ELECTROCONDUCTIVES

DOTITE XC-9082

1. Product Introduction

- Electromagnetic wave absorbing paint effective in the millimeter wave range (30GHz~300GHz).
- Absorption of 20dB (90%) realized as a thin film (150μm thickness).
- Effectively absorbs electromagnetic waves through dielectric absorption process provided by the special carbon filler in combination with the dielectric constant of the resin binder.
- Carbon type, two component, air-drying paste.
- Ideal for use as a solution for millimeter wave radar casing (cavity) resonance.
- Provides flexible solutions, from coating large or complex surfaces to the mending of small, precise details.

2. Specifications

		XC-9082	Remarks
Composition		Two component type: Component A: Special carbon/epoxy-based resin Component B: Special carbon/polyamide-based resin	—
Packaging		Metal can	—
Storage		Room temperature	—
Appearance		Black paste	DSTM-351
Viscosity		A: — B: 16±3 sec.	Ford cup #4 at 23℃
Mixture Ratio		Component A : Component B = 1: 1	—
Recommended Thinner		DOTITE SH Thinner	—
Application Method		Spray, roller, brush, dipping, &c.	—
Drying Conditions	Natural	25℃, 24 hrs. (dry to touch, 15 mins.)	—
	Forced	100℃, 60 mins.	Forced convection oven
Recommended Film Thickness		150μm or thicker	Dried film thickness

※ The above values are representative values collected under lab conditions and do not represent full technical specifications.

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3. Properties

Dried Film Properties (100℃, 60 Mins. Forced Drying)			
Applicable Substrates		Epoxy, phenol, glass, copper plate, zinc phosphate treated plate, aluminum, mild steel plate, &c.	DSTM-401 Cellophane tape – 2 layers
Resistivity		1Ω·cm	DSTM-101
Pencil Hardness		B	DSTM-402
Pyrolysis Temperature	1% Weight Reduction	243℃	SII TG/DTA6200
	3% Weight Reduction	291℃	
	5% Weight Reduction	313℃	

4. Instructions and Warnings

- Keep this DOTITE product away from open flames.
- Apply to a clean substrate.
- Before use, thoroughly mix until the filler is evenly distributed. Performance may be negatively affected if it is not mixed thoroughly before use.
- Reseal after use and store in a cool, dark place. If this product is stored with the lid open or loose, the solvent will evaporate, which may cause the resin to harden or increase in viscosity, and may affect performance.
- To adjust the viscosity of this DOTITE product, the specialized thinner “DOTITE SH Thinner” should be used.
- Recommended drying conditions are listed above in section 2, “Specifications.” However, the drying conditions may be affected by the usage environment or film thickness. Confirm drying conditions on-site before use.
- For other handling and safety information, please refer to the SDS documentation for this product.

The above data are derived from tests conducted by Fujikura Kasei under lab conditions and do not represent this product's properties in all environments. We recommend that the curing conditions, cured film properties, safety precautions, overall applicability for the user's intended purpose, and other factors be confirmed on-site before use.

Recommended Application Method

Procedure

1. When using this DOTITE product as a spray, confirm the spray gun settings before use.
2. Remove any dirt or oil from the substrate by wiping the substrate with an alcohol-based solvent on a clean cloth.
   - ☛ Be sure to use a solvent that does not damage or otherwise affect the substrate.
   - ☛ If the work environment has high heat and humidity, condensation may form on the substrate when the solvent evaporates. To prevent this, after cleaning the substrate with solvent, dry it with a clean cloth.
3. Unseal the product (main component) and stir until uniform using a spatula or mixer.
4. Unseal the product (hardener component) and stir until uniform using a spatula or mixer.
5. After stirring, mix the two components and stir thoroughly (see mixture ratio below).
6. Apply the product as quickly as possible after the main component and hardener component have been mixed.
7. The recommended dry film thickness for this product is 150μm. If the film is too thin, the proscribed millimeter wave absorption properties may not be properly realized.

