

01 HeyGears UltraPrint Resins Overview

Material Categories		Material Name	Characteristics	Application Examples
UltraPrint-Modeling	High Surface Quality	PAS10	• ±0.05 mm Printed Part Tolerance ¹ • Good Detail Sharpness	• Aesthetic Prototypes • Tabletop Miniatures
		PARP10 (Pale Purple)	• Matte Surface for Near Invisible Layer Lines	• Models, Figurines & Statues
		PARP10 (Orange Clay)	• Excellent Detail Sharpness • 0.1 mm Smallest Detail • Matte Surface for Near Invisible Layer Lines	• Scale Replicas (including vehicles, aircraft etc.) • Figurines & Statues • Jewelry Designs (prototyping)
	High Toughness	PAT10	• 88.5% Light Transmittance, Approaching Acrylic Levels • 13200 J/m ² Work of Fracture • Anti-yellowing Properties Lasting 8 yrs of Indoor Use	• Models & Accessories (with transparent or translucent requirements) • Casings for Electronic Products (end-use) • Earphone Casings (end-use)
		PAU10	• High Fracture Toughness 8240 J/m ² Work of Fracture	• Industrial Fixtures • Casings for Consumer Electronics and Tooling Products • Functional Prototypes for Validating ABS-like Properties
	Water Washable	PAWW10	• 2.9% Water Sorption for Longer Term Use • Easy to Clean (3 Minute Water Washable) • Fast Print Speed	• Rapid Prototypes • Models, Figurines & Statues
UltraPrint-Casting	/	PAC10	• 70-75% Wax Content • 0.02% Ash Value for Clear Burnout	Lost-Wax Casting of: • Lightweight Structures (rings, earrings, pendants) • Finely-detailed Structures (studs, mesh-like accessories) • Heavyweight Structures (bracelets, bulky rings)
UltraPrint-Tooling	/	PAU20	• High Rigidity and Resistance to Deformation 2380 MPa Flexural Modulus • High Toughness and Resistance to Fracture 5400 J/m ² Work of Fracture	• Industrial Fixtures & Jigs (for long-term use) • End-use Structural Components (brackets, camera mounts, protective casings, etc.)
	/	PAE10	• Excellent Elasticity 433% Elongation at Break • Rapid Rebound 83% Energy Recovery Rate	• Models & Accessories (clothing, ornaments, etc.) • Industrial Component Prototypes (sealing plugs, fixtures, etc.) • Medical Anatomical Models
UltraPrint-Design	/	PAM10	• Mixable Color Resins for a Full Spectrum of Colors • High Print Accuracy ±0.05 mm Printed Part Tolerance ²	• Casings for Electronic Products (prototyping) • Models with Customized Colors
UltraPrint-Production	/	PAP10	• Excellent Printability 0.15 mm Smallest Pillar Diameter • High Fracture Toughness 3050 J/m ² Work of Fracture	• Tabletop Miniatures (end-use) • Scale Replicas • Models with Finely Textured Surfaces
	/	PAWR10	• 2H High Surface Hardness and Wear Resistance • Smooth Surface with Near Invisible Layer Lines	• Ball-jointed Dolls • Articulated Action Figures • Wear Resistant Applications (e.g. moving gears prototypes) • Casings for Consumer Electronics
UltraPrint-Molding	/	PAH10	• High-Temperature Resistance 110 °C / 230 °F Heat Deflection Temperature (at 0.455 MPa) • High Rigidity 3260 MPa Flexural Modulus	• Silicone Molds • High-Temperature Resistant Prototypes

¹ Data from HeyGears Lab: For printed models equal to or less than 20 mm in the XY direction, the size deviation is equal to or less than 0.05 mm. The printed part wash time is less than 10 minutes, the final curing time is 5 minutes.
² Data from HeyGears Lab: For printed models equal to or less than 20 mm in the XY direction, the size deviation is equal to or less than 0.05 mm. The printed part wash time is less than 10 minutes, the final curing time is 30 minutes.

