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SUPERSEDING
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FEDERAL SPECIFICATION

ADHESIVE, BONDING VULCANIZED SYNTHETIC RUBBER TO STEEL

The General Services Administration has authorized the use of this federal specification, by all federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers adhesives for bonding vulcanized synthetic rubber gaskets, matting, and similar items to steel.

2. APPLICABLE DOCUMENTS

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

FEDERAL STANDARDS

FED-STD 313 - Material Safety Data, Transportation Data, And Disposal Data For Hazardous Materials Furnished To Government Activities.

(Single copies of this specification, and other federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from the General Services Administration, Federal Supply Service, Specification Section, Suite 8100, 470 L'Enfant Plaza, SW, Washington, DC 20407.)

Comments, suggestions, or questions on this document should be addressed to: Director, U.S. Army Research Laboratory, Weapons and Materials Research Directorate, Specifications and Standards Office, ATTN: RDRL-WMM-D, Aberdeen Proving Ground, MD 21005-5069 or emailed to richard.j.squillacioti.civ@mail.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil/.

AMSC N/A FSC 8040

Copies of these documents are available online from https://assist.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.

2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of this document are those cited in the solicitation or contract.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.1200 - Occupational Safety and Health Standards
40 CFR 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories

(Copies of this document are available online at www.access.gpo.gov.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposal shall apply.

ASTM INTERNATIONAL

ASTM D429 - Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.

ASTM D3924 - Standard Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials.

Copies of these documents are available from www.astm.org or ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. The adhesive furnished under this specification shall be products which have been tested by a certified testing facility approved by the qualifying activity and has passed the qualification tests specified herein and has been listed or approved for listing on the applicable Qualified Products Database (QPD) by the qualifying activity (see 4.1 and 6.3) before contract award. Any change in the chemical formulation, the material, the process, or the procedure in manufacturing the adhesive shall necessitate its being qualified again. Any change requires a complete requalification. The material supplied under contract shall be identical, within manufacturing tolerances, to the products receiving qualification. Any adhesive that does not conform to all the qualification tests specified herein shall be removed from the QPD.

3.1.1 Retention of qualification. To retain qualification approval of products listed on the Qualified Products Database (QPD), the manufacturer shall be required to verify by certification to the qualifying activity that its product(s) comply with the requirements of this specification. Unless otherwise specified by the qualifying activity (see 6.2), the time of periodic verification by certification shall be in two-year intervals from the date of original qualification (see 4.3). The certification action is initiated by the qualifying activity.

3.1.2 Qualifying activity. The activity responsible for the collection and storage of adhesive certifications that are required to be furnished under this specification for qualification and conformance testing is the Organic Coatings Team, Materials & Manufacturing Science Division, ATTN: RDRL-WMM-C, Army Research Laboratory (ARL) located at Aberdeen Proving Ground, MD 21005-5069.

3.2 Material. The adhesive material shall be of the best commercial quality, ready for use, and shall have no deleterious effect on steel surfaces to which it is applied. The adhesive shall be free from material which will be toxic to personnel under normal conditions of use. All material used shall be as specified herein, on the drawings, or in the contract. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. The prime and sub-tier contractor shall meet all requirements unless directed otherwise by the contract.

3.2.1 Composition. The composition of the adhesive shall be the same as that of the sample furnished for qualification testing. Any change in the formulation of a qualified product shall require requalification.

3.3 Physical requirements. The adhesive material shall conform to the requirements specified in Table I when tested in accordance with the specified test procedure.

TABLE I. Physical requirements for adhesives.

PROPERTY	Requirement	Test Procedure
Viscosity cup, flow time (seconds), maximum or Brookfield RVF @ 80°F (27°C)	150	4.8.1
Solids content, variation from qualification test values, must be within ± 5% of original solids measurement	±5%	4.8.2
Wet adhesion-before aging, minimum(psi)	2.4	4.8.3
Initial adhesion, minimum (psi)	8.0	4.8.3
Adhesion after salt water immersion, minimum (psi)	6.4	4.8.3
Adhesion at 60°C, (140°F), minimum (psi)	1.6	4.8.3
Stability after aging, (wet adhesion test), minimum (psi)	2.4	4.8.4
HAP Content	< 1% of HAP	4.8.5
Storage	----	4.9

3.4 Marking. Each container of material shall be labeled giving adequate instructions for use and application of contents. The name of the manufacturer, specification number, and month and year of manufacturer shall also be indicated on the label so that traceability to the QPD can be verified. In addition, any special marking shall be as specified in the contract or order (see 6.2).

