

20 AUGUST 1962

SUPERSEDING

MIL-T-4053A

5 OCTOBER 1951

## MILITARY SPECIFICATION

TAPE, PRESSURE-SENSITIVE, ADHESIVE  
(CORROSION-RESISTANT)

*This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.*

## 1. SCOPE

1.1 This specification covers one type of corrosion-resistant pressure-sensitive (glass cloth) tape for use in binding joints in low-pressure hot-air ducts where the temperature does not exceed 350° F.

## 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification to the extent specified herein:

## SPECIFICATIONS

## FEDERAL

QQ-A-267—Aluminum Alloy Bars, Rods, and Shapes Extruded, 2024

QQ-A-268—Aluminum Alloy Bars, Rods and Wire, Rolled, Drawn, and Cold Finished, 2024

UU-P-31—Paper, General Specifications and Methods of Testing

WW-T-799—Tubing, Copper, Seamless (for Use with Soldered or Flared-Fittings)

CCC-T-191—Textile, Test Methods and Supplements Thereto

PPP-T-680—Tape, Pressure Sensitive Adhesive: Packaging and Packing of

## MILITARY

MIL-T-8504—Tubing, Steel, Corrosion-Resistant (18-8) Annealed, Aircraft Hydraulic System.

## STANDARDS

## MILITARY

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

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

## 3. REQUIREMENTS

## 3.1 Material.

3.1.1 *Backing material.* The tape backing shall consist of a high grade, plain weave glass cloth with a minimum thread count of 55 threads per inch in both warp and filling directions and shall be free from unsightly defects, dirt, lumps, and other irregularities.

3.1.2 *Adhesive.* The tape adhesive shall be thermosetting and pressure-sensitive and shall require no moisture, heat, or other manner of preparation prior to application of the tape. The adhesive shall be a smooth, uniform coating covering the entire area of one side of the tape. The adhesive shall not contain any halogen compounds that might cause corrosion of copper, aluminum, and ferrous alloy.

3.2 *Physical properties.* The physical properties of the tape shall be in accordance with table I.

TABLE I. Physical properties

Breaking strength (pounds per inch, min.)	120
Thickness (inches)	0.0045 to 0.0086
Adhesion to steel (ounce per inch of width, min.)	15
Adhesion after heating (percent of original, min.)	100
Corrosion of copper, aluminum, and steel	None

## 3.3 Size.

3.3.1 *Length.* The tape shall be uniformly and smoothly wound in 60-yard rolls, with the adhesive side in, on suitable cores having an inside diameter of  $3.00 \pm 0.0625$  inches. The cores shall have sufficient rigidity to prevent

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distortion of the roll under normal conditions of use. The tape shall be in one continuous strip, except that any single roll may contain not more than three splices, and the number of rolls having three splices in any one shipment shall not exceed 10 percent. The splices shall not separate upon unwinding.

**3.3.2 Width.** The width of the tape shall be 1 inch unless otherwise specified by the procuring activity (see 6.2). A tolerance of plus or minus  $\frac{1}{32}$  inch shall be permissible on tape 1 inch or less in width. A tolerance of plus or minus  $\frac{1}{16}$  inch shall be permissible on tape wider than 1 inch.

**3.4 Color.** The tape shall be supplied in the natural, undyed color.

**3.5 Workmanship.** All details of workmanship shall be in accordance with high grade commercial practice.

**4. QUALITY ASSURANCE PROVISIONS**

**4.1 Inspection responsibility.** The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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.

**4.2 Classification of tests.** The inspection and testing of the tape shall be classified as acceptance tests.

**4.3 Acceptance tests.** Acceptance tests shall consist of all the tests specified in 4.5, test procedures.

**4.3.1 Inspection samples.** Acceptance inspection samples shall be selected from each lot of material offered at one time for acceptance in accordance with Standard MIL-STD-105, small sample inspection level L-3, acceptance number zero.

**4.4 Test conditions.**

**4.4.1 Conditioning.** The tape shall be conditioned for not less than 24 hours at a temperature of  $23^{\circ} \pm 1^{\circ} \text{ C}$  ( $73.4^{\circ} \pm 2^{\circ} \text{ F}$ ) and  $50 \pm 2$

percent relative humidity, and shall be tested under these conditions.

**4.4.2 Specimens.** The first three plies of tape shall be removed before taking specimens for testing. An equal number of specimens from all sample rolls shall be tested.

**4.5 Test procedures.**

**4.5.1 Breaking strength.** The breaking strength of the tape shall be determined in the lengthwise direction in accordance with Method 5102 of Specification CCC-T-191. The jaws of the testing machine shall be padded. In the event that the tape is wider than 1 inch, the tape shall be cut to a width of 1 inch; 1 inch tape shall be tested full width; and if the tape is less than 1 inch in width the strength shall be calculated by dividing the actual breaking strength by the width to convert the resulting answer to pounds per inch of width.

