

Technical Data Sheet

ISONEL 31HF

Modified polyester based high flash point solvent borne baking
Impregnating Varnish

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Description

Isonel 31HF is a high flash point version of its parent Isonel 31 Insulating Varnish.

This is thermosetting modified polyester provides all the excellent electrical and mechanical properties, chemical and moisture resistance of ISONEL 31 together with the advantage of higher flash point. The material does not contain by recipe substances listed in Restriction of Hazardous Substances (RoHS) Directive (2002/95/EC)

Areas of Application

In electrical machines, Isonel 31HF is used both for manufacturing and repairing the following Thermal class H (180) objects:

- Standard motors
- Generators
- Transformers
- Drives in the chemical industry

Properties of cured material

The cured material displays very good film formation and resistance to chemicals. The relatively elastic varnish film has good heat resistance. Owing to its temperature index of 180-200 can be used for machines in thermal class H. A reduction in the degree of hardness of enameled wires generally used does not occur if the components are properly impregnated. Isonel 31HF contains high

flash point solvents leading to lower evaporation loss in the impregnation tank.

Application Methods

Isonel 31HF is processed by all conventional impregnating methods, such as dipping, rolling or flooding. It can also be processed under vacuum. In this case, the vacuum should not drop below 20 mbar to avoid high solvent evaporation. The most advantageous impregnating method in each case depends on the given technical possibilities of the plant, the structure of the components, and the demands placed on the object to be impregnated under operating conditions.

Isonel 31HF being high flash point varnish can be impregnated at elevated temperatures of 80-100C which will enable to achieve higher penetration, higher retention & reduced curing cycles. It also displays low susceptibility to the influence of foreign substances, such as punching grease, oils or primers, however, contamination of the varnish should be avoided as much as possible. After drainage time of 15-45 minutes at room temperature, the product is cured in the circulating-air oven at the temperatures and periods of time given. For large objects or those with a complicated winding structure a two-stage curing process is recommended to ensure removal of the solvents.

Properties of Isonel 31HF as supplied

Colour and appearance [*]	DBI 1001 [**]		Yellow to light brown clear liquid
Solids content [*]	DBI 1022 [**] 2g/150 ⁰ C/2 h	%	46 - 50
Viscosity at 25 ⁰ C [*]	DBI 1015A [**] IS 3944/cup No. 4	s	100 - 200
Density at 23 ⁰ C	ISO 1675	g/ml	0.93 (typical)
Flash point by closed cup [*]	DBI 1005 [**]	⁰ C	Min 61
Recommended Thinner			Thinner 31HF
Compatibility with Thinner 31HF [*]	DBI 1006 [**]	-	1 : min 3
Storage life [*]	When stored in original sealed container at RT	months	12

[*] These properties form our sales specification

[**] DBI are internal test methods and are available on request.

Recommended Curing Cycle : 4hrs/160°C

The suggested curing time is after the unit attains the specified temperature.

Cured Film Properties :

Drying in thin film	DBI 3031 [**]	At 120 ⁰ C	30 min.
Curing in thick layer [*]	DBI 3007 [**] 20g/ 120 ⁰ C / 10 h + 4h/160°C	Top Bottom Inside	S1 (smooth) U1 (Tack free) I 3.1 (leather like rigid, free of bubbles)
Resoftening	IS 10026	at 165°C	No change
Bond Strength	IEC 61033	at RT	180 N
		At 155°C	30 N

Temperature Index by UL 1446

Proof voltage, Twisted pair, 1000 V,	1000 V	⁰ C	182
Bond strength, Helical Coil	22 N	⁰ C	211

Dielectric Properties

Specimen Curing – 10h/120°+4h at 160⁰C

Dielectric strength as per IEC 60455-2	at R.T. after 24 h water immersion at RT	kV/mm	100 80
Volume resistivity at 570 V DC as per IEC 60455-2	at R.T. after 168 h water immersion at R.T.	ohm.cm	10 ¹⁶ 10 ¹⁴
Dielectric constant at 30 V/1 kHz as per IEC 60455-2	at R.T. at 1557C	-	3.5 3.8
Dielectric loss factor 30 V/1 kHz as per IEC 60455-2	at R.T at 1557C	-	0.016 0.038

Resistance against solvents & chemicals

Solvent resistance as per IEC 60455-2	10% H ₂ SO ₄	No Change in colour	-
	2% NaOH	No Change in colour	-
Water absorption ISO62	96h at R.T	% wt.	0.5

Packaging

Isonel 31HF 185 kg in M.S. containers

Thinner 31HF 160 kg in M.S. containers

Safe Handling

Isonel 31HF is a not a flammable liquid. Use foam, CO₂ or dry chemical powder for fire fighting. Inhalation and direct contact with the skin should be avoided. In case of contact, the affected area should be washed with soap and plenty of water. For further details ask for respective material safety data sheet.

Disclaimer

This information is intended only for general guidance in the application of our product. It has been obtained by careful investigation and represents the present state of our knowledge and experience. Because of the large number of possible methods of application and processing we are not able to assume responsibility in any one particular case for either the technical results or the patent rights situation applicable to the country under consideration

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