify its compliance by certification to the qualifying activity. Unless otherwise specified by the activity responsible for the Qualified Products List, certification shall be at intervals of not more than two years.

4.2.3 Submitted samples. The qualification inspection sample shall be considered representative of the manufacturer's entire line of treated carriers; however, where the following modifications have been made, additional qualification samples as specified in 4.2.1 are required:

- a. Change in quantity or type of corrosion inhibitor.
- b. Change in method of treatment, such as impregnation to coating or vice versa.

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- c. Change in binder.
- d. Change to a different basic carrier other than kraft paper, such as direct application to foil, plastic, etc.

4.2.4 Retest. Material rejected by the Government testing agency according to the requirements of this specification shall not be retested for qualification at the request of the manufacturer unless evidence is furnished that changes have been made in the material.

4.3 Quality conformance inspection. Inspection shall be in accordance with MIL-STD-105 except where otherwise indicated. The contractor shall furnish all samples and shall be responsible for accomplishing the required tests (see 4.3.3.2). Check tests may be performed at the discretion of the Government inspector at a Government laboratory for information and correlation purposes. Acceptance testing will be performed at a designated laboratory when results of check tests warrant. The contractor shall furnish test reports showing quantitative results for all inspection tests required by this specification for each lot of material.

4.3.1 Inspection lot. An inspection lot shall consist of either 50,000 square yards of material or all material manufactured by the same process from the same components during one production run, whichever is the lesser. Each lot shall contain only material of the same class, style and form.

4.3.1.1 Resubmitted inspection lots. Paragraph entitled "Resubmitted lots or batches" of MIL-STD-105 shall apply except that a resubmitted inspection lot shall be inspected by the contractor under supervision of the Government inspector using tightened inspection.

4.3.2 In process or end item sampling (visual inspection).

4.3.2.1 Unless otherwise specified by the procuring activity, examination of the end item shall be in accordance with the list of defects and Acceptance Quality Levels (AQLs) set forth below. Facilities shall be made available to the Government inspector for conducting the examinations prescribed herein.

4.3.2.1.1 Examination of the end item for defects in appearance, construction and workmanship. The lot size for this examination shall be expressed in units of square yards of treated carrier. Samples for examination shall be selected in accordance with Level S-3 of MIL-STD-105 with an AQL of 1.5 defects per 100 units. Sufficient rolls shall be selected at random so that by examining approximately 15 yards per roll, the required sample yardage will be obtained. For examination of sheets, samples shall be selected at random. Defects of each type shall be scored only once for each occurrence within a square yard.

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EXAMINE	DEFECT
(Check both sides of treated carrier)	
Configuration	Not rolled or flat cut, as specified
Cleanness	Surfaces not clean; presence of any foreign matter, dirt, sand, grit or oil spots (NOTE Defects do not apply to outer convolution of roll.)
Workmanship	Delamination Embrittlement Any hole (excluding optical pinholes) Any tear Any cut Any chafed spot. (Workmanship defects do not apply to material within 2 inches of beginning or end of roll)
Construction	Not uniform Any layer or section missing
Identification of material (marking)	Missing, incorrect or illegible Not on backing surface where required Complete marking not repeated as specified Legend of markings not as specified in 3 5 Lettering less than 1/8 inch high More than 2 inches between groups of markings Less than one group of markings in each 10 inches of width. Tags or sheets, when applicable, not properly located.

4 3 2 1 2 Examination of the end items for defects related to coating or impregnation The lot size for this examination shall be expressed in units of square yards of treated carrier Sampling shall be in accordance with Inspection Level S-3 of MIL-STD-105 with an acceptance number of zero

EXAMINE	DEFECT
Roll or package sheets	Loss of coating or impregnation causing bald spots Coating or impregnation completely missing. Granular sandpaper surface

4 3.2.1 3 Examination of the end item for defects related to the roll or package of sheets The lot size for this examination shall be expressed in units of rolls or packages of sheets Samples for examination shall be selected in accordance with Inspection Level S-3 of MIL-STD-105 with AQL of 15 defects per 100 units.

