

Technical Data Sheet
VIRIDYN 101-X

Version	Revision Date:	Date of last issue:	14-Aug-2025
3.0	26-Aug-2025	Date of first issue:	27-Jul-2025

OVERVIEW

Type Easy-to-apply hydrophobic and oleophobic liquid nano coating.

Functionality Protects electronics and fluidic devices from water, biofluids, oils, and similar exposures. Excellent anti-wetting properties against a variety of chemicals (e.g. heptane, toluene, acetone). Dries to very thin films with excellent hydrophobic and oleophobic properties.

Application Can be applied by dip, spray, spin, flow, or syringe dispensing. Masking can be optional (when concentrations of less than 4% are used). Application method and film quality can be customised by using solvents with boiling points ranging from 50° C to 220° C. Solvent is non-toxic, non-flammable material.

Testing Summary Third party customer testing has shown that 101-X coated circuit boards in phones achieves certification for **MIL-STD 810G** for working under most environmental conditions. Third party customer testing has shown that 101-X coated devices meet the biocompatibility requirements stipulated in **ISO 10993 (Biological Evaluation of Medical Devices)** and **FDA requirements for 510K submissions**.

Temperature and humidity testing method 507.5 has shown that devices can withstand temperatures up to 140°F in 95% relative humidity.

Salt Fog Method 509.5 testing has shown that coated devices withstand exposure to salt fog at 98°F for 120 hours with no loss of functionality.

101-X coated devices have also been **certified IPX5 or IPX7 waterproof per IEC-60529** by third party testing where the device withstands immersion in 1 meter of water for a period of 30 minutes. 101-X coated circuit boards in smartphones can achieve **IPX5 standards without the use of mechanical seals and gaskets**.

USES & FEATURES

Uses

- ! Fluidic Devices
- ! Biomedical Devices
- ! Pipette Tips
- ! Printed Circuit Boards
- ! MR Heads
- ! Micro Motors
- ! Ball Bearing Tracks
- ! MEMS
- ! Inkjet Print Heads
- ! Hard Disk Drive Components
- ! Atomic Force Microscopes
- ! TFT-LCD
- ! Oleophobic Membranes and Metal Mesh

Features

- ! Adheres to plastic, metal, glass, ceramic, etc.
- ! Repels oil, water and chemical.
- ! No VOCs
- ! Lead-free
- ! RoHS, REACH, WEEE complaint
- ! Excellent wetting for coating applications
- ! Short processing times
- ! Heat cure optional
- ! Easily reworkable
- ! Solder through repairable
- ! Cost effective alternative to traditional conformal coatings.
- ! Not limited to electronic applications
- ! Masking optional

PROPERTIES OF 101-X

Chemistry	C6
Color and clarity	Yellow to pink liquid and lightly turbid to clear
Concentration	0.2 to 20% in fluoro-solvent (resin also available)
Odour	Light ether-like odour
Flammability	Non-Flammable
Viscosity	>0.41 cP depending on polymer concentration
Solubility	HFE7100, AE3000, HFE347, HT110, HT170
Shelf Life	2 years stored in original unopened container
Environmental	Low in toxicity, non-ozone depleting
One Part System	Yes
Application Options	Dipping, spraying, brushing, syringe-dispensing
Dry Time	5 - 30 seconds
Cure Time	No Cure or room temperature for 24 hours or 10 minutes at 60°C
Boiling Point (Solvent)	50°C
Flashpoint	N/A
Available as concentrate	Yes
Available as solid	Yes
Appearance	Transparent
Thickness	0.1 - 6 µm (depending on percent solids and application method/speed)

PROPERTIES OF 101-X FILMS

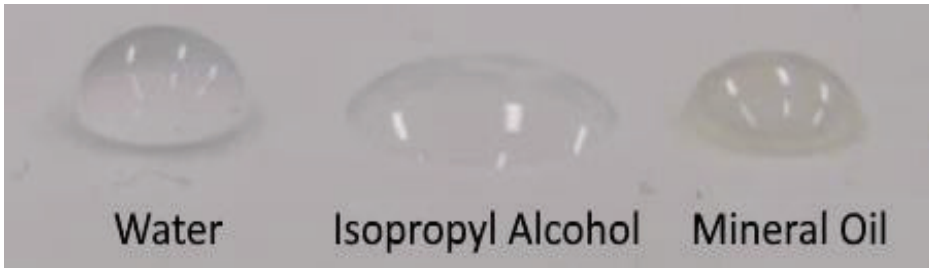
Appearance	Clear, odourless, and colourless film
Contact Angle to Water	~115°
Contact Angle to Oil	>55°
Oleophobicity grade	7
Surface Tension	8-12 dynes/cm
Hardness	>2B pencil
Flammability	Non-burning
UV-Tracer	UV tracer for quality control (see Table 9)
Heat stability continuous	150°C
Max heat stability one hour	250°C
Refractive index Surface	~1.34
Toxicity	HMIS Rating Health = 1
Ease of Application	Excellent
Solvent/Chemical Resistance	Excellent after curing
Transparent	Yes
Ease of Dry	Dries at room temperature in <5 minutes
Low Labor	Yes
Removable Yes	Yes
Solder-through Repairable	Yes
Nonflammability	Meets UL 94 V-0
Glass Transition Temperature (Tg)	75°C
Dielectric Constant (30% RH)	3.0 (1kHz)
Dissipation Factor (30% RH)	0.02 (1kHz)
Dielectric Breakdown Strength @ 35% RH	3000 V/mil

