

MIL-H-62217A(AT)
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 SUPERSEDING
 MIL-H-62217(AT)
 12 September 1974

MILITARY SPECIFICATION

HOSE AND HOSE ASSEMBLIES, NON-METALLIC, SILICONE, POLYESTER AND WIRE REINFORCED (FOR COOLANT AND HEATING SYSTEMS OF DIESEL AND GASOLINE POWERED ENGINES)

This specification is approved for use by US Army Tank-Automotive Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers polyester and wire reinforced, silicone compounded, elastomeric hose and hose assemblies, for coolant and heating systems of diesel and gasoline powered engines.

1.2 Classification. Coolant system and heater hose covered by this specification shall be classified as follows:

- | | |
|----------|---|
| Type I | - Full tube ID for formed and beaded male tube ends on cooling and heater systems. |
| Type II | - Preformed full tube ID for formed and beaded male tube ends in cooling systems. |
| Type III | - A flexible type with cuff ID and OD ends for clamping to formed and beaded male tube ends on cooling systems. |
| Type IV | - Full tube ID to accomodate reattachable fittings for sealed heater systems. |

2. APPLICABLE DOCUMENTS

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: DRSTA-GSS, Warren, MI 48090, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

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SPECIFICATIONS

FEDERAL

- | | |
|----------|---|
| O-A-548 | - Antifreeze/Coolant, Engine: Ethylene Glycol, Inhibited, Concentrated. |
| FF-B-575 | - Bolt, Hexagon and Square. |
| QQ-P-416 | - Plating, Cadmium (Electrodeposited). |
| QQ-Z-325 | - Zinc Coating, Electrodeposited, Requirements for. |
| WW-C-440 | - Clamps, Hose, (Low Pressure). |
| ZZ-R-765 | - Rubber, Silicone. |

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- | | |
|-------------------|---|
| MIL-C-81562 | - Coating, Cadmium, Tin Cadmium and Zinc, (Mechanically Deposited). |
| MIL-H-62217/1(AT) | - Hose, Nonmetallic Straight, Silicone, Polyester Reinforced (Radiator and Heater). |
| MIL-H-62217/2(AT) | - Hose, Preformed: Silicone, Polyester Reinforced (Radiator). |
| MIL-H-62217/3(AT) | - Hose, Preformed, Flexible, Silicone, Polyester and Wire Reinforced (Radiator). |
| MIL-H-62217/4(AT) | - Hose, Straight, Silicone, Polyester Reinforced (Sealed Heater Systems). |

STANDARDS

FEDERAL

- | | |
|----------------|--|
| FED-STD-H28/10 | - Screw Thread Standards for Federal Services. |
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MILITARY

- | | |
|-------------|--|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
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(Copies of Military 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.)

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

AMERICAN SOCIETY FOR TESTING MATERIALS

ASTM D 380	- Rubber Hose.
ASTM D 395	- Compression Set of Rubber.
ASTM D 412	- Rubber, Determination of Tension Characteristics.
ASTM D 413	- Rubber Property - Adhesion to Flexible Substrate.
ASTM D 471	- Rubber Property - Effect of Liquids, Test for.
ASTM D 573	- Rubber - Deterioration in an Air Oven.
ASTM D 1149	- Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimen).
ASTM D1349	- Rubber - Standard Temperature and Atmosphere for Testing and Conditioning.
ASTM D 2240	- Indentation Hardness of Rubber and Plastics by Means of a Durometer.

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

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

J536	- Hose Clamps.
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(Information as to the availability of the above standards may be obtained from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

THE MAINTENANCE COUNCIL - AMERICAN TRUCKING ASSOCIATIONS, INC. (TMC-ATA)

TMC-ATA	- Recommended Practices Manual.
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(Application for copies should be addressed to The Maintenance Council - ATA, 1616 P Street, NW, Washington, DC 20036.)

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

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3. REQUIREMENTS

3.1 First article. The contractor shall furnish sample units for first article inspection and approval (see 4.4 and 6.4). First article samples shall be inspected by the contractor under the surveillance of the Government to determine conformance to the quality assurance provisions of this specification. First article samples shall be fully representative of hose or hose assemblies, to be supplied from production tooling and facilities.

3.2 Materials. Hose furnished under this specification (see 6.1) shall be composed of elastomeric material. Material shall be used in conjunction with fabric, or wire, reinforcement, as applicable (see 6.5). Materials shall conform to applicable drawings and TMC-ATA RP305 and RP307.

