

**ZZ-R-768a**

November 25, 1966

**SUPERSEDING**

Int. Fed. Spec. ZZ-R-00768 (GSA-FSS)

August 30, 1965

**FEDERAL SPECIFICATION**

# **RUBBER FOR MOUNTINGS (UNBONDED-SPOOL AND COMPRESSION TYPES)**

*This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal Agencies*

**1. SCOPE**

1.1 This specification covers unvulcanized rubber compound or finished resilient components to be used in unbonded-spool and compression type mountings, as specified (see 6.2).

**2. APPLICABLE DOCUMENTS**

2.1 **Specifications and standards.** The following specifications and standards, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

*Federal Specifications:*

- QQ-S-781—Steel, Strapping, Flat
- PPP-B-636—Box, Fiberboard.
- PPP-B-665—Boxes; Paperboard, Metal Stayed (Including Stay Material).
- PPP-B-676—Boxes, Setup.

*Federal Standards:*

- Fed. Std No 123—Marking for Domestic Shipment (Civilian Agencies).
- Fed Test Method Std No 601—Rubber: Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U S. Government Printing Office, Washington, D C 20402

(Single copies of this specification and other

product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D C, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies )

*Military Specification:*

MIL-P-116—Preservation, Methods of.

*Military Standards:*

- MIL-STD-129—Marking for Shipment and Storage.
- MIL-STD-407—Visual Inspection Guide for Rubber Molded Items

*Bureau of Ships Drawings:*

- S2300-72285—Spool Type Rubber Mount
- 512527—Compression Type Rubber Mount.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer )

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

FSC 9320

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*American Society for Testing and  
Materials (ASTM) Standard:*

**D 945—Tests for Mechanical Properties  
of Elastomeric Vulcanizates Under  
Compressive or Shear Strains by the  
Mechanical Oscillograph.**

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

(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.)

### 3. REQUIREMENTS

**3.1 Material.** The material shall be a synthetic rubber compound using a copolymer product of butadiene and acrylonitrile as the basic material which meets the requirements specified herein after being vulcanized

**3.1.1 Unvulcanized compound** Unvulcanized compound shall be furnished in sheet form ranging in size from 2 to 3 feet wide, by 3 to 6 feet in length, and 1/4 to 1 inch thick, and when cured, shall meet the physical requirements of 3.3.

**3.2 Type, dimensions, and tolerances of resilient components.** The type, dimensions, and tolerances of resilient components shall be as shown on drawings S2300-72285 and 512527 for the parts specified (see 6.2).

**3.3 Physical requirements.** The cured rubber shall conform to the requirements specified in table I. The procedures detailed in 4.4 shall be used for the tests

**Table I. Physical requirements**

Properties	Re-quire-ments	Test pro-cedure
Initial properties:		
Tensile strength, p s i, minimum	1,800	4 4 1
Ultimate elongation, percent, minimum	300	4 4 1
Hardness, Shore A durometer	55 ± 5	4 4 2
Tear resistance, pounds per inch, minimum	130	4 4 3
Properties after oven aging for 96 ± 1/2 hour at 194° ± 2° F. (90° ± 1.1° C)		
Tensile strength, percent of initial, minimum	80	4 4 4

Properties	Re-quire-ments	Test pro-cedure
Ultimate elongation, percent of initial, minimum	75	4.4 4
Hot Compression set, percent, maximum	45	4 4 5
After immersion in medium No. 3 oil for 96 ± 1/2 hour at 122° ± 2° F (50° ± 1.1° C):		
Volume change, percent	±10	4.4.6
Properties at 73.4° ± 2° F. (23° ± 1.1° C):		
Deformation, percent	19 ± 2	4.4.7
Resilience, percent, maximum	70	4.4 7
Frequency, c.p.s.	4.1 ± 0.3	4.4.7
Absorbed energy, inch-pounds per cubic inch	29 ± 3	4 4.7
Properties at 32° ± 2° F. (0° ± 1.1° C):		
Deformation, percent of value at 73.4° ± 2° F (23° ± 1.1° C), minimum	75	4 4 7
Resilience, percent, maximum	70	4.4 7
Frequency, c p s, minimum	3.6	4.4 7
Absorbed energy, percent of value at 73.4° ± 2° F. (23° ± 1.1° C.), minimum	45	4.4.7
Cold compression set, percent, maximum	15	4 4.8

**3.4 Workmanship.** The workmanship shall be such as to meet all the applicable requirements of this specification. The components shall be examined as specified in 4.3.1.

### 4. QUALITY ASSURANCE PROVISIONS

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

#### 4.2 Sampling.

**4.2.1 Lot of unvulvanized compound.** For

the purposes of sampling for examination and tests, a lot of unvulcanized compound shall consist of not more than 200 pounds of the material produced in one plant under essentially the same conditions, and offered for delivery at one time.

