Engineered to Perform at Altitude:

Advanced Elastomers for Aerospace & Aviation

MOMENTIVE®
SOLUTIONS FOR A SUSTAINABLE WORLD™

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Global Leader in Silicone Aviation Industry

At the forefront of aerospace innovation, elastomers play a vital role in ensuring safety, durability, and efficiency. Our advanced silicone and fluorosilicone elastomers are engineered to withstand the most demanding aviation environments—extreme temperatures, aggressive fuels, and rigorous mechanical stress—delivering uncompromising performance on every flight.

It is Momentive's history and flight time in Aviation and Aerospace that separates its product offerings from others in the industry. Momentive is proud of its long-standing relationship with the world's venture into outer space and our contributions to its successes. Momentive has had silicone materials on every US-manned flight since the early Mercury Program in the sixties to the latest vehicles flying today.

With decades of aerospace expertise and rigorous quality certifications (BMS, MIL standards, etc.), our elastomers provide unmatched consistency and support. We collaborate closely with Tier 1 suppliers and OEMs to deliver customized formulations tailored to your unique application requirements.

Momentive Elastomers for Aviation & Aerospace

Silicone elastomers are a critical material in aviation and aerospace engineering due to their unique combination of thermal stability, environmental resistance, and mechanical flexibility. These properties make silicone rubber ideal for high-performance sealing, insulation, and protection applications across a wide range of aircraft systems.

One of the primary advantages of silicone elastomers is their ability to maintain elasticity and physical integrity across a broad temperature range, typically from –60°C to +230°C, and even higher with specialized grades. This thermal resilience is essential in environments such as engine compartments, nacelles, and external airframes, where exposure to extreme heat and cold is routine.

In addition to temperature resistance, silicone elastomers exhibit excellent resistance to ultraviolet (UV) radiation, ozone, and weathering, making them ideal for long-term use in exposed areas such as door and window seals, fairings, and external lighting gaskets. Their inherent flame retardancy and low smoke/toxicity performance also allow them to meet stringent aerospace flammability standards such as FAR 25.853, making them suitable for cabin interiors and thermal shielding.

Silicone's dielectric properties further support its use in protecting avionics and electrical systems. Silicone compounds are often used for potting, encapsulating, and insulating sensitive electronics, ensuring operational integrity in high-vibration and moisture-prone environments.

Manufacturers have the ability to select from a range of silicone forms—such as high consistency rubber (HCR), liquid silicone rubber (LSR), and fluorosilicones—to meet application-specific requirements, from structural fire seals and engine gaskets to precision-molded sensor boots.

Overall, the durability, environmental resistance, and processing versatility of silicone elastomers make them an indispensable material in aerospace design, contributing to aircraft safety, performance, and reliability over extended service lives.

General Application Overview

Silicone rubber is widely used in aircraft due to its excellent performance in extreme temperatures, resistance to UV, ozone, and chemicals, and its electrical insulation properties. Here's a list of common parts and components in aircraft made from silicone rubber:

In aviation and aerospace, both High Consistency Rubber (HCR) and Liquid Silicone Rubber (LSR) are used extensively, but for different types of applications based on processing method, geometry, production volume, and performance requirements.

Why Choose Momentive's Aerospace/Aviation Elastomers?

Extreme Temperature Resistance: Reliable sealing and flexibility from -60°C to +230°C, ensuring mission-critical performance from ground level to stratosphere.

Fuel and Chemical Resistance: Superior defense against jet fuels, hydraulic fluids, oils, and solvents to prevent swelling, cracking, or degradation.

Long-Term Durability: Excellent compression set resistance and aging stability reduce maintenance intervals and increase operational lifespan.

Fire and Safety Compliance: Materials engineered to meet FAR 25.853 flammability standards and low smoke/toxicity requirements for safer aircraft cabins and systems.

Lightweight & Versatile: Available in liquid and solid forms, supporting complex molding and assembly processes that reduce weight and improve system integration.

Sealing & Gasketing Applications

- Door and window seals (cabin, cargo, cockpit)
- Hatch and access panel gaskets
- Fuel tank seals (when Fluorosilicone is used)
- Fire seals (around engines, APUs, and firewalls)
- Air duct seals (cabin and environmental control systems)
- Weather seals (external and internal)

Thermal & Fire Protection

- Engine and nacelle fire barriers
- Firewall pass-through seals

Electrical & Avionics

- High-voltage insulation sleeves
- Grommets and cable boots
- Elastomeric connectors and keypads (used in cockpit instrumentation)

Other Uses/Applications

- Vibration isolators and shock mounts
- O-rings and diaphragms (fuel, hydraulic, and pneumatic systems — often Fluorosilicone)
- Flexible ducting and hoses (especially for air handling)
- Non-slip mats or pads (maintenance or cargo hold areas)
- Silicone-coated fabrics for bellows and expansion joints

Momentive's Fluorosilicones for Aerospace & Aviation

Momentive's fluorosilicone materials are engineered for superior resistance to jet fuels, Skydrol® hydraulic fluids, lubricants, and solvents.