3.4.1 User instruction markings. All primary containers shall be legibly marked or labeled, as applicable, with the manufacturer's mixing instructions, the VOC content (in pounds/gallon or grams/liter), hazardous air pollutant (HAP) content for the applicator and the following:

PRECAUTION For Operations: The Surgeon General requires airline respirators to be used unless air sampling shows exposure to be below standards. Then, either chemical cartridge respirators or airline respirators are required. Avoid contact with skin and eyes. Use with adequate ventilation. For other safety recommendations refer to the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS). Keep containers closed.

3.5 Toxic ingredients. Other than parachlorobenzotrifluoride (PCBTF), the material being supplied by the chemical manufacturer for qualification to ARL shall contain no benzene (benzol), chlorinated solvents or ethylene based glycol ethers and their acetates (see 4.10). The solvents used shall have no adverse effects on human health when used as intended. Compounds of antimony, arsenic, beryllium, cadmium, chromium, cobalt, cyanide, lead, manganese, mercury, nickel and selenium shall also be absent from all components in the products being submitted for qualification. Chemicals contained in these materials shall be HAP-free.

3.5.1 Hazardous Air Pollutants. The adhesive shall contain no chemicals listed as Hazardous Air Pollutants (HAPs) (see 4.8.5 and 6.8). Any HAP components in the adhesive in a concentration of 1.0 percent or greater by weight or volume will be regarded as sufficient for the presence of HAP in the adhesive. The product containing less than 1% of HAP shall be considered as a HAP-free adhesive.

3.6 MSDS/SDS. The manufacturer shall comply with the requirements set forth by the Hazardous Communication Standard, 29 CFR 1910.1200. A MSDS/SDS shall be prepared for the material in accordance with FED-STD-313 and forwarded to the qualifying activity (see 6.3). The MSDS/SDS shall be included with each shipment of the material (see 6.2) covered by this specification and submitted to pertinent Government agencies as stated in a FED-STD-313.

3.6.1 Safety Data Sheets (SDSs). A Safety Data Sheets (SDSs) shall be phased into the system by the following deadline of June 1, 2015 and after June 1, 2016 the Material Safety Data Sheets (MSDSs) becomes extinct and you must ensure that each hazardous chemical in your workplace has an SDS and only an SDS as specified in the OSHA Brief https://www.osha.gov/Publications/OSHA3514.html and as specified in Appendix D of 29 CFR 1910.1200 (see: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10103).

3.7 Toxicity clearance. All new chemicals and materials being added to the Army supply system shall have a toxicity clearance. A toxicity clearance involves a toxicological evaluation of materials prior to introduction into the Army supply system. The Army program manager shall be responsible for identifying technically feasible materials and requesting a toxicity clearance for use of that material within their program (see 6.6).

4. QUALITY ASSURANCE PROVISIONS

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

a. Qualification inspection (see 4.2).
b. Retention qualification (see 4.3).
c. Conformance inspection (see 4.4).

4.2 Qualification inspection. Qualification shall be conducted by the qualifying activity (see 6.3). The qualification test sample shall consist of adhesive material. The samples shall be legibly identified (see 6.3.1.1). Qualification inspection shall consist of tests for all requirements specified in section 3 and table I. Qualification inspection shall examine for user instruction markings (see 3.4.1). The results of each test shall be compared with the applicable requirement in section 3. Failure to conform to any requirement shall be counted as a defect and adhesive product represented by the sample test shall not be approved for inclusion in the QPD under this specification and shall be cause for rejection.

4.2.1 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with ASTM D3924. Also, unless otherwise stated in the test method or paragraph, room temperature shall be 73 ± 4 °F (23 ± 2 °C) and a 40 - 70 percent relative humidity.

4.2.2 Qualification samples. The initial qualification samples shall consist of the required amount of the adhesive that is needed by the testing facilities to perform all the required tests. Samples shall be identified and forwarded to the appropriate testing facility, and the subsequent testing reports (see 4.2.3) shall be forwarded to the qualifying activity (see 3.1.2) for retention.

