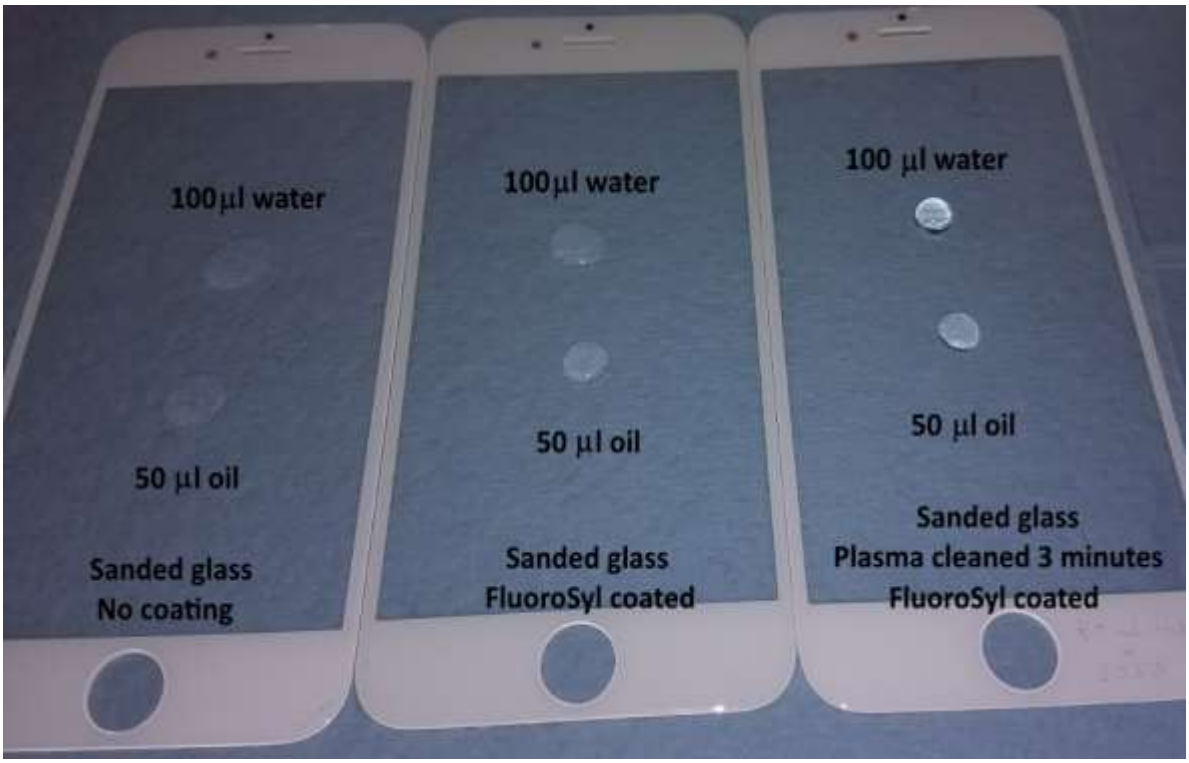
FluoroSyl 3750

Introduction

FluoroSyl 3750 is a hydrophobic and oleophobic perfluoropolyether. FluoroSyl provides long-lasting, anti-fouling, anti-fingerprint and anti-smudge properties to properly prepared surfaces. FluoroSyl bonds to clean glass, plastic and metal surfaces. This produces a low surface energy, low refractive index, transparent, oil, water and stain repellent coating that is less than 10 nanometers thick.