101-X CONCENTRATION & FILM THICKNESS GUIDE

Concentration	Film Thickness
Film thickness at 0.2% polymer	~0.05 µm
Film thickness at 2% polymer	~0.1µm
Film thickness at 5% polymer	~0.5 µm
Film thickness at 10% polymer	~1.0 µm
Film thickness at 20% polymer	~2.0 µm

HEPTANE CONTACT ANGLES of 0.5 µm 101-X FILMS

Test	Contact Angle*
Air-dried for 5 hours	26.7°



*Numbers shown are an average of over 4 readings.

WATER CONTACT ANGLES of 0.5 µm 101-X FILMS

Test	Water Contact Angle*
Air dried for 4-5 hours	114.2°
Baked at 90°C for 15 minutes	116.3°

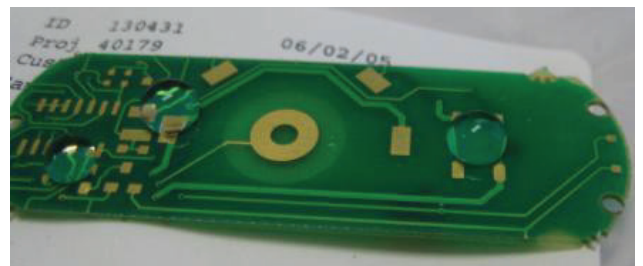
*Numbers shown are an average of over 4 readings.

101-X FILMS and LONG-TERM PERFORMANCE

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101-X FILMS and LONG-TERM PERFORMANCE (>10 years)

101-X Coating Date	June 2, 2005
Initial Contact Water Angle	>110°
Initial Film Quality	Good
Contact angle on Oct 2019	>110°
Film Quality on Oct 2019	Good no-change



ELECTRICAL PROPERTIES of 101-X FILMS

Coating Thickness	Surface Resistance (Ω)	Volume Resistance (Ωm)
0.05 μm film	Conductive	Conductive
0.1 μm film	Conductive	4×10^{20}
0.5 μm film	1×10^9	8×10^{20}
1.0 μm film	5×10^{11}	ND
2.0 μm film	2×10^{14}	ND
>100 μm film	2×10^{17}	ND

*Electrical properties determined on aluminium plates. Measures presented are approximate.

SOLVENT and UV LIGHT RESISTANCE of 0.5 μm 101-X FILMS

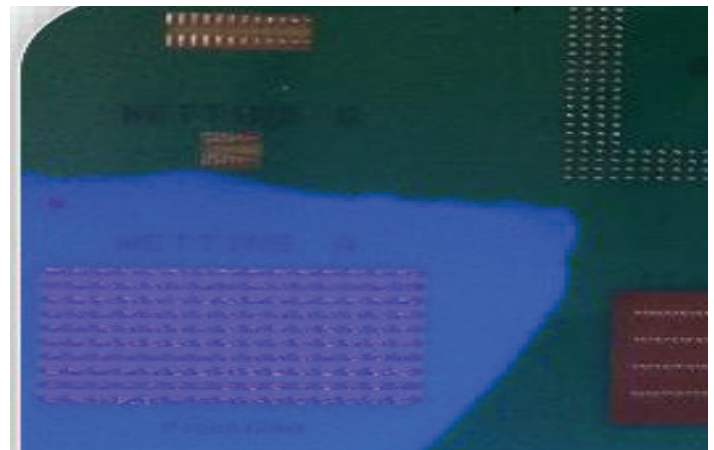
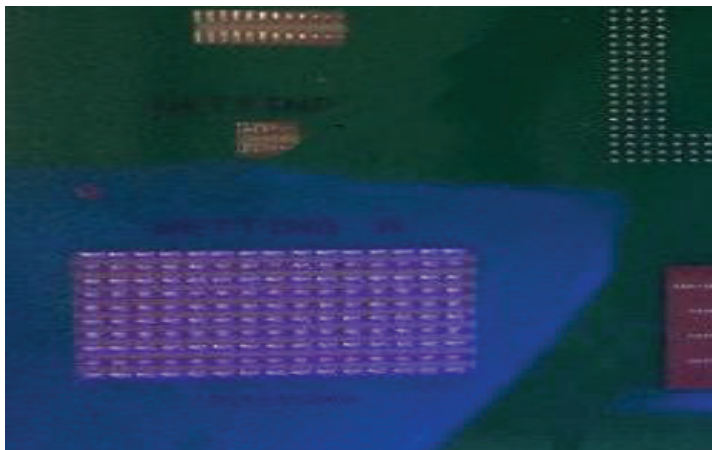
Exposure	Water Contact Angle*
Toluene – 2 minutes	112.7°
Acetone – 2 minutes	104.8°
De-icing fluid – 2 minutes	100.6°
FC40 – 2 minutes	117.3°
Perfluoropolyether vacuum oil – 2 minutes	Removes coating
UV light – 10 minutes	88.2°
UV light – 20 minutes	71.9°

*Numbers shown are an average of 2 readings.

