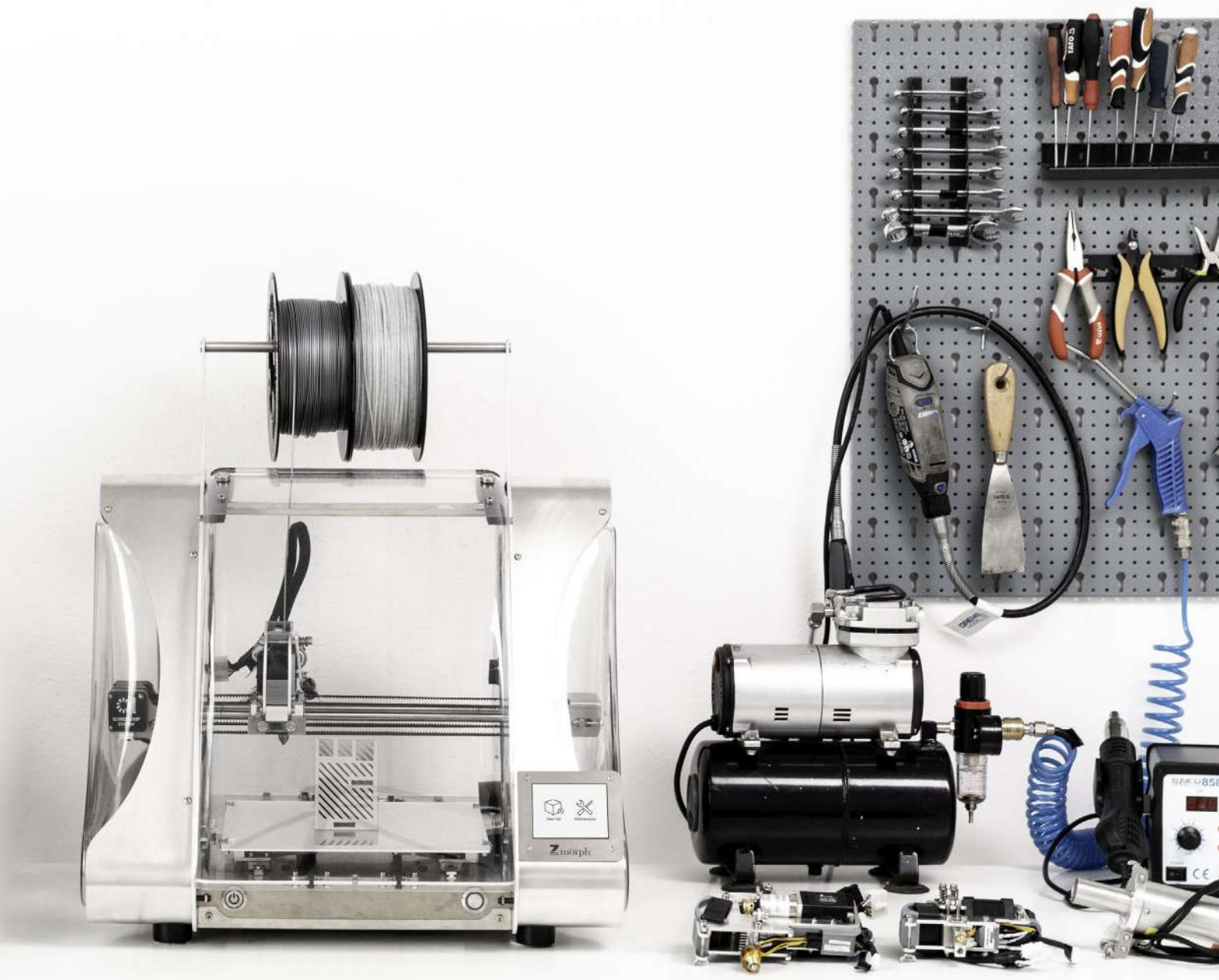
# ZMorph Materials Library

Professional materials for additive and subtractive manufacturing.



