

MIL-R-83412A(USAF)
30 June 1977
 SUPERSEDING
 MIL-R-83412 (USAF)
 5 March 1973

MILITARY SPECIFICATION
 RUBBER, ETHYLENE-PROPYLENE,
 HYDRAZINE RESISTANT

This Specification is approved for use by all Departments
 and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers three types of rubber having good resistance to high and low temperature and hydrazine type propellants, but poor resistance to hydrocarbon oils or solvents. Hydrazines are hazardous chemicals. See "Dangerous Properties of Industrial Materials" by N. Irving Sax.

1.2 Classification. The rubber covered by this specification shall be of the following types as specified (see 6.3):

Type I - Seal Material
 Type II - Bladder and Diaphragm Material
 Type III - Valve Seal Material

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:

SPECIFICATIONS

FEDERAL

L-P-378	Plastic Sheet and Strip, Thin Gauge, Polyolefin
UU-P-268	Paper, Kraft, Untreated Wrapping
PPP-B-585	Box, Wood, Wirebound
PPP-B-591	Box, Fiberboard, Wood-Cleated
PPP-B-601	Boxes, Wood, Cleated-Plywood

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Air Force Materials Laboratory, MXE, WPAFB, Ohio 45433 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5330

MIL-R-83412A (USAF)

PPP-B-621	Box, Wood, Nailed and Lock Corner
PPP-B-636	Box, Fiberboard
PPP-T-45	Tape, Gummed, Paper, Reinforced and Plain, For Easling and Securing

MILITARY

MIL-P-4861	Packing, Performed, Rubber, Packing; Packaging of
MIL-P-26536	Propellant, Hydrazine

STANDARDS

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-289	Visual Inspection Guide for Rubber Sheet Material
MIL-STD-407	Visual Inspection Guide for Rubber Molded Items
MIL-STD-413	Visual Inspection Guide for Rubber O-Rings

(Copies of specifications, standards, drawings, and publications required by suppliers 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 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 AND MATERIALS (ASTM)

ASTM D395	Tests for Compression Set of Vulcanized Rubber
ASTM D412	Tension Testing of Vulcanized Rubber
ASTM D471	Test for Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids

MIL-R-83412A(USAF)

30 June 1977

SUPERSEDING

MIL-R-83412 (USAF)

5 March 1973

MILITARY SPECIFICATION
RUBBER, ETHYLENE-PROPYLENE,
HYDRAZINE RESISTANT

This Specification is approved for use by all Departments
and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers three types of rubber having good resistance to high and low temperature and hydrazine type propellants, but poor resistance to hydrocarbon oils or solvents. Hydrazines are hazardous chemicals. See "Dangerous Properties of Industrial Materials" by N. Irving Sax.

1.2 Classification. The rubber covered by this specification shall be of the following types as specified (see 6.3):

Type I - Seal Material
Type II - Bladder and Diaphragm Material
Type III - Valve Seal Material

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:

SPECIFICATIONS

FEDERAL

L-P-378	Plastic Sheet and Strip, Thin Gauge, Polyolefin
UU-P-268	Paper, Kraft, Untreated Wrapping
PPP-B-585	Box, Wood, Wirebound
PPP-B-591	Box, Fiberboard, Wood-Cleated
PPP-B-601	Boxes, Wood, Cleated-Plywood

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Air Force Materials Laboratory, MXE, WPAFB, Ohio 45433 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5330

MIL-R-83412A (USAF)

PPP-B-621	Box, Wood, Nailed and Lock Corner
PPP-B-636	Box, Fiberboard
PPP-T-45	Tape, Gummed, Paper, Reinforced and Plain, For Easling and Securing

MILITARY

MIL-P-4861	Packing, Performed, Rubber, Packing; Packaging of
MIL-P-26536	Propellant, Hydrazine

STANDARDS

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-289	Visual Inspection Guide for Rubber Sheet Material
MIL-STD-407	Visual Inspection Guide for Rubber Molded Items
MIL-STD-413	Visual Inspection Guide for Rubber O-Rings