4.2.3 Test reports. The manufacturer shall provide certified test reports showing that the material conforms to all the requirements of this specification (see 6.3.1).

4.3 Retention qualification. To ensure compliance with all the requirements of this specification the manufacturer shall complete DD Form 1718 (Certification of Qualified Products) for each plant location and certify that the statements listed on the DD Form 1718 are true. Unless otherwise specified by the qualifying activity (see 6.2), the time of periodic verification by certification shall be in two-year intervals from the date of original qualification (see 3.1.1).

4.4 Conformance inspection. Conformance inspection shall consist of the satisfaction of all of the requirements identified as conformance in Table II. The manufacturer shall forward from each production lot a letter report detailing the batch number, manufacturer's code, specification and type number, QPL number and batch volume to U.S. Army Research Laboratory (ARL), ATTN: RDRL-WMM-C, Coatings, Corrosion, and Engineered Polymers Branch, Building 4600, Deer Creek Loop, Aberdeen Proving Ground (APG), MD 21005-5069. The manufacturer shall perform conformance inspection testing on each production lot and have these test results on file when requested by the contracting officer. There shall be no failures (see 6.4).

4.5 Lot and batch formation. Unless otherwise specified in the contract or purchase description (see 6.2), all lots of materials supplied under this specification must be manufactured using the same formulation, raw materials and supplier(s) of raw materials, methods of manufacture, equipment, and geographic location as the qualification sample, unless changes have been approved by the qualifying activity. A lot shall consist of one of the following.

4.5.1 Lot A. The adhesive produced in not more than 24 consecutive hours from a continuous process which is used to fill shipping containers directly from the process output. A continuous process shall be

the production of product by continuous input of raw materials and output of finished product by one manufacturer in one plant with no change in manufacturing conditions or materials.

4.5.2 Lot B. The adhesive from individual runs of a batch process which is used to fill shipping containers directly from the process output. A batch process shall be the production of product by runs from single additions of raw materials which are mixed, reacted, or purified forming the product.

TABLE II. Properties and test methods.

PROPERTY	TEST METHOD	REFERENCE PARAGRAPH	TESTING	
			QUALIFICATION	COMFORMANCE
Composition		3.2.1	X	X
Viscosity		4.8.1	X	
Solids content		4.8.2	X	
Wet adhesion-before aging	Table V	4.8.3	X	
Initial adhesion	Table V	4.8.3	X	
Adhesion after salt water immersion	Table V	4.8.3	X	
Adhesion at 140° F (60° C)	Table V	4.8.3	X	
Stability after aging, (wet adhesion test)	Table V	4.8.4	X	X
Peel Test Method	ASTM D429, Method B-90°	4.8.3.3	X	
Storage		4.9	X	X
HAP Content	40 CFR 63	4.8.5	X	X
Marking			X	X

4.5.3 Lot C. The adhesive from either or both the continuous and batch processes shall be held in a single storage tank and subsequently withdrawn to fill shipping containers. The product shall be homogeneous at the time of withdrawal and shall not be added to while being withdrawn. After each addition to the storage tank, the contents shall constitute a separate lot.

4.6 Sampling.

4.6.1 Sampling for qualification. Vendors will test and evaluate two samples of their product from different lots for qualification in accordance with this specification. Vendors will provide a report to the qualifying activity detailing the results of the testing according to the specification requirements. In the case of a failed lot, vendors will test and evaluate two additional samples of their product from different lots for qualification in accordance with this specification. Vendors will provide a report to the qualifying activity detailing the results of the testing according to the specification requirements.

Table III. Standard gasket stock and formulation.

