



Fluid Resistance Guide

VMQ Silicone & FVMQ Fluorosilicone Products

Chemical compatibility reference for ElastaPro silicone sheeting products
Covering 13 fluid categories | 190+ fluids and chemicals
Based on ASTM D 471 immersion test data

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RATING KEY

A Excellent	B Good	C Fair	D Severe Effect	N/A No Data
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WARNING. The information in this guide has been gathered from reputable sources and is intended **only as an initial screening guide** for the suitability of ElastaPro silicone and fluorosilicone sheeting in contact with certain substances. Many factors — including temperature, pressure, concentration, and duration of exposure — significantly affect actual performance. It is the responsibility of the user to verify suitability through testing. ElastaPro does not warrant (expressed or implied) that this information is complete or accurate for any specific application.

Introduction

This guide provides a performance reference for ElastaPro VMQ (Dimethyl Silicone) and FVMQ (Fluorosilicone) sheeting products when exposed to various industrial, automotive, aerospace, and food-grade fluids. Ratings are based on ASTM D 471 immersion test methodology and reflect changes in hardness, tensile strength, elongation, and volume swell after prolonged immersion.

About VMQ — Dimethyl Silicone

VMQ (also designated MQ/VMQ per ASTM D 1418) is a general-purpose silicone rubber with outstanding high-temperature stability (–55°C to +230°C), excellent flexibility at low temperatures, and good resistance to ozone, UV, and weathering. VMQ is widely used in food processing, medical, and industrial sealing applications. However, VMQ has limited resistance to petroleum-based fuels, aromatic solvents, and many oils.

About FVMQ — Fluorosilicone

FVMQ introduces trifluoropropyl side groups into the silicone polymer chain, significantly improving resistance to fuels, oils, and aromatic/halogenated solvents while retaining much of silicone's characteristic temperature range (–50°C to +200°C). FVMQ is the preferred choice for aerospace fuel systems, automotive fuel line seals, and environments involving petroleum hydrocarbons. **Note:** FVMQ offers *less* resistance than VMQ to ketones, non-petroleum brake fluids, and concentrated alcohols.

Effects of Immersion

Fluid immersion may affect silicone rubber in several measurable ways: volume swell (fluid penetration between polymer chains), hardness change, tensile strength loss, and elongation change. Negative volume change indicates chemical degradation. Values are rounded from ASTM D 471 test data.

Service Conditions

In actual service, rubber is often only partially exposed to fluids — through splashing or spills rather than full immersion. A material showing only fair results in a prolonged total-immersion test may still perform well in practice. Temperature is a critical factor: a fluid that causes minor changes at room temperature may cause significant degradation at 150°C+.

Selection Recommendations

- For fuel, oil, and solvent environments** — Choose FVMQ. It offers superior resistance to petroleum products, aromatic solvents, and chlorinated compounds.
- For food, steam, and aqueous environments** — VMQ is typically preferred and is available in FDA-compliant grades.
- For ketone or ester-rich environments** — Neither VMQ nor FVMQ performs well. Consider FKM (Viton®) compounds.
- Always test** specific materials under actual service conditions before specifying for critical applications.

Rating	Description	Guidance
A	Excellent	Little or no effect. Volume change typically <10%. Recommended.
B	Good	Minor effect. Some volume or hardness change. Generally acceptable.
C	Fair	Moderate effect. Noticeable property changes. Use with caution.
D	Severe Effect	Significant degradation or excessive swell. Not recommended.
N/A	No Data	Insufficient data. Test material under service conditions.

FUELS & PETROLEUM PRODUCTS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Gasoline, High-Aromatic	D — Severe	A — Excellent
Gasoline, Leaded (Reference Fuel)	D — Severe	A — Excellent
Gasoline, Unleaded	D — Severe	A — Excellent
Gasohol (Gasoline + Ethanol Blend)	D — Severe	B — Good
Diesel Fuel	D — Severe	A — Excellent
Jet Fuel JP-4	D — Severe	A — Excellent
Jet Fuel JP-5	D — Severe	A — Excellent
Jet Fuel JP-8 / Jet-A	D — Severe	A — Excellent
Aviation Gasoline (Avgas)	D — Severe	A — Excellent
Kerosene	D — Severe	A — Excellent
Fuel Oils (Nos. 1, 2, 3, 5A/5B, 6)	C — Fair	A — Excellent
LP Gas / LPG	D — Severe	A — Excellent
Natural Gas	A — Excellent	A — Excellent
Naphtha	D — Severe	A — Excellent
White Gasoline Vapors	D — Severe	A — Excellent