ZMorph VX Multitool 3D Printer for Production, Science and Education

3D Printing, CNC Milling, Laser Cutting and Engraving

Version 05.2019

info@novabeans.com | www.novabeans.com

novabeans

# Materials Overview

## 3D Printing

| Material | Features | Applications |
|---|---|---|
|  PLA | Biodegradable, easy to print, low emission, wide range of colours, low shrinkage, high stiffness. | Molds, consumer goods, architectural models, educational models, containers, medical accessories, prototypes, biodegradable models. |
|  ABS | Dissolves in acetone, exceptional impact strength, good mechanical properties, good heat resistance. | Prototypes, consumer goods, jigs & fixtures, casings, models requiring high-impact strength, gearing, toys, automotive parts. |
|  PET-G | Stability dimensions, low shrinkage, good thermal resistance, scratch resistance, rigidity, good electrical properties. | Bottles, containers, electronic devices housings, precise bearings and gears, photography accessories, transparent elements, models requiring stability of shape. |
|  Nylon | Great mechanical resistance, good abrasion resistance, high impact strength, lightweight, fatigue resistance. | Functional prototypes, gear wheels, plain bearings, models that require abrasion resistance, clips, hooks, screw nuts. |
|  HIPS | Dissolves in d-limonene, easy to postprocessing, lightweight, water resistant. | Support material, casings, containers, protective elements, mechanical parts, models that require abrasion resistance. |
|  ASA | Good impact strength, high temperature resistance, weather and UV resistance, dissolve in acetone. | Outdoor applications, models that require high UV resistance, sporting elements. |
|  PMMA | Transparency, UV resistance, high optical properties, tough, scratch resistance. | Optical applications, UV resistant models, chemical equipment, lamps, protective glass, illuminated signs, electronic casings. |
|  TPE | Good thermoplastic and elastic properties, vibration dampening, good impact and tensile strength. | Prototypes, end parts, connectors, covers, tools, robotic, dampeners. |
|  PC | High impact strength, self-extinguishing, good optical properties, resistance for weather conditions, transparency, dimensional stability. | Automotive components, molds for silicone casting, lifts, photography accessories. |
|  PC/ABS | Great mechanical durability, heat resistance, stiffness, exceptional impact strength, UV resistance. | Cantilever elements, clasps, hooks, dashboards, keyboards, buttons, gears, propellers, housings. |
|  PP | Lightweight, good chemical resistance, resistance to moisture, good heat and fatigue resistance. | Mechanical parts, covers, housings, chemical accessories, containers, caps, pump valves. |
|  PVA | Dissolves in water, biodegradable. | Support for complex designs, molds for cold-metal casting. |



info@novabeans.com | www.novabeans.com

# Materials Overview

## Laser Cutting & Engraving

| Material | Engraving | Cutting | Applications |
|---|---|---|---|
|  Leather | x | x | Jewelry, engraved accessories, leather labels. |
|  Felt | x | x | Jewelry and decorations, furniture pads, coasters. |
|  Laser Foil | x | x | Stickers, advertising materials. |
|  Cardboard | x | x | Stencils, French curves. |
|  Foamiran | x | x | Jewelry and decorations, paddings. |
|  Wood fibre boards | x | | Stencils, frame engraving. |
|  Plywood | x | | Decorations, pictures. |
|  Wood | x | | Engraving on end products. |
|  EPP | | x | Package fillings for better product holding (e.g. small SD cards). |
|  EVA Foam | | x | Accessories, casings. |

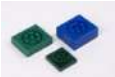
# Materials Overview

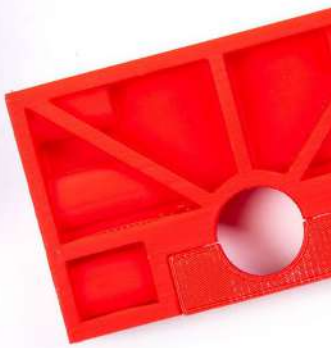
## CNC Milling

| Material | | Family | Features | Applications |
|---|---|---|---|---|
|  | ABS | Plastics | Good machinability, high stiffness, good impact strength. | Casings, automotive parts, protective elements. |
|  | Nylon | Plastics | High tensile strength, lightweight, does not burn –it just melts, low friction coefficient. | Cogwheels, dampening elements. |
|  | HDPE | Plastics | Sturdy, excellent machinability. | Casings, tooling/fixturing, prototyping. |
|  | PTFE | Plastics | Good heat and chemically resistance, flexible, low friction coefficient. | Sliding elements, joints. |
|  | PC | Plastics | Impact resistance, FDA compliant. | Advertising materials, transparent protective elements. |
|  | PP | Plastics | Moisture resistance, FDA compliant grades available. | Dampening elements, casings, clamps. |
|  | POM | Plastics | Chemical resistance, abrasion resistance, excellent rigidity. | Cogwheels, bearing supports, connector elements. |
|  | PMMA | Plastics | Good hardness and stiffness, low water absorption, exceptional uv resistance. | Advertising materials, casings, office equipment. |
|  | PVC | Plastics | Lightweight, weather resistance, abrasion resistance. | Advertising materials, casings, office equipment. |
|  | HIPS | Plastics | Good machinability, impact resistance, insulator, good impact resistance, paintable. | Advertising materials, casings. |
|  | LDPE | Plastics | Moisture resistance, FDA compliant. | Sliding rails, gibs, applications requiring low–temperature flexibility, toughness, and durability. |
|  | PET | Plastics | Water resistance, durable, good thermal isolating properties, FDA compliant, immune to fracturing. | Casings, forms. |
|  | Carbon | Composites | Lightweight, sturdy, high stress resistance. | Drones, construction plates, industrial automation, robotics, aerospace tooling. |

# Materials Overview

## CNC Milling

| Material | | Family | Features | Applications |
|---|---|---|---|---|
|  | FR4 | Composites | Sturdy, bending resistance. | PCBs. |
|  | Dibond | Composites | Lightweight, sturdiness. | Casings, advertising materials, signs. |
|  | TCF | Composites | High thermal durability. | Electrical isolations, stencils. |
|  | Wood | Wood derivatives | Fully biodegradable, good machinability. | Art, reliefs, panels, casings. |
|  | Plywood | Wood derivatives | Excellent machinability, lightweight. | Mockups, prototypes, casings, constructing. |
|  | HDF | Wood derivatives | Paintable. | Furniture, mockups, casings, art. |
|  | Cardboard | Wood derivatives | Eco–friendly, Cheap, Insulating | packaging goods, hardcovers for books, advertising materials. |
|  | Aluminum | Metals | Lightweight, good machinability, good heat transfer. | Casings, radiators, fastenings, art. |
|  | Brass | Metals | Good heat transfer, self lubricating. | Heating elements, casings, reliefs, gliding elements. |
|  | Copper | Metals | Great heat transfer, good machinability. | Radiators, heating elements. |
|  | Machining Wax | Others | Excellent machinability. | Casting, casting cores, molds. |
|  | Modelling Board | Others | Excellent machinability. | Casting, casting cores, molds. |
|  | Styrodur | Others | Great insulator. | Advertising materials, composite cores, acoustic diffusers. |