	Rubber Compound ID					
Ingredients, PPHR *	**Neoprene Class 1 formula Wt.**	**Neoprene Class 1 Wt. %**	**SBR Class 2 formula Wt.**	**SBR Class 2 Wt. %**	**Nitrile Class 3 formula Wt.**	**Nitrile Class 3 Wt. %**
Neoprene WRT or Bayprene 110 Polychloroprene Rubber (+/- 1.0g)	100.00	40.69	------	------	------	------
DSM Copo 1500 SBR, Styrene Butadiene Rubber (+/- 1.0g)	------	------	100.00	40.58	------	------
Paracril B Rubber or Nipol 30-8, 30 % ACN Nitrile Rubber (+/- 1.0g)	------	------	------	------	100.00	37.38
Magnesium Oxide, Maglite D or Elastomag 170 (+/-0.10g)	2.00	0.81	------	------	------	------
Zinc Oxide (+/-0.10g)	5.00	2.03	5.00	2.03	5.00	1.87
Stearic Acid (+/-0.10g	2.00	0.81	2.00	0.81	1.00	0.37
Wingstay 100AZ, Mixed Diaryl p-Phenylenediamine Antioxidant (+/-0.10g)	2.00	0.81	------	------	------	------
Agerite Resin D, Antioxidant DQ, (+/-0.10g) (2,2,4-Trimethyl-1,2 Dihydroquinoline Antioxidant)	------	------	2.00	0.81	2.00	0.75
N-990 Carbon Black (+/- 1.0g)	10.00	4.07	20.00	8.12	91.50	34.21
Statex B Black Replaced with N-330 Carbon Black (+/- 1.0g)	------	------	20.00	8.12	------	------
Atomite Whiting, Hubercarb Q325, Calcium Carbonate (+/-0.10g)	60.00	24.42	70.00	28.41	27.70	10.36
Dixie Clay, HC-100 Clay (+/-0.10g)	45.00	18.31	------	------	------	------
Paraffin Wax, IGI 1231A (+/-0.10g)	2.00	0.81	------	------	------	------
Solid Petrolatum, SR-172 Petro (+/-0.10g)	2.00	0.81	------	------	------	------
Akrosorb 19627 HC Resin P10 (72%) (+/-0.10g)	------	------	------	------	28.00	10.47
Dibutyl Phthalate, DBP Plasticizer (+/-0.10g)	------	------	------	------	10.00	3.74
Sundex 790 or Circo Light Process Oil (+/-0.10g)	15.00	6.10	25.00	10.15	------	------
Spider Sulfur MC-98 (+/-0.10g)			2.00	0.81	1.50	0.56
ETU - 75%, Ethylene Thiourea Accelerator (+/-0.10g)	0.75	0.31	------	------	------	------
Methyl Tuads, Tetramethylthiuram Disulfide Accelerator (+/-0.10g)	------	------	0.40	0.16	0.80	0.30
Formula Weight	**245.75**	**100.00**	**246.00**	**100.00**	**267.50**	**100.00**

***PPHR-Pounds Per Hundred (pounds of) Resin

4.6.2 Rejection. Materials from any failed lot will not be accepted.

4.6.3 Retest. In the case of a failed lot, vendors will test and evaluate two additional samples of their product from different lots for qualification in accordance with this specification. Vendors will provide a report to the qualifying activity detailing the results of the testing according to the specification requirements.

4.7 Standard gasket stocks. Standard gaskets stocks having the recipes listed in accordance with Table III shall be used to evaluate adhesive materials.

4.7.1 Rubber compounds. Because rubber compounding is subject to availability of raw materials (e.g., environmental regulations, supplier no longer produces the compound, etc.), modifications to the three rubber formulations listed in Table III may be acceptable. Modified rubbers must meet the following compositional and performance requirements as specified in Table IV.

Table IV. Modified rubbers.

PROPERTY	**Modified Rubbers**		
	Neoprene	**SBR**	**Nitrile**
Tensile strength	1050-1300 psi	1050-1350 psi	1350-1550 psi
Elongation	600-740%	620-720%	740-260%
Hardness	shore A: 40-50	shore A: 40-50	shore A: 40-50
Die C Tear	90-140 lb/in	125-175 lb/in	210-260 lb/in

4.8 Test procedures. Tests shall be conducted in accordance with ASTM or as specified herein (see 4.4). The right is reserved to make any additional tests deemed necessary to determine that the adhesive meets the requirements of this specification.

4.8.1 Viscosity test.

4.8.1.1 Apparatus. A Brookfield or similar viscometer shall be used. A viscosity cup, specified in (commonly called a Ford cup), shall be used.