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EXAMINE	DEFECT
Roll Width	More than 36-1/4 inches. Less than 35-7/8 inches.
Utility roll width	More than 18-1/4 inches. Less than 17-7/8 inches.
NOTE: When other roll widths are specified, a tolerance of +1/4 or -1/8 inch shall be allowed.	
Sheet width and length	More than specified by more than 1/4 inch. Less than specified by more than 1/8 inch.
Unwinding of rolls	When unwound, material sticks together to the extent that unrolling causes tearing or injury to surface (check both sides of material). Material not wound evenly. Telescoping.
Sticking of adjacent sheets	Sheets stick together to the extent that separation causes tearing or injury to the surface.
Length of individual roll	Less than 200 yards of usable material.
Length of utility roll	Less than 10 yards of usable material.
Count of individual package of sheets	Exceeds 2-1/2% less than specified or indicated quantity.

4.3.2.1.4 Material used for examination and test. The rolls or packages of sheets examined under 4.3.2.1.1 shall be used for examination under 4.3.2.1.2 and test under 4.3.3.1.

4.3.3 In process or end item sampling (inspection after test).

4.3.3.1 Samples for test. For the purpose of maintaining continuous inspection, test samples shall be taken immediately following manufacture or from material packed for shipment. Samples for testing shall be selected in accordance with Inspection Level S-2 of MIL-STD-105 with an acceptance number of zero. Lot size shall be expressed in units of rolls or packages of sheets. From each unit or package of sheets, 15 square yards of treated carrier shall be taken and subjected to the quality conformance inspection tests.

4.3.3.2 Quality conformance inspection tests. These tests shall consist of the following: vapor inhibitor ability, vapor inhibitor ability after exhaustion; contact corrosivity; bursting strength; tearing strength; seam strength (style H and J) (see 4.6).

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4.3.3.3 Examination of packaging. An examination will be made to determine that markings, packaging, packing, contents and weights comply with the requirements of Section 5 of this specification. Defects will be scored in accordance with the classification below. The sample unit shall be one shipping container, fully packed, selected just prior to the closing operations. Closure defects listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of containers in the inspection lot fully prepared for delivery. The Inspection Level shall be S-2 and the AQL shall be 4.0, expressed as defects per 100 units for this examination.

EXAMINE	DEFECT
Markings (exterior and interior)	Incorrect; incomplete, illegible; omitted, of improper size, location, sequence or method of application.
Materials	Any nonconforming component; component missing, damaged or otherwise defective affecting serviceability.
Workmanship	Inadequate application of components such as incomplete closure of container flaps; loose or inadequate sealing, strapping or stapling; bulged or distorted containers.
Contents	Number per container is more or less than required.
Weight	Gross or net weight exceeds requirements of container specifications.
Rolls	Rolls not wound on cores. Inside dimension of core less than 3 inches. Cores crushed, broken, mutilated or collapsed. Rolls not closed at one end by means of inside and outside headers. Rolls not wrapped with one thickness of MIL-B-22191, Type III material. Material not in conformance with specification. Assembly on roll not suitably restrained to prevent unwinding.
Sheets	Sheets not sandwiched between fiberboard pads. Bundles of sheets not overwrapped and sealed as specified.
Exterior containers	Drum closure not reinforced with tape as specified. Plywood not type and class specified. Strapping not galvanized.

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4.4 Preparation of equipment for test.4.4.1 Cleaning.

- a. The utensils and cloths used in the preparation of panels and test specimens shall be clean and free of contamination. Solvents shall be clean and renewed frequently. In all stages of treatment the handling of panels with bare hands shall be avoided. Panels shall not be permitted to contact contaminated surfaces during the cleaning procedure.
- b. After polishing metal panels and test specimens as specified for each procedure, they shall be cleaned with surgical gauze and then scrubbed in a beaker of hot mineral spirits conforming to type I of TT-T-291 with a surgical gauze swab. This shall be followed by successive immersions in hot mineral spirits, boiling 95 percent methanol, and boiling absolute methanol and then allowed to dry and 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.
- c. Apparatus used in the VIA test and exhaustion procedure shall be cleaned in a solution of hot water and soap, followed by a double rinse in hot tap water and a final rinse in distilled water.
- d. Precautions. After all tests, the apparatus shall be thoroughly cleaned as described. Care should be taken to segregate test samples by use of wrapping materials and to avoid contamination. Hands should be washed after handling treated papers and between periods of handling different barriers.