ENGINE, GEAR & LUBRICATING OILS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
ASTM Oil No. 1	A — Excellent	A — Excellent
ASTM Oil No. 2	B — Good	A — Excellent
ASTM Oil No. 3	C — Fair	B — Good
IRM 902 Oil	B — Good	A — Excellent
IRM 903 Oil	C — Fair	B — Good
Mineral Oil	C — Fair	A — Excellent
Motor Oil SAE 10 / 10W-30	B — Good	A — Excellent
Motor Oil 5W-30	B — Good	A — Excellent
Gear Oil / Hypoid Lubricant	C — Fair	A — Excellent
Automatic Transmission Fluid (ATF)	D — Severe	B — Good
Power Steering Fluid	B — Good	A — Excellent
Turbine Oil	D — Severe	A — Excellent
Transformer Oil	B — Good	A — Excellent
Crude Oil 7 API	C — Fair	A — Excellent
Crude Oil 315 API	C — Fair	A — Excellent
Grease, Petroleum-Based	D — Severe	B — Good

HYDRAULIC FLUIDS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Hydraulic Oil, Petroleum-Based	B — Good	A — Excellent
Hydraulic Oil, Synthetic (PAO)	B — Good	B — Good
MIL-H-5606 (Petroleum Base)	B — Good	A — Excellent
Phosphate Ester (Skydrol)	D — Severe	D — Severe
Water-Glycol Hydraulic Fluid	B — Good	C — Fair
Polyglycol Hydraulic Fluid	B — Good	C — Fair
HFC Water-Based Fluid	B — Good	C — Fair
Brake Fluid, Petroleum-Based	A — Excellent	A — Excellent
Brake Fluid, Glycol-Based (DOT 3/4)	A — Excellent	D — Severe

HALOGENATED & CHLORINATED SOLVENTS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Carbon Tetrachloride	D — Severe	A — Excellent
Trichloroethylene	D — Severe	A — Excellent
Perchloroethylene	D — Severe	A — Excellent
Methylene Chloride	N/A	B — Good
Chloroform	D — Severe	B — Good
Chlorobenzene (Mono)	D — Severe	B — Good
1-Chlorodecane	D — Severe	A — Excellent
Trifluorochloroethylene	D — Severe	A — Excellent
Freon 11	D — Severe	A — Excellent
Freon 12	D — Severe	A — Excellent
Freon 22	D — Severe	A — Excellent
Freon 113	D — Severe	A — Excellent
Freon TF	D — Severe	A — Excellent

AROMATIC & ALIPHATIC SOLVENTS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Benzene	D — Severe	A — Excellent
Toluene	D — Severe	A — Excellent
Xylene	D — Severe	A — Excellent
Heptane	D — Severe	A — Excellent
Hexane	D — Severe	A — Excellent
Cyclohexane	D — Severe	A — Excellent
Isooctane	D — Severe	A — Excellent
Mineral Spirits	D — Severe	A — Excellent
Naphthalene	D — Severe	B — Good
Naphtha	D — Severe	A — Excellent
Turpentine	D — Severe	B — Good
Ligroin	D — Severe	A — Excellent
Stoddard Solvent	D — Severe	A — Excellent
Oxylene / Nitrocellulose Solvent	D — Severe	B — Good

KETONES, ESTERS & ETHERS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Acetone	D — Severe	D — Severe
Methyl Ethyl Ketone (MEK)	D — Severe	D — Severe
Methyl Isobutyl Ketone (MIBK)	D — Severe	D — Severe
Cyclohexanone	D — Severe	D — Severe
Diacetone Alcohol	D — Severe	D — Severe
Ethyl Acetate	D — Severe	D — Severe
Butyl Acetate	D — Severe	D — Severe
Isopropyl Acetate	D — Severe	D — Severe
Amyl Acetate	D — Severe	D — Severe
Diethyl Ether	D — Severe	C — Fair
Dioctyl Phthalate	N/A	C — Fair
Dibutyl Phthalate	B — Good	C — Fair
Di(2-Ethylhexyl) Sebacate	N/A	B — Good

