HP 3D High Reusability PA 11

Materials Technical Fact Sheet

General Properties

Common information for all print modes

Category	Measurement	Value	Method
General Properties	Powder melting point (DSC)	202°C/396°F	ASTM D3418
	Particle size	54 µm	ASTM D3451
	Bulk density of powder	0.48 g/cm³ 0.017 lb/in³	ASTM D1895
	Density of parts	1.05 g/cm³ 0.038 lb/in³	ASTM D792
Reusability	Refresh ratio for stable performance	30%	

Balanced print mode

Technical specifications[1]

Category	Measurement	Specimen	Value	Method
Mechanical properties	Tensile strength, max load,[2] XY	Type V	52 MPa/7542 psi	ASTM D638
		Type I	52 MPa/7542 psi	ASTM D638
	Tensile strength, max load,[2] Z	Type V	52 MPa/7542 psi	ASTM D638
		Type I	52 MPa/7542 psi	ASTM D638
	Tensile modulus,[2] XY	Type V	1800 MPa/261 ksi	ASTM D638
		Type I	1800 MPa/261 ksi	ASTM D638
	Tensile modulus,[2] Z	Type V	1800 MPa/261 ksi	ASTM D638
		Type I	1800 MPa/261 ksi	ASTM D638
	Elongation at break,[2] XY	Type V	50%	ASTM D638
		Type I	30%	ASTM D638
	Elongation at break,[2] Z	Type V	50%	ASTM D638
		Type I	30%	ASTM D638
	Flexural modulus,[3] XY		1650 MPa/240 ksi	ASTM D790
	Flexural modulus,[3] Z		1700 MPa/246 ksi	ASTM D790
	Flexural strength (@ 5%),[3] XY		70 MPa/10150 psi	ASTM D790
	Flexural strength (@ 5%),[3] Z		70 MPa/10150 psi	ASTM D790
	Charpy impact notched (@23°C/73.4°F), XY		5 kJ/m²	ISO 179-1/1eA
	Charpy impact notched (@23°C/73.4°F), Z		5 kJ/m²	ISO 179-1/1eA
	Izod impact notched (@3.2 mm/0.126 in, 23°C/73.4°F), XY		6.0 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@3.2 mm/0.126 in, 23°C/73.4°F), Z		5.0 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@10 mm/0.394 in, 23°C/73.4°F), XY		4.5 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@10 mm/0.394 in, 23°C/73.4°F), Z		4.0 kJ/m²	ASTM D256 Test Method A
Thermal properties	Heat deflection temperature (@0.45 MPa, 66 psi), XY		185°C/365°F	ASTM D648 Test Method A
	Heat deflection temperature (@0.45 MPa, 66 psi), Z		185°C/365°F	ASTM D648 Test Method A
	Heat deflection temperature (@1.82 MPa, 264 psi), XY		54°C/129°F	ASTM D648 Test Method A
	Heat deflection temperature (@1.82 MPa, 264 psi), Z		54°C/129°F	ASTM D648 Test Method A

Mechanical print mode

Technical specifications[1]

