Understanding Fire Performance of Silicone-Coated Upholstery

A Technical Guide for Specifiers, Engineers, and OEM Partners

Covers: fire chemistry fundamentals • standards and certifications • material comparison • specification summary • FAQ

Technical Guide TG-FR-2026-07 | Revision 1.0 | Published July 2026
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Introduction

A few years ago, most fire-safety conversations with upholstery buyers ended once a material passed the required test. That has changed. Procurement teams increasingly want to know not just whether a fabric meets a standard such as CAL 117 or FMVSS 302, but how it gets there, and specifically, what has been added to the formulation to make that happen.

This guide explains how Sileather's silicone-coated textiles achieve fire performance across furniture, marine, transportation, and healthcare applications without added FR additives in the coating formulation — and, just as importantly, what that claim does and does not cover.

Sileather silicone-coated upholstery in a Leapmotor automotive interior.

Why Most Upholstery Materials Need Flame Retardants

PVC, polyurethane foam, and many conventional coated textiles rely on carbon-based polymers for their surface layer, and carbon-based polymers burn. To meet baseline fire requirements — CAL 117 for furniture, FMVSS 302 for automotive interiors, EN 45545-2 for rail — manufacturers typically add flame-retardant chemistry directly into that formulation. Brominated compounds and phosphorus-based additives such as TCPP and TDCPP have been common choices for decades, and they work: they slow ignition or interrupt the combustion process.

Several of these chemistries have drawn regulatory attention in recent years. Some brominated flame retardants are restricted under REACH in the EU; certain organophosphates trigger Prop 65 disclosure requirements in California. The industry's typical response has been substitution — replacing a restricted FR compound with one that isn't yet restricted — rather than removing the dependency on added FR chemistry altogether. That is a reasonable short-term fix, but it does not answer the question buyers are increasingly asking: does this material need FR additives at all, and if so, which ones?

How Sileather's Silicone Coating Behaves Differently

It helps to be precise about what Sileather actually is: a silicone-coated textile, meaning a 100% silicone coating applied over a woven or knit backing, not a solid block of silicone. The fire behavior described in

this guide is a property of that coating layer specifically, verified through Sileather's own test reports rather than assumed from silicone chemistry in general.

Chemically, the coating is built on a silicon-oxygen backbone (polydimethylsiloxane, in technical terms) rather than the carbon-carbon backbone found in PVC, polyurethane, and most conventional upholstery coatings. Carbon-based coatings combust: they break down into flammable gases and continue feeding a fire unless something in the formulation interrupts the process. Silicone coatings can behave differently. Under sustained high heat, a silicone coating can form a silica-like, glass-related residue on the surface — related to the same chemistry found in glass and quartz — that acts as a thermal barrier and helps slow heat transfer and flame spread. The exact composition and extent of that residue vary with formulation, thickness, and burn conditions, but the general charring behavior is a well-documented property of siloxane polymers.

