

# Physical Vapor Deposition of CytoSyl TECHNICAL DATA SHEET

## OVERVIEW

When applied by physical vapor deposition (PVD), CytoSyl covalently bonds to glass, metal, and other hydroxide rich surfaces. CytoSyl creates a transparent nano-coating that is easy to clean, reduces staining, increases durability, and improves touch lubricity. PVD is an excellent method for coating eye glass lenses, touchscreens, and other devices. PVD can also be used to hydroxylate-enrich plastic surfaces making plastic receptive to silane coatings. This TDS provides the basic steps for physical vapor deposition of CytoSyl.

## FEATURES

- Oleophobic
- Hydrophobic
- Easy to clean

## PVD GUIDE

- Load 0.25 grams of CytoSyl 3750Y 20% into a copper cap and air dry for 10 to 15 minutes
- CytoSyl loaded caps can be stored for 1 year in vacuum sealed (moisture-free) bags
- Place clean substrates (glass, metal, etc.) in holders and load into PVD chamber
- Place SiO<sub>2</sub> crystals in e-beam heater
- Place CytoSyl tablet on the molybdenum or tungsten boat of resistance heater
- Pump down the vacuum chamber until the absolute pressure is less than  $2.0 \times 10^{-3}$ Pa ( $2.0 \times 10^{-5}$  Torr)
- Ion clean the substrate for 3 minutes using Argon with or without oxygen (120V at 6A)
- E-beam assist evaporate SiO<sub>2</sub> and deposit 10-15 nm of SiO<sub>2</sub> (Use a Quartz Crystal Microbalance (QCM) to monitor the thickness with a tooling factor = 1, density = 2.6, acoustic impedance (z-ratio) set to SiO<sub>2</sub> and deposition rate approximately 0.1-0.5 nm/s)
- Pump down the vacuum chamber until the absolute pressure is less than  $2.0 \times 10^{-3}$ Pa ( $2.0 \times 10^{-5}$  Torr)
- Resistive heat evaporate CytoSyl. Deposit the entire sample of CytoSyl from the loaded copper cap
- Use a Quartz Crystal Microbalance to monitor the deposition with the tooling factor = 1, acoustic impedance (z-ratio) = 1.0, density = 1.0. Typical current input is 80 -100A for resistance boat heaters. Less current may be required for resistive coil heaters. For resistance heaters temperatures under 300°C are preferred, deposition rates of 0.8nm/s and Quartz Crystal Microbalance thickness readings less than 20 nm.
- Vent the chamber and remove the coated substrate parts



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- If possible, bake the coated substrate at 50°C for 120 minutes with 50% relative humidity (alternatively allow the substrate to cure for 12 hours at room temperature with 50% relative humidity)

## PROPERTIES

Appearance	Liquid material in bottle
Solvent	AE3000
Chemistry	Hydrophobic oleophobic silane
Water contact angle on glass	>110°
Shelf life	1 year
Storage	Room temperature tightly closed bottle (protect from moisture)
Package options	100 grams in 100 ml bottle

## PROPERTIES ON GLASS

	CytoSyl PVD on glass	Uncoated Glass
Water contact angle	>110°	<10°
n-Hexadecane contact angle	>65°	<10°
Fingerprint reduction	Excellent	Poor
Easy to clean properties	Excellent	Poor
Permanent marker repellency	Excellent	Poor
Kinetic coefficient of friction	0.08	0.15
Steel wool abrasion	>5000 cycles	N/A

## FAQ

### How many tablets do you need for PVD?

- Only one tablet is needed per coating session. But larger machines may require more tablets.
- Small PVD machines have 4 pockets (crucible pockets)
- Large PVD machines (with big domes) have 8 or 12 pockets

### Can we use E-beam to evaporate CytoSyl?

- No, E-Beam may damage CytoSyl. Please use resistive heat to evaporate CytoSyl

### How many CytoSyl PVD tablets can we prepare with 100 grams of CytoSyl?

- 100 grams of CytoSyl at 20% makes 400 tablets (0.25 grams per tablet)



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