



AMENDMENT - NOTIFICATION

AA 27536

REV.No. '01

PAGE 1 OF 1

AA 27536 : SILICONE LAMINATING RESIN-TEMPERATURE INDEX 220

1. Page 3 of 5:

Include the following matter as clause 6 and re-number the subsequent clause as clause 7.

6. KEEPING PROPERTY:

When stored under cover in a dry place in the original sealed container under normal temperature conditions, no sludge formation shall take place and the material shall retain the properties prescribed in this specification for a period of not less than 6 months after the date of manufacture which shall be subsequent to the date of placing the order.

Please see instructions on the reverse.

Ref:	Amd. No.	Approved	Issued	Date	Cum. Sr. No.
Cl. 27.4.3 of MOM of MRC (E)	01	MRC (E)	Corp R&D	Jan 94	A 1446



SILICONE LAMINATING RESIN TEMPERATURE INDEX 220

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1. **GENERAL:**
This specification covers the technical requirements of heat resistant laminating varnish of temperature index of at least 220.
2. **APPLICATION:**
The material shall be used for the production of high pressure or low pressure glass laminate.
3. **COMPLIANCE WITH NATIONAL STANDARDS:**
There is no national standard covering this material.
4. **REQUIREMENTS:**
 - 4.1 **Composition and class:**
The varnish shall be obtained from phenyl methyl polysiloxane resin. Whenever required by BHEL the manufacturer shall furnish relevant information on composition.

The material shall be of the temperature index of at least 220 when prepared with the recommended catalyst.

The infrared spectra of the individual varnish lots shall always comply with the sample lot type approved earlier and no deviation from this shall be allowed.
 - 4.2 The material shall also comply with the requirements given in table I with a test sample drawn in accordance with the clause 2 of Corporate Standard AA 085 17 10. The test panel shall be made accordingly to clause 3.1 & 3.3 of CS AA 085 17 10 at 250°C with a 3 - 4 hours baking cycle.

Revisions: Brought upto date

Approved:
INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-MRC (E)

Rev. No.	Rev. Date	Revised:	Prepared	Issued	Date
01	JULY, '87	BHOPAL	BHOPAL	CORP. R&D	5th MAY, '81



TABLE - I

Sl.No.	Characteristics	Requirements	Method of Test refer to Cl in CS AA 085 17 10
1.	Colour	Light Straw	
2.	Weight per 10 litre (Kgs.) at 27°C	10.5 - 10.7	5
3.	Viscosity at 27°C in CP	25 - 35 (20 - 25 secs.)	IS: 197
4.	Non-volatile matter as (%) at 140°C	60 ± 2	7.0
5.	Gel time at 160°C (after addition of recommended catalyst)	12 Minutes (% catalyst shall be adjusted to obtain the aforesaid gel time)	9
6.	Flash point (Type Test)	7°C Min.	14
7.	Bond Strength (Type Test) Kg./cm ²	42 Min.	28
8.	<u>Dissipation factor (Type Test)</u>		
	a) at room temp.	.003 Max.	33
	b) at 180°C	.004 Max.	
	c) at 200°C	.006 Max.	
	d) at 220°C	.010 Max.	
9.	<u>Weight loss after 28 days % by weight</u> at 270°C	4.0 Max.	Appendix 1 of this CPS
4.3	Material shall comply with the general conditions as stipulated in clause 4.1 of AA 085 17 10 and the varnish shall be deemed to have approved for final acceptance only after necessary shop trials as a type approval test. Recommended thinner is, toluene.		
4.4	<u>Properties of glass laminates:</u> 3.0 mm thick laminates prepared in line with Appendix II, with woven glass cloth and silicone laminating resin, containing recommended catalyst as per S.No. 5 of Table - 1 shall have following properties.		
4.4.1	Specific Gravity	: 1.75 ± 0.05.	
4.4.2	Cross Breaking Strength at Room Temp.	: 200 N/mm ² , Min.	
	Laminate shall be tested as per Corporate Standard AA 085 17 01.		
	Pot life of approximately 20 hours at 45°C after addition of recommended catalyst.		
5.	<u>TEST CERTIFICATE:</u> Three copies of test certificates shall be supplied bearing the following information:		

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AA 27536 Rev. 01 : Silicone Laminating Resin Temperature Index 220.