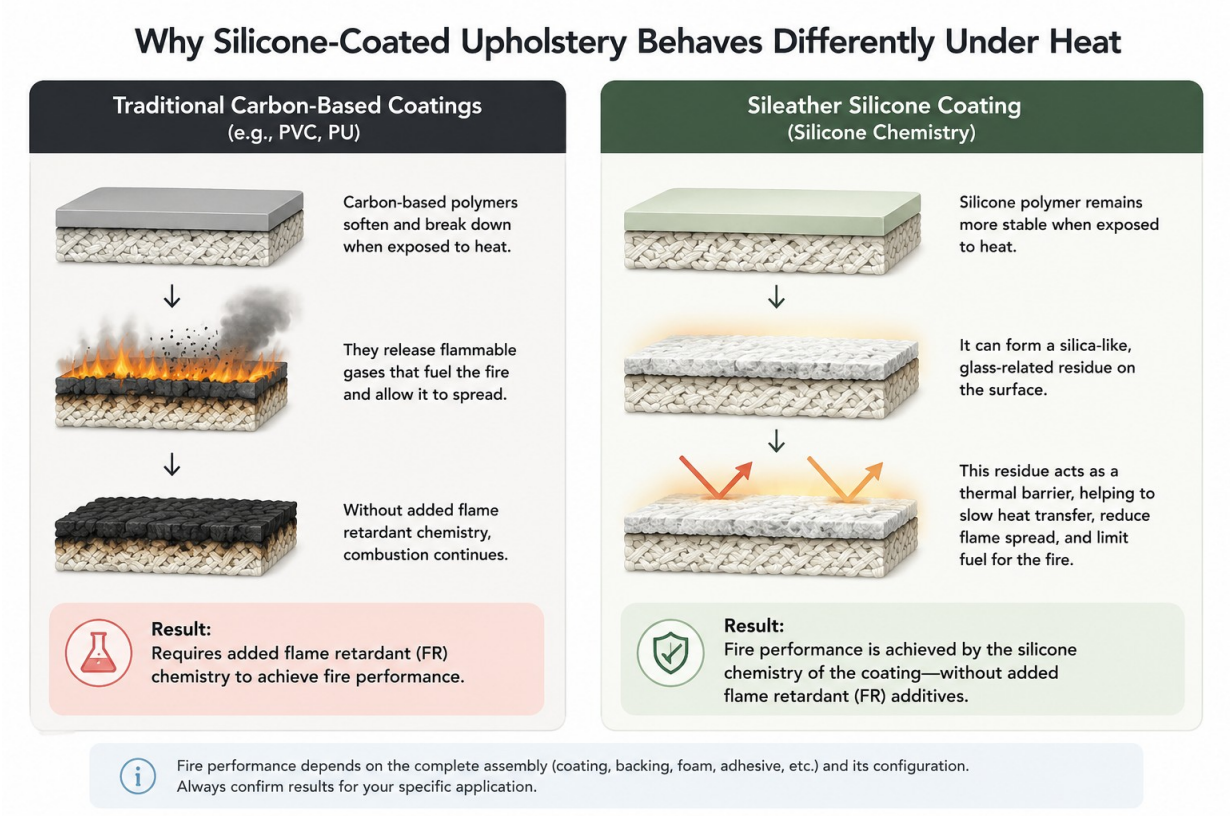

Figure 1. Traditional carbon-based coatings vs. Sileather's silicone coating under sustained heat.

Tested Assembly (illustrative)

Silicone Coating
Textile Backing
Foam / Substrate
Adhesive / Frame

Figure 2. A finished upholstery assembly is also a system of layers — coating, backing, foam, and adhesive — each with its own fire behavior. See “What the Testing Shows” below.

What the Testing Shows

Key Takeaway

Fire-performance testing evaluates the complete upholstery construction, not just the surface coating. The cover fabric, backing, foam, adhesive, and assembly all contribute to the final test result. Test reports should always be interpreted in the context of the specific construction that was tested.

Sileather's CAL Technical Bulletin 117-2013 test, for example, evaluates the cover fabric over a standard non-FR polyurethane foam substrate — the correct way to isolate whether the coating itself contributes flame resistance, rather than riding on a treated foam underneath it. In that tested configuration, the cover fabric passed with an untreated, non-FR foam base. Under those test conditions, the fire performance traces back to the silicone coating rather than a hidden FR layer elsewhere in the construction.

A finished seat cushion or panel is a system: coating, backing, foam, adhesive. Specifiers pairing Sileather with a foam or backing outside its standard tested specification should confirm how the full assembly performs. A compliant cover fabric does not automatically make every possible assembly compliant; it is the most heavily scrutinized part of the picture, but not the only part.

Standards and Certifications

Depending on product and application, Sileather silicone-coated fabrics have been tested to the following standards, all without added flame-retardant chemistry in the coating. Results reflect the specific product construction and test report on file for each standard.

Furniture and Contract

Standard	What It Tests	Result
CAL 117 (CA Technical Bulletin 117-2013)	Smolder resistance of upholstery cover fabric	Pass – tested assembly: cover fabric over standard non-FR polyurethane foam
ASTM E84	Surface burning: flame spread and smoke developed index	Tested per report on file (tunnel test)
BS 5852 (#0 cigarette, #1 butane, Crib 5)	UK/international furniture ignitability	Pass (per report on file)
EN 1021 Parts 1 & 2	EU furniture flammability: cigarette and match flame	Pass (per report on file)
UFAC Class 1	Cigarette ignition resistance	Class 1
NFPA 260	Cigarette ignition resistance of cover fabric, referenced by fire marshals for public-occupancy furniture	Class I (per report on file)

Marine

Standard	What It Tests	Result
IMO FTP 2010 Code, Part 8	Fire test for upholstered furniture aboard vessels	Fire-tested per Part 8; Lloyd's Register type approval on file
IMO FTP 2010 Code, Part 5	Surface flammability for bulkhead, wall	Pass — low flame spread (report

	& ceiling linings	#SDFTS26004468R01, SGS)

Transportation

Standard	What It Tests	Result
FMVSS 302	Horizontal burn rate: US/Canada automotive interiors	Pass (per report on file)
EN 45545-2	European railway fire safety, requirement R21	Meets HL1, HL2 & HL3 per report SL-Z-260/EN45545-R21/359a
GB 8410	Chinese automotive interior horizontal flammability	Pass (per report on file)

Smoke Density (Informational Data)

Sileather-coated leather has also been tested to ASTM E662, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials (VTEC Laboratories, report #100-7860). ASTM E662 does not itself define a pass/fail threshold; results are evaluated against the smoke limit specified by a particular end-use standard or specifying authority. The measured values are provided below for reference.

