

[METRIC]
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SUPERSEDING
ZZ-T-416H
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MS52124
22 September 1972

COMMERCIAL ITEM DESCRIPTION

TIRE, PNEUMATIC: RETREAD AND
REPAIR MATERIALS (METRIC)

The General Services Administration has authorized the use of this commercial item description (CID), for all federal agencies.

1. Scope. This CID covers materials and related products for retreading and repairing pneumatic tires used on ground vehicles.

2. Classification

2.1 Materials. and related productsMaterials and related products covered by this CID shall be of the following types:

2.1.1 Material classes and styles.

<u>T y p e M a t e r i a l</u>	<u>C l a s s</u>	<u>S t y l e</u>
Tire repair materials		
Tread gum	A	
Cushion rubber gum	B	
All purpose gum	C	
Low temperature cure gum	D	

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any other data which may improve this document should be sent by letter to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E, Warren, MI 48397-5000.

FSC 2640

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Type	Material	Class	Style
II	Tire retreading materials		
	Tread robber cushion	A	
	Bevel stock	A	1
	Wing stock	A	2
	Wing stock (valley)	A	2
	Cushion gum facing		
	Strip form stock hot tread application	A	3
	Cold wind stock	A	4
	Padding stock	B	
	Filler strip stock	c	
	Stripping stock	D	
	Tread rubber	E	
	Precured tread	F	
	Relugging	G	
III	Repair fabric and patches		
	Nylon fabric	A	
	Patches	A	UC. SC
	Patch plug and patch mold unit	A, B	
	Patches, chemical cure	A	CC
	Fluid, vulcanizing	B	
IV	Processing materials		
	Vulcanizing cement, cold application	A	1
	Vulcanizing cement, hot robber application	A	2
	Technical talc	B	
	Rubber solvent	C	
	Mold lubricant	D	
	Crayon, robber marking	E	

3. Salient characteristics

3.1 Materials. The materials and related products covered by this CID shall conform to the physics! properties and performance requirements specified herein. After proper installation, the repair and retread materials shall be of a quality capable of withstanding normal service conditions. The use of recovered material made in compliance with regulatory requirements is acceptable providing that all requirements of this CID are met (see 6.6).

3.1.1 Material variety. This CID does not include all varieties of materials which may be used by the retreading industry, and shall not prohibited the use of such materials if the quality of the end product is not compromised.

3.2 Material definitions. Materials referenced in this CID are defined as follows:

3.2.1 Rubber. Rubber used to prepare rubber compounds described in this CID and also listed in ASTM D1418 are natural rubber (NR), isoprene rubber (IR), butadiene rubber (BR), styrene butadiene robber (SBR), and rubber hydrocarbon content (RHC).

3.2.2 Carbon black. Carbon black used to prepare tread rubber compounds described in this CID shall be tread type carbon black High Abrasion Furnace (HAF) quality to better (N300 Series ASTM D1765).

3.3 Tire repair materials, type I. All tire repair materials shall meet the requirements of table I and be furnished as specified in table III.

3.3.1 Gum materials (classes, A, B, C). Gum materials shall meet the applicable requirements of table I for class C, and table II for classes A and B, and shall be suitable for their intended purpose (see 6.1).

3.4 Tire retreading Materials, type II. The rubber compounds used for retreading tires shall conform to the applicable physical properties specified in tables I and II. and be furnished as specified in table III.

3.4.1 Physical properties variation. Tread rubber compounds shall have a variance in tensile stress of ± 1380 kiloPascal (kPa) at 300% elongation. specific gravity $+ 0.015$ and Shore A hardness ± 3 points. The properties shall be verified by ASTM D746.

3.4.2 Cushion gum facing. Bevel and wing die size tread rubber shall be faced with rubber compound not less than .432 mm thickness for truck and 3.3 mm thickness for passenger car.

3.4.3 Curing methods. Unvulcanized tread rubber shall be capable of curing (vulcanization) at a matrix surface temperature of not less than 145°C .

3.4.4 Storage stability of strip tread rubber. Uncured tread rubber shall be subjected to oven aging at $70 \pm 1^{\circ}\text{C}$ for 70 hours. During oven aging, the material shall be enclosed in cellophane and suspended in the oven. After cooling to room temperature, the change in properties shall not exceed the limits in table IV when the strip stock is compression molded thereafter in a platen press.

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3.4.5 Commercial tire, tread rubber ozone resistance. Tread rubber used for commercial tires shall contain antioxidants and antiozonants of a quality to provide standard commercial resistance to weathering.

3.4.6 Military tire, tread ozone resistance. Tread rubber used for retreading nondirectional military tires shall be ozone resistant.