ZMorph Materials Library

# 3D Printing

FFF 3D Printing, also known as additive manufacturing, is a process of making three dimensional solid objects from a digital file. The objects are made by extruding material layer-by-layeruntilthe object is created. FFF 3D Printing is commonly used for production applications, low-cost prototyping, modeling, and design verification with efficient turnaround times. The main advantages of 3D Printing are:

Profitability | Time-effectiveness | Design freedom | Accessibility | Risk reduction

ZMorph VX Multitool 3D Printer is compatible with a vast range of 3D printing materials and offers two high-tech toolheads: Single Plastic Extruder and Dual Extruder with advanced multi-material 3D printing features like printing with PVA support, selective two-material 3D printing, color blending, and image mapping.

| Technical Specs | Metric | Imperial |
|---|---|---|
| Build volume | 235 x 250 x 165 mm | 9.25 x 9.8 x 6.5 inch |
| Layer resolution | 50 –400 microns | |
| Build platform | Heated (up to 100°C) | 212 °F |
| Max. printing temperature | 250°C | 482 °F |
| Max. wall thickness | 0.25 mm | 0.0098 inch |
| Angle accuracy | 60° | |
| Max. working speed | 100 mm/s | 3.9 in/s |

# PLA

PLA (Polylactic Acid) is one of the most common 3D printing materials, it's easy to 3D print, biodegradable and emits low-toxicfumes. PLA is a cost-effective material best for early-stage prototyping,educational facilities, and containers.

Used for molds, consumer goods, architectural models, educational models, containers, medical accessories, prototypes, biodegradable models.

Biodegradable | Low emission | High stiffness | Easy to print

No problem with shrink | Wide range of colours



info@novabeans.com I www.novabeans.com

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 55 °C | 131 °F | ISO 306 |
| Heat deflection temperature | 55 °C | 131 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 16 kJ/m$^2$ | 7,61 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 3500 MPa | 507,63 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,24 g/cm$^3$ | 10,34 lb/gal | ISO 1183/B |
| Melt Flow Index | 6 g/10 min | 6 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 200 –230 °C | 392 –446 °F |
| Bed Temperature | 60 °C | 140 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Open | |

# ABS

ABS (Acrylonitrile Butadiene Styrene) is a sturdy, plastic material with great impact strength and mechanical properties. ABS is a good material for testing, post-processing, low volume manufacturing, and objects where you need a strong, stiff plastic that copes well to external impacts.

Used for prototypes, consumer goods, jigs & fixtures, casings, models requiring high-impact strength, gearing, toys, car interiors.

Dissolvable in acetone | Exceptional impact strength | Good mechanical properties | Good heat resistance

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 94 °C | 201 °F | ISO 306 |
| Heat deflection temperature | 89 °C | 192 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 20 kJ/m$^2$ | 9,52 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 1800 MPa | 261 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,04 g/cm$^3$ | 8,67 lb/gal | ISO 1183/B |
| Melt Flow Index | 40 g/10 min | 40 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 200 –250 °C | 392 –482 °F |
| Bed Temperature | 60 °C | 140 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

# PET-G

PET-G (Polyethylene Terephthalate Glycol) is a common thermoplastic that exhibits industrial strength, barely produces fumes, and is known for its ease of printability and water resistance. PET-G is a perfect choice for low-cost prototyping and complex mechanical components.

Used for bottles, containers, electronic devices housings, precise bearings and gears, photography accessories, transparent elements, models requiring stability of shape.

Stability dimensions | No shrink | Good termal resistance | Scratch resistant | Rigidity | Good electrical properties



info@novabeans.com I www.novabeans.com

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 85 °C | 185 °F | ISO 306 |
| Heat deflection temperature | 70 °C | 158 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 11 kJ/m$^2$ | 5,23 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 1880 MPa | 272 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,27 g/cm$^3$ | 10,59 lb/gal | ISO 1183/B |
| Melt Flow Index | 11 g/10 min | 11 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 230 –250 °C | 446 –482 °F |
| Bed Temperature | 60 –80 °C | 140 –176 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

# Nylon

Nylon (Polyamide) is a thermoplastic well known for its good chemical resistance, toughness, flexibility and abrasion resistance. Nylon is a perfect material choice for functional parts and mechanical applications.

Used for functional prototypes, gear wheels, plain bearings, models that require abrasion resistance, clips, hooks, screw nuts.

