

Aculon® NanoProof® electronic coating series offers anti-wetting, anti-stiction, chemical protection, and moisture protection. The NanoProof® 3 series has similar performance and chemical properties as 3M™ Novec™ products (see Figure A), providing a readily available and accessible alternative to the 3M™ Novec™ product series. This product series is available in North America, Europe, and Asia.

3M™ Novec™ Product	Aculon® Replacement
	NanoProof® 3-01
1700	NanoProof® 3-02
1702	NanoProof® 3-002
1710	NanoProof® 3-10
1720	NanoProof® 3-001X
1902	NanoProof® 3-02
1904	NanoProof® 3-04
1908	NanoProof® 3-08
2704	NanoProof® 3-04
2708	NanoProof® 3-08
7100	Aculon® FS-350

Figure A

	3M™ Novec™ Product			Aculon® NanoProof® Product		
	1700	1702	1710	3-02	3-002	3-10
Solids	Fluoroacrylate 2%	Fluoroacrylate 0.2%	Fluoroacrylate 10%	Fluoroacrylate 2%	Fluoroacrylate 0.2%	Fluoroacrylate 10%
Solvent	7100DL			Aculon FS-350		
Appearance	Clear			Light Green		
Density	1.5 g/mL			1.5 g/mL		
Viscosity	0.91 cP	0.63 cP	4.3 cP	<20 cP		
Boiling Point	61°C			56°C		
Flash Point	None			None		
Environmental	Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S. EPA), contains no chlorine or bromine			Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S. EPA), contains no chlorine or bromine		
Shelf Life	4 years (unopened container)			2 years (unopened container)		
Thickness (varies by application style)	0.1-1 µm	<100 nm	0.1-1 µm	0.2-2 µm	0.1-1 µm	0.25-6 µm
Solvent and Chemical Resistance	Resists a variety of solvents and chemicals, dissolves in acetone			Resists a variety of solvents and chemicals. Attacked by fluorosolvents and ketones.		
Tg (glass transition)	44°C			~95°C from peak on DSC (viscous pool by 70°C)		
Thermal Stability of Dry Film	Can withstand 175°C for 24hrs and maintain repellency			Can withstand 175°C for 24hrs and maintain repellency (WCA/OCA: 120°/78°)		
Contact Angles	WCA / OCA: 105° / 65°			WCA / OCA: 120° / 80°		
Refractive Index	1.39			n=1.376 @ 632.8nm		
Solder Through Repairability	Yes			Yes		
Non-flammability	Meets UL 94 V-0			Will meet UL 94 V-0 (met via 5.5)		
Coefficient of Thermal Expansion - TMA	70 um/(m·°C)			In Process		
Thermal Conductivity	0.1 W/m*K			In Process		
Dielectric Constant @ 30% RH	3.2 (@1kHz)			In Process		
Dissipation Factor @ 30% RH	0.002(@1kHz)			In Process		
Dielectric Breakdown Strength @ 35% RH	2000 V/mil			3600 V/mil		
Cure	None			None		
Removable	Yes, with solvent.			Yes, with solvent.		
Application	Anti-stiction, Chemical Protection, Moisture Protection			Anti-wetting, Anti-stiction, Chemical Protection, Corrosion Protection, Moisture Protection		
Application Location	PCB, Electrical Components			PCB, Electrical Components		

Contact an Aculon® representative to learn which NanoProof® product best suits your application!

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1902	NanoProof® 3-02
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1908	NanoProof® 3-08
2704	NanoProof® 3-04
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7100	Aculon® FS-350

Figure A

	3M™ Novec™ Product	Aculon® NanoProof® Product
	1720	3-001X
Solids	Fluorosilane 0.1%	Fluoroacrylate 0.1%
Solvent	7100DL	Aculon® FS-350
Appearance	Clear	Clear
Density	1.5 g/mL	1.5 g/mL
Viscosity	<20 cP	<20 cP
Boiling Point	61°C	56°C
Flash Point	None	None
Environmental	Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S. EPA), contains no chlorine or bromine	Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S. EPA), contains no chlorine or bromine
Shelf Life	2 years (unopened container)	2 years (unopened container)
Thickness (varies by application style)	<1 µm	<1 µm
Solvent and Chemical Resistance	Resists a variety of solvents and chemicals. Attacked by fluorosolvents and ketones.	Resists a Variety of Solvents and Chemicals. Attacked by fluorosolvents and ketones.
Tg (glass transition)	-110°C	~95°C from peak on DSC (Viscous Pool by 70°C)
Thermal Stability of Dry Film	Stable at 200°C in air for greater than 3 hrs	Can withstand 175°C for 24hrs and maintain repellency (WCA/OCA: 120°/78°)
Contact Angles	WCA / OCA: 105° / 65°	WCA / OCA: 120° / 80°
Solder Through Repairability	Yes	Yes
Reworkable	Not when cured	Yes, with solvent
Cure	135°C for 15 minutes	None

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Novec™ Replacement Technology Comparison