4.4.2 Sealing instructions for qualification and inspection testing.

Cold seals for test purposes shall be a minimum of 1/2 inch wide and shall be effected on a sealer having two sets of rubber coated pullwheels and opposing jaws, using the sealing conditions recommended by the manufacturer. The upper sealing condition limit on this type sealer, which is considered reasonable for production line sealing operations in respect to commonly available sealing equipment and commercially practical fabrication time, is a pressure of 40 pounds per square inch.

4.5 Test conditions. In general, the physical tests contained in this specification shall be made under the controlled atmosphere conditions having a relative humidity of 50 ± 5 percent and a temperature ranging from 70° to 80°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 material in the specified atmospheric condition.

4.5 Test methods.4.6.1 Compatibility with copper.

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4.6.1.1 Preparation of test assembly panel. Three panels of cold rolled, hard temper copper conforming to QQ-C-576 and measuring 1/16 by 1/2 by 3 inches shall be polished to remove pits and irregularities from all surfaces. The panels shall be polished with 240 grit aluminum oxide. The use of "wet and dry" paper is prohibited. Iron oxide abrasives shall not be used. The final abrasion shall be in a direction parallel to the length of the panel. Each panel shall be bent into a "U" shape having a radius of 1/4 inch and a distance of 1/2 inch between side walls at the ends. A sample of treated barrier material measuring 3/4 by 3-1/2 inches shall be tightly wrapped around each "U" shaped panel with the treated or effective side to match, so that the material is perpendicular to the longitudinal axis and at the base of the open section of the "U." The treated barrier shall be secured with white nylon thread conforming to V-T-295.

4.6.1.2 Procedure. The test shall be conducted in a glass jar of one pint capacity, measuring approximately 2-1/2 inches in diameter and 5-1/2 inches in height. Fifty ml of a solution of synthetic glycerine and distilled water, having a specific gravity of 1.103 at 75° + 3°F (23.9 + 1.7°C), shall be poured into the test jar to provide a relative humidity of 85 + 3 percent at 150° + 2°F (65.6° + 1.1°C). A glass vessel suitable for use as a stage shall be inverted and placed inside the test jar. The three wrapped panels shall be placed around the perimeter of the stage with both legs of the inverted "U" resting on the stage in the test jar, avoiding contact with glycerine solution. The test jar shall be sealed with a screw cap using an aluminum foil gasket and placed in a circulating air oven at 150° + 2°F (65.6° + 1.1°C) for 7 days. The test jar shall then be removed from the oven, allowed to cool, and the copper panels removed and unwrapped. The "U" shaped specimen shall be examined on the inside surface of the "U" for evidence of corrosive effects from the vapor in accordance with ASTM Standard D130, "Test for Detection of Copper Corrosion From Petroleum Products by the Copper Strip Tarnish Test."

4.6.2 Tests from FED-STD-101. The following tests shall be conducted in accordance with the methods specified under FED-STD-101:

<u>Test</u>	<u>FED-STD-101 Method</u>
VIA	4031, procedure B
VIA after exhaustion	4031, procedure D
Contact corrosivity	3005
Blocking resistance	3003, procedure A (style C, H and J materials shall only be tested in a face-to-back configuration)
Water resistance of markings	3027
Bursting strength	2007
Tearing strength	2036 (ASTM D689)
Compatibility with heat sealable barrier material conforming to MIL-B-131	3004, procedure C

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4.6.3 Long term protection test.

4.6.3.1 Preparation of panel. Four 2 by 4 by 1/8 inch, cold-rolled 1020 steel panels, shall be finished with 240 grit aluminum oxide to a surface roughness of 6-12 microinches and cleaned as specified in 4.4.1. Edges of the panel shall be rounded, and two 1/8 inch diameter holes drilled at opposite corners of the 4-inch side.

