

Technical Data Sheet VIRIDYN SH-2

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| Version | Revision Date: | Date of last issue: | 04-Jul-2025 |
| 3.0 | 29-Aug-2025 | Date of first issue: | 01-Jun-2025 |

OVERVIEW

| | |
|----------------------|---|
| Type | Easy-to-apply, two-step, RF-transparent superhydrophobic nano-coating. |
| Functionality | High water contact angle (> 145°). Harsh-environment protection for marine and ground-based microwave antennas, radomes, and other telecommunications equipment. Mitigates rain-fade and other environment-driven signal attenuation. Prevents snow and ice accumulation. |
| Appearance | The coated surface is frosty in appearance due to nanoparticles on the surface. |
| Limitations | Excessive abrasion and touching will reduce performance. Organic solvents will reduce performance. May be washed with hose-spray. |

Testing Summary

Rain-Fade: Ka-band ground stations utilizing VIRIDYN SH-2 have reported significant improvements in rain attenuation (rain fade losses) under heavy rain conditions, with expected losses on uncoated systems around 10 dB. Comparative tests between coated and uncoated antennas have shown signal strength margins of 15-20% during heavy rain, where the signal from an uncoated dish drops out at 45%, the coated dish maintains operation at 60-65%.

UV resistance: VIRIDYN SH-2 shows good resistance to solar radiation exposure (up to 1,000 Megajoules per square meter) that could be expected during 5 years in outdoor installations (please see data in Table 1). Surface analysis after prolonged exposure showed good resistance to damage, erosion, and water penetration.

Temperature Cycle Testing: VIRIDYN SH-2 performs well in rapid temperature cycling tests (-45°F to 85°F 100X) and can be expected to perform well in both cold and hot environments.

Salt Fog and Chlorine Exposure: VIRIDYN SH-2 is functionally uncompromised by the extremely corrosive chlorine atmosphere and can be expected to perform well in many other corrosive environments. VIRIDYN SH-2 showed complete or substantial resistance to high salt and high humidity environments that are expected for marine or coastal installations. No visible corrosion of metal substrate after 1,000 hours of salt fog was observed.

HYDROPHOBIC PERFORMANCE DEFINITIONS

When assessing hydrophobicity, the water bead contact angle on a horizontal surface is a crucial measure (Figure 1).

However, due to the absence of universal standards for categorizing hydrophobic performance, we provide the following definitions as a general guideline:

- ! **Non-hydrophobic:** Contact angle below 90°.
- ! **Semi-hydrophobic:** Contact angle nearing 90° (approximately 80° to 90°).
- ! **Hydrophobic:** Contact angle exceeding 90° but below 130°.
- ! **Super-hydrophobic:** Contact angle surpassing 130°, with certain coating products reaching up to 160°.

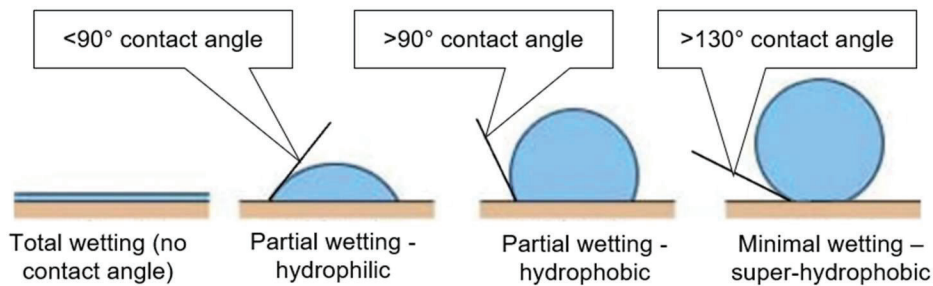


Figure 1 Hydrophobicity performance levels

PROPERTIES OF VIRIDYN SH-2

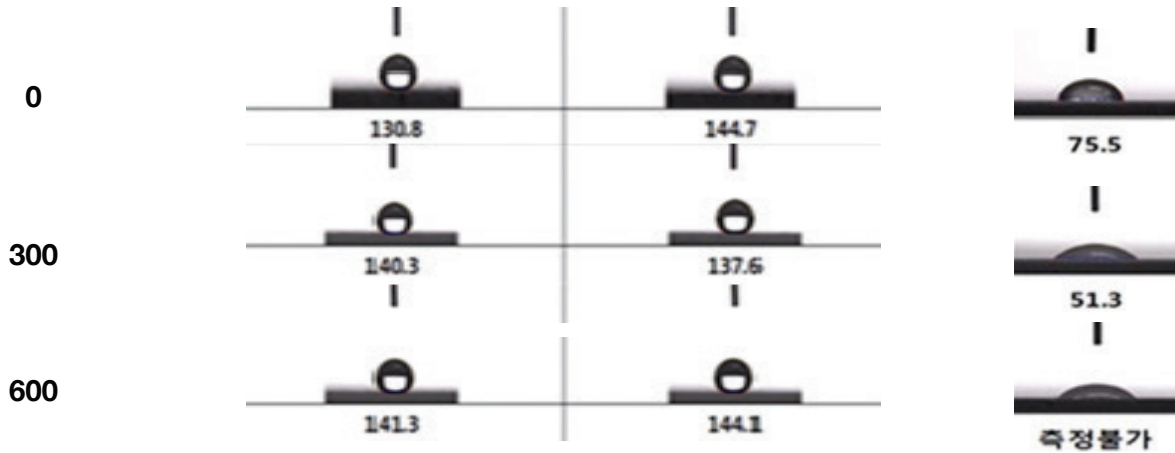
| | |
|-------------------------------|---|
| Color | Frosty-white, Frosty-gray, Frosty-black, Frosty-red, Frosty-blue |
| Solids percent | ~10% |
| Flammability | Basecoat: No Topcoat: Shipped Dry (requires acetone) |
| Storage temperature | 20-30°C |
| Shelf life | 1 year |
| Weatherability | 1 - 5 years (varies based on environmental conditions) |
| Dielectric constant | 3 at 100 MHz |
| Electrical resistivity | ~2 tera ohms |
| Taber abrasion | Super-hydrophobic after 5-10 cycles with CS10 wheel |
| RF-Transparent | Yes |

