ELECTROCONDUCTIVES

DOTITE FC-435

1. Product Introduction

Dotite FC-435 is a carbon paste for coating the silver pastes used on connectors. It is composed of cross-linked epoxy and phenolic resins making a strong overcoat for connectors. It has good adhesion to silver pastes, and exceptional printability, contributing to increased precision during production.

2. Specifications

	FC-435	Remarks
Appearance	Black paste	DSTM-351
Viscosity	350±50d Pa・s	DSTM-203 (Viscotester VT-04, No. 2 Rotor, at 23℃)
Curing Conditions	150℃×30分	--
Resistivity	$5.0\times10^{-2}\Omega$・cm	DSTM-101, 150℃ 30 min.
Adhesion	100 / 100	DSTM-401, 150℃ 30 min., 100μ PET film
Pencil Hardness	3H	DSTM-402, 150℃ 30 min.

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

3. Instructions and Warnings

- The carbon filler in this Dotite may separate and settle. Before use, thoroughly mix the product to ensure even dispersion. Performance may be affected if product is not mixed thoroughly.
- If dilution is required, Dotite P Thinner is recommended. Performance may be affected if inappropriate thinner is used.
- This Dotite product contains flammable solvent – keep away from flames and ensure that the workspace is properly ventilated.
- Seal container firmly after use and refrigerate at 10℃ or below.
- For other handling and safety information, please refer to the SDS documentation for this product.

※These data are derived from tests conducted by Fujikura Kasei under lab conditions. Samples can be provided for further testing.

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DOTITE FC-435

0.5mm Pitch Connector Evaluation and Comparison to Standard C Paste FC-415

1. Test Sample Preparation

Comparison Sample	Silver Paste: FA-353N Carbon Paste (Overcoat): FC-435 FC-415
Substrate	PET Film, Lumirror S Type, 75μm thickness (Toray) Annealed at 155℃ 1 hr.
Connector	Molex 0.5mm Pitch Connector
Test Pattern	Fujikura Kasei Test Pattern Pitch: 0.5mm Silver Circuit: 0.15mm Carbon Overcoat: 0.35mm
Printing Conditions	Printer: Mino Group SMP-30TF Screen: 200 bias mesh, Tetoron, 15μm emulsion thickness Squeegee: Urethane 70 hardness
Curing Conditions	Mechanical Convection Oven, 150℃ 30 min.

2. Test Items

Connector Insertion/Extraction

Migration Test 65℃ 95%RH, 5V, 240 hrs.

Cold Resistance -40℃, 96 hrs.

Heat Resistance 65℃ 95%RH, 96 hrs.

3. Measurements

After the above tests were conducted, the resistivity of each sample was measured with a digital multimeter, and the appearance was checked.

4. Results

Table 1

	FC-435	FC-415
Resin	Epoxy/Phenol	Polyester
Curing Conditions	150℃ 30 min.	150℃ 30 min.
Adhesion (Silver)	100/100	100/100
Adhesion (PET Film)	100/100	100/100
Pencil Hardness	3H	2H~3H
Printability	Excellent	Good (some spread)
Migration Test	No loss of insulation	Loss of insulation
Cold Resistance (Change in Resisitivity)	-7.70%	-7.40%
Heat Resistance (Change in Resistivity)	-1.70%	-1.10%
Connector Insertion/Extraction	No change in resistivity	Significant damage

DOTITE FC-435 Connector Insertion/Extraction

Connector Type: Molex 0.5 mm Pitch Connector

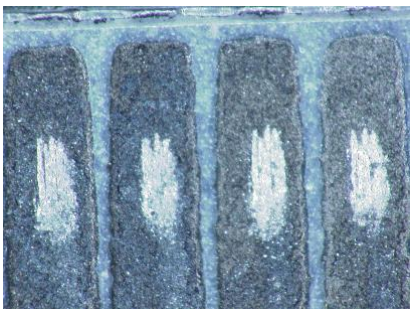
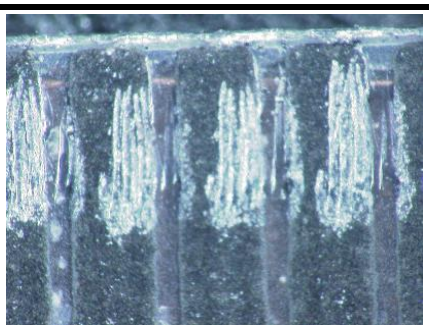
Test Procedure
1. In unlocked position, insert the connector
2. In locked position, measure resistivity
3. In locked position, extract the connector

Test Results: FC-435 showed good abrasion resistance. See Table 2 below.