3.4.7 Strip form stock (class A-3). Strip form stock shall be suitable for a hot tread application process.

3.4.8 Cold wind stock (class A-4). Cold wind stock shall be 98.4 + 3.2 mm wide, by 4.0 + 0.8 mm thick, with tapered edges 6.4 to 12.7 mm wide. The stock shall have a tacky surface protected with polyethylene backing 140 mm wide. The cold wind stock and backing shall be spirally wound on to a 127 mm wide, 76.2 inside diameter (minimum) spool until the outside diameter of the roll is 508 to 610 mm. The spool shall be easy to remove from the roll. The compound used to formulate cold wind stock shall be in accordance with table II.

3.4.9 Relugging stock class G Relugging stock shall be unvulcanized tread rubber capable of being applied to a prepared tire casing. Lug application and tread design shall be in the form of continuous chevrons used for off road service. After proper vulcanization, the tire shall meet the requirements of the off road tire compounds of table II.

3.4.10 Low temperature properties. When required, tire retreading materials for military ground vehicle tires shall meet the cold brittleness requirements of ASTM D746 at -54°C.

3.4.11 Shelf life. Tire reconditioning materials shall meet their intended requirements for a minimum period of 6 months after date of manufacture at which time they shall show no more than a light sulphur or antiozonant bloom.

3.4.12 Storage stability cushion, or splice gum, repair gum, and shoulder strips for precured tread. Such materials shall meet their intended requirements for a minimum of 3 months after date of manufacture.

3.4.13 Splices. Splicing material shall be of class F, unvulcanizing gum rubber compound,

3.4.14 Backing. An embossed or unembossed untreated, medium slip, normal strength polyethylene (clear or transparent film may be used) backing of not less than 0.08 mm thickness shall be processed on all tire retreading and tire repair materials except strip form stock tread rubber and chemical cure patches.

3.5 Repair fabric and patches. type III. Type III materials shall meet the requirements specified herein and be furnished as specified in table III.

3.5.1 Repair fabric (class A) Tire repair fabric shall be coated on both sides with cushion rubber gum meeting the requirements of table I. type I. class B of this CID. The coating shall be approximately equal on each side and shall be from 0.127 to 0.254 mm in thickness. The minimum fabric tensile strength shall be not less than 340 kg in 25.4 mm of width.

3.5.2 Tire repair patches. Pneumatic tire patches shall be furnished in the uncured (UC) (see A-A-00 A158/1) or semicured (SC) condition. The minimum fabric tensile strength for each ply shall be not less than 340 kg in 25.4 mm of width. All patches shall have gum stripping of 0.76 mm conforming to type I, class B.

3.5.2.1 Patch facing. Facing for each complete pneumatic tire repair patch or unit of a multiple unit patch shall be of cushion rubber gum meeting the requirements of type I, class B.

3.5.3 Patch, plug unit, chemical cure. Plug patch units shall consist of a prevulcanized shank and prevulcanized patch molded together into one integral unit. Each unit shall be coated entirely with an uncured chemical face gum and, upon application of its corresponding vulcanizing fluid, shall cure simultaneously with item to be repaired at room temperatures of 21°C.

3.5.4 Storage life. Tire repair patch plug units and their corresponding vulcanizing fluids shall maintain their quality and meet their intended requirements for a minimum of 2 years after date of manufacture.

3.5.5 Marking. Each patch shall be so marked to assure proper installation. Markings shall include, where applicable, direction of cord, cord material. ply rating, and size.

3.5.6 Patch construction and identification. Construction and identification shall be as specified in table V.

3.6 Processing materials. Type IV. Processing materials shall meet the requirements specified herein and be furnished as specified in table III.

3.6.1 Vulcanizing cement, class A. Vulcanizing cement shall be capable of developing a cured adhesion of at least 54.4 kg per 25.4 mm and shall not contain reclaimed rubber. It shall not gel, nor precipitate when diluted with rubber solvent, and shall conform to the physical and mechanical properties of table VI.

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3.6.2 Rubber solvent (class C). The rubber solvent shall have a boiling range of .37 to 60° C initial and 93° to 137° C end point with no oil residue.

3.6.3 Mold lubricant (class D) Mold lubricant shall be a silicone water based emulsion and shall be suitable to perform its intended function.

3.6.4 Rubber marking crayon (class E). Rubber marking crayons shall be waterproof and shall exhibit clear, sharp, even-marking qualities when marking is on the wet surface of a tire at room temperatures of 21°C.

3.7 **Identification markings.** Identification markings shall be placed on the outside of the container and shall be permanent and legible and shall include, as a minimum, the manufacturer's identification code (CAGE), the contract number, the part or identification number (PIN), the marking code, and the national stock number (NSN).

3.8 Instructions. Complete instructions for the application and use of repair and retread materials described herein shall be furnished and legibly marked on wrappers, envelopes, containers or tags attached thereto.

4. Quality assurance provisions

4.1 **Responsibility for inspection.** The contractor is responsible for the performance of all inspections (examinations and tests).