(Copies of specifications, standards, drawings, and publications required by suppliers 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 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 AND MATERIALS (ASTM)

ASTM D395	Tests for Compression Set of Vulcanized Rubber
ASTM D412	Tension Testing of Vulcanized Rubber
ASTM D471	Test for Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids

ASTM D624	Test for Tear Resistance of Vulcanized Rubber
ASTM D1329	Evaluating Low-Temperature Characteristics of Rubber and Rubber- Like Materials by a Temperature- Retraction Procedure (TR Test)
ASTM D2240	Test for Indentation Hardness of Rubber and Plastics by Means of a Durometer

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 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 First article. The ethylene-propylene rubber furnished to this specification shall conform to the requirements of Section 3 when tested and inspected in accordance with Section 4 (see 4.3).

3.2 Materials. The base polymer used to formulate the rubber covered by this specification shall be ethylene-propylene polymers.

3.3 Shape and dimensions. Shape and dimensions of the rubber shall be as specified by the procuring activity.

3.4 Dimensions and tolerances.

3.4.1 Sheets and strips. Unless otherwise specified (see 6.2) the width of the sheet material shall be 36 ± 1 inches, the length shall be 120 inches ± 1 percent, and tolerances on thickness shall be as shown in Table I. The width of strip shall be 4 inches with a tolerance of ± 5 percent, the length shall be 75 feet ± 1 foot; the tolerances on thickness shall be as shown in Table I. The dimensions and tolerances of the shapes cut from sheets shall be as specified on the detail drawings.

MIL-R-83412A (USAF)

3.4.2 Molded parts and extruded shapes (including tubing). Unless otherwise specified (see 6.2) dimensions and tolerances of molded parts and extruded shapes (including tubing) shall be as specified on the drawing or in the contract or order.

Table I. Thickness tolerances of sheet and strip

NOMINAL THICKNESS (Inch)	TOLERANCE (inch)
.031 and less	$\pm .010$
over .031 to .063 inclusive	$\pm .012$
over .063 to .125 inclusive	$\pm .016$
over .125 to .188 inclusive	$\pm .020$
over .188 to .375 inclusive	$\pm .031$
over .375 to .563 inclusive	$\pm .047$
over .563 to .750 inclusive	$\pm .063$
over .750 to 1.000 inclusive	$\pm .093$
over 1.000	$\pm 10\%$

3.5 Physical properties. Physical properties shall conform to the requirements specified in Table II.

3.6 Identification of product. Identification marking on the surface of this material is not allowed. The unit package, lable, or tag shall be marked to show the specification number, type, the manufacturer, the manufacturer's designation (compound number), and the cure date by quarter and year.

EXAMPLE:

MIL-R- (USAF)
 TYPE
 XYZ COMPANY
 COMPOUND NO. 123
 CURE DATE 1Q73

When used, the unit package shall show the marking of shipments (see 5.3) in addition to the above markings. The identification shall recur constantly from one end of the unit package, label or tag to the other end if possible in rows, spaced approximately 5 inches apart, and shall be clearly legible, contrasting in color, and not less than 3/8 inch high.

.7 Workmanship. The product shall be free from defects, foreign materials, surface irregularities such as unbonded sections, holes, dents, blisters, pits, etc., pigmentation discolorations, and shall be uniform in quality; also it shall be free from flash unless otherwise permitted on the drawing or contract.

. QUALITY ASSURANCE PROVISIONS

.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 in the contract or order, the supplier 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.

.1.1 Inspection records. Inspection records shall be kept complete and available to the procuring activity at all times.

.1.2 Test data obtained from base polymer and pre-compounded materials supplied is not acceptable for fulfillment of the fabricator's additional responsibility for final cured product quality control.

.2 Classification of inspection. The inspection and testing of the ethylene-propylene rubber shall be classified as follows:

a. First article inspection (see 4.3).

b. Quality conformance inspection (see 4.4).