**4.2.2 Lot of resilient components.** For the purpose of sampling for examination, a lot of resilient components shall consist of those components of the same form, type, and dimensions produced in one plant under essentially the same conditions, and offered for delivery at one time.

**4.2.3 Sampling for visual and dimensional examination.** For the examination specified in 4.3.1, representative samples shall be taken at random from each lot of resilient components in accordance with table II.

**Table II. Sampling for examination**

Number of components in lot	Number of components in sample	Major defects	
		Acceptance number	Rejection number
40 and under	10	0	0
41 to 110	15	0	1
111 to 300	25	1	2
301 to 500	35	1	2
501 to 800	50	2	3
801 to 1300	75	3	4
1301 and over	110	4	5

**4.2.3.1 Major defect defined.** A major defect is a defect that is likely to result in failure or to reduce materially the usability of the resilient components for its intended purpose.

**4.2.4 Sampling for tests.** For the tests specified in 4.4, the contractor shall furnish three cured sample pieces 6 inches long, by 6 inches wide, by  $0.080 \pm 0.010$  inch thick and one cured sample piece at least 6 inches long, by 6 inches wide, by  $0.500 \pm 0.010$  inch thick, to represent each lot of either unvulcanized compound or resilient components. The sample pieces shall be certified by the supplier to be identical in composition and prepared at the same time from material used in the lot offered for delivery.

**4.3 Quality conformance examination and tests.**

**4.3.1 Examination.** Each of the samples taken in accordance with 4.2.3, shall be subjected to examination for workmanship, dimensions, and tolerances. MIL-STD-407 shall be used to determine and evaluate defects.

**4.3.1.1 Rejection.** Any component in the sample containing one or more defects shall not be offered for delivery. If the number of defective components in any sample exceeds the acceptance number for that sample, this shall be cause for rejection of the lot represented by the sample.

**4.3.2 Tests.** The samples submitted in accordance with 4.2.4, shall be subjected to all tests specified in 4.4.

**4.3.2.1 Action in case of nonconformance.** If any of the samples representing a lot is found to be not in conformance with the requirements of this specification, this shall be cause for rejection of the lot it represents. Furthermore, additional samples shall be provided in accordance with 4.2.4, for each subsequent lot which shall be subjected to the tests listed in table I (see 3.3). Each lot shall then be accepted only after satisfactory results are obtained on the tests of all the samples representing the lot. This additional testing shall be discontinued after four successive lots have passed the test or tests

#### 4.4 Test methods.

**4.4.1 Tensile properties** Tensile properties shall be determined in accordance with methods 4111 and 4121 of Fed Test Method Std No. 601. Die III specimens shall be used for all determinations of tensile properties.

**4.4.2 Hardness.** Hardness shall be determined by method 3021 of Fed Test Method Std. No. 601 using a Shore A durometer. The three-second reading shall be taken on a  $0.500 \pm 0.010$  inch thick specimen.

**4.4.3 Tear resistance** Tear resistance shall be determined by method 4211 of Fed. Test Method Std. No. 601 using Die C specimens that are  $0.080 \pm 0.010$  inch thick.

**4.4.4 Tensile properties after oven aging.** Tensile properties shall be determined after

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oven aging in accordance with method 7221 of Fed Test Method Std. No 601. The aging period shall be  $96 \pm 1/2$  hour at  $194^\circ \pm 2^\circ$  F ( $90^\circ \pm 1.1^\circ$  C.). Determination shall be made not less than 20 nor more than 48 hours after removal from the oven.

**4.4.5 Hot compression set.** Hot compression set shall be determined by method 3311 of Fed Test Method Std. No 601, with specimens clamped to 40 percent deflection and aged for  $96 \pm 1/2$  hour at  $194^\circ \pm 2^\circ$  F ( $90^\circ \pm 1.1^\circ$  C.).

**4.4.6 Volume change after immersion in oil.** The volume change shall be determined by method 6211 of Fed Test Method Std. No 601 after immersion in medium No 3 oil of method 6001 of Fed Test Method Std. No 601 for  $96 \pm 1/2$  hour at  $122^\circ \pm 2^\circ$  F ( $50^\circ \pm 1.1^\circ$  C.).

**4.4.7 Deformation, resilience, frequency, and absorbed energy.** Deformation, resilience, frequency, and absorbed energy shall be determined using a Yerzley oscillograph following the procedure for measurements in compression detailed in ASTM D 945. The mechanical properties shall be determined at both  $73.4^\circ \pm 2^\circ$  F ( $23^\circ \pm 1.1^\circ$  C.) and  $32^\circ \pm 2^\circ$  F ( $0^\circ \pm 1.1^\circ$  C.), after conditioning the specimens for 2 days at room temperature plus  $1 \pm 0.1$  hour at each test temperature.

**4.4.7.1 Deformation.** Deformation is the percent deflection of the specimen caused by five standard weights, calculated as one inch equals 20 percent.

