Raise3D Tough 2K Grey V1 Resin Technical Data Sheet[1]

Tough and durable resin for functional applications

Tough 2K Resin is a tough and strong material with excellent ductility, toughness and impact resistance. As a result, it is ideally suitable for end-use parts where performance and durability are needed.

Features

- 45 MPa tensile strength
- 35% elongation at break
- 31 J/m Izod notched impact
- 2158 MPa Young's modulus
- 68°C HDT @ 0.45 MPa

Benefits

- Tough and strong
- Excellent toughness and impact resistance
- Strength and rigidity similar to ABS

Applications

- Strong and stiff prototypes
- Jigs and fixtures
- Manufacturing aids
- Housings and enclosures

[1] The cover shows FPGA enclosure.

Physical Properties

Property	Testing Method	Typical Value	
		Metric	Imperial
Appearance	/	Liquid, Grey	
Density (liquid resin)	ASTM D4052	1.150 g/cm^3	9.60 lb/gal
Density	ASTM D792	1.20 g/cm^3	10.01 lb/gal
Liquid Viscosity	ASTM D7867	481 cps@25°C	481 cps@77°F
Shore D Hardness	ASTM D2240	87D	87D

Mechanical Properties*

Property	Testing Method	Green		Post-Cured	
		Metric	Imperial	Metric	Imperial
Young's Modulus	ASTM D638	1334 MPa	193.47 ksi	2158 MPa	312.98 ksi
Tensile Strength	ASTM D638	25 MPa	3.63 ksi	45 MPa	6.53 ksi
Elongation at Break	ASTM D638	59%	59%	35%	35%
Flexural Modulus	ASTM D790	1347 MPa	195.36 ksi	2315 MPa	335.75 ksi
Flexural Strength	ASTM D790	53 MPa	7.69 ksi	90 MPa	13.05 ksi
Notched Izod	ASTM D256	36 J/m	0.67 ft-lbf/in	31 J/m	0.58 ft-lbf/in

***Note:**
All test specimens were printed with Raise3D DF2 printer (100µm thickness, 14s).
All post-cured test specimens were cured with DF Cure for 20 minutes per side at room temperature.
All specimens were conditioned in ambient lab conditions at 20-25 °C / 40-60% RH for 16 to 24 hours.
Test performance differs depending on part geometry, print placement orientation, print settings and temperature.

Thermal Properties*

Property	Testing Method	Post-Cured	
		Metric	Imperial
Heat Deflection Temp. @0.45 MPa/66 psi	ASTM D648	68°C	154.4°F
Heat Deflection Temp. @1.82 MPa/264 psi	ASTM D648	53°C	129.2°F

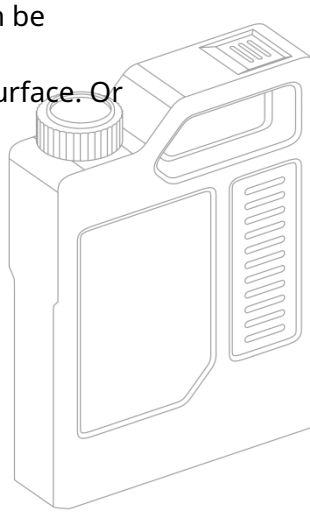
***Note:**
All test specimens were printed in 100μm thickness with Raise3D DF2 printer (100μm thickness, 14s) and cured with DF Cure for 20 minutes per side at room temperature.
All specimens were conditioned in ambient lab conditions at 20-25 °C / 40-60% RH for 16 to 24 hours.
Test performance differs depending on part geometry, print placement orientation, print settings and temperature.

Workflow

Printer setting
Recommended to use the default printing profiles in ideaMaker.

Recommended printing parameters with Raise3D DF2 printer:
- Shake the resin bottle before usage
- Environmental conditions: 20-25 °C, 40-60% RH
- Power: 2 mW/cm^2 at 405 nm
- Layer thickness: 50 μm
- Normal layer curing time: 3 - 4.5 s

Cleaning
Tough 2K Grey V1 Resin requires cleaning to achieve ideal properties of printed part.
Support structures should be removed from the printed part, and the part should then be washed before post-curing.
Blow dry the part with compressed air/nitrogen to remove residual solvent from the surface. Or leave the part for a short time at room temperature to dry.



Post curing
After cleaning, Tough 2K Grey V1 parts requires post curing to achieve optimal properties.
Recommended print parameters with Raise3D DF Cure:
- Intensity: 25 mW/cm^2 at 405 nm

- UV cure time: 20 min per side
- Cure temperature: Room temperature.