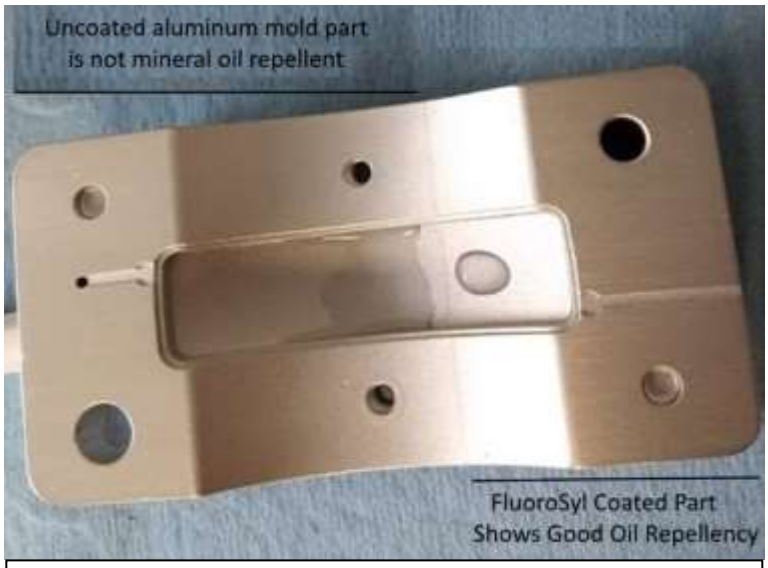
Surface Preparation

FluoroSyl adheres to surfaces, such as glass, siliceous materials and metals. Materials rank ordered in adhesion from excellent to good include: Silica, Quartz, Glass, Aluminum, Copper, Tin, TiO2, Steel and Nickel. A clean surface that is free of interference from contaminants and coatings is needed for FluoroSyl adhesion. Use of plasma to clean and hydroxylate the surface of glass, plastic and metal produces the most durable coating. Alternatively, clean glass or metal with cerium oxide and water made into a paste using a swirling motion and rough cloth

or paper towel. Then rinse with water and dry the substrate. Apply FluoroSyl immediately after surface preparation.

Coating Application

FluoroSyl 3750 may be applied using many methods including dipping, spraying, physical vapor deposition, spritz-and-wipe, etc. For Dipping, FluoroSyl may be diluted to 0.1 to 0.2% with a low boiling fluorosolvent. Articles should be in solution for 1 minute. For spraying, we recommend air assisted atomization pressure of 5-10 psi (34-69kPa) and fluid pressure of 3-5psi (20-25kPa). For ultrasonic assisted atomization, use 30-45 kHz frequency and liquid air flow rates of 3/5ml per minute and an air shaping pressure of 30-60psi (206-413kPa). FluoroSyl may be applied by PVD after depositing onto heated boats or porous pellets. Spritz and spread-on FluoroSyl using a rubber squeegee can also be used.



One third of a clean aluminum mold was dipped in FluoroSyl. The 50-microliter mineral oil test shows that FluoroSyl is oil repellent. The uncoated part of the mold is “attracting” oil.

Curing

The solvent evaporates and FluoroSyl dries in a few minutes producing a tact free substrate. However, FluoroSyl achieves its optimal properties with curing at 100 to 150°C for 15 minutes in a >50% relative humidity environment. Curing at room temperature would require between 1 to 12 hours to achieve proper adhesion. For the best abrasion resistance, we recommend curing at the highest substrate safe temperature possible.

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Post-curing

If the coated surface appears oily or hazy, wipe it with a clean non-abrasive cloth.

Physical Information Refractive Index: 1.3 Density: 1.55 g/cm^3 Surface Energy: 12 mN-m^{-1} Dry Coefficient of Static: 0.68 Dry Coefficient of Sliding Friction: 0.66
Contact Angle Data for Float Glass Static Contact Angle to Water: >110° Static Contact Angle to Mineral Oi: >65° Sliding Angle to Water (200 µl): 4° Sliding Angle to Mineral Oil (200 µl): 3°
Contact Angle Data after 24 Hour Exposure to Cleaning Agents and Solvents Contact Angle after Windex Exposure: >110° Contact Angle after Isopropyl Alcohol Exposure: >110° Contact Angle after Acetone Exposure: >110°
Contact Angle Data for Water after Abrasion Contact Angle after 10,000 Cotton Double Rubs: >110° Contact Angle after 3500 #0000 Steel Wool Rubs: >110°

Abrasion: 500g weight on eraser and 1,500 cycles (40 cycles/min) on coated area: Pass, N=5, **Contact angle >110°**

Alcohol exposure: Methyl-alcohol was poured constantly on coated glass with 500g weight on eraser and 250 cycles (40 cycles/min): Pass, N=5, **Contact angle >110°**

Buffer exposure: 48 hrs in pH 4.6 Buffer Solution: Pass, N=5, **Contact angle >110°**

Humidity exposure: Humidity for 120 hrs in 85°C and 85% chamber 4 hrs recovery time at room temp Measure within a hour: Pass, N=5, **Contact angle >110°**

UV-light exposure: 20 cm from UV Lamp for 72hrs: Pass, N=5, **Contact angle >110°**

Thermal shock: -40°C to 85°C, 1 cycle = 1 hr Total 30 cycles: Pass, N=5, **Contact angle >110°**

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