

## 2. IMPREGNATING RESINS **VUDAP**/ Polyesterimide in diallylphthalate/ NH 91, NH 91 MW NH 91 LV



CABLES



IMPREGNANTS



WIRES



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### Application:

Impregnating resins NH 91/... are suitable for vacuum pressure impregnation or for dipping and flooding impregnation of

- form wound stators, armatures and deep section windings
- explosion proof electrical machines
- standard motors, special machines and transformers

up to thermal class H according to IEC - Publication 216.

Windings impregnated with impregnating resins NH 91/... provide good reliability of machines in reversing operation, good resistance to tropical climates, and good resistance to solvents, acids, oils, freons and radioactivity.

### Description:

Chemical base of impregnating resins is solution of unsaturated polyester resin in diallylphthalate. Their cure time is 3-5 h at 135 °C - 150 °C.

### Processing data:

			NH 91	NH 91 LV	NH 91 MV
Density (DIN 53 217)	25 °C	[kg/m <sup>3</sup> ]	1130 – 1180	1130 - 1140	1150-1180
Flow time( DIN Becher 4 )	25 °C 40 °C	[s]	110 – 150 40 – 50	50 - 60	180-280
Viscosity	25 °C 40 °C	[mPa.s]	600 – 800 150 – 200	200 - 400	1200-1600
Shelf- life	max. 25 °C	[months]	min. 12	min. 12	min.12
Flash point (Cleveland)		[°C]	145	145	145
Vapor pressure	25 °C 100 °C	[mbar]	0,0013 0,26	0,0013 0,26	0,0013 0,26
Gel-time <sup>1</sup>	130 °C 140 °C 150 °C	[min]	7 – 9 4 – 5 3 – 4	6 - 8 4 - 5 3 - 4	8-10
Pot- life (Criterion : double increase of viscosity)	50 °C	[days]	50	50	50
Effect of varnish on enameled wires <sup>2,3</sup> after 60 min at 70 °C		Decrease of pencil hardness	0-1	0-1	0-1

Polyesterimide in diallylphthalate



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SINCE 1950

F-11.1.22-10-2/11en

## 2. IMPREGNATING RESINS **VUDAP/** Polyesterimide in diallylphthalate/ NH 91, NH 91 MW, NH 91 LV



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### Properties after cure:

			NH 91	NH 91LV	NH 91 MV
Ability to cure in considerable thickness <sup>4,5</sup>		[degree °]	S 1 U 1 I 1.1	S 1 U 1 I 1.1	S 1 U 1 I 1.1
Curing of test specimen	150 °C	[h]	4	4	4
Dielectric strength <sup>6</sup>	23 °C	[kV/mm]	120 – 150	120 - 150	120-150
Volume resistivity <sup>5</sup>	23 °C	[Ω.m]	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup>
	155 °C	[Ω.m]	10 <sup>11</sup>	10 <sup>11</sup>	
	180 °C	[Ω.m]	10 <sup>10</sup>	10 <sup>10</sup>	10 <sup>10</sup>
	after immersion in water for 4 days	[Ω.m]	10 <sup>13</sup>	10 <sup>13</sup>	10 <sup>13</sup>
Twisted coil test <sup>7</sup>	23 °C	[N]	350 – 400	300 - 350	300-350
	155 °C	[N]	120 – 150	130 - 160	
	180 °C	[N]	80 – 100	90 - 120	80-100
Helical coil test <sup>7</sup>	23 °C	[N]	200 – 250	200 - 250	180-200
	155 °C	[N]	100 – 120	100 - 120	
	180 °C	[N]	60 – 90	60 - 90	40-60
Glass transition temperature	(Tg)	[°C]	140	140	
Thermal endurance <sup>8</sup> , Test criterion:	Bond strength 22 N (Helical coil)	[°C]	183	183	188
	Breakdown voltage 700 V (Twist)	[°C]	181	181	185
Thermal endurance <sup>10</sup> Test criterion:		[°C]	180	180	180
	Breakdown voltage 1500 V (Twisted pairs)				

1. DIN 16 945 Method A

2. IEC 60464-2

3. Polyesterimid, Polyesterimid + amidimid

4. 4,5 h at 100 °C + 1,5 h at 110 °C and 2 h at 120 °C

5. DIN 46 448 Blatt 1

6. NEMA Standard RE 2-1987

7. Bond strength IEC 61033

8. IEC 60216

9. Interior : rigid, no voids

Top side: Smooth, non- tacky

10.UL test 1446 File E233982

### Packing a storage:

Impregnating resin is delivered in drums. It has to be stored in tightly closed drums at temperature max. +25°C.



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