Unlike standard silicones, FQE elastomers maintain seal integrity and mechanical properties after prolonged chemical exposure — a requirement for modern aircraft fuel systems.

The technologies offer broad thermal stability, capable of reliable performance from -60°C to +200°C, with some grades higher. Additionally, the thermal stability nables sealing components to function across altitude-induced cold and engine compartment heat, often within the same duty cycle.

FSE Material Technology

Momentive's FSE materials offer several critical advantages in aerospace and high-performance industrial applications due to their unique chemistry. FSE materials are critical enablers of aerospace system reliability, particularly where fuel exposure, thermal stress, and long service life intersect. Their use ensures safety, performance, and regulatory compliance across commercial, defense, and space applications.

FQE Material Technology

Momentive's FQE materials (Fluorosilicone Elastomers with advanced Fuel and chemical resistance, Quality, and Environmental resilience) are critical in aerospace applications because they address the most demanding performance needs where standard silicone or other elastomers fail, particularly in fuel-rich, high-temperature, and mission-critical environments.

HCR Fluorosilicones	Peroxide	Appearance	Density g/cm3	Hardness/ Durometer Shore A	Tenmsile Strength, Mpa	Elongation, %	Tear Strength, Die B N/mm	Compression Set, % (post-cured)
General Purpose								
FSE7520	X	White	1.36	26	7.7	550	16	15
FSE7540	X	White	1.39	44	8.3	380	13	8
FSE7560	X	White	1.42	62	9.2	290	18	10
FSE7570-D1	X	Off-White	1.47	66	8.2	350	35	15
High Tear Resistance								
FSE7340	X	Pale Yellow	1.43	43	11.2	500	42	8
FSE7360	X	Pale Yellow	1.47	62	10.5	400	38	12
Compression Set								
FQE205U	X	Pale Yellow	1.42	52	9.2	290	17	4
FQE206U	X	Light Yellow	1.45	61	11.2	280	22	5
FQE207U	X	Light Yellow	1.53	71	8.5	190	17	3
Low Compression Set - High Strength								
FQE307U	X	Light Yellow	1.45	70	10.5	260	14	4

LIQUID SILICONE RUBBER (LSR) FLUOROSILICONES

Fluorosilicone Specification callouts: Mil-DTL-25988C, Mil-R-25988, and AMS-R-25988 are frequently used to specify fluorosilicone rubber. Momentive offers materials specifically formulated to meet the aforementioned specifications.

In addition, AMS 3325 through AMS 3331 also specify/identify fluorosilicone materials. Momentive's Applications Development Engineering team can assist and support in meeting your fluorosilicone compound specification needs whether it be via a base fluorosilicone recommendation or a ready-to-use compound.

Liquid Silicone Rubber (LSR) Fluorosilicones	Appearance	Density g/cm3	Hardness/ Durometer Shore A	Tenmsile Strength, Mpa	Elongation, %	Tear Strength, Die B N/mm	Compression Set, % (post-cured)
Fluorinated LSR							
FSL 7641	Translucent	1.23	40	6	500	20	17
FSL 7651	Translucent	1.23	50	6	400	20	15
FSL 7661	Translucent	1.26	60	7	300	32	23
FSL 7586/40	Translucent	1.23	70	6	380	20	17

Key Benefits

Exceptional Fuel and Solvent Resistance

- Fluorosilicones combine the thermal stability of silicones with the chemical resistance of fluorocarbons.
- Momentive's fluoro materials resist:
  - Jet fuels (Jet A, JP-8)
  - Hydraulic fluids (Skydrol®)
  - Oils and solvents (e.g., MEK, toluene, alcohols)

Excellent Compression Set Resistance

- Maintains sealing force over long durations and thermal cycling.
- Ensures long-term gasket and seal performance in critical systems.

Durability in Harsh Environments

- Resists ozone, UV, and weathering — key for external aircraft components or exposed parts.
- Fluorosilicone's molecular structure adds stability under chemical and environmental stress.

Wide Operating Temperature Range

- Typical FSE grades operate from -60°C to +200°C.
- Ideal for aerospace environments with extreme cold at altitude and high heat near engines.