ALCOHOLS & GLYCOLS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Methanol (Methyl Alcohol)	A — Excellent	C — Fair
Ethanol (Ethyl Alcohol)	B — Good	B — Good
Isopropyl Alcohol	A — Excellent	B — Good
Butyl Alcohol (n-Butanol)	B — Good	B — Good
Amyl Alcohol	D — Severe	B — Good
Benzyl Alcohol	N/A	C — Fair
Octyl Alcohol	B — Good	B — Good
Ethylene Glycol	A — Excellent	B — Good
Propylene Glycol	A — Excellent	B — Good
Glycerin (Glycerol)	A — Excellent	A — Excellent
Diethylene Glycol	B — Good	B — Good
Antifreeze (Ethylene Glycol Base)	C — Fair	B — Good

SILICONE FLUIDS & GREASES

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Silicone Oil (Low Viscosity)	C — Fair	A — Excellent
Silicone Oil (High Viscosity)	C — Fair	A — Excellent
Silicone Grease	C — Fair	A — Excellent
Dimethyl Silicone Fluid (PDMS)	C — Fair	A — Excellent
Phenyl Silicone Fluid	C — Fair	B — Good
DOWSIL / XIAMETER Compounds	C — Fair	A — Excellent
Silicone Compounds (General)	C — Fair	A — Excellent

FOOD PRODUCTS & OILS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Vegetable Oil (Generic)	D — Severe	A — Excellent
Corn Oil	A — Excellent	A — Excellent
Soybean Oil	A — Excellent	A — Excellent
Olive Oil	D — Severe	A — Excellent
Coconut Oil	A — Excellent	A — Excellent
Linseed Oil	A — Excellent	A — Excellent
Castor Oil	A — Excellent	A — Excellent
Lard (Animal Fat)	B — Good	A — Excellent
Butter	B — Good	A — Excellent
Orange Peel / Citrus Oil	D — Severe	C — Fair
Milk	A — Excellent	A — Excellent
Beer	A — Excellent	A — Excellent
Coffee	A — Excellent	A — Excellent
Honey	A — Excellent	A — Excellent
Glycerin / Corn Syrup	A — Excellent	A — Excellent
Coca-Cola / Carbonated Beverages	A — Excellent	A — Excellent
Grape / Fruit Juice	A — Excellent	A — Excellent

WATER & STEAM

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Water, Room Temperature	B — Good	B — Good
Water, Hot (>80°C / 176°F)	B — Good	C — Fair
Water, Distilled	B — Good	B — Good
Salt Water / Seawater	A — Excellent	B — Good
Carbonated Water	N/A	B — Good
Steam, Low Pressure (<100°C)	B — Good	C — Fair
Steam, Medium Pressure	C — Fair	C — Fair
Steam, High Pressure (>150°C)	C — Fair	D — Severe
Hydrogen Peroxide 10%	A — Excellent	A — Excellent
Hydrogen Peroxide 30%	B — Good	B — Good
Hydrogen Peroxide 50%	B — Good	C — Fair

ACIDS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Acetic Acid, Dilute (<20%)	C — Fair	C — Fair
Acetic Acid (20%)	B — Good	C — Fair
Acetic Acid, Glacial	B — Good	D — Severe
Citric Acid	A — Excellent	A — Excellent
Lactic Acid	A — Excellent	A — Excellent
Formic Acid	B — Good	C — Fair
Phosphoric Acid	C — Fair	B — Good
Hydrochloric Acid (10%)	D — Severe	B — Good
Hydrochloric Acid (37%)	B — Good	B — Good
Sulfuric Acid (5–20%)	D — Severe	B — Good
Sulfuric Acid, Concentrated	D — Severe	D — Severe
Nitric Acid (5–10%)	C — Fair	C — Fair
Nitric Acid (20%)	D — Severe	D — Severe
Nitric Acid, Concentrated	D — Severe	D — Severe
Hydrofluoric Acid (20%)	D — Severe	C — Fair
Hydrofluoric Acid (50%+)	D — Severe	D — Severe
Fatty Acids	C — Fair	B — Good
Oleic Acid	D — Severe	B — Good