.3 First article inspection. First article inspection shall consist of all the tests specified (see 6.4).

.3.1 First article test samples. First article test samples shall consist of molded sheets, 6 by 6 by 0.075 ± 0.010 inches.

.4 Quality conformance inspection.

.4.1 Sampling for inspection. Sampling for quality conformance inspection shall be in accordance with MIL-STD-105, except where otherwise indicated herein. Quality conformance tests are required on final products for all production lots of material.

MIL-R-83412A (USAF)

Table II. Physical properties

PROPERTY AND CONDITION	TYPE I	TYPE II	TYPE III
Original physical values			
Tensile Strength, psi, min.	2100	1650	1600
Elongation, %, min.	150	260	80
Tensile Stress (modulus), psi at 100% elongation	--	1200+250	--
Hardness, points	88+5	90+5	90+5
Tear Strength, lb./in., min.	--	300	--
Temperature Retraction, 10% (TR-10), °F, max.	-45	-30	-45
Dry heat resistance, 70 hr @ 257°F			
Tensile Strength Change, %, max.	-35	-20	-20
Elongation Change, %, max.	-30	-30	-30
Hardness Change, points, max.	+5	+5	+5
Fuel resistance, Hydrazine, 96 hours @ 160°F			
Compatibility, Pressure Rise, psi, max. (Greater than control container)	2	2	2
Tensile Strength Change, %, max.	-20	-20	-20
Elongation Change, %, max.	-20	-20	-20
Volume Change, %, max.	3	3	3
Compression set in hydrazine, %, max.	25	25	25

4.4.1.1 Batch. A batch shall be the quantity of material compounded on a mill or mixer at one time.

4.4.1.2 Lot. A lot shall consist of all material of the same identity, cured in the same production run, from the same batch, and submitted at the same time for inspection.

4.4.2 Quality conformance test samples. Whenever possible, the end item, or specimens cut from the end item, shall be used as the sample. If these items are unsuitable for use as test samples, tests shall be performed on samples of identical composition and comparable state of cure as that of the end item (see 6.4).

4.4.3 Inspection of materials and components. The supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with referenced subsidiary specifications and standards to the extent specified, or if none, in accordance with this specification (see 4.1). In the event of conflict, this specification shall govern.

4.4.4 Inspection of the end item. Examination of the end item shall be in accordance with the classification of defects, inspection levels, and acceptance quality levels (AQL's) set forth herein. The lot size, for the purpose of determining the sample size in accordance with MIL-STD-105, shall be expressed in units of molded parts, yards of sheets, or strips, as applicable, for examinations as specified (see 4.4.4.1, 4.4.4.2, and 4.4.4.3). If the end item is less than 1 yard, the sample unit shall be the end item.

4.4.4.1 Examination for defects in appearance and workmanship.

4.4.4.1.1 Molded parts including O-Rings. The sample unit shall be one molded part and the examination shall be in accordance with MIL-STD-413 for O-Rings and MIL-STD-407 for other molded parts. The sample size shall be in accordance with MIL-STD-105, inspection level II, and the AQL related to percent defective shall be 1.5.

4.4.4.1.2 Sheets and strips. The sample unit shall be 1 linear yard, except if the end item is less than 1 yard, the sample unit shall be the end item. The examination shall be in accordance with MIL-STD-289. The sample size shall be in accordance with MIL-STD-105, inspection level II, and AQL related to percent defective shall be 2.5.

4.4.4.2 Examination for dimensional defects.

4.4.4.2.1 Molded parts. The sample unit shall be one molded part. The dimensions shall be within the tolerances specified on the drawing, contract or order. The sample size shall be in accordance with MIL-STD-105, inspection level II, and the AQL related to percent defective shall be 1.5.

4.4.4.2.2 Sheets and strips. The sample unit shall be 1 linear yard, except if the end item is less than 1 linear yard, the sample unit shall be the end item. The dimensions shall be within the tolerances specified (see 3.3.1) or the drawing, contract or order as applicable. The sample size shall be in accordance with MIL-STD-105, inspection level II, and the AQL related to percent defective shall be 1.5.