Category	Measurement	Specimen	Value	Method
Mechanical properties	Tensile strength, max load,[2] XY	Type V	58 MPa/8412 psi	ASTM D638
		Type I	55 MPa/7977 psi	ASTM D638
	Tensile strength, max load,[2] Z	Type V	58 MPa/8412 psi	ASTM D638
		Type I	55 MPa/7977 psi	ASTM D638
	Tensile modulus,[2] XY	Type V	1900 MPa/275 ksi	ASTM D638
		Type I	1900 MPa/275 ksi	ASTM D638
	Tensile modulus,[2] Z	Type V	1900 MPa/275 ksi	ASTM D638
		Type I	1900 MPa/275 ksi	ASTM D638
	Elongation at break,[2] XY	Type V	55%	ASTM D638
		Type I	30%	ASTM D638
	Elongation at break,[2] Z	Type V	55%	ASTM D638
		Type I	30%	ASTM D638
	Flexural modulus,[3] XY		1650 MPa/239 ksi	ASTM D790
	Flexural modulus,[3] Z		1650 MPa/239 ksi	ASTM D790
	Flexural strength (@ 5%),[3] XY		65 MPa/9427 psi	ASTM D790
	Flexural strength (@ 5%),[3] Z		65 MPa/9427 psi	ASTM D790
	Charpy impact notched (@23°C/73.4°F), XY		6.5 kJ/m²	ISO 179-1/1eA
	Charpy impact notched (@23°C/73.4°F), Z		6.0 kJ/m²	ISO 179-1/1eA
	Izod impact notched (@3.2 mm/0.126 in, 23°C/73.4°F), XY		6.0 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@3.2 mm/0.126 in, 23°C/73.4°F), Z		6.0 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@10 mm/0.394 in, 23°C/73.4°F), XY		5.0 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@10 mm/0.394 in, 23°C/73.4°F), Z		5.0 kJ/m²	ASTM D256 Test Method A
Thermal properties	Heat deflection temperature (@0.45 MPa, 66 psi), XY		180°C/356°F	ASTM D648 Test Method A
	Heat deflection temperature (@0.45 MPa, 66 psi), Z		180°C/356°F	ASTM D648 Test Method A
	Heat deflection temperature (@1.82 MPa, 264 psi), XY		54°C/129°F	ASTM D648 Test Method A
	Heat Deflection Temperature (@1.82 MPa, 264 psi), Z		54°C/129°F	ASTM D648 Test Method A

Dimensional print mode

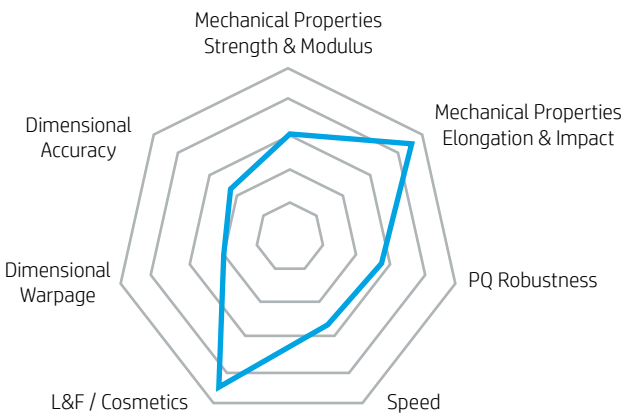
Technical specifications[1]

Category	Measurement	Specimen	Value	Method
Mechanical properties	Tensile strength, max load,[2] XY	Type V	50 MPa/7252 psi	ASTM D638
		Type I	50 MPa/7252 psi	ASTM D638
	Tensile strength, max load,[2] Z	Type V	50 MPa/7252 psi	ASTM D638
		Type I	50 MPa/7252 psi	ASTM D638
	Tensile modulus,[2] XY	Type V	1800 MPa/261 ksi	ASTM D638
		Type I	1800 MPa/261 ksi	ASTM D638
	Tensile modulus,[2] Z	Type V	1800 MPa/261 ksi	ASTM D638
		Type I	1800 MPa/261 ksi	ASTM D638
	Elongation at break,[2] XY	Type V	40%	ASTM D638
		Type I	30%	ASTM D638
	Elongation at break,[2] Z	Type V	25%	ASTM D638
		Type I	15%	ASTM D638
	Flexural modulus,[3] XY		1800 MPa/261 ksi	ASTM D790
	Flexural modulus,[3] Z		1800 MPa/261 ksi	ASTM D790
	Flexural strength (@ 5%),[3] XY		70 MPa/10152 psi	ASTM D790
	Flexural strength (@ 5%),[3] Z		70 MPa/10152 psi	ASTM D790
	Charpy impact notched (@23°C/73.4°F), XY		5 kJ/m²	ISO 179-1/1eA
	Charpy impact notched (@23°C/73.4°F), Z		4 kJ/m²	ISO 179-1/1eA
	Izod impact notched (@3.2 mm/0.126 in, 23°C/73.4°F), XY		6.0 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@3.2 mm/0.126 in, 23°C/73.4°F), Z		4.5 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@10 mm/0.394 in, 23°C/73.4°F), XY		4.5 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@10 mm/0.394 in, 23°C/73.4°F), Z		4.0 kJ/m²	ASTM D256 Test Method A
Thermal properties	Heat deflection temperature (@0.45 MPa, 66 psi), XY		180°C/356°F	ASTM D648 Test Method A
	Heat deflection temperature (@0.45 MPa, 66 psi), Z		180°C/356°F	ASTM D648 Test Method A
	Heat deflection temperature (@1.82 MPa, 264 psi), XY		54°C/129°F	ASTM D648 Test Method A
	Heat deflection temperature (@1.82 MPa, 264 psi), Z		54°C/129°F	ASTM D648 Test Method A