SOLAR RADIATION & CONTACT ANGLE [TABLE 1]

Solar Radiation
Megajoules per square
meter [MJ/m²]

Water contact angle on VIRIDYN SH-2

**Water contact angle
substrate***



*Testing over 600 MJ/m² was not carried out due to deterioration and failure of the substrate in this study

SUPERHYDROPHOBIC PERFORMANCE [RAIN TESTING]

| Water (100 µl) roll-off angle after simulated rain exposure (degrees) | | | | | | | | | | |
|---|------|------|------|------|------|------|------|----|----|------|
| Water Gallons / sq. inch | 0 | 3 | 6 | 12 | 18 | 24 | 30 | 36 | 45 | 60 |
| VIRIDYN SH-2 | 1° | 1° | 1° | 1.5° | 1.5° | 1.8° | 1.8° | 2° | 2° | 2.2° |
| VIRIDYN SH-2 ME | 1° | 1.5° | 2.5° | 3° | 3° | 3° | 3.5° | 4° | 4° | 5° |
| WX2100 | 1.5° | 2° | 2° | 4° | 6° | 8° | 8° | 8° | 8° | 10° |

VIRIDYN SH-2 exhibited no significant loss of contact angle after over 50 gallon per square inch of simulated heavy rain (please see table 3). In other tests, VIRIDYN SH-2 had 145° contact angles after exposure to extreme rain at 60 inches per hour for one hour.

COVERAGE

Apply by spraying or rolling.

Spray application provides the best appearance and most consistent results. Coverage will vary by thickness of coating applied.

Coverage of 500 ml (X2) of VIRIDYN SH-2 is approximately 10 square meters.

APPLICATION INSTRUCTIONS

Temperature: The temperature of the surface to be sprayed should be between 45°F and 95°F. At lower temperatures, the coating requires several days to properly dry. Keep container at room temperature prior to use.

Surface Preparation: All surfaces need to be dry, clean, and free from dust, wax, grease, and polishes for good adhesion.

[STEP 1, BASE COAT] Spray Application:

- 1.! First shake the can of BASE-COAT vigorously for 30 seconds.
- 2.! The nanoparticles in the BASE-COAT must be dispersed properly before and during spraying.
- 3.! Hold the spray-gun vertically 8-10 inches from the surface.
- 4.! Depress the trigger button fully.
- 5.! Move the spray-gun evenly across the surface covering 6-10 inches per second.
- 6.! Apply half overlapping strokes 3-4 inches apart.
- 7.! Shake the spray-reservoir for a few seconds every 60 seconds.
- 8.! Allow the BASE-COAT to dry for 10 minutes or more before applying the TOP-COAT.

[STEP 2, TOP COAT] Spray Application:

- 1.! In the USA, the TOP-COAT is provided ready for spraying.
 - a.! **For projects outside the continental United States** add acetone to the “dry- powder” TOP-COAT.
 - b.! **Add 666 grams of acetone to 1000 ml bottles or 2636 grams of acetone to gallon cans and shake the container vigorously for 30 seconds.**
- 2.! Hold the spray-gun vertically 8-10 inches from surface.
- 3.! Depress the button fully.
- 4.! Move the spray-gun evenly across the surface covering 6-10 inches per second.
- 5.! Apply half overlapping strokes 3-4 inches apart.
- 6.! Shake the spray-reservoir for a few seconds every 60 seconds.
- 7.! Allow the coating to dry for over 24 hours before exposing to rain.

For best long-term performance avoid touching the coated surface.

HISTORY

VIRIDYN SH-2 has been available for commercial applications since 2003.

This includes large radomes in Norway, wind farms in Spain, antenna in Alaska, and wind speed sensors (anemometers) worldwide.



IDENTIFICATION

Product name

VIRIDYN SH-2

MANUFACTURER or SUPPLIER'S DETAILS

Company name of supplier

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



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