4.6.3.2 Assembly and exposure. An unused fiberboard box conforming to PPP-B-636, type CF, class weather-resistant, variety-SW, grade V3c, style RSC or CSSC of 1 cubic foot capacity with the length, width and height equal shall be completely lined on the inside of all faces, except the top, with a single layer of treated carrier, which shall be held in place with staples. The carrier shall have its (or a) treated side facing toward the center of the box. One of the four panels shall be placed face up and centered on a 6 by 6 inch sheet of the treated carrier. The sheet shall be tightly wrapped around the panel and fastened with a double fold at the middle of the panel face; a single fold of the sheet shall be made at the ends of the panel. The wrapped panel shall be secured in the prepared box with the folds of the sheet against the bottom of the box. The three remaining panels shall be suspended by stainless wires from two opposite top edges of the box. One panel shall be suspended in such a position that its center is at the approximate center of the box cavity; the other two panels shall be suspended at the same level facing the center panel at least one inch from the center panel and the sides of the box. The seams of the box shall be fastened together with 3-inch wide tape conforming to PPP-T-60, type IV. Three strips of the tape shall be applied to both top and bottom of the box so that all seams are covered their full length. The tape applied over the center lengthwise seams shall extend at least 3 inches onto each of the end panels. The manufacturer's joint must be taped to establish a completely sealed container. The sealed box shall be exposed outdoors for 12 months in a louvered shed located in a temperate zone with climatic conditions similar to the Philadelphia area. Upon completion of the exposure period, the panels shall be examined visually for conformance to the requirements of table I.

4.6.4 Seam strength (style H and J).

4.6.4.1 As received.

4.6.4.1.1 Preparation of test specimen. A six by twelve inch specimen for this test shall be folded in half with the crease parallel to the long axis. The open or unfolded length shall be sealed, and the folded length cut off. From this, three adjacent 1 inch wide specimens shall be cut perpendicular to the seam.

4.6.4.1.2 Test at room temperature. The three 1 inch wide specimens selected for this test shall be opened and one end of each specimen shall be clamped so that the other end of the specimen hangs freely. A 1/2 pound weight shall then be gently attached to the free end of the specimen so as not to impact load the seal. The weight shall be allowed to act for 5 minutes whereupon the weight shall be removed and the specimen examined for separation of the seal faces.

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4.6.4.2 Sealed after aging.

4.6.4.2.1 Test specimens. The treated barrier for this test, in the flat unsealed condition as taken from the sample roll, shall be aged in a circulating air oven maintained at $150^{\circ} + 2^{\circ}\text{F}$ for 12 consecutive days (288 hours). After removal from the oven, the unsealed sections shall be allowed to come to room temperature. Test specimens shall then be obtained as described in 4.6.4.1.1.

4.6.4.2.2 Test at room temperature. The three 1 inch wide specimens selected for this test shall be tested as specified in paragraph 4.6.4.1.2.

4.7 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 Material Safety Data Sheet detailed in FED-STD-313. One copy of the Material Safety Data Sheet shall accompany the samples being submitted for testing (see 4.2.1).

5. PACKAGING

5.1 Preservation. The levels of preservation shall be Level A or Commercial, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Rolls. Each 36-inch roll shall be wound on a substantial core that has a minimum diameter of 3 inches and shall be suitably restrained from unwinding. The rolls shall be wrapped with one thickness of type III barrier material conforming to MIL-B-22191. Each roll shall be completely wrapped and closed at the ends by means of inside and outside headers, with all seams and joints sealed with waterproof adhesive conforming to MMM-A-260 or with tape conforming to type IV of PPP-T-60.

5.1.1.1.1 Utility rolls. Utility rolls shall be preserved as specified in 5.1.1.1, except that header and core diameter requirements shall not apply.

5.1.1.2 Flat cuts. Flat cuts shall be sandwiched between two sheets of fiberboard conforming to PPP-F-320, grade W5s in bundles. The weight of the bundles shall be specified by the acquiring activity (see 6.2). Bundles shall be overwrapped and sealed as specified for rolls in 5.1.1.1. Cuts shall then be placed in fiberboard boxes conforming to PPP-B-636, type SF, class weather-resistant, grade V3s. The box shall be closed by taping in accordance with requirements for interior boxes in the appendix of PPP-B-636.

5.1.2 Commercial. The rolls and flat cuts shall be preserved in accordance with ASTM D3951. In addition, it is required that each roll or bundle of flat cuts shall be sealed in a polyethylene bag. Be certain that water vapor condensation does not form when the polyethylene bag is sealed (see 3.2.3).

5.2 Packing. Packing shall be Level A, Level B or Commercial, as specified (see 6.2).

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5.2.1 Level A.

5.2.1.1 Rolls. Each roll, packaged as specified in 5.1.1.1, shall be packed in drums conforming to PPP-D-723, type III. Drum closure shall be reinforced by means of 3-inch wide, waterproof tape conforming to PPP-T-76.