4.2 Contractor certification. The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of this CID and that the product conforms to the producer's own drawings, specifications, workmanship standards, and quality assurance practices. Items with known defects shall not be submitted for Government acceptance. The Government reserves the right to require proof of such conformance prior to the first delivery and thereafter as may be otherwise provided for under the provision of the contract.

5. Preservation, packaging, packing labeling, and marking. Preservation, packaging, packing, labeling, and marking shall be as specified in the contract or order (see 6.3).

6. Notes

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Low temperature cure gum (class D). Commercial contractors may use a commercially available low temperature gum in lieu of type I. classes A, B, or C

6.2 Addresses for obtaining copies of referenced documents.

6.2.1 Government documents. Copies of A-A-52518/1 "Patch, Pneumatic Tire Repair: Uncured" are available from the Defense Printing Service Detachment Office, Bldg. 4D (Customer Service), 700 Robbins Avenue, Philadelphia, PA 19111-5094.

TABLE I. Physical and mechanical properties.

Type	Class	Material	Total RHC by vol. (min %)	Specific gravity (maximum)	Hardness durometer Shore A	Ultimate elongation (min %)	Tensile strength (min MPa)	Tensile strength at 30% (min MPa)
I	A	Tread Gum	55	1.165		500	17.2	4.8
	B	Cushion Rubber Gum	60	1.165		500	17.2	4.8
	C	All Purpose Gum	64	1.165	55-60	500	20.0	4.1
II	A	Die Size Boxed Tread Rubber Cushion Gum	55			550	16.5	4.8
	B	Padding Stock	55			550	17.2	4.8
	C	Filler Strip	55	1.165		500	17.2	4.8
	D	Stripping	55	1.165	53-65	500	17.2	4.8
	E	Tread Rubber	60	1.12 - 1.15	60-64	550	17.2	6.9 - 9.7
	F	Precured Tread		1.13	60	550	16.5	5.9
		Shoulder Strips	70	1.13 - 1.16	55-60	550	20.0	6.2
		Cushions	64	1.09 - 1.14	55-60	550	18.6	5.5

TABLE II. Type of vehicle service.

Materials	Passenger cars <u>1/</u>		Trucks		Off-road (1)
			Commercial	Military	
RHC by volume (minimum)	50% 45%		55	50	55
RHC by type & distribution NR, IR, SBR, BR	100% 75% max ---- 25% min		100% ----	75% max 25% min	---- ----
Carbon Black parts by weight/100 parts by weight RHC	50-90 50-95		50-70	50-85	----
Specific gravity (maximum)	1.17 1.18		1.16	1.16	1.18
Durometer, Shore A	60 + 5 60 + 5		62 + 5	62 + 5	60-75
Tensile stress at 300% elongation (minimum MPa)	5.9 5.9		6.9	6.9	6.9
Tensile at Break (minimum MPa)	17.2 15.2		19.3	17.2	----
Ultimate elongation (minimum %)	475 475		475	475	450
Acetone Extract (maximum %)	27.5 30		25	27.5	18

(1) See Tire and Rim Yearbook for identification

1/ The data in the two columns are based on the amount of RHC, either 50% or 45% by volume.

TABLE III. Dimensions and weights.

Type	Class	Style	Unit	Weight or size	Approximate width (mm)	Thickness (mm)
I	A	---	Roll	4.5 or 11.3 kg	457 - 508	1.50 1.65
	B	---	Roll	.5, 2.3, 11.3 kg	457 - 508	0.71 0.86
	C	---	Roll	.5 to 13.6 kg	610 - 1020	0.79 1.14
II	A	1, 2	Roll <u>1</u> /	22.7 to 38.6 kg	---	---
		3	Box	45.4 to 90.7 kg	69.9 + 4.8	11.1 + 1.6
	B	---	Roll	4.5 or 11.3 kg	76.2	1.50 1.65
	C	---	Roll	11.3 kg	63.5	3.2 <u>2</u> /
	D	---	Roll	11.3 kg	25 - 76	1.50 1.65
	E	---	Roll	22.7 to 38.6 kg	---	---
III	A	---	Roll	11.3 kg	610 - 1020	0.79 1.14
	B	---	Container	.95, 3.8 or 19 Liter	---	---
IV	A	1	Container	.95, 3.8, 19 or 208 Liter	---	---
		2	Container	.95, 3.8, 19 or 208 Liter	---	---
	B	---	Box	.5, .9 or 2.3 kg	---	---
	C	---	Container	.95, 3.8, 19 or 208 Liter	---	---
	D	---	Container	.47, .95 or 3.8 Liter	---	---
	E	---	Box	12/Box	---	---

1/ Quantity shall cover not less than 1 complete tire.2/ Tapered to a thin edge.