**4.4.7.2 Resilience.** The resilience shall be calculated by dividing the vertical distance of the upstroke of the first cycle (rebound) by the vertical distance of the downstroke of the first cycle from the starting point and multiplying by 100.

**4.4.7.3 Frequency.** The frequency shall be determined by counting a convenient number of cycles, then measuring in inches the horizontal distance along the center axis of the set of oscillations covered by this number of cycles, and by dividing the number of cycles by the measured distance.

**4.4.7.4 Absorbed energy.** The absorbed energy shall be calculated by multiplying the vertical distance in inches of the downstroke of the first cycle by the constant 20. (The constant 20 equals the energy of 5 weights corresponding to one inch vertical distance on the chart per cubic inch of material.)

**4.4.8 Cold compression set.** Cold compression set shall be determined by method 5411 of Fed Test Method Std. No 601, with specimens clamped to 40 percent deflection and conditioned for  $96 \pm 1/2$  hour at  $32^\circ \pm 2^\circ$  F ( $0^\circ \pm 1.1^\circ$  C.), and allowed to recover for 30 minutes at the conditioning temperature before measuring the final thickness.

**4.5 Inspection of preparation for delivery.** The packaging, packing, and marking shall be examined for compliance with section 5.

## 5. PREPARATION FOR DELIVERY

**5.1 Packaging.** Packaging shall be level A or C, as specified (see 6.2).

**5.1.1 Level A.** Resilient components of one size shall be unit protected in accordance with method III of MIL-P-116 and packaged in containers conforming to PPP-B-665 or PPP-B-676, at the option of the contractor. Container closure and sealing shall be in accordance with the applicable container specification or appendix thereto. The gross weight of paperboard boxes shall not exceed 10 pounds.

**5.1.2 Level C.** Packaging of resilient components shall be sufficient to afford adequate protection against deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

**5.2 Packing.** Packing shall be level A, B, or C, as specified (see 6.2).

**5.2.1 Level A.** Resilient components, packaged as specified, shall be packaged in containers conforming to PPP-B-636 (class weather-resistant) with all corners and edge seams and manufacturer's joints water-

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**CIVIL AGENCY INTEREST:**

**GSA-FSS**

**COM-NBS**

Review and user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be based on the information in the current DODISS.

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Orders for this publication are to be placed with General Service Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 5 cents each

proofed with tape in accordance with the appendix to the box specification. Boxes shall be closed, strapped, and banded in accordance with the applicable box specification or appendix thereto. Steel strapping shall conform to type I, class A or B, 5/8 or 3/4 by 0.020 inch thick of QQ-S-781. The gross weight of fiberboard boxes shall not exceed the weight limitations of the box specification.

**5.2.2 Level B** Resilient components, packaged as specified, shall be packed in containers conforming to PPP-B-636 (class domestic). Box closures shall be as specified in the applicable box specification or appendix thereto. The gross weight of the boxes shall not exceed the weight limitations of the box specification.

### 5.2.3 Level C

**5.2.3.1 Unvulcanized compound** Sheets of unvulcanized compound shall be dusted with soapstone, whiting, or talc, separated with nonadhesive paper or plastic film and packed on nonreturnable pallets. The compound shall be protected against contamination with dirt or other foreign material during direct shipment from the supply source to the first receiving activity for immediate use.

**5.2.3.2 Resilient components** Resilient components, packaged as specified, shall be packed in a manner which will insure acceptance by common carrier, at the lowest rate, and will afford protection against physical or mechanical damage during direct shipment from the supply source to the first receiving activity for immediate use.

### 5.3 Marking.

**5.3.1 Civil agencies** In addition to any special marking specified in the contract or order, shipping containers shall be marked in accordance with Fed. Std. No. 123. The information shall include nomenclature, Federal stock number, or manufacturer's part number, contract or order number, cure date, contractor's name and destination.

**5.3.2 Military agencies.** In addition to any special marking required by the contract or

order, interior packages and exterior containers shall be marked in accordance with MIL-STD-129 and shall also include nomenclature, Federal stock number or manufacturer's part number, contract or order number, cure date, contractor's name and destination.

## 6. NOTES

**6.1 Intended use.** This specification describes a synthetic rubber material used as resilient elements of unbonded-spool type and compression type mountings that are used to mount equipment and gages for shock protection and vibration isolation.

**6.2 Ordering data.** Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Form of material required (see 1.1 and 3.1.1).
- (c) Type, dimensions, and tolerances required for resilient components (see 3.2).
- (d) Selection of applicable levels of packaging and packing required (see 5.1 and 5.2).
- (e) Special marking required (see 5.3).

**6.3 Supersession data.** This specification includes the requirements of MIL-R-17006-A, dated October 9, 1952.

## MILITARY INTEREST:

### Custodians:

Army—MR

Navy—SH

### Review Activities:

Army—MI, MR, WC

Navy—SH

### User Activities:

Army—EL, MU

Navy—MC

### Preparing Activity:

Navy—SH