4.8.1.2 Procedure for Brookfield. Both the sample of adhesive and the apparatus shall be conditioned for 4 hours at the testing temperature of 77°F ± 2° F (25°C ± 1.1° C) before starting the test. Which spindle, rotation rate, other spindles and rotation rates can be used as long as they can accurately measure the viscosity of the adhesive according to the instrument specifications. Reviewing the commercial adhesive technical data sheet for specific viscosity ranges, spindle numbers and temperatures should be considered. Note: medium viscosity products are best tested on an RVT Brookfield viscometer.

4.8.1.3 Procedure for Ford cup. Both the sample of adhesive and the apparatus shall be conditioned for 4 hours at the testing temperature of 73.5°F ± 2° F (23°C ± 1.1° C) before starting the test. Mix the adhesive material thoroughly. Level the apparatus and cover the 1/4 inch orifice of the cup from underneath. Immediately fill with the adhesive. Allow air bubbles to rise momentarily and then uncover the orifice of the cup, and simultaneously start a stopwatch. Observe the stream flowing from

the orifice and at the first break in the stream, stop the watch. This test shall be run in duplicate using a new sample of material for each determination. Record the test time in seconds for each determination.

4.8.2 Solids content.

4.8.2.1 Procedure. A suitable container with cover shall be weighed, and approximately five grams of thoroughly mixed adhesive shall be poured into the tared container, covered, and weighed. After removing the cover, the solvent shall be allowed to evaporate from the adhesive at room temperature for at least 24 hours. The container shall be placed in an oven at 158° F ± 2° F (70° C ± 1.1° C), until the sample reaches a constant weight. The covered container with the sample shall be cooled to room temperature, in a desiccator before weighing. The test shall be run in duplicate.

4.8.2.2 Calculations. The percentage of total solids shall be calculated as follows: Total solids, (%) = the weight (g) of the residue/ the weight (g) of the original sample x 100.

4.8.3 Strip adhesion.

4.8.3.1 Specimens. The rubber gasket materials used for this test shall be prepared as specified in section 4.7 (Table III), and the sheet steel panels to which the rubber strips are bonded shall be hot rolled sheet, commercial quality. Strips of rubber material measuring 1 x 6 x 1/4 inches shall be bonded to steel panels, 3 x 6 x 1/8 inches in dimensions. Strip adhesion tests shall be conducted at least in triplicate on specimens prepared from each of the classes 1, 2, and 3 rubber gasket materials for each of the following test conditions.

1. Wet adhesion before and after aging the adhesive for 2 weeks at 120° F ± 2° F (49° C ± 1.1° C).
2. Initial adhesion.
3. Adhesion after immersion in salt water solution.
4. Adhesion at 140° F ± 2° F (60° C ± 1.1 ° C).

4.8.3.2 Procedure for determining strip adhesion. Materials and Substrate Preparation: Samples shall be prepared using the prescribed substrate combination of unpolished steel and one of the 3 classes of rubber compounds described in section 4.7. The rubber compound should be (1 x 6 x .025 inches) in dimension and meet the specifications described in section 4.7. The rubber shall be hand sanded using a course abrasive paper to roughen the bonding surface and cleaned with acetone. The steel panel should be (3 x 6 x .032 inches) in dimension and cleaned with acetone prior to adhesive application. Release tape should be place on both substrates to create a clean edge to start the peel approximately 2 inches from the top of the panel. The adhesive shall be applied with a brush until a thin uniform film is achieved. Two coats of adhesive (allowing drying between coats) are required on the rubber substrate and one coat on the steel. The steel substrate shall require just one coat of adhesive because of the low porosity, whereas the rubber substrate shall require two coats of adhesive because of the higher porosity of the material. Once the adhesive has dried to a tacky consistency, the two substrates should be bonded together. Immediately after the rubber strips have been bonded to the steel panels, a roller, 2 inches in diameter, should be used to remove any trapped air between the substrates and to assist with the bonding process. The assemblies shall be conditioned according to the descriptions listed in Table V prior to testing. Prior to strip adhesion testing, the assemblies should be cut at the substrate/adhesive interface to prevent edge effects which could result in an incorrect tension measurement.