**4.5.2 Thickness.** The thickness of the tape shall be determined in accordance with Method 173 of Specification UU-P-31, except that the tape shall be doubled with the adhesive side in and the thickness of these two layers of tape shall be divided by two to indicate the thickness of a single layer of tape.

**4.5.3 Adhesion to steel.** Adhesion to steel shall be determined in accordance with Method 100 of Specification UU-P-31.

**4.5.4 Adhesion after heating.** Adhesion after heating shall be determined by the method specified in 4.5.3 for determining adhesion to steel, except that the plates with specimens attached shall be heated for 2 hours in an oven at a temperature of  $174^{\circ}$  to  $180^{\circ} \text{ C}$  ( $345^{\circ}$  to  $355^{\circ} \text{ F}$ ) and shall then be removed and allowed to cool at room temperature  $23^{\circ} \pm 1.1^{\circ} \text{ C}$  ( $70^{\circ}$  to  $75^{\circ} \text{ F}$ ) for 30 minutes prior to pulling. Failure of the backing material under load during the adhesion portion of this test shall be considered evidence that the adhesive strength is equal to the original.

**4.5.5 Corrosion.**

**4.5.5.1 Copper and aluminum.** One 6-inch length of  $\frac{1}{4}$ -inch copper tubing conforming to Specification WW-T-799, condition N, and one 6-inch length of  $\frac{1}{4}$ -inch diameter aluminum rod conforming to Specification QQ-A-267 or QQ-A-268, condition T, shall be polished with 150 grit, abrasive cloth or paper. The tubing

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and the rod shall then be spirally wound for approximately one-half their length with tape overlapped by one-half the width of the tape. Specimens thus prepared shall then be suspended over water in a closed container for 144 hours at room temperature ( $23^{\circ} \pm 1^{\circ} \text{C}$  ( $70^{\circ}$  to  $75^{\circ} \text{F}$ )). At the end of this exposure period, the tape shall be removed and the metal surfaces examined visually for any pitting or other signs of corrosion. If the taped metal surfaces are corroded more than the bare metal surfaces, the tape shall be rejected.

#### 4.5.5.2 *Stainless steel.*

4.5.5.2.1 *Preparation of test specimens.* A 10-inch length of tubing conforming to Specification MIL-T-8504, with 0.375 outside diameter and 0.035 inch wall thickness, shall be bent on a tube bender to form a U-shaped test specimen with a radius as shown on figure 1, and a dimension of  $2.250 \pm 0.031$  inches between the legs. Holes of  $\frac{1}{16}$ -inch diameter shall be drilled in the tubing, a number 8-32, type 304 stainless steel machine screw passed through the holes, and the open end of the tubing drawn to the dimensions as shown on figure 1. The tubing shall be cleaned with ACS grade xylene. An area 1 inch on each side of the center of the curved portion of tubing shall be spirally wound with  $\frac{1}{16}$ -inch strips of the tape, using finger-pressure to obtain adhesion.

4.5.5.2.2 *Test equipment.* A 2-liter Parr vessel equipped with a pressure gage and a thermowell, or a similar 2-liter vessel constructed to withstand a minimum internal pressure of 300 pounds per square inch, shall be used. All interior surfaces of the pressure vessel, including thermowell, pressure gage outlet, and tubing leading to the pressure gage, shall be of stainless steel, or glass, as applicable.

4.5.5.2.3 *Test procedure.* Ten cubic centimeters of distilled water shall be added to the pressure vessel (see 4.5.5.2.2). Three tubing specimens, prepared as specified in 4.5.5.2.1, shall be suspended, using stainless steel or nickel-chrome wire wound around the taped portion of the specimen, open ends down in the vessel to a level just above the water. The wire and side of the vessel shall not make direct contact with the tubing walls. Dissimilar metal contact shall be avoided. The vessel shall be closed and the effect of the tape tested

as follows: Heat the vessel to an internal temperature of  $325^{\circ} \text{F}$ . After 1 hour, check that internal pressure is increasing to determine that no leak exists in the system. Maintain the  $325^{\circ} \text{F}$  temperature for 144 hours. Cool the vessel and remove the specimens. Shave the tape from the tubing with a sharp instrument, and clean the tubing with solvent. Under 10-power magnification, examine the tubing for cracking and corrosion. If no cracking or corrosion is observed, draw open ends of the specimens from the 1.875-inch to a 1.50-inch separation. Reexamine for cracking and corrosion. If no cracking or corrosion is observed, the tape is acceptable.

4.6 *Rejection.* Items (samples) failing to conform to this specification shall cause rejection of the lot represented in accordance with the provisions of Standard MIL-STD-105.

