FABRIC, VINYL & INTERIOR SURFACES — TECHNICAL FAQ

Aqueous SiO_2 Surface-Engineering Platform for Soft & Flexible Substrates

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1. What is the Fabric / Vinyl / Interior Surfaces platform?

This platform is an **aqueous, inorganic silicon dioxide (SiO_2) surface-engineering system** designed specifically for **soft, flexible, and polymer-rich interior substrates**, including:

- Fabrics (natural and synthetic)
- Marine and automotive vinyl
- Flexible PVC windows and clear vinyl
- Synthetic leather and seating materials
- Interior plastics and trims

It is a **surface treatment**, not a ceramic coating and not a film.

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2. Why do fabric and vinyl require a different chemistry than glass?

Soft and flexible substrates:

- Contain plasticizers
- Flex, fold, and compress during use
- Must remain breathable and soft
- Are damaged by rigid, film-forming coatings

Traditional ceramic or solvent-based coatings often:

- Stiffen materials
- Crack or craze under flex
- Extract plasticizers
- Create haze or residue buildup

This platform is engineered to **bond without rigidity** and **protect without altering feel**.

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3. Is this a water-based or solvent-based system?

The Fabric / Vinyl platform is **fully aqueous (water-based)**.

This is critical to ensure:

- Plasticizer-safe performance
- Flexibility and breathability
- Low VOC and odor
- Compatibility with interiors and enclosed spaces

Solvent-based systems are intentionally avoided for these substrates.

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4. Is this a coating or a surface treatment?

It is a **surface treatment**, not a coating film.

The system:

- Forms a **sub-micron inorganic SiO_2 microlayer**
- Chemically anchors to fibers or polymer surfaces
- Does not create measurable thickness
- Does not crack, peel, or flake

Performance comes from **surface chemistry**, not from layer thickness.

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5. What functional benefits does this platform provide?

Depending on the substrate, benefits include:

- Water repellency
- Soil and stain release
- Reduced absorption of spills
- Easier cleaning and maintenance
- Improved durability under repeated use

The goal is **functional protection**, not cosmetic gloss.

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6. Does the treatment stiffen fabric or vinyl?

No.

When applied correctly, the system:

- Preserves flexibility
- Maintains softness and hand feel
- Does not embrittle vinyl or synthetic leather
- Does not block pores or breathability

This is a core design requirement of the platform. [Patent Aqu...Substrates | Word]

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7. How does the treatment work on porous or flexible materials?

The SiO_2 system:

- Anchors at the surface of fibers or polymer chains
- Conforms to texture and micro-movement
- Modifies surface energy rather than encapsulating the material

This allows protection **without sealing or suffocating** the substrate.

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8. Is the platform hydrophobic?

Yes — **controlled hydrophobicity** is a key function.

However, unlike fluoropolymer sprays or waxes:

- Hydrophobicity is structural, not cosmetic
- Performance does not rely on PFAS
- Water repellency is balanced with breathability

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9. Does the treatment change color, texture, or appearance?

No.

The platform is engineered to be **visually neutral**:

- No color change
- No added gloss
- No haze or residue
- No sticky feel

Surfaces look and feel the same — just easier to clean.

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10. How durable is the treatment under real-world use?

The treatment is designed to withstand:

- Repeated sitting, flexing, and handling
- Routine cleaning with mild detergents
- Interior humidity and temperature cycling

Because it is **chemically bonded**, performance does not wash away like topical sprays.

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11. Is this system breathable?

Yes.

Breathability is preserved because:

- No continuous film is formed
- Pores are not sealed
- Moisture vapor can still pass through

This is essential for fabrics, seating, and interior environments.

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12. Is this platform PFAS-free?

Yes.

All Fabric / Vinyl / Interior systems:

- Are **PFAS-free**
- Do not rely on fluorinated surfactants or silanes
- Achieve performance through **inorganic SiO_2 microlayer engineering**. [CHEMFIL MA...$_2$ PLATFORM | Word]

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13. How is the treatment applied?

Depending on the application environment, the system can be applied by:

- Spray
- Wipe
- Dip or saturation methods

It cures under **ambient conditions** and does not require heat or UV lamps.

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14. Is this intended for factory use or aftermarket use?

The platform supports **both**:

- OEM or factory finishing
- Upholstery and fabrication shops
- Marine and automotive interior protection
- Commercial maintenance programs

The aqueous chemistry allows flexibility across deployment models.

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15. How does this platform differ from ceramic or “9H” coatings?

Ceramic coatings are typically:

- Solvent-based
- Rigid and film-forming
- Designed for hard, non-flexing surfaces

This platform is:

- Aqueous
- Flexible and breathable
- Non-film-forming
- Safe for soft, plasticized substrates

They are **fundamentally different technologies**. [Our SIO2 vs ceremics | Word]

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16. Designed failure mode

The designed failure mode is:

Gradual surface wear over time, not cracking, peeling, or delamination.

This allows predictable maintenance without surface damage.

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17. Key takeaway

The Fabric / Vinyl / Interior Surfaces platform is an aqueous, PFAS-free SiO_2 surface-engineering system designed to protect soft and flexible substrates without stiffness, films, or cosmetic side effects — enabling real durability where ceramic coatings fail.
