AERONAUTICAL MATERIAL SPECIFICATION

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AMS 3221B

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Revised

SYNTHETIC RUBBER
Rapid Fuel Swelling (45-55)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. FORM: Sheet, strip, tubing, extrusions, molded shapes, or as ordered.

3. APPLICATION: The compound shall be suitable for fuel seals.

4. QUALITY: (a) It shall be uniform in quality, free from foreign materials or imperfections, tough and not easily torn by hand. It shall resist the solvent action of aircraft engine fuels.

(b) Parts shall be smooth and free from flash.

(c) If products have a vulcanized joint, the joint section must have the same strength and size as the solid section.

5. REQUIREMENTS: (a) Physical Properties.- This material shall possess the following physical properties as received:

Shore Durometer "A" Hardness	50 ± 5
Tensile Strength, psi	1500 min
Elongation, %	400 min

All tensile tests required by this and succeeding paragraphs shall conform to ASTM D412-41, except that physical properties after all aging tests shall be based on the original unaged cross-sectional area.

Φ (b) Fuel Aging.- Tests shall be conducted in accordance with ASTM D471-44T, Immediate Deteriorated Properties. Test conditions shall be as follows:

Medium	Aromatic Blended Fuel:	62 Octane Gasoline	60%
		Toluol	20%
		Xylol	15%
		Benzol	5%
Time	30 minutes, 24 and 168 hours		
Temperature	70° - 85°F		

After the 24 hour aging period, the elongation shall have decreased not more than 50% from the values found for the material as received. The Shore Durometer "A" hardness change shall be within the limits of 0 to -20 points. The volume change shall be +25% minimum in 30 minutes, and within the limits of +50 to +150% at the end of the 24 hour aging period. After aging for 168 hours, the volume change shall be not more than +150% and not less than 95% of the percentage change after 24 hours.

(c) Extraction.- Tests shall be conducted in general accordance with ASTM D297-43T, Section 12, using benzol as the extractant. The sample shall be dried before extraction, cut into strips, and extracted until the benzol siphons over clear. The sample shall then be dried free of all extractant, and the extracted volume and weight shall be determined. The weight of the sample shall have decreased not more than 7.5%. The volume also shall have decreased not more than 7.5%. Extracted samples, after immersion in aromatic blended fuel as in paragraph 5(b) above for 30 minutes, shall show a volume increase of not less than 20% using the original unextracted volume as the base.

(d) Oven Aging.- Tests shall be conducted in accordance with ASTM D573-42 for 70 hours at 212°F ± 2°. After aging, the surface shall be neither hard nor brittle, and specimens shall withstand bending 180° flat without cracking. The Shore Durometer "A" hardness change shall be within the limits of 0 to +10 points. The tensile strength shall have decreased by not more than 40% and the elongation by not more than 50% from the values found for the material as received.

(e) Compression Set.- Tests shall be conducted in accordance with ASTM D395-40T, Method B, under the following conditions:

Time	70 hours
Temperature	212°F ± 2°
Compression, To	70% of original thickness

(1) The maximum compression set shall be 85% when expressed as a percentage of the original deflection.

(2) The maximum compression set shall be 26% when expressed as a percentage of the original thickness.

Note: In lieu of the compression set above, the tension set may be determined in accordance with ASTM D412-41. The permanent set shall not exceed 10%.

(f) Low Temperature Brittleness.- Tests shall be conducted in accordance with ASTM D736-43T for 5 hours at -40°F. The compound shall pass the brittleness test.

6. SAMPLING: (a) Sampling procedures shall conform to ASTM D15-41. Vendor shall furnish sufficient material for such specimens from production run materials which he guarantees to be of equal quality to the material supplied, except where purchaser desires specimens from production run parts, in which case the procedure in paragraph (b) shall be followed.

(b) When the form in which the material is furnished is unsuitable for the proper preparation of the required test specimens, the size of the test specimens shall be modified for adaptation to the finished part. This modification of the sampling procedure shall be agreed upon by both vendor and purchaser. If the requirements of the specification cannot be met using the modified test specimens, the modified test requirements shall be agreed upon by both vendor and purchaser.