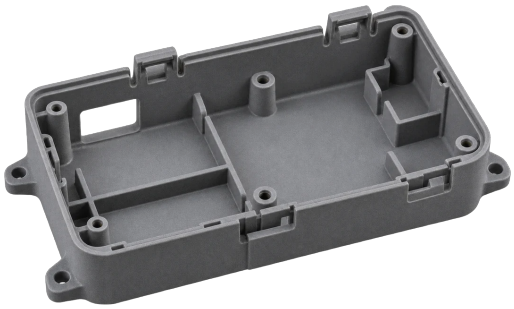
MULTI JET FUSION

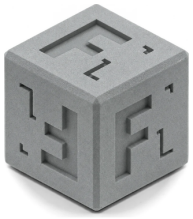
HP High Reusability PA12

High-Performance Multi Jet Fusion Nylon

HP 3D High Reusability PA 12 is a balanced material that produces functional parts with excellent detail, surface quality, and mechanical properties. Ideal for complex geometries and production applications.



SURFACE FINISHES



Standard Finish As-Printed

MJF parts are delivered with a standard bead-blasted finish in natural grey. Bead blasting removes excess powder and slightly smooths the surface while keeping the material's natural matte texture.



Deep Color Dye Enhanced

A specialized dye bath gives a deep, uniform black that chemically bonds with the nylon. The dye fully penetrates the surface, so unlike paint it won't chip or wear off over time.



Vapor Smoothing Premium

An advanced chemical smoothing process slightly melts and redistributes the surface material, eliminating the grainy texture and sealing porous areas for a smoother, semi-gloss finish. Fine details may soften.



Performance Paint Premium

An automotive-grade coating that enhances aesthetics and durability, hand-finished for smooth surfaces with professional-grade equipment. It comes in matte to semi-gloss, with custom colour matching for precise branding needs.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
380 × 284 × 380 mm	4-8 business days	0.08 mm	±0.3% (min ±0.5 mm)

MECHANICAL PROPERTIES

HP High Reusability PA12 delivers dependable strength and impact resistance for functional prototypes, end-use parts and automotive interior and under-hood components, helping teams move from prototype to production with confidence. Its balanced mechanical profile handles demanding load conditions.

Elongation and unnotched impact strength are higher in XY than in Z, so flexing features such as snap fits and clips perform best laid in the XY plane. Stiffness and strength fall well above room temperature, so size loaded parts that run warm from the 55 and 90 °C values, and use HP's −40 °C notched impact values for vehicle and outdoor parts in cold service.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength (XY / Z)	**50 / 50 MPa**	ASTM D638
Tensile Modulus (XY / Z)	**1900 / 1900 MPa**	ASTM D638
Tensile Strength at 55 / 90 °C (XY)	**36 / 27 MPa**	ASTM D638 Type I
Tensile Modulus at 55 / 90 °C (XY)	**800 / 500 MPa**	ASTM D638 Type I
Elongation at Yield (XY / Z)	**10 / 8 %**	ASTM D638
Elongation at Break (XY / Z)	**17 / 9 %**	ASTM D638
Izod Impact Strength, Notched 3.2 mm (XY / Z)	**4.2 / 3.8 kJ/m²**	ASTM D256 Method A
Charpy Impact Strength, Notched (XY / Z)	**3.3 / 2.6 kJ/m²**	ISO 179-1/1eA
Charpy Impact Strength, Notched at −40 °C (XY / Z)	**2.5 / 3.3 kJ/m²**	ISO 179-1/1eA
Charpy Impact Strength, Unnotched (XY / Z)	**49 / 28 kJ/m²**	ISO 179-1/1eU
Flexural Modulus (XY / Z)	**1750 / 1850 MPa**	ASTM D790 Procedure B
Flexural Strength at 5% Strain (XY / Z)	**63 / 68 MPa**	ASTM D790 Procedure B
Compression Strength at 10% Strain (XY / Z)	**60 / 57 MPa**	ASTM D695
Compression Modulus (XY / Z)	**1450 / 1450 MPa**	ASTM D695
Poisson's Ratio (XY / Z)	**0.4 / 0.3**	ASTM D638

THERMAL PROPERTIES

For under-hood automotive components and industrial equipment exposed to heat sources, use the higher-load heat deflection value and the relative thermal index when sizing loaded parts near heat, and allow clearance on long parts that run warm, because expansion increases above room temperature.

HP also publishes glow-wire, ball pressure and relative thermal index results, the values electrical equipment designers use to qualify housings and covers.

PROPERTY	VALUE	TEST STANDARD
Powder Melting Point (DSC)	**187 °C**	ASTM D3418
HDT @ 0.45 MPa (XY / Z)	**175 / 173 °C**	ASTM D648 Method A
HDT @ 1.82 MPa (XY / Z)	**108 / 104 °C**	ASTM D648 Method A
Vicat Softening Temperature, 10 N (XY / Z)	**175 / 175 °C**	ASTM D1525
Vicat Softening Temperature, 50 N (XY / Z)	**166 / 163 °C**	ASTM D1525
Thermal Conductivity (XY / Z)	**0.178 / 0.251 W/m·K**	ISO 8302
Coefficient of Linear Expansion (XY / Z, −30 to 20 °C)	**105 / 97 ×10^{-6}/K**	ISO 11359-2
Coefficient of Linear Expansion (XY / Z, 50 to 100 °C)	**180 / 145 ×10^{-6}/K**	ISO 11359-2

Ball Pressure Test	**172 °C**	IEC 60695-10-2
Relative Thermal Index (RTI)	**65 °C**	UL 746B
Glow-Wire Flammability Index (0.75 / 1.5 / 3.0 mm)	**775 / 700 / 700 °C**	IEC 60695-2-12
Glow-Wire Ignition Temperature	**725 °C**	IEC 60695-2-13

PHYSICAL PROPERTIES

Consistent density and surface quality keep critical features in tolerance and downstream finishing predictable. Low density makes parts lightweight yet durable, and minimal warpage means parts meet specifications after standard bead blasting, so assemblies fit and finish without secondary rework.