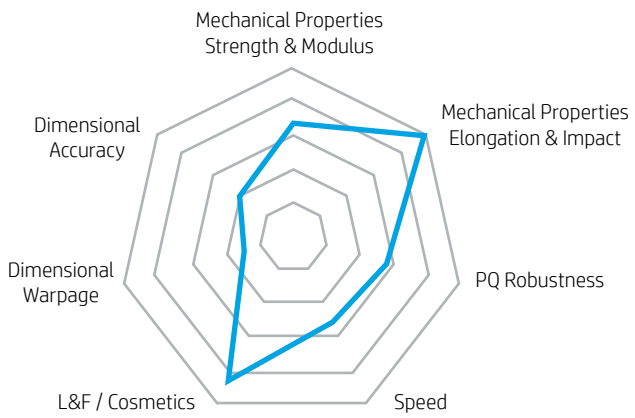
Print mode profiles

Profiles based on average XYZ values

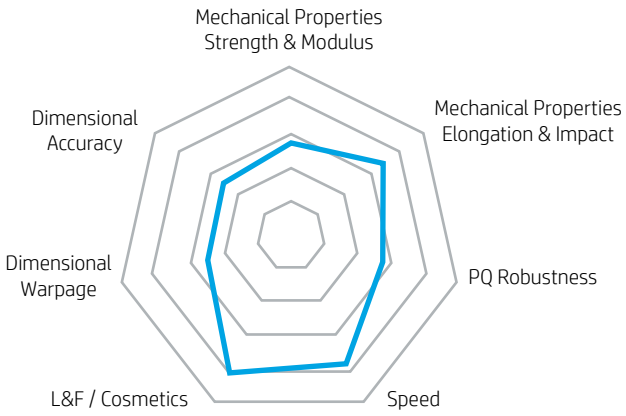
Balanced Print Mode



Mechanical Print Mode



Dimensional Print Mode



Print mode comparison table

Profiles based on average XYZ values

	Speed	Mechanical properties	Look & feel	PQ Robustness	Dimensional accuracy	Dimensional warpage
Balanced	=	=	=	=	=	=
Mechanical	↓	↑	=	=	↓	=
Dimensional	↑	↓	=	=	↑	↑

For more information, please visit
hp.com/go/3DMaterials

1. The following technical information should be considered representative of averages or typical values and should not be used for specification purposes. These values are with FW BD7 and have been obtained from a sample of specimens printed in plots with 6% packing density. Separation between specimens in the plot was 10 mm. Modulus has been calculated using the slope of the regression line between 0.05% and 0.25% strain measured with an automatic extensometer during the entire test. Cross-section dimension measures are done using a micrometer with round ends. Conditioning according to ASTM D618 Procedure A: 48 hours after printing and unpacking of the parts at 23°C/73°F and 50% RH.
2. Test results realized under the ASTM D638 with a test rate of 50 mm/min and 10 mm/min for type I and type V, respectively.
3. Test results realized under ASTM D790 Procedure B at a test rate of 13.55 mm/min.

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This is an HP Indigo digital print.