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Company Certified ISO 9001 and EN9100

Product Information

MAPSIL® 213-B

LOW OUTGASSING ENCAPSULATING RESIN

CNES License n°89/CNES/6303 & 99/CNES/0171

DESCRIPTION

MAPSIL® 213-B is a low outgassing two component silicone resin used as an encapsulating, adhesive or varnish for printed circuits boards (PCB).

MAPSIL® 213-B is a RTV-2 silicone adhesive elastomer dedicated to encapsulate electronic components used in the space industry & vacuum technologies. Used as an adhesive for solar cells or as varnish for PCB.

Developed from **MAPSIL® 213, MAPSIL® 213-B** holds a new type of catalyst allowing optical transparency while protecting components such as KOVAR from corrosion.

TYPICAL PROPERTIES *(Technical data are indicative and non-contractual – all properties measured at 23°C)*

Properties	Norms	Results (Base)
Viscosity	ISO 3219	3.6 Pa.s
Properties	**Norms**	**Results (Base / Hardener)**
Appearance / colour	Visual	Transparent
Mixing ratio	By weight	100 / 10
Pot life	NF-EN 14022*	1 h @ 20°C
Density	ISO 2811-1	1.00
Hardness	ISO 7619-1	37 Sh A
Young modulus	ISO6721-1	1.8 MPa
Shrinkage	-	Nil
Outgassing	ECSS Q 70-02-C	RML = 0.36 % CVCM = 0.04 %
Thermal conductivity (λ)	CNES internal norm (under vacuum) ASTM C177	0.15 $W.m^{-1}.K^{-1}$
Linear coefficient of thermal expansion (CTE)	ISO 11359-2 (TMA)	Before Tg : 123 x 10^{-6} K^{-1} After Tg : 362 x 10^{-6} K^{-1}
Glass transition temperature (Tg)	ISO 11357-2 (DSC)	-122.7°C
Max temperature service	ATG Analysis	-100°C to +200°C
Dielectric strength	ASTM D149-97a	86.4 $kV.mm^{-1}$
Dielectric constant	ASTM D150-98	2.3 @ 100 Hz 2.2 @ 100 kHz
Dissipation factor	ASTM D150-98	2.4 x 10^{-3}@ 100 Hz 3.2 x 10^{-3} @ 100 kHz
Electrical Volume Resistivity (Rv)	ASTM D257-99	1.14 10^{15} Ω.cm
Electrical Surface Resistance (Rs)	ASTM D257-99	2.87 x 10^{14} Ω/□

***associated to MAP internal standard**

APPLICATIONS

MAPSIL® 213-B is suitable for several applications: encapsulating, bonding or varnishing.

MAPSIL® 213-B can be applied by pouring (encapsulating), with a spatula (bonding) or with a brush (varnishing).

COMPLIANCE WITH EUROPEAN REGULATION (REACH, ROHS…) AND NORTH AMERICAN REGULATIONS (ITAR/EAR)

MAPSIL® 213-B is compliant with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHs). **MAP** meets also the requirements of the Registration, Evaluation, and Authorization of Chemicals (REACH) regulation.

MAPSIL® 213-B is fully compliant with the ESA working group policy regarding the sensitiveness of the substances included in the formulation.

MAPSIL® 213-B is developed with MAP raw materials (Silicone polymers synthetized by MAP) and CNES – MAP

MAP SPACE COATINGS

Company Certified ISO 9001 and EN9100

Product Information

patented process and then are not subjected to ITAR/EAR regulations.

MAPSIL® 213-B

LOW OUTGASSING ENCAPSULATING RESIN

Embossing (thin coats): 300 to 700 µm

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APPLICATION PARAMETERS

Surface preparation:

MAPSIL® 213-B is RTV-type silicone elastomer. Its polymerization mode is polyaddition, which is sensitive to elements/materials that can inhibit the cure, such as:

- Rubbers containing sulphur, butyl, or chlorine, silicones containing tin salt catalyst
- Certain oils and greases, CAF containing amines, PVC plasticizers, sulphur …

Also, the surfaces and mixing/application tools previously in contact with above-mentioned materials can lead to inhibition.
The presence of sticky or uncured product at the interface, after normal curing time, indicates inhibition of cure.
It is necessary to use gloves which chemical nature is compatible with **MAPSIL® 213-B** curing method (i.e. nitrile gloves).
Please contact REACH department of MAP for further information (reach@map-coatings.eu).

Substrates and adhesion

Handle cleaned surfaces with appropriate gloves to avoid any inhibition or pollution.

Good adhesion to glass. The application of PSX primer is prerequisite on composites and metallic alloys.

Mixing preparation

For **MAPSIL®213-B** supplied in 2 components (Base and Hardener), mix thoroughly base and hardener under mechanical or manual mixing. It is mandatory to respect the weight ratio between base and hardener (Base = 100 / Hardener = 10). **MAPSIL 213-B** is delivered in two components that must be mixed thoroughly before use. While mixing, make sure you do not introduce too much air.

Mixing de-airing

It is recommended to de-air **MAPSIL® 213-B** mixture before use. The de-airing should be carried out under primary vacuum on the base & hardener mix. The volume of the container must be 5 to 10 times higher than the **MAPSIL® 213-B** volume to avoid the product overflowing the container under vacuum.
With suitable equipment, switching rapidly to atmospheric pressure may reduce the de-airing process. This can be done several times.

Application parameters

MAPSIL® 213-B can be applied by pouring or by brushing.
Tools must be perfectly clean before use (cf. § Surface preparation).

- Pouring (encapsulating):

De-air the mixture first, under vacuum (20 mm Hg) @ room temperature. Pour the product into the mould in stages, while de-airing each time, or pour the whole product under vacuum (50 mm Hg). The mould must be maintained under pressure @ 20 mm Hg during the whole operation.

Curing Conditions

MAPSIL® 213-B curing time depends on the curing temperature. Typical conditions used for the MAPSIL® 213 are:
Encapsulating:

- 24h @ 25°C
- 12h @ 65°C

Thin coats:

- 24h @ 25°C
- 4h @ 25°C then 4h curing @ 80°C ± 20°C

Any sticking on the resin being absolutely prohibited, the sticking areas must be masked beforehand.

REFERENCES

Qualification and Evaluation:

CNES Qualification reports:

- 89/CT/DRT/TVE/TH n° 074
- DT-96-090/DGA/T/AE/MTE/TH
- DCT-TV-TH-2012-13180

ESA Evaluation reports:

- ESA SP 1173
- ESA MR 2523

SAFETY INSTRUCTIONS

Precautions: This product is not flammable. This preparation is not classified as a health hazard according to 1999/45/CE directive. For complete information, please refer to our latest safety data sheets.

Labelling: This preparation was classified in compliance with the directives in effect.

Transport: Please refer to our latest safety datasheet.

COMMERCIAL INFORMATION

Packaging:

550 g (500 g Base + 50 g Hardener)
220 g (200 g Base + 20 g Hardener)

Storage: Up to 12 months in original unopened packaging at 20°C +/- 5°C.

WARRANTY

This information, based upon literature and our testing experience to date, is offered as part of our service to customers, and is intended for use by persons having technical skill, at their own discretion and risk for their own investigation and verification. We do not guarantee favourable results and we assume no liability in connection with its use. This information is not intended as a licence to operate under, or a recommendation to infringe, any patent covering any material or use.