3.3 General construction. Hose and hose assemblies shall be constructed to the form and dimensions specified in MIL-H-62217/1 through MIL-H-62217/4, in TMC-ATA - Recommended Practices Manual, and as specified herein (see 6.2).

3.3.1 Types I, II, and IV hose. Hose shall consist of an inner tube, an intermediate fabric reinforcement, and an outer cover, or protective skin. Type IV hose assembly shall consist of foregoing with metal end fittings attached.

3.3.2 Type III hose. Hose shall consist of an inner tube, a helical wire reinforcement, and an outer cover, and shall have a preformed cuff (soft end) on each end. Cuff shall be built up with plies of silicone elastomeric material, or fabric impregnated with silicone elastomeric material, and shall be of uniform thickness.

NOTE: Hose clamps used to install types I, II, and III hose shall conform to type F or G of WW-C-440, or to SAE J536, type F, styles 1, 2, or 4.

3.3.3 Inner tube. Inner tube shall be a silicone compounded elastomeric material conforming to ZZ-R-765, class 2, color optional, except that physical properties shall conform to table I.

3.3.4 Cover. Cover shall consist of a continuous layer of minimum thickness, or a thin skin, wrapped layer of polysiloxane compounded elastomeric material bonded to reinforcement. Physical properties shall conform to table I.

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3.3.5 Reinforcement.

3.3.5.1 Type I, II and IV. Reinforcement of type I, II and IV hose shall consist of multiple plies of woven or knitted fabric of such strength as to meet requirements of this specification.

3.3.5.2 Type III. Reinforcement of type III hose shall consist of high carbon steel wire which shall not be exposed on either inner or outer diameter of hose. In addition, a fabric reinforcement may be used over entire length of hose. Reinforcements must be of such strength as to meet requirements of this specification.

TABLE I. Physical properties requirements.

Physical properties	Types I, II, and IV		Type III	
	Tube	Cover	Tube	Cover
Original properties				
Hardness, durometer, Shore A	50/70	N/A	55/65	N/A
Tensile strength, min, psi	800	800	1000	1000
Elongation, min, percent	200	200	250	250
Oven aging at temperatures noted, °F (72 hours)	350° + 5°	350° + 5°	350° + 5°	350° + 5°
Changes after 72 hours				
Hardness, durometer, Shore A	-5 to +10	0 to +10	0 to +20	N/A
Tensile strength retained, min, percent	90	90	90	90
Elongation retained, min, percent	65	65	65	65

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TABLE I. Physical properties requirements. - Continued

Physical properties	Types I, II, and IV		Type III	
	Tube	Cover	Tube	Cover
Oil immersion (change) volume, max, percent (70 hours at 212°F)	0 to +40	0 to +40	0 to +40	0 to +40
Tensile strength retained, min, percent	60	60	60	60
Hardness, durometer, Shore A, max	0 to -20	0 to -20	0 to -20	0 to -20
Coolant immersion (change) volume, max, percent (166 hours at 235° ± 5°F)	0 to +10	N/A	0 to +10	N/A
Hardness, durometer, Shore A	+10	N/A	+10	N/A
Tensile strength retained, min, percent	70	N/A	70	N/A
Elongation retained, min, percent	75	N/A	75	N/A
Adhesion, min, pounds				
Tube to ply	10	10	N/A	N/A
Tube to cover	10	N/A	10	N/A
Ply to ply	N/A	10	N/A	N/A
Cover to ply	N/A	10	N/A	N/A
Compression set, max, percent	35	N/A	35	N/A

3.3.6 Woven or knitted fabric. Layers of fabric shall be well bonded with elastomeric silicone material which shall firmly join plies to tube and cover, and to each other.

3.3.7 Fittings. Type IV hose assemblies shall consist of hose with fittings assembled on each end. Fittings may be of the reusable type. Unless otherwise specified, one fitting in each hose assembly shall be of the male type and one of the female type. The female type shall incorporate a swivel. Steel fittings, except stainless, shall be zinc plated in accordance with type II, class 2 of QQ-Z-325, or type II, class 2 of MIL-C-81562, or cadmium plated in accordance with type II, class 2 of QQ-P-416.

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3.4 Dimensions.

3.4.1 Diameter tolerances. Tolerance for hose diameters shall be as shown in tables II, III, and IV (see 6.3).

TABLE II. Hose diameter tolerances (types I & II).