- Great mechanical resistance
- Good abrasion resistance
- High impact strength
- Fatigue resistance
- Lightweight

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 170 °C | 338 °F | ISO 306 |
| Heat deflection temperature | 165 °C | 329 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 11 kJ/m$^2$ | 5,23 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 1180 MPa | 171 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,01 g/cm$^3$ | 8,42 lb/gal | ISO 1183/B |
| Melt Flow Index | 8 g/10 min | 8 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 235–250 °C | 455 –482 °F |
| Bed Temperature | 110 °C | 230 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

# HIPS

HIPS (High Impact Polystyrene) is a blend of polystyrene and rubber. It's easy to print with good strength and stiffness profile, recyclable and non-hygroscopic. HIPS is mainly used as support material for ABS prints because it's easily dissolvable in Limonene.

Used for support material, casings, containers, protective elements, mechanical parts, models that require abrasion resistance.

Dissolves in d'limonene | Easy to postprocessing | Lightweight | Water resistance



info@novabeans.com | www.novabeans.com

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 94 °C | 201 °F | ISO 306 |
| Heat deflection temperature | 89 °C | 192 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 7 kJ/m$^2$ | 3,33 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 1800 MPa | 261 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,04 g/cm$^3$ | 8,67 lb/gal | ISO 1183/B |
| Melt Flow Index | 7 g/10 min | 7 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 220 –250 °C | 428 –482 °F |
| Bed Temperature | 70 –80 °C | 158 –176 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

# ASA

ASA (Acrylonitrile Styrene Acrylate) is a thermoplastic that exhibits exceptional chemical resistance and is known for its high impact and temperature resistance. ASA is commonly used for our outdoor applications as it can cope with harsh weather conditions along with UV resistance.

Used for outdoor applications, models that require high UV resistance, sporting elements, good impact strength.

Good impact strength | High temperature resistance | Weather and UV resistance | Dissolves in acetone

# Material Properties Information

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 220 –250 °C | 428 –482 °F |
| Bed Temperature | 85–100 | 185 –212 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

# PMMA

PMMA (Polymethyl Methacrylate) is a transparent scratch resistant thermoplastic that exhibits high tensile and flexural strength, UV tolerance, and impact resistant. PMMA is used for end products and prototyping.

Used for optical applications, UV resistant models, chemical equipment, lamps, protective glass, illuminated signs, electronic casings.

Transparency | UV resistance | High optical properties | Tough | Scratch resistance



info@novabeans.com I www.novabeans.com

# Material Properties Information

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 230–260 °C | 446 –500 °F |
| Bed Temperature | 60 °C | 140 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

# TPE

Flexible filament can be used to 3D print any parts or objects that need to be soft, flexible or moveable. It's durable and resistant to wearing off, which makes it a good choice for technical and mechanical material.

Used for prototypes, end parts, connectors, covers, tools, robotic.

Good thermoplastic and elastic properties

Vibration dampening

Good impact and tensile strength



info@novabeans.com | www.novabeans.com

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 103 °C | 212 °F | ISO 306 |
| Heat deflection temperature | 100 °C | 212 °F | ISO 75 |
| **Mechanical** | | | |
| Flexural modulus | 8 MPa | 1,16 ksi | ISO 37 |
| **Physical** | | | |
| Density | 0,89 g/cm$^3$ | 7,42 lb/gal | ISO 1183/B |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 210 –230 °C | 410 –446 °F |
| Bed Temperature | 70 –120 °C | 158 –248 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Open | |

# PC

PC (Polycarbonate) is a lightweight thermoplastic that has exceptional toughness and great resistance to heat. PC has a high impact strength and it's extremely durable. This material is mainly is used for projects that require to retain their shape during subjecting to high temperatures.

Used for automotive components, molds for silicone casting, lifts, photography accessories.

High impact strength | Self-extinguishing | Good optical properties | Transparency | Dimensional stability | Resistance for weather conditions

# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 55 °C | 131 °F | ISO 306 |
| Heat deflection temperature | 55 °C | 131 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 16 kJ/m$^2$ | 7,61 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 3500 MPa | 507,63 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,24 g/cm$^3$ | 10,34 lb/gal | ISO 1183/B |
| Melt Flow Index | 6 g/10 min | 6 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 230–260 °C | 446 –500 °F |
| Bed Temperature | 85–100 °C | 185 –212 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

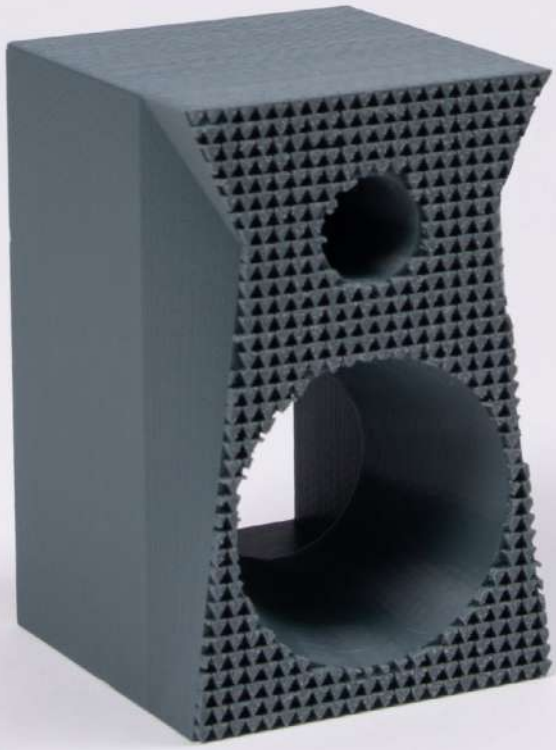
V1 03.2019

# PC/ABS

PC/ABS (Polycarbonate + Acrylic Butadiene Styrene) alloy combines exceptional PC mechanical properties and heat resistance with the ABS printability. PC/ABSis an extremely durable material used for strong and resilient prints.