02 Material Properties & Aging Tests

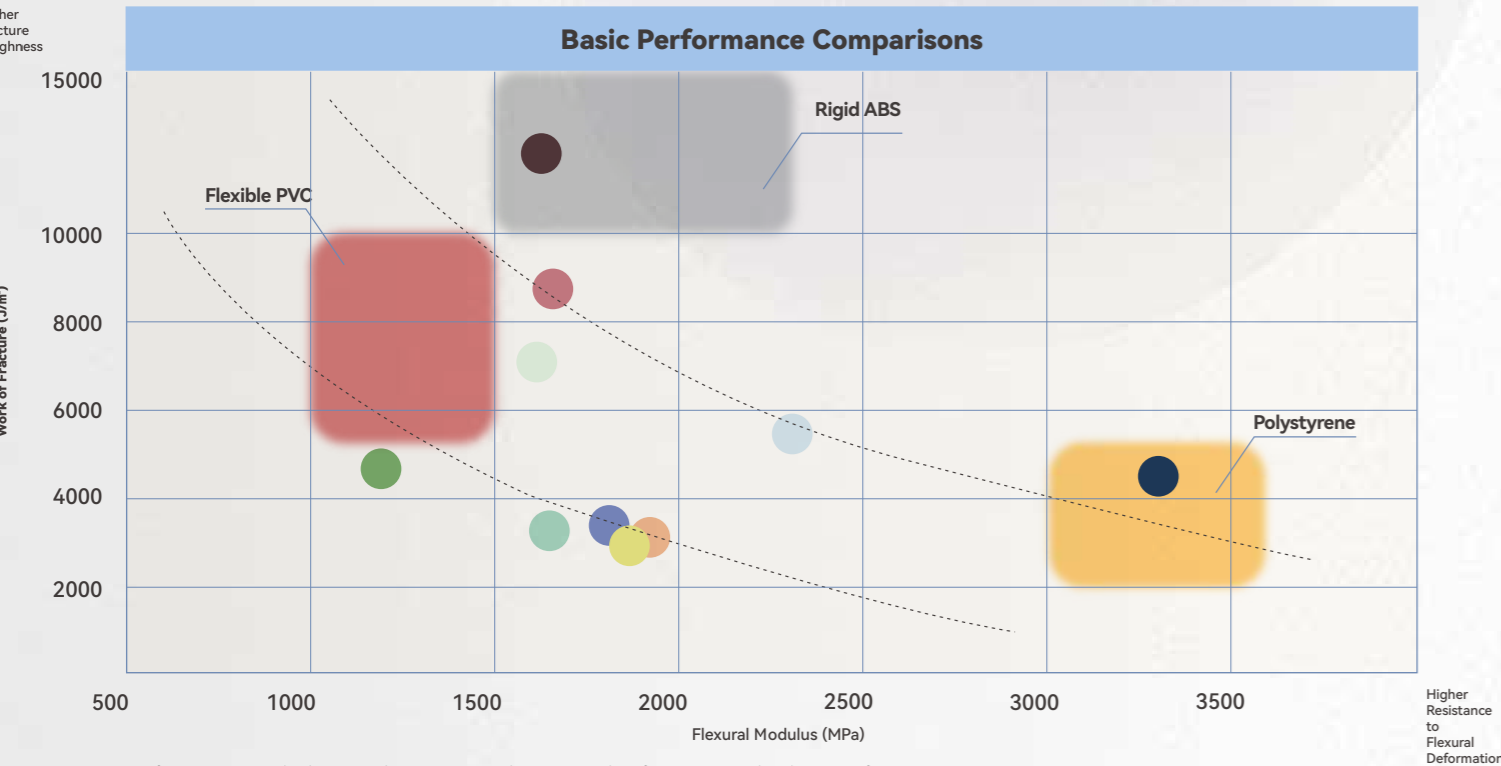
Material Properties ¹													
Material Name ²	Printing Effects ³			Properties ⁴									/
	Smallest Pillar Diameter (mm)	Smallest Hole Diameter (mm)	Printed Part Tolerance ⁵ (mm)	Flexural Strength (MPa)	Flexural Modulus (MPa)	Work of Fracture (J/m ²)	Elongation at Break (%)	Impact Strength (Notched) (J/m)	Hardness (Shore D)	Heat Deflection Temperature (°C)	Water Sorption (%)	Viscosity (mPa·s)	
/	/	/	/	ASTM D790	ASTM D790	ISO20795.1	ASTM D638	ASTM D256	ASTM D256	ASTM D648	ASTM D570	ASTM D792	/
PAS10	0.4	0.4	±0.05	79	1630	3200	16	32	81	51	1.2	531	Reflex, RS
PARP10 (Pale Purple)	0.4	0.4	±0.05	79	1630	3200	16	32	81	51	1.2	531	Reflex, RS
PARP10 (Orange Clay)	0.3	0.4	±0.05	80	1830	3350	15	34	84	52	1.1	320	Reflex, RS
PAT10	0.4	0.5	±0.05	67	1580	13200	25	28	81	67	0.9	925	Reflex
PAU10	0.3	0.2	±0.05	69	1700	8240	23	27	81	62	0.8	745	Reflex
PAWW10	0.3	0.3	±0.04	80	1850	2910	10	/	84	/	2.9	52	Reflex, RS
PAC10	0.2	0.2	±0.03	30	680	/	16	13	64	/	/	259	Reflex
PAU20	0.4	0.4	±0.04	109	2380	5400	23	35	84	60	1.9	3400	Reflex
PAE10	1.2	1.2	±0.1	/	/	/	433 ⁶	/	49 (Shore A) ⁷	/	/	2420 ⁸	Reflex
PAM10 ⁹	0.3	0.4	±0.05	60	1540	7480	25	50	82	63	1.2	/	Reflex
PAP10	0.15	0.2	±0.04	93	1920	3050	12	36	83	58	1	385	Reflex, RS
PAWR10	0.5	0.6	±0.06	59	1290	4300	20	64	81	52	2.5	373	Reflex, RS
PAH10	0.2	0.2	±0.08	137	3260	4160	6	32	81	110	0.7	660	Reflex