Inside diameter		Tolerances	
From (inch)	To and including (inch)	Straight hose (inch)	Curved hose (inch)
3/8	1/2	$\pm 1/64$	$\pm 1/32$
5/8	4	$\pm 1/32$	$\pm 1/32$

TABLE III. Hose diameter tolerances (type III).

Inside diameter		Outside diameter	
(Hose & cuff) (inch)	Tolerance (inch)	(Cuff only) (inch)	Tolerance (inch)
1 1/4	$+ 1/64 - 1/32$	1 5/8	$+ 1/16 - 0$
1 1/2	$+ 1/64 - 1/32$	2	$+ 1/16 - 0$
1 3/4	$+ 1/64 - 1/32$	2 1/4	$+ 1/16 - 0$
2	$+ 1/64 - 1/32$	2 1/2	$+ 1/16 - 0$
2 1/4	$\pm 1/32$	2 7/8	$+ 1/16 - 0$
2 1/2	$\pm 1/32$	3 1/8	$+ 1/16 - 0$
3	$\pm 1/32$	3 3/4	$+ 1/16 - 0$
4	$\pm 1/32$	4 3/4	$+ 1/16 - 0$

TABLE IV. Hose diameter tolerances (type IV).

Nominal Size I.D. (inch)	Inside Diameter Tolerance (inch)
1/2	$+ .039 - .000$
5/8	$+ .042 - .000$
7/8	$+ .042 - .000$
1 1/8	$+ .047 - .000$

3.4.2 Wall thickness. Types I, II, and IV hose wall thickness shall be within limits shown in tables V and VI. Type III hose wall thickness shall be uniform and wire shall not be exposed (see 3.3.5.2).

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TABLE V. Wall thickness limits (types I and II).

Inside diameter	Minimum (inch)	Maximum (inch)
All sizes	.170	.220

TABLE VI. Wall thickness limits (type IV).

Size (inch)	Minimum (inch)	Maximum (inch)
1/2	.144	.166
5/8	.144	.166
7/8	.142	.168
1 1/8	.155	.177

3.4.3 Tolerance on lengths. Tolerances on types I, III, and IV for specified (cut) lengths shall be as specified in table VII, and on type II hose (preformed) shall be as shown in table VIII.

TABLE VII. Tolerance on hose lengths (types I, III & IV).

Over (inch)	To and including (inch)	Tolerance (inch)
--	12	+ 3/16 - 1/16
12	24	+ 1/4 - 1/8
24	--	+ 1/2 - 1/4

TABLE VIII. Tolerance on preformed (type II) hose length.

Each end (measured from end to intersect of nearest centerline)	(inch)
	+ 3/16 - 1/8

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3.4.4 Fitting.

3.4.4.1 Screw threads. Screw threads of fittings shall be in accordance with FED-STD-H28/10 for the size specified. Classes of fits for threads shall be in accordance with best commercial practice.

3.4.4.2 Interchangeability. Fittings shall conform to the performance requirements specified herein when installed on any hose conforming to the requirements specified herein, and when attached to any standard mating part for the specified fitting type and size. Fittings shall conform to TMC-ATA RP305 and RP307.

3.4.4.3 Wrench flats. Nominal distance across wrench flats (hexagon or other) shall be in multiples of 1/16 inch. Tolerance shall not exceed the tolerance across flats for the semifinished hexagon nut nearest the fitting wrench flat size, as specified in FF-B-575.

3.4.4.4 Swivel fittings. Swivel fittings, shall swivel freely with hand torque.

3.4.5 Bulk hose. Unless otherwise specified, type I bulk hose shall be furnished in lengths of 3, 25, or 40 feet, or multiples thereof (see 6.2).

3.5 Physical requirements.

3.5.1 Burst pressure. Hose, or hose assembly, shall not burst at any pressure below that specified in table IX.

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TABLE IX. Hose burst pressure.

Type	Size	Nom ID (inch)	Min burst pressure (psi)
I	-6	3/8	425
	-8	1/2	425
	-10	5/8	425
	-12	3/4	425
	-14	7/8	425
	-16	1	375
	-18	1 1/8	375
I, II & III	-20	1 1/4	350
	-22	1 3/8	350
	-24	1 1/2	350
	-28	1 3/4	325
	-32	2	300
	-36	2 1/4	300
	-38	2 3/8	250
	-40	2 1/2	250
	-44	2 3/4	200
	-48	3	200
	-56	3 1/2	175
-64	4	150	
IV	-10	1/2	350
	-12	5/8	275
	-16	7/8	200
	-20	1 1/8	175

3.5.2 Durometer hardness. Durometer hardness of hose, or hose assembly, specimens shall be as specified in table I, as applicable.