Paint Adjustment

Paint Mixture Ratio		Component A :Component B = 1 :1
Dilution	Brush	Paint / DOTITE SH Thinner 100 / - ~ -
	Spraying	Paint / DOTITE SH Thinner 100 / 0 ~ 10
Viscosity		15~20 secs. (Ford cup #4 at 20℃)

Spray Application Conditions

Spray Repetitions		Single, 15 times
Spray Gun Aperture		1.3 ~ 1.5 (m / m)
Spray Pressure		2 ~ 3 kg / cm²
Coverage	Brush	30 cm² / g
	Spraying	14 cm² / g
Dry Film Thickness		150μm

Drying

Natural Drying	Dry to touch	25℃ x 15 mins.
	Dry	25℃ x 24 hrs.
Forced Drying		100℃ x 60 mins.

* Forced drying is recommended.
* Because XC-9082 is a two component type paste, mix Component A and Component B thoroughly before use.

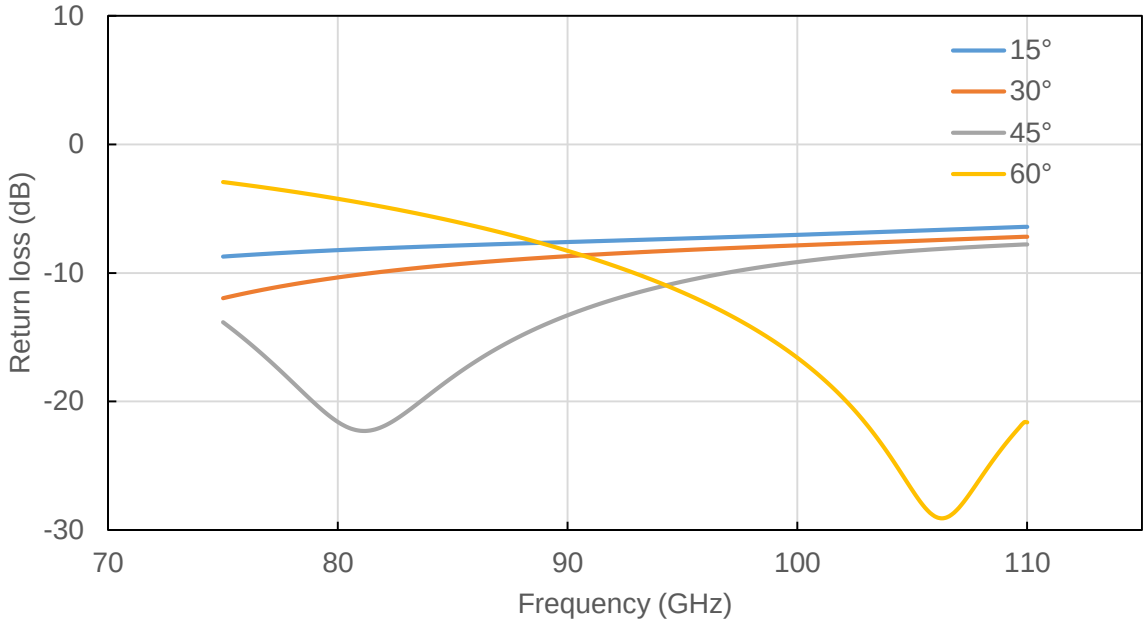
Adhesion Test Data

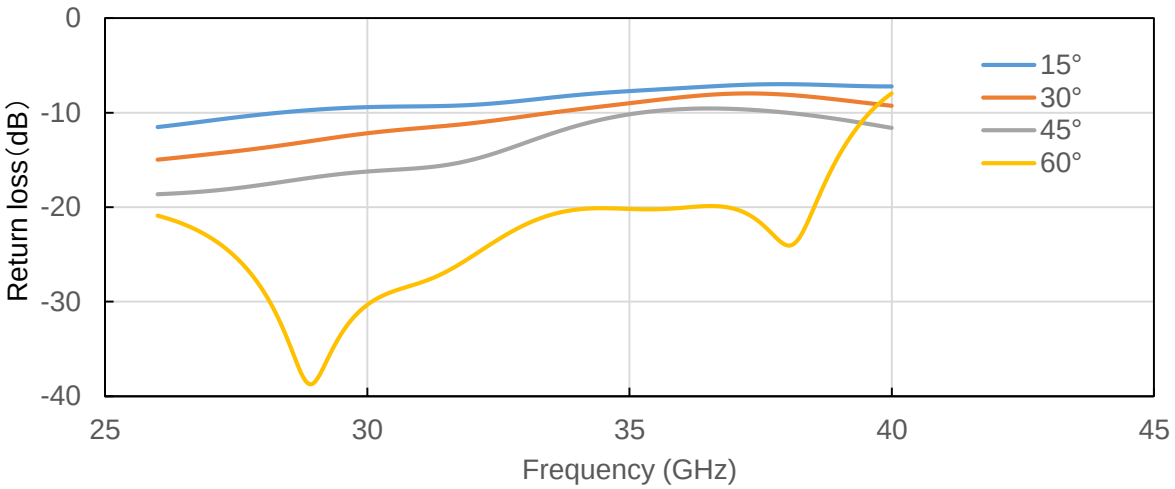
ABS	○	Rigid Chloride Vinyl Sheet	—	ACS	—
Polystyrol	—	Polyethylene	—	Glass	○
Polypropylene	—	FRP	○	Copper Plate	○
Polycarbonate	—	Melamine	—	Zinc Phosphate Treated Plates	○
Noryl	—	Epoxy	○	Aluminum	○
Acrylic	—	Phenol	○	Mild Steel Plate	○