Upward and downward faces finish smoother than side walls, so place cosmetic faces flat in the build. Its powder particle size and bulk density give consistent, well-packed builds.

PROPERTY	VALUE	TEST STANDARD
Part Density	**1.01 g/cm³**	ASTM D792
Shore Hardness D	**73**	ASTM D2240
Taber Abrasion Loss, 1000 cycles (X / Y / Z)	**27 / 23 / 23 mg**	ASTM D4060
Surface Roughness Sa (top and bottom faces)	**9 µm**	ISO 25178-2
Surface Roughness Sa (side faces)	**12 µm**	ISO 25178-2
Powder Particle Size (D50)	**60 µm**	ASTM D3451
Powder Bulk Density	**0.425 g/cm³**	ASTM D1895

ELECTRICAL PROPERTIES

Its high volume resistivity makes HP High Reusability PA12 an electrical insulator for housings, connector covers and insulating features in integrated electrical systems.

Dielectric strength is lowest in XY, and the Z value falls after humid conditioning, so design touch protection into a cover's shape, fixing and clearances, and confirm it in testing of the finished product.

PROPERTY	VALUE	TEST STANDARD
Volume Resistivity, 23 °C 50% RH (XY / Z)	**2.7×10^{14} / 3.7×10^{14} Ω·cm**	ASTM D257
Dielectric Strength, 23 °C 50% RH (XY / Z)	**2.8 / 6.2 kV/mm**	ASTM D149
Dielectric Strength, 35 °C 90% RH (XY / Z)	**2.8 / 4.1 kV/mm**	ASTM D149

CHEMICAL PROPERTIES

HP rates HP High Reusability PA12 for good resistance to oils, greases, aliphatic hydrocarbons and alkalies. In its automotive fluid immersion study, no sample showed chemical reaction, stress cracking or solvation: brake fluid was absorbed without plasticizing the part, coolant slightly plasticized the samples, and most of the grease weight gain was residue left on the surface.

Chemical ratings are screening guidance; confirm them with application-specific testing before production release.

CHEMICAL	WEIGHT CHANGE	HP FINDING
Motor oil (60 °C, 4 weeks)	**+0.16%**	**No significant effect**
Gear oil (60 °C, 4 weeks)	**+0.27%**	**No reaction**
ATF / steering fluid (60 °C, 4 weeks)	**+0.31%**	**No attack**
Lubricating grease (60 °C, 4 weeks)	**+1.44%**	**No effect**

Brake fluid (60 °C, 6 weeks)	**+2.24%**	**Not plasticized**
Antifreeze coolant, 50% glycol (60 °C, 6 weeks)	**+3.32%**	**Slightly plasticized**

BIOCOMPATIBILITY AND COMPLIANCE

HP tested representative parts printed from fresh HP High Reusability PA12 powder with its fusing and detailing agents on the Jet Fusion 4200/4210 to USP Class I–VI, ISO 10993-5, -10 and -11 and US FDA guidance for intact skin surface devices. These results support regulatory reviews for intact-skin devices and housings; each device maker tests its own device, and HP makes no sterilization claim for this grade.

HP has tested it to FMVSS 302 for vehicle interiors and provides RoHS and REACH declarations. It is rated UL 94 HB and is not flame retardant.

STANDARD	STATUS
USP Class I–VI Met USP Class I–VI requirements, including muscle implantation (USP <88>), with HP fusing and detailing agents; HP tested representative parts printed from fresh powder on the Jet Fusion 4200/4210	HP tested
FDA Intact Skin Surface Devices guidance Meets US FDA guidance for intact skin surface devices; HP tested representative parts printed from fresh powder on the Jet Fusion 4200/4210	HP tested
ISO 10993-5 (Cytotoxicity) In vitro cytotoxicity test passed; HP tested representative parts printed from fresh powder on the Jet Fusion 4200/4210	HP tested
ISO 10993-10 (Irritation and sensitization) Irritation and skin sensitization tests passed; HP tested representative parts printed from fresh powder on the Jet Fusion 4200/4210	HP tested
ISO 10993-11 (Acute systemic toxicity) Acute systemic toxicity test passed; HP tested representative parts printed from fresh powder on the Jet Fusion 4200/4210	HP tested
FMVSS 302 (Interior flammability) Passed with a 0 mm/min burn rate on the Jet Fusion 5200 Series; identical to Canada's CMVSS 302	HP tested
UL 94 flammability HB at 0.75, 1.5 and 3.0 mm; not flame retardant	HB
RoHS Directive 2011/65/EU RoHS compliance for the EU and other listed regions	HP declaration
EU REACH REACH information in HP's Environmental Attributes and Regulatory Summary, on request	HP declaration

SUPPORTING DOCUMENTS

RoHS declaration