Low Outgassing & Flame Resistance

- Certain grades meet aerospace flammability and low outgassing standards, such as:
- FAR 25.853
- NASA ASTM E595

Lightweight Sealing Option

- Can replace heavier metallic or composite seals in some designs.
- Supports aerospace trends toward weight reduction and fuel efficiency.

MIL-DTL-25988C is a U.S. military specification that covers fluorosilicone rubber (FVMQ) compounds used primarily for sealing applications in aerospace and defense systems. These compounds are designed to meet stringent requirements for fuel resistance, temperature stability, and mechanical performance in harsh environments.

Overview of MIL-DTL-25988C Fluorosilicone Compounds

01 Scope and Purpose

- Defines the physical, chemical, and mechanical requirements for fluorosilicone rubber compounds.
- Intended for O-rings, gaskets, and seals exposed to aviation fuels, lubricants, and hydraulic fluids.
- Ensures materials provide reliable performance in military aircraft, missiles, and ground support equipment.

02 Key Properties and Requirements

Property	Typical Requirement
Temperature Range	-60°C to +204°C (-75°F to +400°F)
Fuel Resistance	Resistance to Jet fuels (JP-4, JP-5, JP-8)
Hydraulic Fluid Resistance	Compatible with Skydrol and other fluids
Tensile Strength	Minimum ~7 MPa (1000 psi)
Elongation at Break	Typically ≥150%
Compression Set	≤25% after aging
Specific Gravity	Generally 1.8 - 2.0
Hardness	70 ± 5 Shore A typically
Outgassing	Low, suitable for avionics applications

(MIL-DTL-25988C, TYPE 1/CLASS 1):

- MIL-DTL-25988 Grade 60
- MIL-DTL-25988 Grade 70
- MIL-DTL-25988 Grade 80

MIL-R-25988/3 – Rubber, Fluorosilicone Elastomer, Oil- and Fuel-Resistant, O-rings, Class 1, Grade 60
MIL-R-25988/1 – Rubber, Fluorosilicone Elastomer, Oil- and Fuel-Resistant, O-rings, Class 1, Grade 70
MIL-R-25988/4 – Rubber, Fluorosilicone Elastomer, Oil- and Fuel-Resistant, O-rings, Class 1, Grade 80

ML-DTL-29588: Class 1

	GRADE 60	GRADE 70	GRADE 80
Original Properties			
Hardness, points	60 ± 5	70 ± 5	80 ± 5
Tensile strength, psi, min	700 (4.83 kPa)	750 (5.17 kPa)	750 (5.17 kPa)
Elongation, %, min	150	135	70
Temperature retraction, °F, max	-70 (-56.7 °C)	-70 (-56.7 °C)	-70 (-56.7 °C)
After air aging 70 hours @ 75 ± °F (23.9 ± 2.8 °C) Compression set, %, max			
Under 0.11 inch (2.79 mm) 10 15 25	20	15	25
Under 0.11 inch (2.79 mm) 15 15 20	15	15	20
After aging 70 hours at the temperatures	392 ± 5 °F (200 ± 2.8 °C)	392 ± 5 °F (200 ± 2.8 °C)	392 ± 5 °F (200 ± 2.8 °C)
Hardness, change, point, max	+10, -5	+10, -6	+10, -7
Tensile strength, decrease, %, max	25	25	20
Elongation decrease, %, max	25	25	20
Weight loss, %, max	2	2	2
After aging 22 hours @ 347 ± 5 °F (175 ± 2.8 °C) Compression set, %, max			
Under 0.110 inch (2.79 mm)	45	30	50
Over 0.110 inch (2.79 mm)	40	30	45
After aging 70 hours in AMS 3021 @ the temperatures	302 ± 5 °F (150 ± 2.8 °C)	302 ± 5 °F (150 ± 2.8 °C)	302 ± 5 °F (150 ± 2.8 °C)
Hardness, change, points, max	± 15	± 15	± 15
Tensile strength decrease, %, max	45	40	30
Elongation decrease, %, max	30	25	15
Volume change, %	1 to 15	1 to 15	1 to 15
Compression set, %, max			
Under 0.110 inch (2.79 mm)	50	30	60
Over 0.110 inch (2.79 mm)	45	30	60
After aging 22 hours @ 75 ± 2.8 °F (23.9 ± 2.8 °C) in AMS 2629, Type 1			
Hardness, change, points, max	-20	-20	-20
Tensile strength decrease, %, max	50	45	30
Elongation decrease, %, max	40	35	30
Volume change, %	1 to 25	1 to 25	1 to 25




Boeing uses a proprietary material specification system known as BMS (Boeing Material Specification). For silicone elastomers in aerospace applications, BMS standards define the required properties, performance criteria, testing protocols, and intended uses