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Figure A

	3M™ Novec™ Product			Aculon® Replacement NanoProof® Product		
	1902	1904	1908	3-02	3-04	3-08
Solids	Fluoroacrylate 2%	Fluoroacrylate 4%	Fluoroacrylate 8%	Fluoroacrylate 2%	Fluoroacrylate 4%	Fluoroacrylate 8%
Solvent	blend 7100/7200			Aculon® FS-350		
Appearance	Clear			Light Green		
Density	1.43 g/ml			1.43 g/ml		
Viscosity	0.81 cP	1.11 cP	2.2 cP	<20 cP	<20 cP	<20 cP
Boiling Point	75°C			75°C		
Flash Point	None			None		
Environmental	Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S.-EPA), contains no chlorine or bromine			Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S.-EPA), contains no chlorine or bromine		
Shelf Life	2yrs in unopened package from manufacture date			2yrs in unopened package from manufacture date		
Thickness (depending on application style)	0.1-1um	0.5-6um	0.4-5um	0.2-2um	0.25-2um	0.25-4um
Solvent and Chemical Resistance	Resists a variety of solvents and chemicals, dissolves in acetone			Resists a variety of solvents and chemicals. Attacked by fluorosolvents and ketones.		
Tg (glass transition)	44.5°C			~95°C from peak on DSC (Viscous Pool by 70°C)		
Thermal Stability of Dry Film	Can withstand 175°C for 24hrs and maintain repellency			Can withstand 175°C for 24hrs and maintain repellency		
Contact Angles	WCA/OCA: 105°/65°			WCA/OCA: 120°/80°		
Refractive Index	1.39			n=1.376 @632.8nm		
Solder Through Repairability	Yes			Yes		
Non-flammability	Meets UL 94 V-0			Will meet UL 94 V-0 (Met via 5.5)		
Coefficient of Thermal Expansion - TMA	70 um/(m·°C)			In Process		
Thermal Conductivity	0.1 W/m*K			In Process		
Dielectric Constant @ 30% RH	3.2(@1kHz)			In Process		
Dissipation Factor @ 30% RH	0.002(@1kHz)			In Process		
Dielectric Breakdown Strength @ 35% RH	2000 V/mil			3600V/mil		
Cure	None			None		
Application	Anti-stiction, Chemical Protection, Corrosion Protection, Moisture Protection			Anti-Wetting, Anti-stiction, Chemical Protection, Corrosion Protection, Moisture Protection		
Application Location	PCB, Electrical Components			PCB, Electrical Components		

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Figure A

	3M™ Novec™ Product		Aculon® Replacement NanoProof® Product	
	2704	2708	3-04	3-08
Solids	Fluoroacrylate 4%	Fluoroacrylate 8%	Fluoroacrylate 4%	Fluoroacrylate 8%
Solvent	7200 and <5% PGMEA		Aculon® FS-350	
Appearance	Yellow-Orange		Light Green	
Density	1.4 g/ml		1.49 g/ml	
Viscosity	1.75 cP	4.9 cP	<20 cP	<20 cP
Boiling Point	78°C		56.2°C	
Flash Point	None		None	
Environmental	Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S.-EPA), contains no chlorine or bromine		Non-ozone depleting, low in toxicity, low in GWP, RoHS compliant and VOC exempt (per U.S.-EPA), contains no chlorine or bromine	
Shelf Life	2yrs in unopened package from manufacture date		2yrs in unopened package from manufacture date	
Thickness (depending on application style)	0.1-4um	0.4-5um	0.25-2um	0.25-4um
Solvent and Chemical Resistance	Resists a variety of solvents and chemicals, dissolves in acetone		Resists a variety of solvents and chemicals. Attacked by fluorosolvents and ketones.	
Tg (glass transition)	53°C		~95°C from peak on DSC (Viscous Pool by 70°C)	
Thermal Stability of Dry Film	Can withstand 175°C for 24hrs and maintain repellency		Can withstand 175°C for 24hrs and maintain repellency	
Contact Angles	WCA/OCA: 105°/65°		WCA/OCA: 120°/80°	
Refractive Index	1.39		n=1.376 @632.8nm	
Solder Through Repairability	Yes		Yes	
Non-flammability	Meets UL 94 V-0		Will meet UL 94 V-0 (Met via 5.5)	
Coefficient of Thermal Expansion - TMA	88 um/(m·°C)		In Process	
Thermal Conductivity	0.1 W/m*K		In Process	
Dielectric Constant @ 30% RH	3.2(@1kHz)		In Process	
Dissipation Factor @ 30% RH	0.001(@1kHz)		In Process	
Dielectric Breakdown Strength @ 35% RH	2500V/mil		3600V/mil	
Cure	None		None	
Application	Anti-stiction, Chemical Protection, Corrosion Protection, Moisture Protection		Anti-Wetting, Anti-stiction, Chemical Protection, Corrosion Protection, Moisture Protection	
Application Location	PCB, Electrical Components		PCB, Electrical Components	

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