Technical Data Sheet

DOWSIL™ RSN-0996 Resin

General purpose impregnating varnish

Features & Benefits

- Silicone resin in xylene
- Can be cured at temperatures as low as 150°C
- Proven reliability over a decade of extensive use
- Long service life even at 220°C hottest spot temperature
- Combines in one varnish, excellent electrical properties, bond strength and moisture resistance
- Good drainage factor (little varnish runoff during cure)

Applications

- General purpose impregnating varnish for motors, coils and transformers.

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Property	Unit	Result
Color		Clear blue
Solids, after 3 hrs at 135°C, min.	%	49
Relative density at 25°C		1.00 to 1.02
Viscosity at 25°C	cSt	100 to 200
Drying time at 150°C, max.	hours	3
Solvent		Xylene
Flash point - closed cup	°C	27
Typical properties of cured film, cured 16 hours at 150°C		
As supplied		
Dielectric strength, 50 mm electrodes	kV/mm	64
Permittivity at 25°C, 100 Hz		3.1
Permittivity at 25°C, 100 kHz		3.0
Dissipation factor at 25°C, 100 Hz		0.008
Dissipation factor at 25°C, 100 kHz		0.005
Surface resistivity	ohm	1×10^{14}
Volume resistivity	ohm.cm	1×10^{14}
Weight loss after 3 hours at 250°C	%	4

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Typical Properties (Cont.)

Property	Unit	Result
Heat endurance at 250°C - flex life	hours	700
Heat endurance at 250°C - craze life	hours	1800
Thermal life, curved electrode method at 300°C/275°C/250°C[1]	hours	200/1000/5000
After immersion in distilled water for 24 hours		
Dielectric strength, 50 mm electrodes[2]	kV/mm	40
Permittivity at 25°C, 100 Hz		3.2
Permittivity at 25°C, 100 kHz		3.1
Dissipation factor at 25°C, 100 Hz		0.02
Dissipation factor at 25°C, 100 kHz		0.01
After 96 hours at 23°C and 96% relative humidity		
Surface resistivity	ohm	1×10^{12}
Volume resistivity	ohm.cm	1×10^{14}

1. Hours necessary to reduce the electric strength of glass cloth impregnated with DOWSIL™ RSN-0996 Resin to 12kV/mm when the varnish film is elongated two percent.
2. Tested on aluminum panels because copper oxidizes too rapidly.

How to Use

Electrical equipment should be kept clean at every step of insulation to prevent contamination of the impregnating varnish. After the equipment has been insulated but before it is dipped in DOWSIL™ RSN-0996 Resin, it should be prebaked at between 150°C and 200°C to drive out moisture and to cure new insulating components.

After prebaking, the equipment should be allowed to cool to 80°C or below. It should then be dipped in this product for 5 to 10 minutes (or until most of the bubbling stops). Immersion time should not be longer than 10 minutes.

The first coat of varnish must be air dried, partially cured, and then cooled to room temperature before any further impregnation. Two dips will usually give sufficient buildup of varnish.

Curing

The curing time and temperature will vary with the size and complexity of the impregnated unit, the properties desired in the varnish film, and the characteristics of the circulating air curing oven.

Although it is not necessary to begin the cure in a preheated oven, curing time should be measured from the time both the oven and the impregnated equipment reach the curing temperature.

How to Use (Cont.)

Curing (Cont.)
The following general rules should be kept in mind when establishing curing schedules for specific equipment:

1. The final cure temperature should be 20°C to 30°C above the maximum operating temperature of the impregnated equipment. Equipment intended for AIEE Class 180°C service should be cured at 200°C; if intended for AIEE Class 220°C service, it should be cured at 250°C.
2. When maximum bond strength is required, equipment should be given a final cure at 250°C for at least 6 hours.
3. Immersion time of electrical equipment in this product must be kept to a minimum to prevent solvent damage to the insulating components.

Oven Ventilation
Xylene, the principal solvent in DOWSIL™ RSN-0996 Resin, is flammable and proper precautions are necessary. At the recommended curing temperature, the solvent evaporates quickly and may present an explosive hazard if allowed to accumulate in the oven. Therefore, a well ventilated circulating air oven must be used. If there is any doubt about the adequacy of the oven ventilation, the air drying period should be extended to between 8 and 10 hours.