More printing information please read ***Raise3D DF2 3D Printer User Manual.***

Testing Geometries

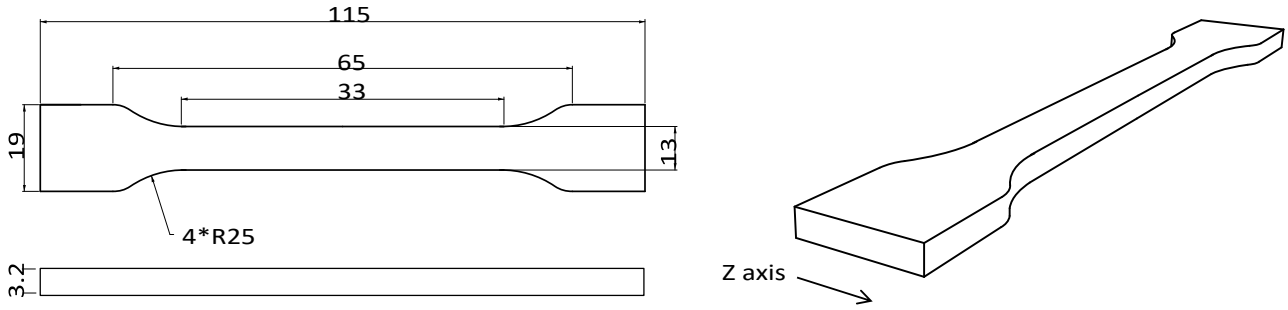
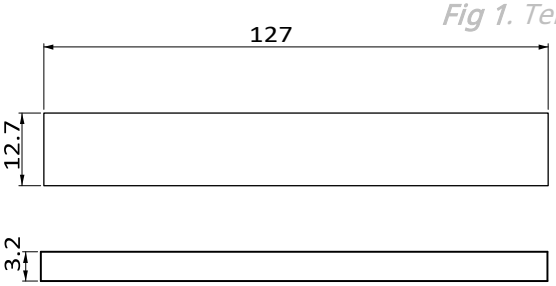
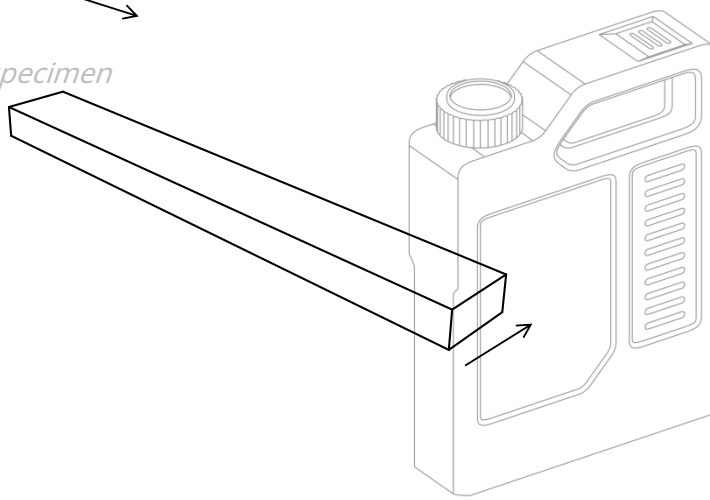


Fig 1. Tensile testing specimen





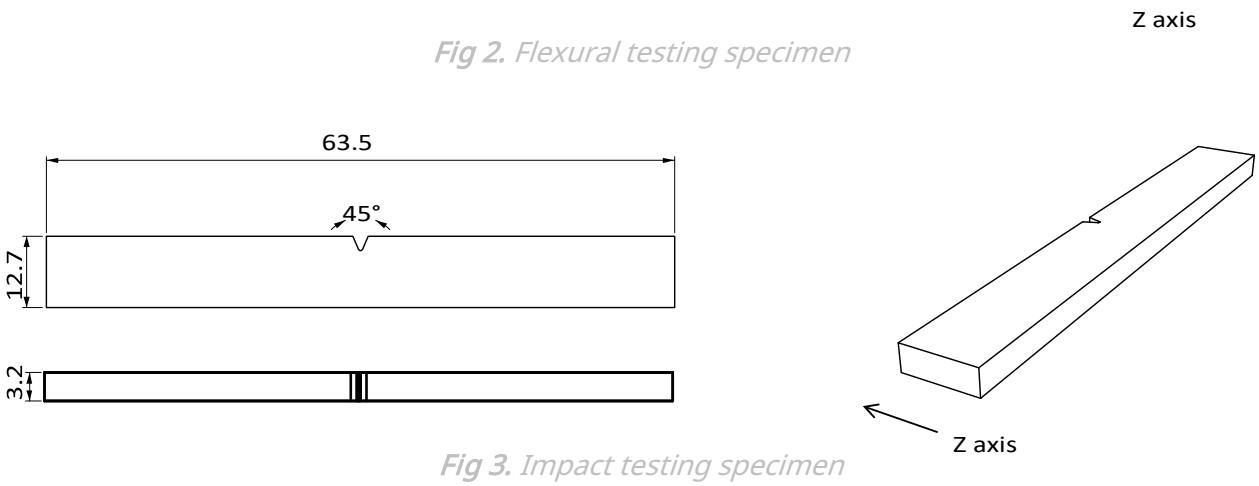


Fig 2. Flexural testing specimen

Fig 3. Impact testing specimen

Disclaimer

The typical values presented in this data sheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions. End-use performance of printed parts depends not only on materials, but also on part design, environmental conditions, printing conditions, etc. Product specifications are subject to change without notice.

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