Table 2

Silver Paste	Carbon Overcoat	Circuit Resistance (Ω)					Increase in Circuit Resistance			
		Init.	5 Times	10 Times	15 Times	20 Times	5 Times	10 Times	15 Times	20 Times
FA-353N	FC-435	1.09	1.16	1.21	1.25	1.37	6.3%	10.8%	14.5%	25.6%
		1.35	1.39	1.41	1.45	1.50	2.5%	4.0%	6.9%	10.6%
		1.46	1.48	1.50	1.51	1.53	1.7%	2.8%	3.7%	4.5%
FA-353N	FC-415	1.24	1.30	1.41	1.65	2.07	5.1%	13.7%	33.4%	67.9%
		1.21	1.21	1.31	1.57	2.00	0.0%	7.9%	29.7%	64.4%
		1.36	1.38	1.45	1.75	2.03	2.0%	7.0%	28.7%	49.3%

Figure 1: Insertion/Extraction test after 20 repetitions (50 times magnification)

FA-353N/FC-435	FA-353N/FC-415
	

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Environmental Tests (1)

1: Cold Resistance (-40℃ 96 hrs.)

Silver Paste	Carbon Overcoat	Circuit Resistance (Ω)			Insulation Resistance (Ω)		Adhesion	
		Init.	After	Change	Init.	After	Init.	After
FA-353N	FC-435	1.146	1.121	-2.2%	0.5×10^{11}	0.1×10^{11}	100/100	100/100
		1.085	1.064	-1.9%	1×10^{11}	0.5×10^{11}	100/100	100/100
		1.165	1.154	-0.9%	5×10^{11}	3×10^{11}	100/100	100/100
FA-353N	FC-415	1.526	1.502	-1.6%	2×10^{11}	0.6×10^{11}	100/100	100/100
		1.478	1.459	-1.3%	3×10^{11}	2×10^{11}	100/100	100/100
		1.360	1.354	-0.4%	2×10^{11}	1×10^{11}	100/100	100/100

2. Heat Resistance (65℃ 95% RH 96 hrs.)

Silver Paste	Carbon Overcoat	Circuit Resistance (Ω)			Insulation Resistance (Ω)		Adhesion	
		Init.	After	Change	Init.	After	Init.	After
FA-353N	FC-435	1.258	1.158	-8.6%	1×10^{11}	1×10^{11}	100/100	100/100
		1.347	1.268	-6.2%	5×10^{11}	3×10^{11}	100/100	100/100
		1.328	1.226	-8.3%	3×10^{11}	1×10^{11}	100/100	100/100
FA-353N	FC-415	1.531	1.436	-6.6%	1×10^{11}	0.6×10^{11}	100/100	100/100
		1.434	1.325	-8.3%	3×10^{11}	2×10^{11}	100/100	100/100
		1.469	1.370	-7.2%	3×10^{11}	1×10^{11}	100/100	100/100

3. Migration (65℃ 90% RH DC5V 240 hrs.)

Silver Paste	Carbon Overcoat	Circuit Resistance (Ω)			Insulation Resistance (Ω)		Adhesion	
		Init.	After	Change	Init.	After	Init.	After
FA-353N	FC-435	1.245	1.115	-11.6%	5×10^{11}	2×10^{11}	100/100	100/100
		1.645	1.458	-12.9%	2×10^{11}	0.5×10^{11}	100/100	100/100
		1.476	1.336	-10.4%	3×10^{11}	1×10^{11}	100/100	100/100
FA-353N	FC-415	1.642	1.475	-11.3%	1×10^{11}	1×10^{11}	100/100	100/100
		1.784	1.626	-9.7%	5×10^{11}	2.6×10^{3}	100/100	100/100
		1.645	1.410	-16.7%	0.5×10^{11}	0.5×10^{11}	100/100	100/100

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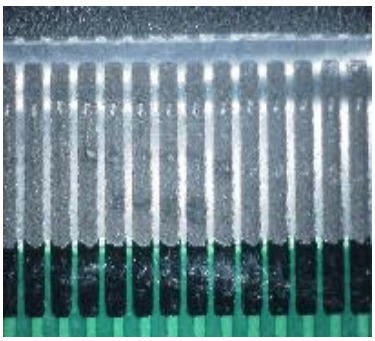
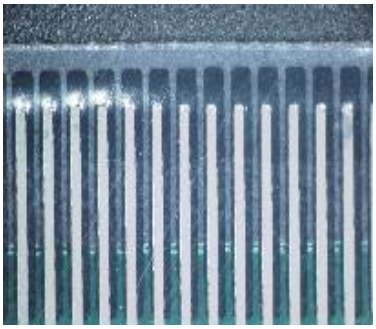
Environmental Tests (2)

Connectors after migration test

FA-353N/FC-415 showed some migration, and loss of insulation.

Silver	Carbon	Front	Back
FA-353N	FC-435		
FA-353N	FC-415