Used for cantilever elements, clasps, hooks, dashboards, keyboards, buttons, gears, propellers, housings.

Great mechanical durability | Heat resistance | Stiffness | Exceptional impact strenght | UV resistance



# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 115 °C | 239 °F | ISO 306 |
| Heat deflection temperature | 98 °C | 208 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 40 kJ/m$^2$ | 19 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 2650 MPa | 384 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,19 g/cm$^3$ | 9,93 lb/gal | ISO 1183/B |
| Melt Flow Index | 11 g/10 min | 11 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 240 –260 °C | 464 –500 °F |
| Bed Temperature | 110 °C | 230 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

V1 03.2019

# PP

PP (Polypropylene) is a durable and lightweight material that exhibits very good heat and fatigue resistance. PP has a high level of flexibility and is resistant to many chemicals. Thanks to its excellent properties PP is commonly used for prototyping, electronic components, and lab equipment.

Used for mechanical parts, covers, housings, chemical accessories, containers, caps, pump valves.

Lightweight | Good chemical resistance | Resistance to moisture | Good heat and fatigue resistance

# Material Properties Information

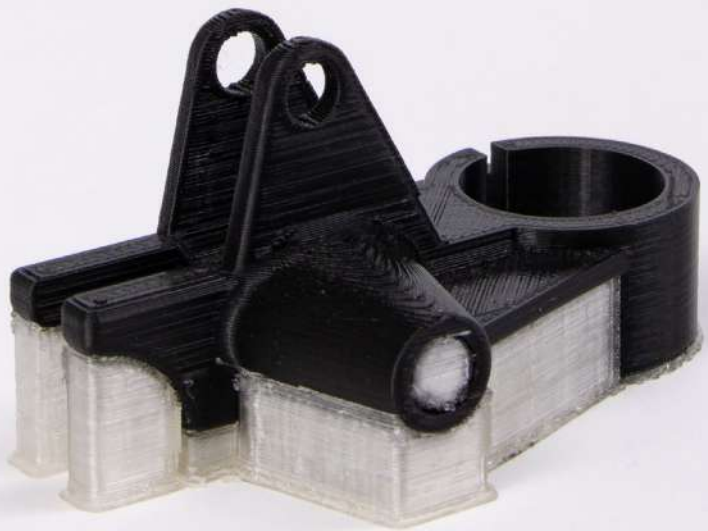
| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 210–230 | 410 –446 °F |
| Bed Temperature | 100–120 °C | 212 –248 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Open | |

# PVA

PVA (Polyvinyl Alcohol) is a biodegradable and water-soluble material for multi-extrusion 3D printing. PVA doesn't require special solvents as it's perfectly dissolvable in the water. PVA is the go-to support material for 3D printing complex designs with internal cavities, hollow spaces and large overhangs. It works great with PLA and Nylon.

Used for support for complex designs, molds for metal casting.

Dissolves in water | Biodegradable



# Material Properties Information

| Material Properties | Metric | Imperial | Method |
|---|---|---|---|
| **Thermal** | | | |
| Vicat softening temperature | 55 °C | 131 °F | ISO 306 |
| Heat deflection temperature | 55 °C | 131 °F | ISO 75 |
| **Mechanical** | | | |
| Impact strength | 16 kJ/m$^2$ | 7,61 lbf/in$^2$ | ISO 179 |
| Flexural modulus | 3500 MPa | 507,63 ksi | ISO 178 |
| **Physical** | | | |
| Density | 1,24 g/cm$^3$ | 10,34 lb/gal | ISO 1183/B |
| Melt Flow Index | 6 g/10 min | 6 g/10 min | ISO 1133 |

| Printing Properties | Metric | Imperial |
|---|---|---|
| Printing Temperature | 230–260 °C | 446 –500 °F |
| Bed Temperature | 85–100 °C | 185 –212 °F |
| Nozzle | 0,2 mm, 0,3 mm, 0,4 mm | |
| Printer Space | Closed | |

V1 03.2019



ZMorph Materials Library

# CNC Milling

CNC milling is a form of computer numerical controlled machining. It is one of the most common subtractive manufacturing technologies where the material is removed from a solid block using cutting tools to manufacture a part from a CAD model. Thanks to its versatility & repeatability CNC milling is widely used for low-to-mass production, prototyping, mechanical parts and more. The main advantages of CNC Milling are:

Accuracy | Versatility | Repeatability | Reproducibility

Turn ZMorph VX Multitool 3D Printer into a CNC unit with CNC PRO Toolhead, that works with a wide range of materials including plastics, composites, metals, and foams. Dedicated CNC worktable additionally ensures safety during the fabrication process.