3.5.3 Tensile strength and elongation. Hose, or hose assembly, shall meet tensile strength and elongation requirements specified in table I, as applicable.

3.5.4 Resistance to heat. Hose, or hose assembly, shall conform to limits specified in table I after heat aging for 72 hours.

3.5.5 Resistance to oil. Hose, or hose assembly, shall conform to limits in physical properties specified in table I, as applicable, after 70 hours of oil immersion at 212°F.

3.5.6 Resistance to coolant. Hose, or hose assembly, shall conform to limits in physical properties specified in table I, as applicable, after 166 hours of coolant immersion at 235°F.

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3.5.7 Adhesion. Force required to separate tube from cover or ply, ply from ply, or cover from ply, shall be not less than that specified in table I.

3.5.8 Low temperature flexibility. Hose, or hose assembly, shall evidence no cracks or breaks after exposure to minus 65°F ambient air temperature.

3.5.9 Ozone resistance. Rubber components shall be ozone resistant. After testing as specified in ASTM D 1149, rubber shall evidence no cracking.

3.5.10 Proof pressure. Hose, or hose assembly, shall undergo test of proof pressure as specified in ASTM D 380. Proof pressures shall be one half of minimum burst pressure values specified in table IX. Hose, or hose assembly, shall exhibit no leakage during or after undergoing test.

3.5.11 Pulsating proof pressure. Hose, or hose assembly, shall undergo pulsating proof pressure test as specified in ASTM D 380, and shall not bulge, separate, or leak during or after testing.

3.5.12 Resistance to vibration (type III). Hose, or hose assembly, shall undergo 50 hours of vibration without leak or other impairment.

3.5.13 Resistance to compression set. Hose shall undergo compression set test specified in ASTM D 395. Thereafter, hose shall conform to table I.

3.6 Marking for identification.

3.6.1 Identification of types. Types I and II hose, and type IV hose assembly, shall be marked on outer surface, in contrasting color, by stencil or printed type. Type III hose shall be marked on one or both cuffs, in contrasting color, by stencil or printed type. Following information shall be included:

National Stock Number
Nominal size (ID)
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Type
Manufacturer's name or trademark
Month and year of manufacture 1/

1/ Month and year of manufacture shall be recorded as defined, but shall apply for reference purposes only.

3.6.1.1 Identification tag. In addition, hose assemblies shall have a tag attached. Tag shall be marked legibly with:

National Stock Number
Date of assembly
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3.7 Workmanship. Workmanship shall be such as to produce hose free of looseness of cover, exposed reinforcements (wire, fabric), cuts or bruises, blisters, breaks, pitting, wrinkles in cover, loose foreign matter, excess mandrel lubricants, or any other defects which adversely affect hose performance or appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified in the contract, 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 Materials and construction. Contractor's inspection records shall be examined to determine conformance to 3.2 through 3.3.7.

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

- a. First article inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Except as otherwise specified herein, all inspections shall be performed in ambient air temperatures specified in ASTM D 1349.

4.3.1 Time of conditioning. Specimens shall be conditioned for not less than 3 hours before being tested, and shall be tested in the same atmosphere.

4.4 First article. First article samples shall consist of 6 feet of each, type I, II, and IV, and four 2 foot pieces of flexible, type III hose. Specimens, properly marked with identifying information, shall be representative of units proposed to be furnished to the Government in procurement. First article inspection shall consist of examination for defects as specified in table XI and tests as specified in table X, in order listed.

4.4.1 Failure. Failure of any sample to conform to any requirement specified herein shall cause the Government to withhold approval of first article until action by the contractor to correct defects and prevent recurrence has been approved by the Government.

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TABLE X. Test schedule.

Paragraph number	Tests	First article tests	Acceptance tests	Control tests
4.6.1	Burst pressure	X	X	
4.6.2	Hardness, durometer	X	X	
4.6.3	Tensile strength and elongation	X	X	
4.6.4	Resistance to heat	X		
4.6.5	Resistance to oil	X		X
4.6.6	Resistance to coolant	X		X
4.6.7	Adhesion	X	X	
4.6.8	Low temperature flexibility	X		X
4.6.9	Ozone resistance	X		
4.6.10	Proof pressure	X	X	
4.6.11	Pulsating proof pressure	X		
4.6.12	Resistance to vibration	X		X
4.6.13	Resistance to compression set	X	X	

4.5 Quality conformance inspection.4.5.1 Sampling.

4.5.1.1 Lot formation. For purposes of sampling and inspection, a lot shall consist of all hose of one type, made from one batch or process, and offered for delivery at one time.