※1 Due to variations in the substrate material (batch, quality, etc.), adhesion may vary. Confirm adhesion with substrate on-site before using.
※2 For substrates to which XC-9082 will not adhere well, physically roughening the surface or using chemical processing may improve adhesion. Additionally, primer coating can be provided.

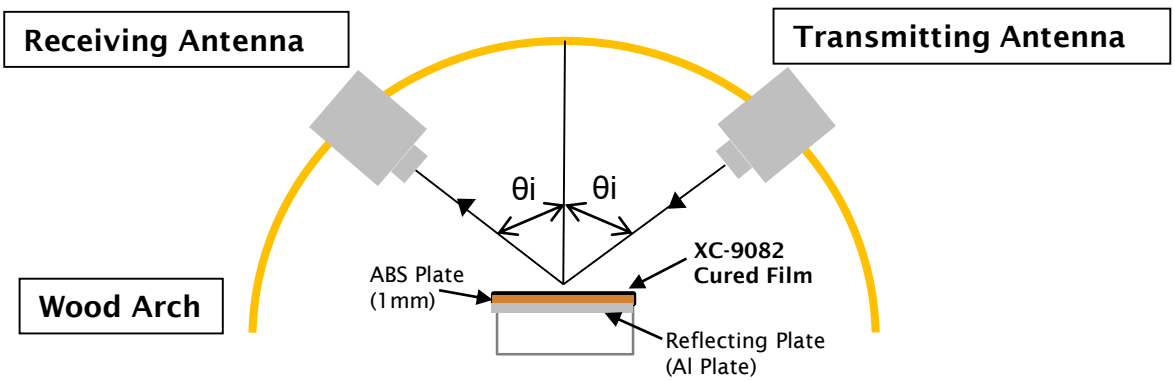
Test Conditions
DSTM-401 (Cross-cut cellophane tape test) Forced drying, 100℃, 60 mins.
Key:
○: 100/100 **X**: 0/100 — : No data

Millimeter Wave Absorption Data





Measurement of Reflection Loss in Free Space
(Film Thickness 150μm)



[Test Reference Diagram]

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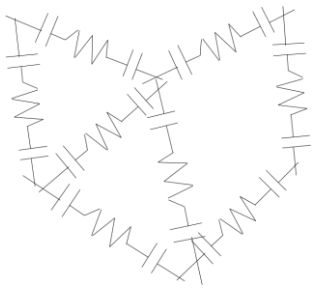
Millimeter Wave Absorption Mechanism

① XC-9082 is made with epoxy resin containing carbon particles. When cured, the resistive carbon particles dispersed in the material form a lossless dielectric body.

② Using this to create an electrical equivalent circuit produces a complex bond like the image below where the carbon particles hold their own resistivity and the carbon particles maintain capacitance between themselves.



XC-9082 cured film equivalent circuit

③ If a low frequency electromagnetic waves are introduced to the external surface of this cured film, because low frequency waves have low current, only a small amount of heat is produced from the resulting electrical resistance, (i.e., electromagnetic waves are not absorbed.)

④ However, when the frequency is high, the capacitor impedance ($1/j\omega C$) drops in direct inverse to the frequency, and the current can then flow through even the resistive body.
(※ ω: angular frequency [rad/s]; C: capacitance [F])

⑤ Because of this, heat is generated in the resistive body. Through this phenomenon, the electromagnetic waves are absorbed as the electromagnetic energy is converted to heat energy.