MIL-R-83412A (USAF)

4.4.4.3 Examination for defects in preparation for delivery. An examination shall be made in accordance with Table III to determine that the packaging, packing, and markings comply with Section 5. The sample unit for this examination shall be one shipping container fully packed, selected just prior to the closing operation. Shipping containers fully prepared for delivery shall be examined for closure defects. The sample size shall be in accordance with MIL-STD-105, inspection level II, and the AQL related to percent defective shall be 2.5.

4.4.5 Quality conformance tests. The following tests shall be conducted on each lot of material (see 4.4.1.2):

Original:	Fluid Resistance:
Tensile strength	96 hours at 160°F in Hydrazine
Elongation	Pressure Rise
Hardness	Tensile Strength Change
Tear Strength (Type II)	Elongation Change
	Volume Change
	Compression Set

4.4.5.1 Rejection criteria. A lot shall be rejected upon the failure of any sample to meet the test requirements specified herein. A lot that has been rejected may be reworked to correct the deficiencies and resubmitted for acceptance.

4.5 Test conditions. All test specimens shall be conditioned and tested at standard conditions (see 4.5.1) unless otherwise specified herein or in the applicable ASTM test method.

4.5.1 Standard conditions. Standard conditions shall be 50 ± 15 percent relative humidity and a temperature of 75 ± 5°F.

4.6 Test methods

4.6.1 Physical properties. Unless otherwise specified herein, physical properties shall be determined in accordance with ASTM test methods for rubber products as follows:

<u>Property</u>	<u>ASTM method</u>
Tensile strength and elongation	D 412, Die B
Hardness	D 2240
Temperature retraction (TR 10)	D 1329
Volume increase	D 471
Tear Strength	D 624 (Use Die B)

MIL-R-83412 (USAF)

Table III. Examination for defects in preparation for delivery

EXAMINE	DEFECTS
Packaging (molded parts)	<p>Not the level specified.</p> <p>Not packaged as specified or required.</p> <p>Packaging material, closures not as specified.</p> <p>Unit items not individually wrapped when specified.</p>
(Sheets)	<p>Not interleaved; separator sheets do not fully cover the full area of contact between the sheets.</p> <p>Stacked over 10 inches high.</p>
(Strips)	<p>Not in rolls; not wound on suitable cores.</p> <p>Rolls not wrapped or sealed as specified.</p> <p>Total length per roll varies by more than the indicated tolerances (5.1.1.4).</p>
Packing	<p>Not level specified; not in accordance with contract requirements.</p> <p>Container not as specified, closures not accomplished by specified or required methods or materials.</p> <p>Any nonconforming component, component missing, damaged or otherwise defective, affecting serviceability.</p> <p>Inadequate application of components, such as incomplete closure of case liners, containing flaps loose or inadequate strapping, bulged or distorted containers.</p>
Count	<p>Less than specified or indicated quantity, linear footage, or units, as applicable.</p>
Weight	<p>Gross weight exceeds specified requirements.</p>
Markings	<p>Interior or exterior markings, as applicable, omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements.</p> <p>Date of cure, storage instructions missing.</p>

MIL-R-83412A (USAF)