| Technical Specs | Metric | Imperial |
|---|---|---|
| X, Y, and Z operations strokes | 235 x 250 x 85 mm | 9.25 x 9.8 x 3.35 inch |
| Mechanical resolution | 0.014 x 0.0006 mm | 0.00055-0.0002 inch |
| Repeatable tolerance | +/-0.1mm | 0.004 inch |
| Operation speed | 6 -1800 mm/min | 0,24-70,87 inch/min |
| Maximum spindle rotation | 9.200 rpm | |
| Spindle motor | DC motor Type 300W | |
| Cutting tool chuck | Collet method ER11 | |

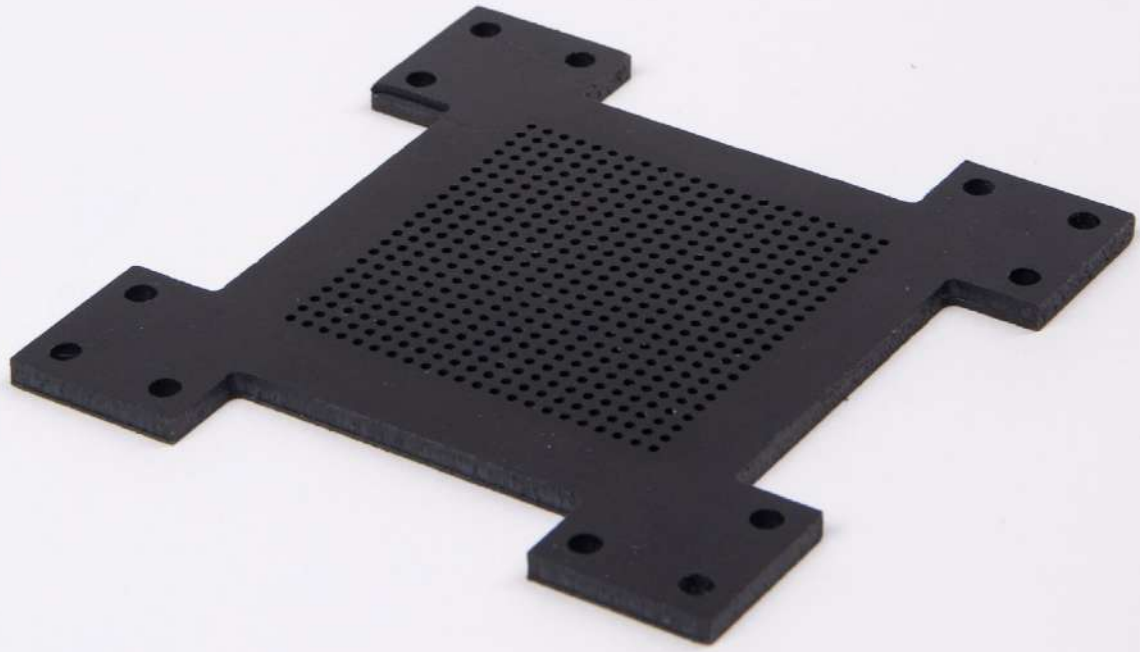
Following materials may be dangerous for your health. During milling and engraving always make sure that you and your surroundings are protected against all hazardous factors.

# ABS

ABS (Acrylonitrile Butadiene Styrene) is a common thermoplastic known for its high impact strength, good heat resistance, and outstanding machinability. ABS is widely used for proto-typing applications thanks to its properties and cost-effectiveness.

Used for casings, car parts, protective elements.

Good machinability | High stiffness | Good impact strength



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●○○ | |
| Tensile Strength | 35 MPa | 5,100PSI |
| Elongation at Break | 40% | |
| Hardness | Rockwell R100 | |
| Density | 0,97 g/cm$^3$ | 0.035 lbs / cu. in |
| Maximum Temp | 71 °C | 160 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# Nylon

Nylon (Polyamide) is an engineeringthermoplastic that offers excellent abrasion resistance, high impact strength, electrical insulation, and good mechanical properties. Nylon is easy to machine, and ideal for jigs, fixtures, and wear blocks.

Used for cogwheels, dampening elements.

High tensile strength | Lightweight | Low friction coefficient

Does not burn –it just melts

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●●○ | |
| Tensile Strength | 77 MPa | 11,200PSI |
| Elongation at Break | 50% | |
| Hardness | Rockwell R110 | |
| Density | 1,13 g/cm$^3$ | 0.041 lbs / cu. in |
| Maximum Temp | 85 °C | 185 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–12 |
| 1 | 1–12 |
| 1.5 | 1–12 |

# HDPE

HDPE (High-Density Polyethylene) is a thermoplastic with exceptional moisture and chemical resistant that has a good impact strength and large strength-to-densityratio. HDPE is resistant to many solvents, and it's popular for outdoor applications thanks to its good weather resistance.

Used for casings, tooling/fixturing,prototyping.

Sturdy | Excellent machinability

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 28 MPa | 4,000PSI |
| Elongation at Break | 500% | |
| Hardness | Rockwell R65 | |
| Density | 0,97 g/cm$^3$ | 0.035 lbs / cu. in |
| Maximum Temp | 82 °C | 180 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# PTFE

PTFE (Polytetrafluoroethylene) is an engineering thermoplastic characterized by chemical inertness, exceptional low friction coefficient, and high heat resistance. Teflon offers exceptional thermal resistance and its use in cold temperature environments.

Used for sliding elements, joints.