4.5.1.2 Sampling for examination. Samples for quality conformance examination shall be selected in accordance with level II of MIL-STD-105.

4.5.1.3 Sampling for acceptance testing. Samples for acceptance testing shall be selected in accordance with MIL-STD-105.

4.5.2 Quality conformance examination.

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4.5.2.1 Acceptable quality levels. Each hose, or hose assembly, selected in accordance with 4.5.1.2 shall be examined for conformance to following Acceptable Quality Levels (AQL's), on the basis of percent defective:

<u>Classification</u>	<u>AQL</u>
Major	2.5
Minor	4.0

4.5.2.2 Classification of defects. For examination purposes, defects shall be classified as specified in table XI.

TABLE XI. Classification of defects.

<u>Category</u>	<u>Defect</u>	<u>Method of inspection</u>
Major		
101	Poorly patched cover	Visual
102	Blistered or loose patch on cover	Visual
103	Under gage cover area	Gage- visual
104	Poor cover lap, opening or lack of adhesion	Gage- visual
105	Cover missing	Visual
106	Loose cover (wrinkle when bent)	Visual
107	Depressed area, groove or hole in cover (exceeding specified tolerance)	Visual
108	Split, slit or break in cover	Visual
109	Blister under cover	Visual
110	Ridge on tube - severe	Visual
111	Bunching of tube - severe	Visual
112	Loose tube	Visual
113	Off center - under gage cover	Gage- visual
114	Hole in tube	Visual
115	Bad lap, or delamination of tube	Visual
116	Misbranding	Visual
117	Hose length or diameters (see tables II through VIII) out of tolerance	Gage- visual <u>1/</u>

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TABLE XI. Classification of defects. - Continued

Category	Defect	Method of inspection
Minor		
201	Under gage cover area (less than one quarter circumference in largest dimension)	Gage-visual
202	Surface lines, ridges or irregularity	Visual
203	Depressed area (within tolerance)	Visual
204	Rough surface (within tolerance)	Visual
205	Wrinkles in cover	Visual
206	Ridge on tube	Visual
207	Bunching of tube	Visual
208	Excessive mandrel lubricant or other foreign material	Visual
209	Off center - but minimum gage in cover met	Gage-visual
210	Branding not in specified place	Visual

1/ Length shall be determined as prescribed in method 2411, FED-STD-601.

4.5.3 Classification of tests. Tests shall be classified as follows:

- a. Acceptance tests (see 4.5.4).
- b. Control tests (see 4.5.5).

4.5.4 Acceptance tests. Each sample, selected in accordance with 4.5.1.3, shall be subjected to tests specified in table X in order listed, using an AQL of 6.5 on the basis of percent defective.

4.5.5 Control tests.

4.5.5.1 Sampling for control testing. Samples for control testing shall be selected at the rate of one sample from each 10,000 feet of each nominal size and type produced, except that not more than two samples shall be selected in any 30 day period. Each sample shall consist of sufficient hose to conduct specified tests.

4.5.5.2 Failure. Failure of a control test sample to pass any specified examination or test may be cause for the Government to refuse to accept subsequent lots until it has been proved to the satisfaction of the Government that the faults revealed by the test have been corrected.

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4.6 Conformance verification.

4.6.1 Burst pressure test. To determine conformance to 3.5.1, hose, or hose assembly, test specimen shall be subjected to straight bursting pressure test specified in ASTM D 380.

4.6.2 Durometer hardness test. To determine conformance to 3.5.2, test specimen from hose being tested shall be subjected to durometer hardness test specified in ASTM D 2240.

4.6.3 Tensile strength and elongation test. To determine conformance to 3.5.3, tensile strength and elongation tests shall be conducted in accordance with ASTM D 412. Tube and cover test specimens shall be taken from one or more samples of hose, or hose assemblies, being tested, or from molded test slabs representative of cover compound of hose being tested.

4.6.4 Resistance to heat test. To determine conformance to 3.5.4, hose, or hose assembly, shall be subjected to aging tests specified in ASTM D 573 at applicable temperatures and for periods of time shown in table I. Test specimens shall be taken as specified in 4.6.3.