Proper Care
At the time of shipment, DOWSIL™ RSN-0996 Resin meets rigid specifications which ensure high standards of quality. It is supplied at a viscosity of 100 to 200 centipoises to assure proper initial consistency. Like any other electrical impregnating varnish, this varnish will deteriorate rapidly if the proper viscosity is not maintained. If dirt is allowed to accumulate in the dip tank, it can seriously affect the dielectric properties, reduce bond strength between the cured resin film and the windings, and may cause voids through which moisture can penetrate.

It is very important, therefore, that DOWSIL™ RSN-0996 Resin in the dip tank be kept as clean as possible and the proper viscosity maintained by following the procedures outlined below.

Maintaining Cleanliness
Dip tanks should be fitted with tight covers to exclude dust and to help maintain varnish consistency by minimizing evaporation. Welded black iron construction should be used for dip tanks. Tanks with soldered joints are not satisfactory because silicone varnish has a tendency to gel in contact with solder or soldering flux.

Dip tanks should be cleaned at least twice a year. Drain the varnish from the tank into a clean container. Remove sludge or dirt by straining the varnish through several layers of cheese cloth before returning it to the tank. Check varnish viscosity and add thinner if necessary.

Maintaining Proper Viscosity
DOWSIL™ RSN-0996 Resin should be kept at a viscosity between 100 to 200 mm^2/s to assure good penetration and adequate build up during impregnation.

How to Use (Cont.)

Maintaining Proper Viscosity (Cont.)

If the viscosity of DOWSIL™ RSN-0996 Resin is allowed to exceed 200 mm^2/s, the varnish may not penetrate the windings, and air spaces may be left unfilled. Build up may be too great, leading to crazing of the thick varnish sections. If the varnish in the dip tank becomes too thick, it will deteriorate and may have to be discarded.

The viscosity of DOWSIL™ RSN-0996 Resin in a dip tank should therefore be checked frequently. If motors are dipped in the tank daily, the viscosity should be checked daily. Even if the dip tank is seldom used, the varnish viscosity should be checked at least every other week. The viscosity can be conveniently measured with a Zahn cup No. G-2 or a Demmler cup No.1. The following procedure should be used:

1. DOWSIL™ RSN-0996 Resin should be at room temperature for accurate viscosity measurement. The more the temperature varies from 25°C, the more inaccurate the measurement becomes.
2. Stir the varnish in the tank to be sure of a representative sample. Immerse the clean viscometer cup until it is completely filled with DOWSIL™ RSN-0996 Resin.
3. Lift the cup quickly out of the tank and start timing as soon as the cup is lifted above the surface. Count the number of seconds that pass before the stream of varnish pouring through the hole in the bottom of the cup starts to break. Check the first measurement with a second sample taken from the middle of the tank.
4. If the absolute viscosity is above 200 mm^2/s, thinner will have to be added.
5. DOWSIL™ RSN-0996 Resin should be at room temperature when mixed. Add the thinner to the varnish slowly, and stir constantly until they are thoroughly mixed. Incomplete mixing is indicated by streaks in the surface of the varnish, or by a separation of the faster flowing solvent from the varnish on a spatula blade.
6. After the thinner has been added. The viscosity should be measured again.
7. If the absolute viscosity is less than 100 mm^2/s, too much thinner has been added, and an extra dip may be required to produce adequate build up.
8. The viscometer cup should be thoroughly cleaned after each use by rinsing in a solvent and drying with a clean cloth.

Xylene or Xylok are recommended thinners for DOWSIL™ RSN-0996 Resin. Other specific solvents may be equally satisfactory. Any thinner used to reduce the viscosity of DOWSIL™ RSN-0996 Resin should meet the following requirements:

1. Kauri-Butanol Value: > 50.
2. Initial boiling point: > 104°C
3. Final boiling point: > 169°C
4. Corrosion: none

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life and Storage

When stored at or below 25°C in the original unopened containers, this product has a usable life of 24 months from the date of production.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

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