Good heat and chemical resistance | Low friction coefficient | Flexible

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●○○ | |
| Tensile Strength | 31 MPa | 4,500PSI |
| Elongation at Break | 300% | |
| Hardness | Rockwell R60 | |
| Density | 1.27 g/cm$^3$ | 0.046 lbs / cu. in |
| Maximum Temp | 204 °C | 400 °F |

## Work Parameters

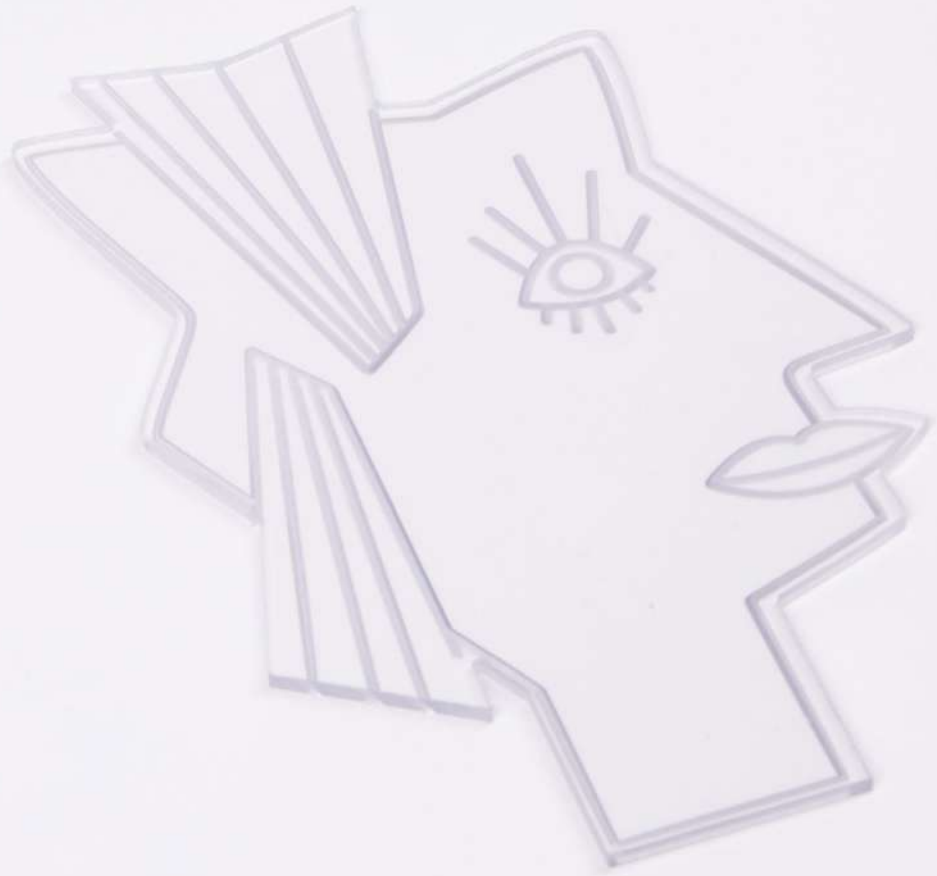
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–12 |
| 1 | 1–12 |
| 1.5 | 1–12 |

# PC

PC (Polycarbonate) is a popular engineering thermoplastic that has an excellent impact strength, is heat resistant and it's easy to machine. PC is a good choice for heat–resistant and outdoor applications.

Used for advertising materials, transparent protective elements.

Impact resistance | Good creep | FDA compliant



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 55 MPa | 8000 PSI |
| Elongation at Break | 110% | |
| Hardness | Rockwell R120 | |
| Density | 1,24 g/cm$^3$ | 0.045 lbs / cu. in |
| Maximum Temp | 82 °C | 180 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–12 |
| 1.5 | 1–2 |

# PP

PP (Polypropylene) is a thermoplastic polymer with great chemical and solvent resistance that offers good impact strength and thermal resistance. Thanks to its properties PP is widely used for laboratory and manufacturing applications.

Used for amortizing dampening, casings, clamps.

Moisture resistance | FDA compliant grades available

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 17 MPa | 2,500PSI |
| Elongation at Break | 34% | |
| Hardness | Rockwell R55 | |
| Density | 1,16 g/cm$^3$ | 0.042 lbs / cu. in |
| Maximum Temp | 80 °C | 176 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 6–12 |
| 1 | 6–12 |
| 1.5 | – |

## CNC Milling –Plastics

# POM

POM (Polyoxymethylene) is an engineering thermoplastic characterized by high stiffness, low friction, and dimensional stability. POM is an easily machinable material perfect for wide applications like mechanical gears, sliding and guiding elements or medical applications.

Used for cogwheels, bearing supports, connector elements.