BASES & ALKALIS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Sodium Hydroxide (NaOH, 10%)	A — Excellent	B — Good
Sodium Hydroxide (NaOH, 50%)	A — Excellent	C — Fair
Potassium Hydroxide (KOH)	C — Fair	B — Good
Ammonium Hydroxide	A — Excellent	B — Good
Calcium Hydroxide	A — Excellent	B — Good
Calcium Oxide	A — Excellent	A — Excellent
Lithium Hydroxide	N/A	B — Good
Sodium Carbonate	A — Excellent	A — Excellent
Potassium Carbonate	A — Excellent	B — Good
Ammonia Gas, Cold	A — Excellent	B — Good
Ammonia Gas, Hot	A — Excellent	C — Fair
Ammonia Liquid	N/A	C — Fair

SALTS, GASES & OTHER INORGANICS

Fluid / Chemical	VMQ Dimethyl Silicone	FVMQ Fluorosilicone
Sodium Chloride (Brine)	A — Excellent	A — Excellent
Calcium Chloride	A — Excellent	A — Excellent
Copper Sulfate	B — Good	A — Excellent
Ferric Chloride	B — Good	A — Excellent
Aluminum Chloride	B — Good	A — Excellent
Magnesium Chloride	A — Excellent	A — Excellent
Calcium Carbonate	A — Excellent	A — Excellent
Sodium Bicarbonate	A — Excellent	A — Excellent
Chlorine Gas (Dry)	D — Severe	C — Fair
Chlorine Water	D — Severe	C — Fair
Bromine Liquid	D — Severe	D — Severe
Hydrogen Sulfide (Aqua)	C — Fair	B — Good
Sulfur Dioxide	N/A	B — Good
Carbon Dioxide (Dry)	B — Good	A — Excellent
Nitrogen Gas	A — Excellent	A — Excellent
Helium	A — Excellent	A — Excellent
Hydrazine	N/A	C — Fair
Molybdenum Disulfide	N/A	B — Good

NOTES & TECHNICAL REFERENCES

Data Sources

- Dow Chemical / Dow Corning Fluid Resistance Guide (SILASTIC™ & XIAMETER™ Products)
- ElastaPro internal chemical compatibility data (VMQ DiMethyl Silicone)
- ASTM D 471 — Standard Test Method for Rubber Property — Effect of Liquids
- ASTM D 1418 — Standard Practice for Rubber and Rubber Latexes — Nomenclature
- Rahco Rubber FVMQ Technical Reference
- Industry standard O-ring and elastomer compatibility references

Material Designations (ASTM D 1418)

- VMQ — Methyl-Vinyl Silicone Rubber (Dimethyl Silicone, general purpose)
- FVMQ — Fluorovinylmethyl Silicone Rubber (Fluorosilicone)
- MQ — Methyl Silicone (no vinyl groups)
- PVMQ — Methyl-Phenyl-Vinyl Silicone (low-temperature grade)

Key Differences: VMQ vs. FVMQ

- FVMQ contains trifluoropropyl side groups (23–28% fluorine by weight)
- FVMQ greatly improves fuel, oil, and aromatic/halogenated solvent resistance vs. VMQ
- VMQ has a wider temperature range: –55°C to +230°C vs. FVMQ –50°C to +200°C
- VMQ outperforms FVMQ in: ketones, non-petroleum brake fluids, steam, strong alkalis
- FVMQ can be blended with VMQ to achieve intermediate resistance profiles

Abbreviations Used

- ASTM — American Society for Testing and Materials
- IRM — Industry Reference Material (standardized test oil)
- MIL — Military Specification
- ATF — Automatic Transmission Fluid
- DOT — Department of Transportation (brake fluid grade)
- PDMS — Polydimethylsiloxane (standard silicone oil)
- PAO — Polyalphaolefin (synthetic lubricant base)

ElastaPro Silicone Sheeting

For technical questions regarding material selection, custom formulations, or application engineering support, please contact:

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