101-X FILMS and QUALITY CONTROL INSPECTION

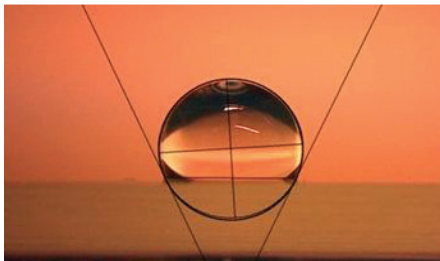
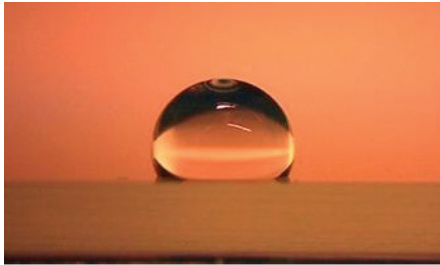
365 nm UV lamp (blacklight)

254 nm UV lamp



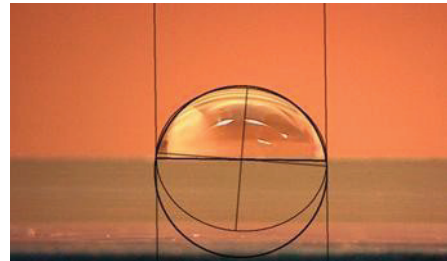
CONTACT ANGLE ANALYSES of 101-X ON GLASS

Water



2.0% polymer on glass [water]
Contact angle: 113.3°

Oil



2.0% polymer on glass [oil]
Contact Angle: 82.0°

DIP COATING APPLICATION GUIDE

The environment for the coating process needs to be clean. Dust can negatively affect the coating application process resulting in poor adhesion, voids, and reduction of coating performance.

[A] MASKING (can be optional)

Microphones, speakers, camera lenses may need masking using Duraseal (applied by manual labour).

[B] CLEANING PROCESS

Device may need to be cleaned using IPA Wipes and/or compressed air to remove dust.

[C] COATING PROCESS

- ! Dip coat manually or using automated system
- ! Recommended starting test point immersion speed of 15cm/min, withdrawal speed of 15cm/min.
- ! Control immersion speed to avoid excessive air bubbles. Bubbles can result in voids in the coating.
- ! Withdrawal speed determines the cosmetic appearance and uniformity of the coating. Slow is good.
- ! Dry by hanging at room temperature or leaving in basket.
- ! Cure by heating at 60°C for 10 minutes (optional).
- ! Remove from tray or hook and package.
- ! The coating concentration must be monitored during a production run.

[D] DEMASKING

Remove Duraseal with tweezers

[E] COATING DURING ASSEMBLY

It may be useful to apply a drop of 101-X using a dropper or syringe to exposed connectors and joints made during device assembly. This will assure that water will be effectively repelled for the life of the device.

SAFETY & HEALTH

Safety

In Case of a Spill: Evacuate unprotected and untrained personnel. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Clean up residue with an appropriate solvent. Place in a metal container approved for transportation by appropriate authorities. Seal the container. Dispose of collected material as soon as possible.

Health

Eye Contact: Contact with eyes during product use is not expected to result in significant irritation.

Skin Contact: Contact with skin during product use is not expected to result in significant irritation.

Inhalation: Thermal decomposition products may be harmful if inhaled.

Ingestion: No health effects are expected.

First Aid: The following recommendations assume that appropriate personal and industrial hygiene practices are followed

- ! **Eye Contact:** Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.
- ! **Skin Contact:** Wash affected area with soap and water. If signs/symptoms develop, get medical attention.
- ! **Inhalation:** If signs/symptoms develop, remove person to fresh air. If signs/symptoms persist, get medical attention.
- ! **If Swallowed:** If signs/symptoms develop, get medical attention. No need for first aid is anticipated.

SIZE & PACKAGING OPTIONS

0.2% TO 20% Concentration

1 LB bottle
 3 LBS liter bottle
 8 LBS gallon bottle
 40 LBS 5-gallon carboy

100% Concentration

25 gram can
 1 LBS can
 8 LBS gallon can
 40 LBS 5-gallon pail

IDENTIFICATION

Product name

VIRIDYN 101-X

MANUFACTURER or SUPPLIER'S DETAILS

Company name of supplier

ViriDyn LLC
www.viridyn.com
info@viridyn.com



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