4.6.2 Fuel resistance. ^{1/} Specimens shall be thoroughly cleaned by washing with deionized water in an ultrasonic cleaner, rinsing in filtered water, followed by a rinse in isopropyl alcohol, and drying with dry, filtered nitrogen. The specimens shall then be placed in a moisture tight cylindrical stainless steel container that is capable of being sealed and fitted with a 0-100 psi pressure gauge. The total volume of the test container is 305 cubic centimeters. The following strips of rubber shall be placed in the container: three 1-inch by 6 inch by .075-inch (for tensile specimens), three 1-inch by 2-inch by .075-inch (for volume change specimens), and sufficient additional rubber to make a total rubber volume of 39.3 cc. The additional rubber shall also be cut from .075 inch thick sheet and shall be 1-inch wide. Add 226.9 cc of hydrazine conforming to MIL-P-26536 and seal the container. The sealed container shall be exposed to 160°F for 96 hours. A control container of the same type, containing the same volume of hydrazine, except without rubber specimens shall be subjected to identical conditions. The pressure rise in all containers shall be monitored periodically through the 96-hour aging period. The maximum pressure difference observed at 160°F between the rubber-containing vessels and the control vessel shall be the measure of compatibility. Since very small amounts of contamination can cause catalytic decomposition of hydrazine, absolute cleanliness must be maintained for specimens, for containers, and for handling equipment. All safety precautions normal to propellant handling should be observed. At the end of 96 hours the containers shall be cooled to room temperature and the specimens removed. The specimens should be placed on laboratory wiping tissues and carefully blotted dry. The tensile specimens should be cut from the 1-inch by 6-inch strips using Die B of ASTM D 412. Tensile, elongation, and volume change properties are to be determined within 4 hours of removal from the hydrazine. During the time between drying and testing, the specimens should be protected by placing in polyethylene bags. NOTE: This test method describes one particular test apparatus. Other test apparatus may be used providing the same sample/propellant/ullage ratio is maintained.

4.6.3 Compression set in hydrazine. Compression set shall be determined in accordance with Method B of ASTM D 395 except as otherwise specified. The compressed specimens shall be exposed to hydrazine at 160°F for 96 hours using an appropriate size container. Compression set tests shall be conducted on test specimens plied up from applicable test samples.

^{1/} Hydrazine is a hazardous chemical. See "Dangerous Properties of Industrial Materials", by N. Irving Sax.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Molded parts. Molded rubber parts other than o-rings shall preferably be placed in polyethylene bags or be individually wrapped with kraft paper conforming to UU-P-268 and packaged in containers. The polyethylene bags shall be made from material conforming to L-P-378.

5.1.2 O-Rings. O-Rings shall be packaged in accordance with the Level A requirements of MIL-P-4861.

5.1.1.3 Sheets. Kraft paper conforming to UU-P-268 shall be used between the sheets extending over the full area of contact between each sheet. Unit quantity shall be a stack not to exceed 10 inches.

5.1.1.4 Strip. Rubber strips shall be wound on suitable cores that will provide rigid support and that will not distort nor change shape during handling or shipping. Each roll shall be wrapped in kraft paper conforming to UU-P-268 and sealed with tape conforming to PPP-T-45. Unless otherwise specified, each roll shall consist of 75 feet \pm 1 foot of rubber strip.

5.1.1.5 Extruded shapes. Extruded rubber shapes shall be individually wrapped with kraft paper conforming to UU-P-268.

5.1.2 Level C. The rubber shall be preserved and packaged in a manner which will 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. Shipping containers shall contain identical rubber items of the same shape and size and shall inclose the contents in a snug, tight-fitting manner. The inside height of containers for rubber sheet shall not exceed 10 inches. Rubber strip shall be packed one roll per container. Containers for extruded rubber shapes shall

MIL-R-83412A (USAF)

have an inside maximum cross-sectional area of 36 square inches and, unless otherwise specified by the procuring activity, a maximum length of 10 feet. Unless otherwise specified by the procuring activity, rubber material shall be packed in overseas-type wooden containers conforming to PPP-B-601 or PPP-B-621. As far as practical, containers shall be uniform in shape and size and contain identical quantities. Container closure and strapping shall be in accordance with the applicable box specification or appendix thereto. Gross weight of containers shall not exceed 200 pounds. O-rings shall be packed in accordance with the level A requirements of MIL-P-4861.