4.6.5 Resistance to oil test. To determine conformance to 3.5.5, specimens of tubes and covers shall be subjected to tests as specified in ASTM D 471. Hose, or hose assembly, shall be immersed in ASTM oil No. 3 for 70 hours at 212°F.

4.6.6 Resistance to coolant test. To determine conformance to 3.5.6, tube specimens shall be subjected to test specified in ASTM D 471. Hose, or hose assembly, shall be immersed in solution of 60 percent inhibited ethylene glycol antifreeze, conforming to O-A-548, and 40 percent water for 166 hours at 235°F.

4.6.7 Adhesion test. To determine conformance to 3.5.7, hose, or hose assembly, specimens shall be subjected to test specified in ASTM D 413.

4.6.8 Low-temperature flexibility test. To determine conformance to 3.5.8, hose, or hose assembly, specimens shall be subjected to low-temperature flexibility test specified in ASTM D 380, except test temperature shall be minus 65°F.

4.6.9 Ozone resistance test. To determine conformance to 3.5.9, hose, or hose assembly, specimens shall be subjected to tests specified in ASTM D 1149.

4.6.10 Proof pressure test. To determine conformance to 3.5.10, hose, or hose assembly, specimens shall be subjected to test for proof pressure specified in ASTM D 380.

4.6.11 Pulsating proof pressure test. To determine conformance to 3.5.11, hose, or hose assembly, shall be tested as specified in ASTM D 380. The pressure shall be 40 psi applied internally at pulsating intervals of 5 seconds (2 seconds "ON" and 3 seconds "OFF") for 15 minutes.

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4.6.12 Resistance to vibration test (type III). To determine conformance to 3.5.12, hose shall be conditioned and tested as specified in 4.6.12.1 and 4.6.12.2

4.6.12.1 Test specimen (type III). Each specimen shall consist of a 24 inch long hose which has been conditioned for 24 hours at $80^{\circ} \pm 9^{\circ}\text{F}$.

4.6.12.2 Procedure. Samples, up to and including one inch size, shall be installed on vibration equipment in a manner incorporating a 90 degree bend and a 45 degree circumferential twist in the sample. (Sample larger than one inch size shall be mounted horizontally with a 45 degree circumferential twist.) Vibration of the sample shall be for 50 hours at 30 ± 5 Hz at 1/4 inch double amplitude, and in ambient air temperature of $80^{\circ} \pm 5^{\circ}\text{F}$. During vibration period, water shall be circulated through sample at pressure equal to 1/4 of burst value for same size hose shown in table IX.

4.6.13 Resistance to compression set test. To determine conformance to 3.5.13, hose, or hose assembly, shall be subjected to compression set test (constant deflection method) specified in ASTM D 395, after aging for 70 hours at 302°F . Molded test slabs, representative of batch from which hose is made, may be used.

4.7 Packaging inspection. All packages and packs shall be inspected to determine conformance to Section 5.

5. PACKAGING

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking shall be in accordance with the applicable packaging standard or packaging data sheet specified by the procuring activity (see 6.2).

6. NOTES

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

- a. All types are intended for severe service such as on cars, buses, heavy duty military and commercial trucks, military combat vehicles, and off-road earth moving equipment.
- b. Type I (1/2 inch ID thru 1 1/8 inch ID) hose is intended for connecting hot water heaters to coolant circulating systems of ground vehicles.

6.1.1 Other uses. Applicable provisions of this specification may be used in procurement of coolant system hose required for installation on industrial and marine engines.

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6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type of hose required (see 1.2).
- c. Size and length required (see 3.4 and tables II through IX and applicable Military specification sheet, see 3.3).
- d. Type of fitting required (see 3.3.6).
- e. Length for bulk hose (see 3.4.5).
- f. Applicable packaging standard, or data sheet (see 5.1).

6.3 International standardization agreements. Certain provisions of this specification are the subject of international standardization agreements, STANAG 4043 and QSTAG 133. When amendment, revision, or cancellation of this specification is proposed which will affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels, including departmental standardization offices, if required.

6.4 First article. First article samples shall be tested and approved under the appropriate provisions of 7-104.55 of the Defense Acquisition Regulation. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for examination, tests, and approval of the first article (see 3.1).

6.5 Recycled materials. The use of recycled materials which meet the requirements of the applicable material specifications without jeopardizing the intended use of the item shall be encouraged (see 3.2).

6.6 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.

Custodian:
Army - AT

Preparing activity:
Army - AT

Review activity:
DLA-CS

Project No. 4720-A548

User activity:
Army - ME

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