¹ Data from HeyGears Lab. For more details, visit the website to download the material Safety Data Sheet (SDS).
² The colors in the chart represent the actual available colors of the materials.
³ Data from HeyGears Lab.
⁴ Data from HeyGears Lab. The material parameters are the average values from testing, with a deviation of ±10%.
⁵ Data from HeyGears Lab: Indicating the dimensional deviation for a printed test model measuring equal to or less than 20 mm in the XY direction. Test results are within the 95% confidence interval.
⁶ The test standard is ASTM D412.
⁷ The test standard is ASTM D2240.
⁸ The test standard is ASTM D4212.
⁹ Test data for PAM10 White color resin.

Aging Tests						
Standard	ASTM G154 UV Light Aging Test		YY/T 0681.1 Thermal Accelerated Aging Test	IEC 60068-2-78 Damp Heat Test	GB/T 2423.22 Temperature Change Test	ISO 105-E04 Color Fastness Test
	600h ¹	200h ²	1600h ³	/	/	/
PAU10	✓	✓	✓	✓	✓	✓
PAT10	✓	✓	✓	✓	✓	✓
PAM10	✓	✓	✓	✓	✓	✓
PAH10	✓	✓	✓	✓		
PAP10	✓	✓	✓	✓		
PAWR10		✓	✓	✓		
PARP10 (Pale Purple)		✓		✓		
PAS10		✓		✓		
PAU20		✓		✓		
PARP10 (Orange Clay)		✓		✓		
PAWW10				✓		
PAE10				✓		

¹ Equivalent to 8 years of indoor use or 1 year of outdoor use, the material's properties degrade by less than 30%, with a non-significant color change (ΔE < 2) and a dimensional deviation of ±0.1 mm.
² Equivalent to 3 years of indoor use, the material's properties degrade by less than 30%, with a non-significant color change (ΔE < 2) and a dimensional deviation of ±0.1 mm.
³ Equivalent to 1 year of outdoor use, the material's properties degrade by less than 30%, with a non-significant color change (ΔE < 2) and a dimensional deviation of ±0.1 mm.