5.2.2 Level B. All rubber material packaged as specified in 5.1, shall be packed in domestic type shipping containers conforming to PPP-B-585, PPP-B-591, PPP-B-601, PPP-B-621 or PPP-B-636. Exterior shipping containers shall be of minimum cube and tare consistent with the protection required. As far as practicable, exterior shipping containers shall be of uniform shape and size and contain identical quantities. The gross weight of wood and wood-type shipping containers shall not exceed two hundred (200) pounds. The gross weight of fiber-board shipping containers shall not exceed the weight limitations of the box specifications. Closure and strapping shall be in accordance with the applicable box specification or appendix thereto. O-rings shall be packed in accordance with level B requirements of MIL-P-4861.

5.2.3 Level C. Packages which require overpacking for acceptance by the carrier shall be packed in exterior-type shipping containers in a manner that will insure transportation at the lowest rate to the point of delivery. Containers shall conform to the Uniform Freight Classification Rules or Regulations of other common carrier, as applicable to the mode of transportation. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

5.3 Marking of shipments. In addition to any special marking required by the contract or order, interior packages and exterior shipping containers shall be marked in accordance with the requirements of MIL-STD-129. When applicable, interior packages shall also be marked as specified (see 3.4). The nomenclature shall be as follows:

Rubber (sheet, strip or molded parts)
 Type
 Cross section and length (inches) or part number
 Compound number, lot number
 Specification MIL-R- (USAF)
 Cure date (quarter and year)
 STORE IN A COOL DRY PLACE

6. NOTES

6.1 Intended use. The elastomeric material specified herein is intended primarily for use in applications which require excellent resistance to hydrazine. They are particularly useful where decomposition of hydrazine is a problem. A compatibility test is conducted to insure that ingredients in the rubber formulation will cause only minimal decomposition. These materials can also be used in other hydrazine fuels such as monomethyl hydrazine and the 50/50 mixture of hydrazine/unsymmetrical dimethyl hydrazine. Hydrazines are hazardous chemicals. See "Dangerous Properties of Industrial Materials", by N. Irving Sax.

6.2 This specification does not require that specific formulations be used. The following formulations are, however, good starting points for meeting the requirements of this specification:

A. Type I Seal Material

Material	<u>Parts by Weight</u>
Ethylene Propylene Terpolymer (Extracted Nordel 1040 <u>1</u> / or Nordel 1635) (DuPont)	100.00
Fumed silicon dioxide (Cab-O-Sil M-5) (Cabot Corp.)	25.0 <u>±</u> 1.0
1,2-Polybutadiene Resin (Hystl, B-3000) (Dynachem Corp.)	25.0 <u>±</u> 1.0
PTFE Powder T-8A (DuPont)*	5.0 <u>±</u> 0.2
Zinc Oxide (Baker Reagent Grade)	5.0 <u>±</u> 0.2
Calcium Oxide (Baker Reagent Grade)	5.0 <u>±</u> 0.2
Vinyl Silane (A-172) (Union Carbide)	1.0 <u>±</u> 0.1
Dicumyl Peroxide (Di-Cup R) (Hercules Powder Co.)	2.0 <u>±</u> 0.1

Press Cure: 30 ± 3 minutes @ 350°F ± 10°F

Post Oven Cure: 2 ± 0.1 hours @ 225°F ± 10°F

MIL-R-83412A (USAF)

B Type II Bladder and Diaphragm Material

<u>Material</u>	<u>Parts by Weight</u>
Ethylene Propylene Terpolymer (Extracted Nordel 1040 <u>1/</u> or Nordel 1635) (DuPont)	100.0
Fumed silicon dioxide, Methyl silane treated (Aerosil R-972) (DeGussa)	30.0 \pm 1.5
PTFE Powder T-8A (DuPont)*	10.0 \pm 0.3
1,2-Polybutadiene Resin (Hystl, B-3000) (Dynachem Corp.)	20.0 \pm 1.0
Zinc Oxide (Baker Reagent Grade)	5.0 \pm 0.2
Calcium Oxide (Baker Reagent Grade)	5.0 \pm 0.2
Lupersol 101 Peroxide (Wallace & Tiernan)	0.9 \pm 0.1