4.8.3.3 Peel Test Method. The Peel Test Method from ASTM D429, Method B-90° Stripping Test-Rubber Part Assembled to One Metal Plate, shall be used as a guideline for determining the peel strengths of the adhesive bonded to the rubber strip and steel panel. Peel strength is the average load per unit width of bond-line required to progressively separate a flexible member from a rigid member or another flexible member. Testing shall be conducted on a power driven machine that was capable of uniform expansion between the grips. The test machine shall digitally measure the load applied and the extension to the rubber strip during the 90° angle peel. The head of the machine shall be set to travel at a rate of 2 ± 0.2 inches per minute. The top grip shall be a hydraulic clamp used to hold the free end (~2 x 1 inches) of the rubber substrate bonded to the panel during testing. The hydraulic clamp provides constant pressure to keep the rubber substrate in the grip. The bottom grip of the Instron shall be a table mounted on linear bearings. The linear bearings of the table allow forward movement while the rubber strip is peeled from the steel panel and remains perpendicular to the panel. Fasteners on the table affix the steel panel of the peel assembly shall be located in the bottom Instron grip. The results of the specimens tested shall be averaged and reported.

Table V. Conditioning and test schedule.

Strip Adhesion Test	Conditioning Schedule for Assemblies
Wet Adhesion-before aging	Step 1: 2 hr @ 73.5° F ± 2° F (23° C ± 1.1° C) Step 2: Test immediately after conditioning cycle
Wet Adhesion-after aging (stability test 4.8.4)	Step 1: Follow product conditioning for stability test in section 4.8.4 prior to preparing assemblies for strip adhesion Step 2: 2 hr @ 73.5° F ± 2° F (23° C ± 1.1° C) Step 3: Test immediately after conditioning cycle
Initial Adhesion	Step 1: 144 hr (6 days) @ 73.5° F ± 2° F (23° C ± 1.1° C) Step 2: Test immediately after conditioning cycle
After Immersion in aqueous NaCl 5% solution	Step 1: 48 hr @73.5° F ± 2° F (23° C ± 1.1° C) Step 2: 72 hr immersed in NaCl soln. @ 73.5° F ± 2° F (23°C ± 1.1°C) Step 3: 24 hr @ 73.5° F ± 2° F (23° C ± 1.1° C) Step 4: Test on day 6 (144 hr)
Adhesion @ 60°C	Step 1: 144 hr (6 days) @73.5° F ± 2° F (23°C ± 1.1° C) Step 2: 20 minutes @ 140° F ± 2° F (60° C ± 1.1° C) Step 3: Test on day 6 @ 140° F ± 2° F (60° C ± 1.1° C)

4.8.4 Stability test. A closed 1-pint container of the adhesive material shall be placed in an oven for 2 weeks at 120° F ± 2° F (49° C ± 1.1° C). It shall then be removed from the oven and allowed to cool and equilibrate at room temperature. Strip adhesion samples shall be assembled following the "wet adhesion after aging" stability test specification. The strip adhesion test specified in Table I shall then be conducted.

4.8.5 Hazardous Air Pollutants. The adhesive shall not contain any hazardous air pollutants (HAP) as defined in 40 CFR 63 (see 3.5.1).

4.9 Storage. The manufacturer shall certify and shall support his certification with test data that the adhesive, after being stored in its original unopened container for one year at room temperature 77° F ± 9° F (25° C ± 5° C), shall meet the requirements of this specification.

4.10 Toxic ingredients. Other than PCBTF, the manufacturer of the chemical being supplied for qualification to ARL shall certify that the pretreatments contain no benzene (benzol), chlorinated solvents or ethylene based glycol ethers and their acetates. All products being submitted for qualification shall be absent of components containing compounds of antimony, arsenic, beryllium, cadmium, chromium, cobalt, cyanide, lead, manganese, mercury, nickel and selenium. Chemicals contained in these materials shall be HAP-free. Nonconformance to 3.5 constitutes failure of this requirement.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

INFORMATION FOR GUIDANCE ONLY. (This section contains information of a general or explanatory nature that is helpful, but is not mandatory.)

6.1 Intended use. Adhesives conforming to this specification are intended for bonding rubber to steel in miscellaneous nonstructural uses, where high adhesive strength bonds are not required. Bond strengths obtained are low (about 5 pounds per square inch).