Boeing / Momentive Cross-Reference

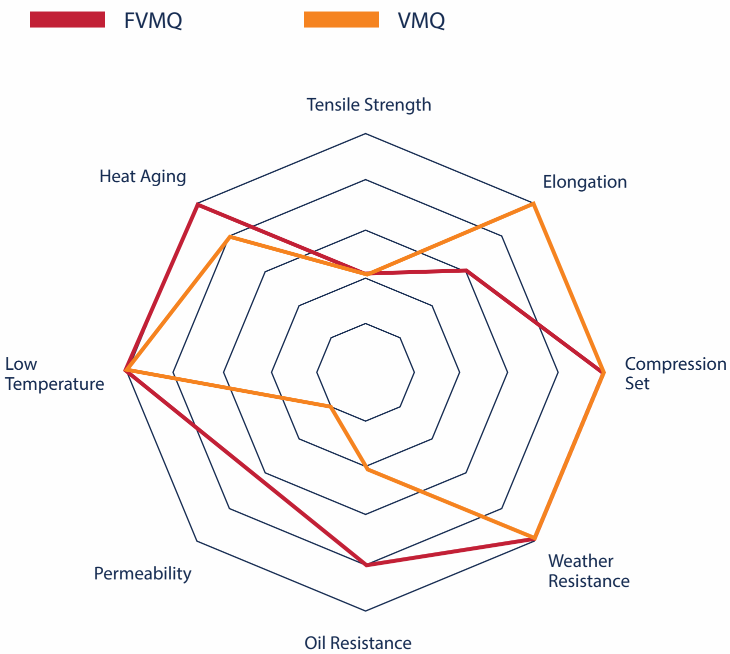
	Appearance	Density g/cm^3	Hardness/ Durometer Shore A	Tenmsile Strength, Mpa	Elongation, %	Tear Strength, Die B N/mm	Compression Set, % (post-cured)	Typical Applications
BMS 1-73								
FSE7340	Pale-yellow	1.43	42	11.2	500	42	8	Clamp blocks for fuel lines
FSE2620	Off-White	1.41	59	8.9	425	21	20	
FSE7570	Off-White	1.45	66	8.2	350	35	15	
FSE7560	White	1.4	60	8.9	300	26	10	
BMS 1-75								
SE5563U-1	Gray	1.18	53	9.2	565	32	16	Aerodynamic seals, Door Seals
AS157U	White	1.07	56	7.4	500	28	10	
BMS 1-62								
SE6855U	Off-White	1.16	55	10.1	950	43.8	22	Seat Channel Blocks
BMS 1-71								
SE4910A-D1	Off-White	1.16	60	9.1	575	44	8	Window Seals
BMS 1-72								
SE5569U	Off-White	1.22	55	7.9	600	34	15	Interior Parts, gaskets and flexible ducting
AS172U	White	1.07	56	7.4	500	28	10	
BMS 1-74								
SE7550U	Red	1.22	50	9.7	578	23.5	-	Nacelle seals (engine area), Thrust reverser seals
SE7550U-FR	Red	1.19	50	8.3	517	20.6	-	

LOW SWELL IN FUELS

Fluorosilicones from Momentive have excellent resistance against automotive and aircraft fuels and are used in static and dynamic seals around the fuel system like O-rings, membranes and other gaskets.

In diesel fuels and PME (Palm methyl ester) partly fluorinated grades like FSL also show excellent performance.

Immersion test in Diesel and PME 72 h at 120°C



Primary uses of Momentive fluorosilicones are in fuel systems at temperatures up to +177°C (+350°F) and in demanding applications where the dry-heat resistance of the elastomer is required (+204°C/400°F).

Fluorosilicones may also be exposed to petroleum-based oils and/or hydrocarbon fuels. In some fuels and oils; however, the high temperature limit in the fluid list is more conservative because fluid temperatures approaching 200°C (390°F) may degrade the fluid, producing acids which can attack fluorosilicone. For low temperature applications, fluorosilicones seal at temperatures as low as –73°C (–100°F).

Silicones (VMQ) have good heat resistance and cold flexibility, weathering resistance, and good insulating properties. Compared to silicone, fluorosilicones (FVMQ) have fluorinated side chains for good oil and fuel resistance.

- Excellent thermal and heat stability properties
- Outstanding cold flexibility when compared against other fluoroelastomers
- Excellent weather, aging and ozone stability
- Good resistance in oils and hydraulic fluids
- Temperature range from –50°C to +200°C

Elevate Your Aerospace Systems with Silicone

Discover how advanced silicone solutions can transform your aerospace applications. Contact us today to explore materials engineered for the skies—and beyond.

Engineered to Perform at Altitude

NOTES

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