5.2.1.1.1 Utility rolls. Utility rolls shall be packed in overseas type containers conforming to PPP-B-601, style A or B or PPP-B-621, style 2 or 4. The boxes shall be closed and strapped in conformance with the appendix of the applicable box specification.

5.2.1.2 Flat cuts. Flat cuts packaged as in 5.1.1.2 shall be packed in overseas exterior type containers conforming to PPP-B-601, style A or B or PPP-B-621, style 2 or 4. The boxes shall be closed and strapped in conformance with the appendix of the applicable box specification. Quantity shall be as specified by the acquiring activity (see 6.2).

5.2.2 Level B.

5.2.2.1 Rolls. Each 36-inch wide roll shall be packed in type I or II drums of PPP-D-723. Drum closure shall be reinforced by means of 3-inch wide, water-resistant tape conforming to PPP-T-76.

5.2.2.1.1 Utility rolls. Utility rolls shall be packed in domestic type fiberboard boxes conforming to PPP-B-636, type CF, class domestic, or type SF, class domestic. Quantity shall be as specified by the acquiring activity.

5.2.2.2 Flat cuts. Flat cuts packaged as specified in 5.1.1.2 shall be packed in domestic type exterior containers conforming to PPP-B-601, style A or B, PPP-B-621, style 2 or 4, or fiberboard boxes conforming to PPP-B-636, class domestic. Quantity shall be as specified by the acquiring activity (see 6.2).

5.2.3 Commercial. The rolls and flat cuts shall be packed in accordance with ASTM D3951.

5.3 Marking. All individual packages and shipping containers shall be marked for shipment in accordance with MIL-STD-129 and as follows:

Class _____ Style _____ Form _____
 Contract or Order Number _____
 Material Designation _____
 Size - Nominal net lineal yardage of roll or dimensions of flat
 cuts (net lineal yardage is the number of yards of usable
 material in the rolls).
 Date of Manufacture (month and year)

5.3.1 Precautionary marking for stocking and storing. The following marking shall appear on at least one side and wherever practicable on two sides of each wrapped roll or box:

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KEEP COOL AND DRY
REPLACE PARTIALLY USED ROLLS IN
EXTERIOR CONTAINER.
STAND ROLLS ON END. 1/

1/ This requirement applies to roll stock only.

5.3.1.1 Precautionary marking for interior containers. All interior containers shall be marked in accordance with MIL-STD-129 and as follows:

- a. By a separate set of markings, include the following on interior containers for both rolls and flat cuts:

DO NOT RUB OR WIPE EYES WHILE
HANDLING THIS PRODUCT. AFTER
HANDLING, WASH HANDS. PRODUCT
MAY CONTAIN MILD IRRITANT
TO EYES AND HANDS.

- b. By a separate set of markings, include the following on interior containers for both rolls and flat cuts:

DO NOT USE WITH FOODSTUFFS.

6. NOTES

6.1 Intended use. These materials are intended as preservatives for certain metals and alloys. The specific type of metal or alloy shall determine whether contact with the material may be direct or indirect (solely with the VCI vapors). The materials may be used in direct contact with ferrous alloys, aluminum, and aluminum-base alloys. Zinc-base phosphate coatings and manganese-base phosphate coatings on ferrous parts are also completely compatible. Parts, subassemblies and assemblies containing zinc plate, cadmium, cadmium plate, zinc-base alloys, magnesium-base alloys, lead-base alloys, and alloys of other metals (including solders and brazing alloys) containing more than 30 percent of zinc or 9 percent lead shall not be packaged with VCIs. In all cases, direct contact of the VCI with non-ferrous metals except aluminum and aluminum-base alloys shall be avoided unless specific permission is granted by the acquiring activity. Procedures covering the use of VCI materials are detailed in MIL-I-8574.

6.1.1 Required compatibility testing. Materials shall not be used to package assemblies containing plastic, painted, or rubber components, unless the specific inhibitor has passed the compatibility test specified in Procedure B of Test Method No. 3004 of FED-STD-101. Additionally, VCI materials shall not be used in applications where they might come in contact with high explosives or propellants associated with ammunition.

6.1.2 Sealing styles H and J. Styles H and J materials may be sealed either manually or by cold seal packaging machinery.