Measurement	Non-Flaming (avg)	Flaming (avg)
Ds @ 1.5 min	1.2	29.6
Ds @ 4.0 min	3.2	52.9
Dm (maximum specific optical density)	5.3	60.7
Dm (corrected)	0.7	23.1

For reference, common transportation-industry smoke-density benchmarks based on ASTM E662 (e.g., Docket 90A / NFPA 130 criteria for transit interior materials) call for Ds @ 1.5 min ≤ 100 and Ds @ 4.0 min ≤ 200 in flaming mode. Sileather's tested flaming-mode values (29.6 and 52.9, respectively) are well within these commonly referenced limits — a strong smoke-density result for specifiers evaluating transportation, healthcare, and public-occupancy applications. This benchmark is provided for context; it reflects this specific test result rather than a full-system code certification.

Wall Coverings and Curtains (France / EU)

Sileather has also been classified M1 under the French reaction-to-fire system (NF P 92-501 to 507, electrical burner test method), per FCBA Fire Laboratory Certificate No. CM-20-P-101. This classification is specific to wall-hung coverings, sheers, and curtains, and does not extend to upholstered seating; the certificate itself notes it is not applicable to upholstered seat use under French Decree AM 18 (March 6, 2006). Seating and furniture fire performance for Sileather is addressed separately by the standards in the Furniture and Contract table above.

Standard	What It Tests	Result
M1 (NF P 92-501 to 507)	French reaction-to-fire classification for wall coverings, curtains, and hanging textiles	M1 (FCBA Certificate #CM-20-P-101) — wall coverings/curtains only, not upholstered seating

How This Compares to Other Upholstery Materials

None of this makes silicone automatically “better” than PVC or polyurethane for every application. Durability, hand feel, cost, and cleaning chemistry all factor into a real specification decision. But the fire-compliance path is genuinely different, and it is worth laying out plainly rather than in marketing shorthand.

Material	How It Typically Reaches Fire Compliance	FR Additives in Coating
PVC / vinyl	Plasticizer package combined with added FR chemistry in the coating or backing	Yes, typically
Polyurethane foam & coated fabrics	FR-treated foam and/or a topical FR finish on the fabric	Yes, typically
Silicone-coated textiles (Sileather)	Char-forming behavior of the silicone coating itself	No, per tested formulation

The practical difference for a specifier is documentation. With FR-treated materials, a full chemical disclosure means listing what was added and confirming it against current restrictions. With Sileather's silicone coating, that particular disclosure is simpler, because the coating formulation does not include dedicated FR additives to begin with. It is not the whole picture, though: other components in a finished product, such as adhesives, pigments, or backings, should still be addressed per whatever material disclosure requirements a project calls for.

Specification Summary

Sileather silicone-coated upholstery in a hospitality bar seating application.

Applications

- Marine seating and interiors (yacht, commercial vessel, cruise)
- Marine bulkhead, wall, and ceiling linings
- Contract, hospitality, and healthcare furniture
- Rail and transit interiors
- Automotive OEM upholstery
- Wall coverings and curtains in France/EU markets requiring M1 classification
- Protective and grip-focused glove applications (e.g., Sileather's Grip Power coating), where the same no-added-FR-chemistry formulation is relevant to heat-exposure use

Key Attributes

- Inherent flame resistance in the silicone coating, no added FR additives
- Low VOC, cleanable, non-porous surface
- 100% silicone coating over woven/knit backing
- Resistant to UV, mildew, and common cleaning chemicals (see separate durability documentation)

Typical Use Cases

- Marine seating where IMO FTP 2010 Part 8 and UV/mildew resistance both apply
- Marine bulkhead, wall, and ceiling linings requiring IMO FTP 2010 Part 5 low-flame-spread performance
- Healthcare and hospitality seating requiring CAL 117, cleanability, and chemical resistance
- Rail interiors requiring EN 45545-2 hazard-level compliance
- Automotive programs requiring FMVSS 302 or GB 8410