4.7 *Packaging, packing, and marking.* Preparation for delivery shall be examined for conformance with section 5.

### 5. PREPARATION FOR DELIVERY

5.1 *Packaging and packing.* Rolls of tape shall be packaged level A or C, packed level A, B, or C in accordance with Specification PPP-T-680 (see 6.2).

5.2 *Marking.* In addition to the marking specified in Specification PPP-T-680, unit and exterior containers shall be durably and legibly marked with the following information:

Tape, Pressure-Sensitive, Adhesive, (Corrosion-Resistant).

Specification No. MIL-T-4053B.

Width.

Length.

Order number.

Federal Stock No.

Date of manufacture (month and year).

Manufacturer's name or trade-mark.

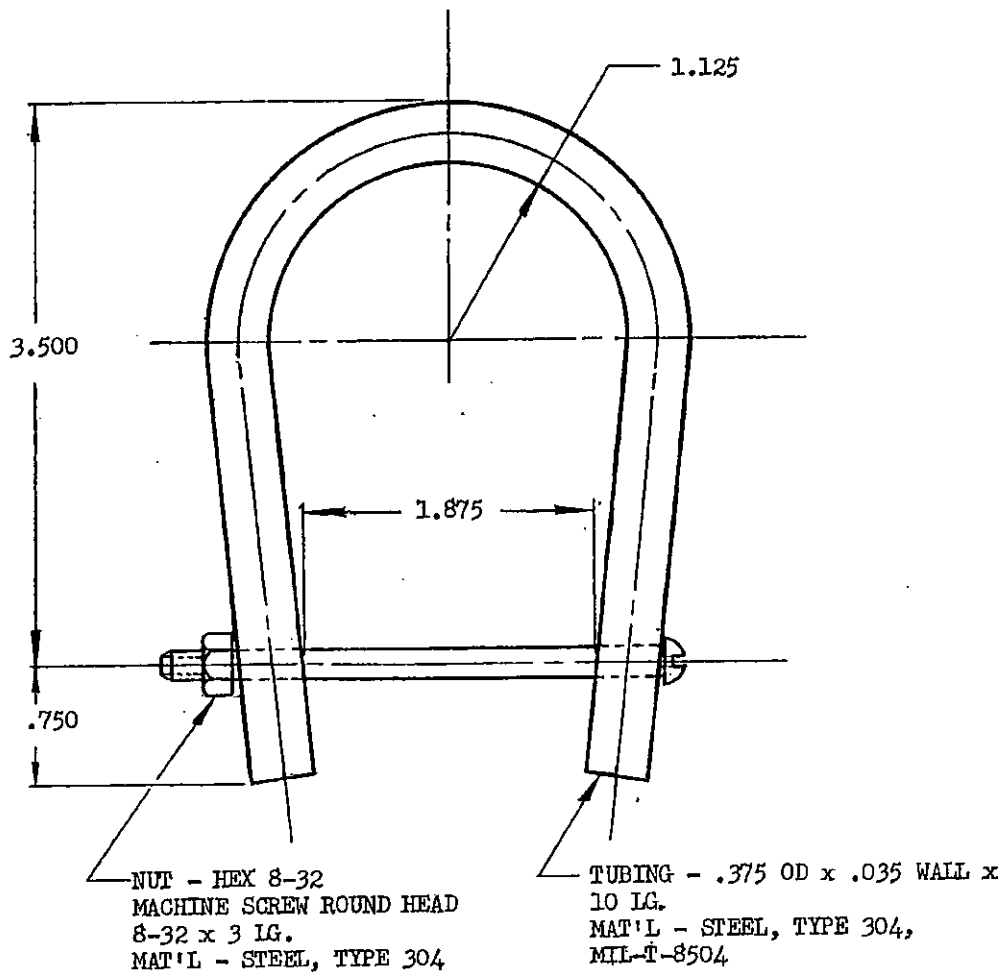
Name of contractor (if not the same as manufacturer).

### 6. NOTES

6.1 *Intended use.* The tape covered by this specification is intended for sealing joints of low-pressure, hot-air conductors with temperatures not exceeding  $350^{\circ} \text{F}$ .

6.2 *Ordering data.* Procurement documents should specify the following:

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

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DIMENSIONS IN INCHES

UNLESS OTHERWISE SPECIFIED, TOLERANCE: DECIMALS  $\pm .016$

FIGURE 1. Corrosion test specimen.

- (b) Width (see 3.3.2).
- (c) Quantity.
- (d) Applicable levels of packaging and packing (see 5.1).
- (e) Whether individual roll or multiple roll packaging is desired.
- (f) Whether or not a case liner is required.
- (g) Whether intermediate packaging is required.

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