6.2 Ordering data. Requests, requisitions, schedules and contracts or orders shall contain the following:

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- a Title, number and date of this specification
- b Specification part number (see 3.8)
- c. Quantity.
- d Configuration (rolls or flat cuts)
- e Level of preservation and packing required (5.1 and 5.2)
- f Weight of bundle (5.1.1.2)
- g Utility rolls (specify quantity) per pack (5.2.2.1.1)
- h Size, when different from that specified in 3.4 or 3.4.1
- i Number of bundles of flat cuts per pack (5.2.1.2 and 5.2.2.2)
- j Addresses for submission of MSDSs (see 6.8)
- k Manufacturer will provide the material's month and year of manufacture (see 6.2.1)

6.2.1 Identification The Government will accept material marked in accordance with the previous revision until November 1988. The Government will not accept material not marked in accordance with 3.5 after November 1988.

6.3 Qualification Awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in the applicable qualified products list, whether or not such qualified products have been listed by that date. The attention of the suppliers is called to this requirement, 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 Air Systems Command, Department of the Navy, Washington, DC 20360, however, information pertaining to qualification of products may be obtained from the Naval Air Development Center, Warminster, PA 18974, marked Attention Aircraft and Crew Systems Technology Directorate (Code 60622).

6.3.1 Acceptable qualified material It is understood that materials supplied under contract shall be identical in every respect to the sample tested and found satisfactory, except for changes previously approved by the Government. Any unapproved changes from the qualification sample shall constitute cause for rejection.

6.4 Changes from previous issue Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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6 5 Toxicity questions For Navy acquisitions, questions regarding toxicity should be referred to the Naval Environmental Health Center, Cincinnati, OH For Army procurements, referrals should be to the Surgeon General For Air Force acquisitions, questions regarding toxicity should be referred to OEHL/ECE, Occupational and Environmental Health Laboratories, Environmental Assessments Branch, Brooks AFB, TX 78235

6 6 Subject term (key word) listing

Barrier
Packaging material
Volatile corrosion inhibitor

6 7 Metric conversion factors The following conversion factors are referenced in FED-STD-376

6 7 1 Temperature To convert Fahrenheit (°F) to Celsius (°C) use the following formula

$$\text{Temperature } ^\circ\text{C} = \frac{(\text{Temperature } ^\circ\text{F} - 32)}{1.8}$$

6 7 2 Pressure To convert pounds per square inch (lb/in² or psi) to kilopascals (kPa), multiply by 6 895

6 7 3 Weight To convert pounds (lbs) to kilograms (kgs), multiply by 0 4536

6 7 4 Length

a To convert inches (in) to millimeters (mm), multiply by 25 4

b To convert yards (yd) to meters (m), multiply by 0 9144

6 7 5 Area To convert square yards (yd²) to square meter (m²), multiply by 0.8361

6 8 Material Safety Data Sheets Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313 and 29 CFR 1910 1200 The pertinent Government mailing addresses for submission of data sheets are listed in Appendix B of FED-STD-313

MTL-1 04205

Custodians

Army - SM
Navy - AS
Air Force - 69

Preparing Activity

Navy - AS
DOD Project 8135-0592

Review activities

Army - AV, GL, EA, AR
Navy - YD, SA, OS
Air Force - 99
Other - OS

User activities

Army - AT
Navy - SH

INSTRUCTIONS In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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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c Reason/Rationale for Recommendation

6 REMARKS

7a NAME OF SUBMITTER (Last, First, MI) - Optional

8 WORK TELEPHONE NUMBER (Include Area Code) - Optional

c MAILING ADDRESS (Street, City, State ZIP Code) - Optional

8 DATE OF SUBMISSION (YYMMDD)

DD FORM 1426
82 MAR

PREVIOUS EDITION IS OBSOLETE

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1 DOCUMENT NUMBER

2 DOCUMENT TITLE

MIL-P-3420F

Packaging Materials, Volatile Corrosion Inhibitor Treated, Opaque

3a NAME OF SUBMITTING ORGANIZATION

4 TYPE OF ORGANIZATION (Mark one)

VENDOR

USER

MANUFACTURER

OTHER (Specify) _____

5 ADDRESS (Street, City, State ZIP Code)

5 PROBLEM AREAS

a Paragraph Number and Wording