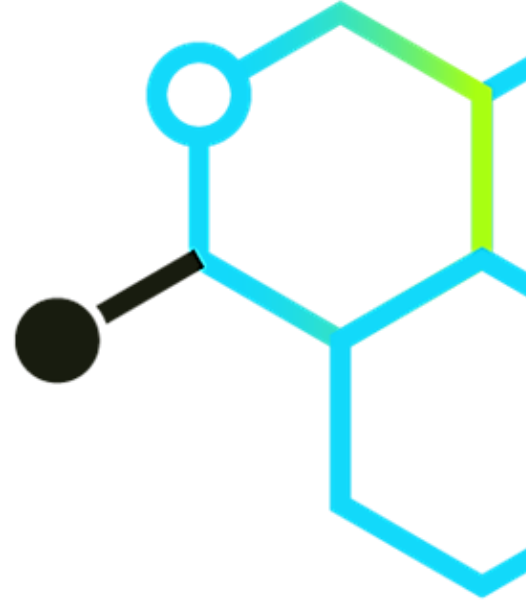


Technical Datasheet

FORMULA1b

Rigid Static Dissipative
Photopolymer Resin
Black



Formula1b

Formula1b is a rigid, static-dissipative photopolymer resin. It uses a urethane methacrylate base that include a stable dispersion of discrete functionalized carbon nanotubes (D'Func) to yield consistent surface resistance and enhances key mechanical performance properties such as Tensile Strength, Flexural Strength, and Impact Resistance.



Advantages

- Isotropic ESD properties
- Excellent surface finish & fine details
- Absence of carbon sloughing



Industries

- Electronics
- Automotive
- Aerospace & Defense



Applications

- PCB carriers
- Electronic housings
- Soldering fixtures
- Conformal coating masks
- Electrical connectors

PROPERTIES

Mechanical Properties	Green	Post-Cured	Units	Method
Ultimate Tensile Strength	99	99	MPa	ASTM D 638-14
Tensile Modulus	2700	3300	MPa	ASTM D 638-14
Elongation at Break	5.5	3.3	%	ASTM D 638-14
Flexural Strength	104	128	MPa	ASTM D 790-15
Flexural Modulus	2700	3500	MPa	ASTM D 790-15
Flexural Strain at Break	7.5	6.0	%	ASTM D 790-15
IZOD Impact Strength (Notched)	23	23	J/m	ASTM D 256-10
Hardness Shore "D"	81	88		ASTM D 2240
Thermal Properties				
Heat Deflection Temperature (1.82 MPa)	120	125	°C	ASTM D 648 ¹
Other Properties				
Surface Resistance	10 ⁷	10 ⁷	Ω	ANSI ESD S11.11
Liquid Properties				
Viscosity (25°C) ²	1200-1300		cps	ASTM D7867
Density	1.1 – 1.2		g/cm ³	ASTM D1475

Notes

¹Measured using ElectroForce DMA in air.

²The resin is shear-thinning. The data reported at shear rate 10, [1/s] @25°C



WORKFLOW

To achieve the properties specified in the TDS, validated workflows must be complied with. The following is an example of the verified workflow steps.

MACHINE SETTINGS

Formula1b is designed to fabricate parts on desktop and industrial DLP machines.

Recommended Build Parameters		Example Build Parameters (10 mW/cm ² at 405 nm, 22°C):	
Temperature, [°C]	20 – 22	Layer Height, [µm]	100
Wavelength, [nm]	385, 405	Base Layer Exposure, [s]	8 – 12
Irradiance, [mW/cm ²]	3 – 10	Model Layer Exposure, [s]	6 – 8

POST-PROCESSING

Formula1b requires post-processing to achieve specified performance. Prior to post-curing, support structures should be removed from the fabricated component, and the part should be washed. It is recommended to use compressed air to remove residual solvent from features such as holes, pockets, slots, etc. between cleaning steps and prior to post-curing.

Step	Agent	Method	Duration	Intervals
Cleaning 1	Glycol-Ether based cleaner	Agitated Bath	2 – 5 min	1 to 2
Cleaning 2 ¹	IPA	Agitated Bath	2 – 3 min	1 to 2
Dry ²	n/a	Compressed air	60 s	1 or 2
Wait before post-cure	n/a	Ambient	60 min	1

Notes

¹Dry before intervals

²Dark space is recommended for storage

POST-CURE

Formula1b requires post-curing to achieve specified properties. The following protocol and post-curing equipment has been qualified to date. Other post-curing protocols will be added later.

Curing Unit	Energy Source	Wavelength	Cure Time/side	Cure Temperature
Photocentric Cure L2	UV LED	405 nm	15 min	60°C

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