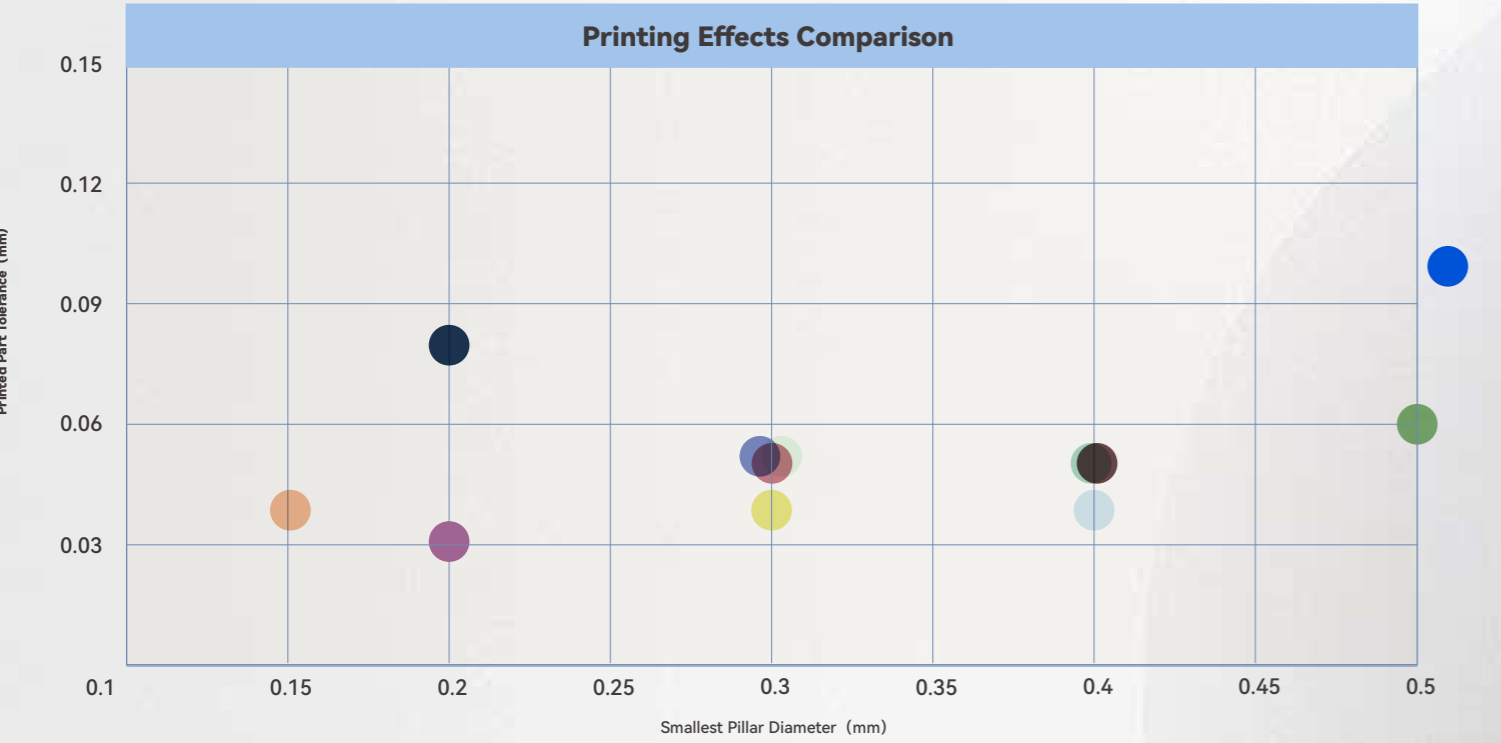
03 Material Performance Comparisons



*Data from HeyGears Lab. The material parameters are the average values from testing, with a deviation of ±10%.
*Flexible PVC, Rigid ABS, and Polystyrene data are for reference only.

- PAT10
- PAU10
- PAM10
- PAU20
- PAH10
- PAP10
- PAWW10
- PARP10 (Pale Purple) PAS10
- PAWR10
- PAE10
- PAC10
- PARP10 (Orange Clay)

*The colors are for readability purposes only and do not represent the actual material colors.

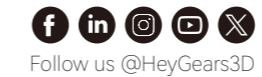


*Data from HeyGears Lab.

HEYGEARS

HeyGears was founded in 2015 as an innovation-driven company, devoted to providing digital manufacturing solutions in various industries. The company bases its core competencies in 3D printing, software development, materials, and big-data handling. HeyGears believes in a product development process rooted deeply into vertical applications, and our vision goes beyond just 3D printing technology. We strive to create very integrated solutions through the solid establishment of hardware, software, material, and service platforms, delivering our goal to bring advanced technology into daily life.

- 🌐 www.heygears.com
- ✉ sales@heygears.com
- ☎ +1(318)353-4295 (Global) / +1(949)418-9418 (USA) / +49 211 935 98403 (Europe)
- 📍 USA: 17931 Sky Park Circle, Suite E, Irvine, CA, 92614
CHN: Block B2, 501, 601, Enterprise Accelerator, Kaifa District, Guangzhou, Guangdong, China



MATERIALS ENGINEERED TO EXCEED EXPECTATIONS

ULTRAPRINT Reflex SERIES