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TABLE IV. Change in properties after oven aging of uncured stock and subsequent press cure.

Change	Maximum limit (%)
Tensile strength	-25
Ultimate elongation	-25
Hardness durometer	7

TABLE V. Patch construction and identification.

CID PIN	Former MS Part Number	Marking Code <u>1</u>	Overall Patch Dimension (mm)
A52518-1	MS52124-1	MESH - 0 - A	41
A52518-2	MS52124-2	MESH - 0 - A	60
A52518-3	MS52124-3	MESH - 0 - A	79
A52518-4	MS52124-4	MESH - 0 - A	118
A52518-5	MS52124-5	2 - 6 - 6	76
A52518-6	MS52124-6	2 - 19 - 6	102
A52518-7	MS52124-7	2 - 13 - 10	127
A52518-8	MS52124-8	3 - 19 - 10	152
A52518-9	MS52124-9	3 - 13 - 14	178
A52518-10	MS52124-10	4 - 19 - 14	203
A52518-11	MS52124-11	4 - 25 - 14	254
A52518-12	MS52124-12	6 - 38 - 14	254
A52518-13	MS52124-13	6 - 64 - 14	305
A52518-14	MS52124-14	6 - 76 - 14	356
A52518-15	MS52124-15	8 - 51 - 18	356
A52518-16	MS52124-16	8 - 76 - 18	432
A52518-17	MS52124-17	8 - 89 - 18	483
A52518-18	MS52124-18	10 - 76 - 24	559
A52518-19	MS52124-19	12 - 152 - 28	610
A52518-20	MS52124-20	14 - 127 - 32	660
A52518-21	MS52124-21	16 - 127 - 36	711
A52518-22	MS52124-22	18 - 178 - 36	762
A52518-23	MS52124-23	4 - 76 - T	305
A52518-24	MS52124-24	4 - 102 - T	356
A52518-25	MS52124-25	6 - 140 - T	483

1/ The marking code denotes the number of plies in the patch, the maximum injury size in mm and the ply rating of the tire for which the patch is intended. Example: 6 - 102 - 8/12 indicates 6 plies to the patch, 102 mm maximum tire injury size and patch suitable for 8 and 12 ply tires. A "0" indicates nail hole injury size. "A" indicates use with all ply ratings, and "T" indicates tractor tires.

TABLE VI. Vulcanizing cement physical and mechanical properties.

Vulcanizing cement	Minimum percent solid	Brookfield viscosity (Centipoise) <u>1/</u>	Minimum storage life (months)
Brush grade Style 1	10	400 - 4000	12
Spray grade Style 1	4	20 - 65	12
Hot Rubber Application, Style 2	6	20 minimum	4

1/ Based on a number 3 spindle at 6 rpm.

6.2.2 Non-Government documents. Copies of ASTM D746 "Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact". ASTM D1418 "Rubber and Rubber Latices - Nomenclature, Practice for" and ASTM D 1765 "Carbon Blacks Used in Rubber Products Classification System" are available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

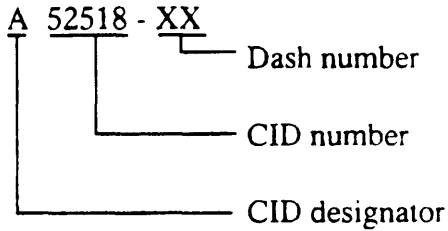
6.2.2.1 Tire and rim yearbook. Copies of "Tire and Rim Association Yearbook" are available from the Tire and Rim Association, Inc., 3200 West Market Street, Akron, OH 44313.

6.3 Ordering data. Acquisition documents must specify the following:

- a. Title, number, and date of this CID.
- b. PIN number and quantity required.
- c. Issue of DODISS to be cited in the solicitation and the specific issue of individual documents referenced.
- d. Selection of applicable levels and packaging requirements.
- e. Type, class, and style of material required.
- f. Type of vehicle service for tread rubber.
- g. Physical properties if other than specified.
- h. Low temperature properties, if required.
- i. Strip form stock dimensions.
- j. Applicable CIDSS.

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6.4 Part or identification number (PIN). The PINs to be used for materials acquired to this CID are created at follows:



6.5 Cross reference. Pneumatic tire retread and repair materials conforming to this CID are interchangeable/substitutable with retread and repair materials conforming to ZZ-T-416H and MS52124.

6.6 Regulatory requirements. The offeror/contractor is encouraged to use recovered materials in accordance with Pubic Law 94-580 to the maximum extent practicable.

MILITARY INTERESTS:

Custodians:

Army - AT

Air Force -99

Review Activities:

Navy - MC

Air Force -84

CIVIL AGENCY COORDINATING ACTIVITY:

DOT - ACO

USDA - AFS

JUSTICE - FPI

GSA - FSS

PREPARING ACTIVITY:

Army - AT

(Project 2640-0209)