BHEL Order No.

Batch No.

Size and No. of Drums

Date of Manufacture: Date of Expiry.

Storage and conditions.

Test results containing, the properties of varnish and cured films as per Table 1.

6. **PACKING AND MARKING:**

The material shall be packed in non-reactive drums of 20 litres or any suitable size as per our order and sealed. The drums are to be suitably packed to prevent damage during transit. Each drum shall bear the following information.

AA 27536 : Silicone Laminating Resin Temperature Index 220

BHEL Order No.

Date of Manufacture.

Date of Expiry.

Storage condition.

Net weight.

Supplier's Name.

Appendix - I

DETERMINA

DETERMINATION OF WEIGHT LOSS

1.0 **Sample Preparation:**

Take a desized glass cloth as specified below:

Weight per unit area	: (approx.) 55g./m ²
Thickness	: 0.05-0.07 mm
Yarn	: Continuous glass filament yarn free from alkali.
Residual size content	: 0.2% max.

Take the specified glass cloth of convenient size so that four specimens of 10 x 10 cm could be prepared.

1.1 **Impregnation:**

Immerse the glass cloth vertically and completely in the varnish sample and withdraw it from the varnish at a rate at which the excess of varnish slips down the surface of the glass cloth, care being taken to avoid air bubbles sticking to the surface. Dry the specimen in a well ventilated dust free chamber for 10 minutes. Dry the specimen at 200°C till it is surface dry. Repeat the above immersion procedure turning upside down for second coat, in order to obtain a uniform coating. Cure the specimen at 200°C for 1 to 2 hrs. The immersion and curing cycle may be repeated in the manner it is specified above till a dry coating thickness of 0.16 ± 0.02 mm is obtained.

- 1.2 Take the 10 x 10 cm specimen of uncoated and varnish coated glass cloth. Keep both the specimen at 110°C for 2 hours. Cool the specimens to room temperature in desiccator. Record the initial weight of uncoated (W_1) and varnish coated specimen (W_2) to the nearest 0.001 mg. Keep the varnish coated specimen in a oven at 250°C for 24 hours, remove and cool to room temp. in a desiccator. Record the weight of the specimen. Repeat the heating, cooling and weighin after every 24 hours. At the end of the specified period take the final weight of the specimen (W_3).

- 1.3 Report the percentage weight loss as

$$\% \text{ Wt. Loss} = \frac{(W_2 - W_1) - (W_3 - W_1)}{(W_2 - W_1)} \times 100$$

Appendix II

METHOD FOR PREPARATION OF SILICONE GLASS
CLOTH LAMINATE USING DC - 2104 OF
M/s. DOW CORNING

1. **Test for Mixing Ratio:**

Using catalyst y5 for resin DC - 2104 in concentration levels of 0.05, 0.1 and 0.2%, find out the catalyst concentration which gives a gel time of 12 minutes at 160°C for the resin.

2. **Mixing:**

Add catalyst y5 to the resin DC - 2104 in the ratio obtained at Cl. 1.0 above for preparation of silicone glass laminate.

3. **Preparation of Laminate:**

0.18 mm thick glass cloth shall be used for preparation of the laminate. Cut glass cloth to the required size and heat clean by ageing at 250°C for 24 hours.

Apply resin (2.0) on the glass cloth by using brush, just enough resin to wet the glass cloth shall be used. All the layers of glass cloth shall be treated in the same manner and laid one over the other. Sufficient no. of layers shall be used to get the desired thickness of laminate.

4. Curing of Laminates:Low Pressure Laminates:

Laminate built up as per Cl. 3 shall be placed between plattens of press maintained at 150 - 170°C and apply a pressure of 0.70 kg/cm². Maintain this pressure and temperature for 30 minutes. After this period release the pressure and switch off the heating arrangement. Take out the laminate when plattens of the press have cooled to 100°C.

5. Post Curing:

The laminates shall be post cured as under:

- 2 hours at 150°C
- 2 hours at 200°C
- 2 hours at 250°C.