Certifications / Standards

- CAL 117, ASTM E84, BS 5852, EN 1021 Parts 1 & 2, UFAC Class 1, NFPA 260
- IMO FTP 2010 Code Parts 5 & 8
- FMVSS 302, EN 45545-2 (HL1–HL3), GB 8410
- M1 (NF P 92-501 to 507, France) — wall coverings and curtains only, not upholstered seating
- ASTM E662 (smoke density, informational data — see Standards & Certifications)

Limitations

- Certifications apply to the specific cover fabric plus the standard substrate tested; non-standard foam, backing, or adhesive combinations should be verified separately.
- Color and finish variants should be checked against the specific test report on file, since smoke density and flame spread results can shift slightly with pigment loading.
- The fire behavior described in this guide reflects Sileather's tested coating formulations; it should not be read as a claim about silicone products generically.
- ASTM E662 results in this guide reflect this specific tested construction and are provided as reference data; they are not, on their own, a certification to NFPA 130, Docket 90A, or other full-system transit specifications, which evaluate a complete assembly.
- The M1 classification applies to wall coverings and curtains only; per the certificate, it is not applicable to upholstered seating (French Decree AM 18).

Frequently Asked Questions

Does Sileather contain added flame-retardant chemicals?

No flame-retardant additives, such as brominated compounds or organophosphates, are added to Sileather's silicone coating formulation to achieve its tested fire performance. Ancillary components such as adhesives, pigments, or backings should still be confirmed separately if full material disclosure is required.

Why does Sileather's coating resist fire without additives?

Its silicon-oxygen backbone can form a silica-like, glass-related residue under high heat, which behaves as a thermal barrier rather than the flammable char that carbon-based coatings produce. This is a property of the coating chemistry, verified through Sileather's own test reports.

Does passing CAL 117 or FMVSS 302 mean an entire cushion assembly is fire-safe?

The cover fabric passes on its own against a standard non-FR foam substrate. Full assemblies using non-standard foam, backing, or adhesive should still be reviewed.

What's the difference between FMVSS 302 and CAL TB 117?

FMVSS 302 is a US federal standard measuring horizontal burn rate for automotive interior materials; it is mandatory for vehicles sold in the US and Canada. CAL TB 117 is a California standard measuring smolder resistance (cigarette ignition) for upholstered furniture cover fabric; it is not automotive-specific but is used nationwide as a furniture-industry baseline. They test different failure modes and are not interchangeable.

Can silicone-coated textiles replace FR-treated vinyl in an existing specification?

Often, yes, subject to a project-specific review. Silicone-coated textiles are tested to many of the same standards vinyl is specified against (CAL 117, FMVSS 302, and others), but hand feel, cost, cleaning chemistry, and any application-specific certifications should be confirmed before substitution.

Is this relevant outside marine and automotive?

Yes — and contract furniture is arguably where fire performance has mattered longest. Public-occupancy furniture (hotels, restaurants, healthcare facilities) has long been subject to cigarette-ignition testing such as NFPA 260, often required by local fire marshals independent of any single state or federal rule. Sileather's cover fabric has been tested to NFPA 260 and rated Class I. Rail interiors reference EN 45545-2, and healthcare and hospitality settings are increasingly layering FR-additive disclosure questions on top of these established fire-performance requirements.

How does this relate to PFAS-free specifications?

They are separate questions, but procurement teams increasingly ask both. Sileather's silicone coating is formulated without added FR chemistry, a distinct answer from, but consistent with, a PFAS-free position.

Why This Matters

Material compliance questions keep expanding across every one of Sileather's markets — furniture, marine, transportation, and healthcare alike. Specifiers are increasingly asking not just whether a material passes a fire test, but what is in it and why it passes. For Sileather's tested silicone-coated constructions, the answer is structurally simple: the coating does not require added FR additives to achieve the tested fire performance in the configurations described in this guide.

Need Help Specifying?

Every project brings its own combination of foam, backing, adhesive, and application requirements. If you're evaluating Sileather for a specific program, our technical team can help confirm the right construction and point you to the relevant test reports.

We regularly support specification work in:

- Marine seating and interiors
- Healthcare and medical seating
- Transportation (rail, bus, automotive)
- Hospitality and contract furniture

Request Documentation or a Specification Review

For full test reports, certificates, or help selecting the appropriate construction for your project, contact your Sileather representative or email marketing@sileather.com.