

Issued 1940-01  
Reaffirmed 2003-11  
Revised 2011-05

Superseding AMS3220F

Rubber, Synthetic  
General Purpose, Fluid Resistant  
55 - 65

## RATIONALE

AMS3220G results from a Five Year Review and update of this specification.

### 1. SCOPE

#### 1.1 Form

This specification covers a synthetic rubber in the form of sheet, strip, tubing, extrusions, and molded shapes.

#### 1.2 Application

Primarily for packing and sealing joints which come in contact with aircraft fuels, hot petroleum-base lubricating oils, and ethylene glycol from -20 to +220 °F (-29 to +104 °C) This material has fair resistance to all fluids listed. Where better resistance to a particular fluid is required, use the AMS for material compounded specifically for good resistance to that fluid.

#### 1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

### 2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2011 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

**TO PLACE A DOCUMENT ORDER:** Tel: 877-606-7323 (inside USA and Canada)  
Tel: +1 724-776-4970 (outside USA)  
Fax: 724-776-0790  
Email: CustomerService@sae.org  
http://www.sae.org

**SAE WEB ADDRESS:**

**SAE values your input. To provide feedback  
on this Technical Report, please visit  
<http://www.sae.org/technical/standards/AMS3220G>**

## 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

AMS2279 Tolerances, Rubber Products

AMS2810 Identification and Packaging, Elastomeric Products

## 2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, [www.astm.org](http://www.astm.org).

ASTM D 297 Standard Test Methods for Rubber Products - Chemical Analysis

ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

ASTM D 471 Standard Test Method for Rubber Property - Effect of Liquids

ASTM D 573 Standard Test Method for Rubber - Deterioration in an Air Oven

ASTM D 2240 Standard Test Method for Rubber Property - Durometer Hardness

ASTM D 3182 Standard Practice for Rubber – Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets.

## 3. TECHNICAL REQUIREMENTS

### 3.1 Material

Shall be a compound, based on a synthetic elastomer, suitably cured to produce a product meeting the requirements of 3.2.

#### 3.1.1 Toxicological Formulations

The material shall have no adverse effects on the health of personnel when used for its intended purpose in accordance with manufacturer's instructions and with appropriate handling procedures.

### 3.2 Physical Properties

The product shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable

#### 3.2.1 Original Properties

3.2.1.1	Hardness, Durometer "A" or equivalent	60 ± 5	ASTM D 2240
3.2.1.2	Elongation, minimum	200%	ASTM D 412, Die B or C
3.2.1.3	Specific Gravity	Preproduction Value ± 0.02	ASTM D 297

3.2.2	Petroleum Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: ASTM Oil No. 1 Temperature: 302 °F ± 5 (150 °C ± 3) Time: 5 hours ± 0.2
3.2.2.1	Hardness, Durometer "A" or equivalent	50 to 70	
3.2.2.2	Elongation, minimum	150%	
3.2.2.3	Decomposition	None	
3.2.2.4	Surface Tackiness	None	
3.2.3	Aliphatic Fuel Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: ASTM Ref. Fuel A Temperature: 68 to 86 °F (20 to 30 °C) Time: 5 hours ± 0.2
3.2.3.1	Elongation, minimum	200%	
3.2.3.2	Volume Change	0 to +30%	
3.2.3.3	Decomposition	None	
3.2.3.4	Surface Tackiness	None	
3.2.4	Dry Heat Resistance		ASTM D 573 Temperature: 212 °F ± 2 (100 °C ± 1) Time: 15 hours ± 0.5
3.2.4.1	Hardness, Durometer "A" or equivalent, maximum	70	
3.2.4.2	Elongation, minimum	150%	

### 3.3 Dimensions and Tolerances

Dimensions and tolerances shall be as specified in the parts standard, drawing or purchase document. If not specified, the requirements of AMS2279 shall apply.

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

The manufacturer of the product shall be responsible for assuring that all required testing and product inspection has been performed. Unless specified otherwise by contractual requirements, testing may be performed either at the product vendor's own test facility, at the mixer, or at a suitable independent test facility. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this AMS specification.

## 4.2 Classification of Tests

### 4.2.1 Acceptance Tests

Tests for the following requirements are acceptance tests and shall be performed on each lot:

TABLE 1

Requirement	Paragraph Reference
Hardness, Original Properties	3.2.1.1
Elongation, Original Properties	3.2.1.2
Elongation Change in Oil	3.2.2.2
Volume Change in Fuel	3.2.3.2

### 4.2.2 Qualification Tests

Qualification testing shall consist of all of the physical property requirements listed in 3.2 and shall be performed prior to certification of materials to this specification, when a change in ingredients and/or processing requires reapproval as in 4.5.2, and/or when purchaser deems confirmatory testing to be required.

### 4.2.3 Test Samples

4.2.3.1 For qualification testing, specimens shall be prepared from 6 inch (152 mm) square by 0.075 inch  $\pm$  0.008 (1.90 mm  $\pm$  0.20) thick molded test slabs per ASTM D 3182 compounded for the same intended curing process as the end product.

4.2.3.2 For acceptance testing, sufficient material shall be taken at random from each lot of product to provide specimens to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three. If specimens cannot be prepared from the product, test specimens prepared from the same batch of material and in the same state of cure as the product shall be used. At a minimum, specific gravity tests shall be conducted on the end item or a section removed from the end item (except as noted in 4.2.3.2.3).

4.2.3.2.1 When the product supplied is an extrusion of such shape that suitable test specimens cannot be cut from the product, a separate extruded flat strip test sample, 0.075 inch  $\pm$  0.008 (1.90 mm  $\pm$  0.20) thick, produced from the same production batch of compound, in the same state of cure as the product being supplied, shall be used to prepare test specimens.

4.2.3.2.2 When the product is a molded item of such shape that suitable test specimens cannot be cut, a slab 6 inches (152 mm) square by 0.075 inch  $\pm$  0.008 (1.90 mm  $\pm$  0.20) thick per ASTM D 3182, molded from the same batch of compound, in the same state of cure as the product being supplied, shall be used to prepare test specimens.

4.2.3.2.3 When the mixer of the material is not the actual manufacturer of the end product, specimens shall be prepared from 6 inch (152 mm) square by 0.075 inch  $\pm$  0.008 (1.90 mm  $\pm$  0.20) thick molded test slabs per ASTM D 3182, catalyzed and cured to an optimum state of cure.

### 4.2.3.3 Specimen Test Values

All individual specimen test result values used to determine pass/fail criteria must be within acceptable limits as indicated in 3.2. Where test methods dictate that results be reported as average or median values, 'failed' values shall not be allowed in these determinations.