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, revision letter, amendment, and date of this specification.
b. If issues of documents are different (see 2.1.1).
c. If the time of periodic verification is different (see 3.1.1 and 4.3).
d. If requirement change for the prime and sub-tier contractor (see 3.2).
e. If special marking is required (see 3.4).
f. Whether a MSDS/SDS is required with each shipment (see 3.6).
g. If inspection conditions are different (see 4.2.1).
h. If packaging requirements are different (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products Database (QPD) - MMM-A-121, whether or not such products have actually been so listed by that date. The attention of manufacturers 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 purchase orders for the products covered by this specification. Information (questions, etc.) pertaining to qualification and testing of products and the

certified test results from the approved testing facility for the qualified products database (QPD) testing (see 4.2) and for the conformance program (see 4.4) should be submitted to the Organic Coatings Team, Material & Manufacturing Science Division, ATTN: RDRL-WMM-C, Army Research Laboratory (ARL) located at Aberdeen Proving Ground, MD 21005-5069.

6.3.1 Inspection, and other information. In addition to the qualification test samples, the qualifying activity will request the manufacturer to submit to the qualification activity: (a) a certified test report showing that the material conforms to the requirements of this specification (see 4.2.3); (b) one copy of the MSDS (see 3.6 and 6.6); (c) certification that the manufacturer's material meets the HAP and VOC content requirement (see 3.5).

6.3.1.1 Sample identification for qualification inspection. Qualification inspection samples are to be forwarded to the laboratory designated in the letter of authorization (see 6.3) and identified as follows:

QUALIFICATION TEST SAMPLES

Specification: MMM-A-101; Title: ADHESIVE, BONDING VULCANIZED SYNTHETIC RUBBER TO STEEL

Manufacturer's name and product number.
Submitted by (name and date) for qualification testing in accordance with authorization
(reference authorizing letter)

6.4 Conformance inspection. Conformance inspection ensures that production items meet specification requirements prior to acceptance by the Government. Conformance inspection includes a description of the inspection procedure, sequence of inspections, number of units to be inspected, and the criteria for determining conformance to the requirement specified. Conformance examinations and tests may be the same as those specified for first article inspection, but they do not duplicate any long-term or special tests that were used to justify inclusion of qualification in a specification.

6.5 Method of application. New design documents, engineering drawings and ordering data should indicate the type of adhesive required, packaging, packing, and special marking requirements and methods of application when practicable.

6.5.1 Application conditions. The contractor should be cognizant of the environmental controls necessary so as not to apply any adhesive outside the manufacturer's recommendations. Adhesive should not be applied when the surface temperature, air temperature, or relative humidity would cause a negative effect on the application and subsequent function of the applied adhesive.

6.6 MSDS/SDS. Contracting officers will identify those activities requiring copies of a completed MSDS/SDS prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in FED-STD-313.

6.7 Toxicity request. Department of the Army Regulation (AR) 40-5, Preventive Medicine, (AR) 70-1, Acquisition Policy, and Department of the Army Pamphlet 70-3, Acquisition Procedures, require a toxicity clearance. Army toxicity questions and/or a toxicity clearance request should be addressed to: US Army Public Health Command (USAPHC), ATTN: MCHB-IP-TTE, 5158 Blackhawk Road, APG-EA, MD 21010-5403 or emailed to usaphctepinfo@amedd.army.mil .

6.8 Hazardous Air Pollutant (HAP). HAP is defined as any substance listed under Section 112 of the Clean Air Act or its modifications. The text of the Clean Air Act, listed pollutants and modifications are kept by the Environmental Protection Agency (EPA) and are accessible through the website: http://www.epa.gov.

6.9 Volatile organic compound (VOC). VOC is defined in 40 CFR Part 51.100 (s). Volatile organic compounds (VOC) means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. For the latest complete definition of VOC see: http://www.epa.gov/ttn/naaqs/ozone/ozonetech/def_voc.htm.

6.10 Subject term (key word) listing.

Cleaning
Gaskets
Matting
Method
Neoprene
Nitrile
Process
Stability
Surfaces
Type
Viscosity
VOCs
VOHAPs

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

CONCLUDING MATERIAL

MILITARY INTERESTS:

Custodians
Army - MR
Navy - SH
Air Force - 11

Review Activities
Army - AV, MI, PT
Navy - AS, MC
Air Force - 13, 19, 99
DLA - DH, IS, GS4
DISA - DC5

CIVIL AGENCY COORDINATING ACTIVITY:

GSA/FAS

Preparing Activity:
Army - MR

DoD Project 8040-2015-002

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil/ .