Press Cure: 30 \pm 3 minutes @ 350°F \pm 10°FPost Oven Cure: 2 \pm 0.1 hours @ 225°F \pm 10°F

* Must be pre-dispersed with Polybutadiene Resin

C Type III Valve Seat Material

<u>Material</u>	<u>Parts by Weight</u>
Ethylene Propylene Terpolymer (Extracted Nordel 1040 <u>1/</u> or Nordel 1635) (DuPont)	100.0
Fumed silicon dioxide (Cab-O-Sil M-5) (Cabot Corp.)	25.0 \pm 1.0
1,2-Polybutadiene Resin (Hystl, B-3000) (Dyrachem Corp.)	25.0 \pm 1.0
Dicumyl Peroxide (Di-Cup R) (Hercules Powder Co.)	5.0 \pm 0.2

Press Cure: 30 \pm 3 minutes @ 350°F \pm 10°FPost Oven Cure: 2 \pm 0.1 hours @ 225°F \pm 10°F

1/ Extracted by boiling methyl alcohol for 24 hours followed by boiling methyl ethyl ketone for 24 hours. Dry rubber thoroughly prior to compounding.

MIL-R-83412A (USAF)

6.3 Ordering data. Procurement documents should specify:

- a. Title, number, and date of this specification.
- b. Type (see 1.2).
- c. Dimensions and tolerances (see 3.3).
- d. Quantity.
- e. Detail drawing and additional requirements, if any.
- f. Unit quantity of molded parts if other than specified (see 5.1.1.1).
- g. If first article tests are required (see 6.3).
- h. Selection of applicable level of packaging and packing required (see 5.1 and 5.2).

6.4 First article. First article tests are required for each type of materials furnished to this specification. A copy of the first article test report shall be furnished the Air Force Materials Laboratory, Attn: MXE, Wright-Patterson AFB, Ohio 45433. The first article test need not be repeated for new orders or different parts provided the materials and processes have not been changed and a certified statement to this effect is furnished to the procuring activity. The waiving of the first article tests will be strictly at the discretion of the procuring activity. First article tests will not be acceptable if they are more than 3 years old.

6.5 Comparable states of cure. Comparable states of cure for different shapes are defined in "Equivalent Cures in Specimens of Various Shapes", by F. S. Conant, J. F. Svetlik, A.E. Jure, - Rubber World, Volume 137, No. 6, Pg. 856, March 1958.

Custodian:
Air Force - 11

Preparing activity:
Air Force - 11

Reviewer:
Air Force - 99
DLA - IS

PROJECT NUMBER: 5330-F042

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.

NOTE This form shall not be used to submit requests for waivers, deviations or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

DOCUMENT IDENTIFIER (Number) AND TITLE

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

VENDOR USER MANUFACTURER

1 HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW

A GIVE PARAGRAPH NUMBER AND WORDING

B RECOMMENDED WORDING CHANGE

C REASON FOR RECOMMENDED CHANGE(S)

2 REMARKS

SUBMITTED BY (Printed or typed name and address - Optional)

TELEPHONE NO.

DATE

FOLD

ASD/ENESS
Wright-Patterson AFB, O 45433

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

POSTAGE AND FEES PAID
DEPARTMENT OF AIR FORCE
DOD 318



ASD/ENESS
Wright-Patterson AFB, O 45433

FOLD

NOTICE
OF VALIDATION

MIL-R-83412A(USAF)
NOTICE 2
10 December 1992

MILITARY SPECIFICATION
RUBBER, ETHYLENE-PROPYLENE GENERAL PURPOSE

MIL-R-83412A(USAF), dated 30 July 1977, has been reviewed and determined to be valid for use in acquisition.

Custodians:
Air Force - 11

Preparing activity:
Air Force - 11

Reviewer activities:
Air Force - 99
DLA - IS

AMSC N/A

FSC 5330

DISTRIBUTION STATEMENT A. Approved for public release;
distribution is unlimited.