Chemical resistance | Abrasion resistance | Excellent rigidity

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 62 MPa | 9,000PSI |
| Elongation at Break | 25% | |
| Hardness | Rockwell M90 | |
| Density | 1,41 g/cm$^3$ | 0.051 lbs / cu. in |
| Maximum Temp | 82 °C | 180 °F |

## Work Parameters

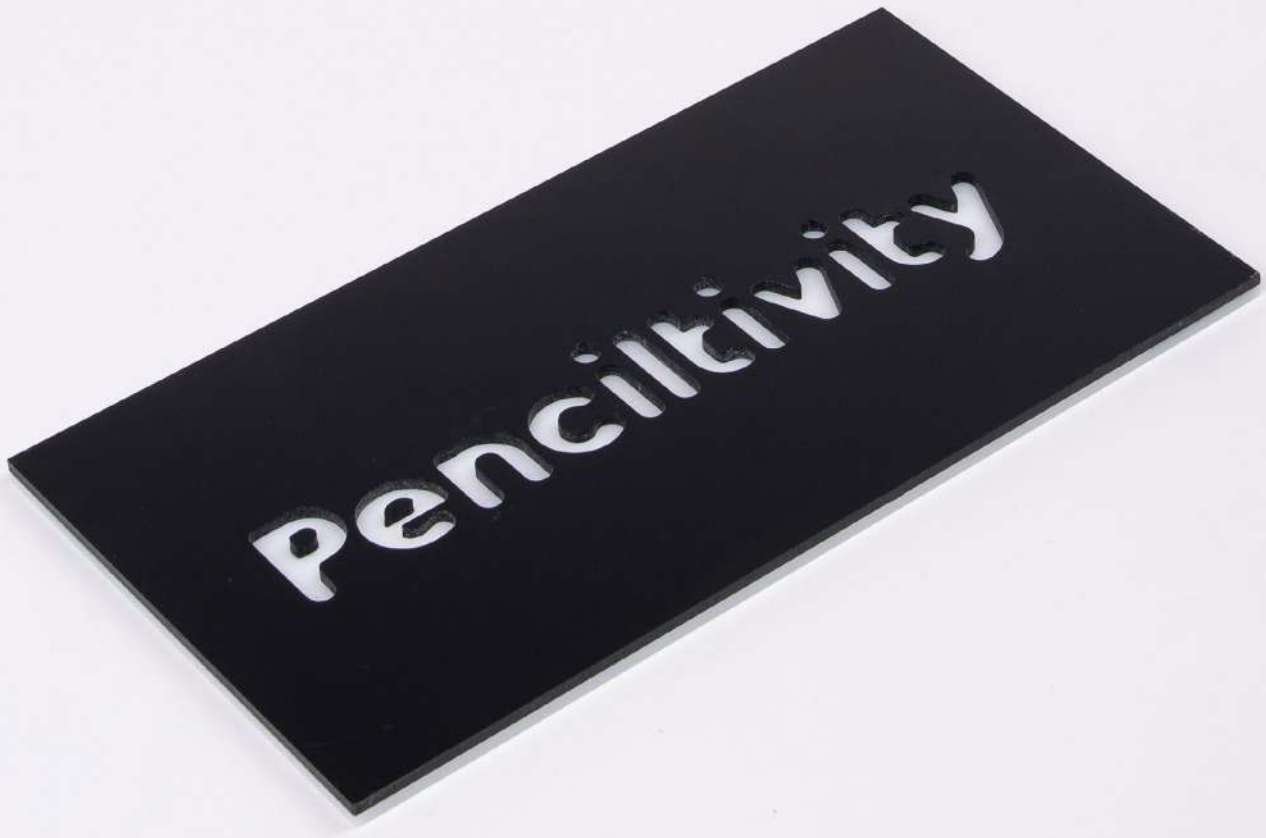
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# PMMA

PMMA (Polymethylmethacrylate) is a mostly optically clear or opaque plastic that comes in a variety of colors and textures. Acrylic is mostly used for art, jewelry, and optical applications.

Used for advertising materials, casings, office equipment.

Good hardness and stiffness | Low water absorption | Exceptional UV resistance



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 55 MPa | 8,000PSI |
| Elongation at Break | 6% | |
| Hardness | Rockwell M95 | |
| Density | 1,19 g/cm$^3$ | 0.043 lbs / cu. in |
| Maximum Temp | 77 °C | 170 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 5–15 |
| 1 | 5–15 |
| 1.5 | – |

## CNC Milling –Plastics

# PVC

PVC (Polyvinyl Chloride) is a common plastic polymer that exhibits high hardness and mechanical properties along with high chemical resistance and exceptional insulating properties. PVC is easily machinable material making it a popular choice for manufacturing.

Used for advertising materials, casings, office equipment.

Lightweight | Weather resistance | Abrasion resistance

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 41 MPa | 6,000PSI |
| Elongation at Break | 272% | |
| Hardness | Rockwell R115 | |
| Density | 1,38 g/cm$^3$ | 0.050 lbs / cu. in |
| Maximum Temp | 60 °C | 140 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–12 |
| 1 | 1–12 |
| 1.5 | 1–3 |

# HIPS

HIPS (High Impact Polystyrene) is an inexpensive sturdy plastic material that is easy to machine and delivers high impact strength, great thermoforming characteristics and it's easy to glue, paint and print.

Used for advertising materials, casings, fixtures, shelves, models, and prototypes.

Good machinability | Impact resistance | Insulator | Good impact resistance | Paintable

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 35 MPa | 5,100PSI |
| Elongation at Break | 40% | |
| Hardness | Rockwell R100 | |
| Density | 0,97 g/cm$^3$ | 0.035 lbs / cu. in |
| Maximum Temp | 71 °C | 160 °F |

## Work Parameters

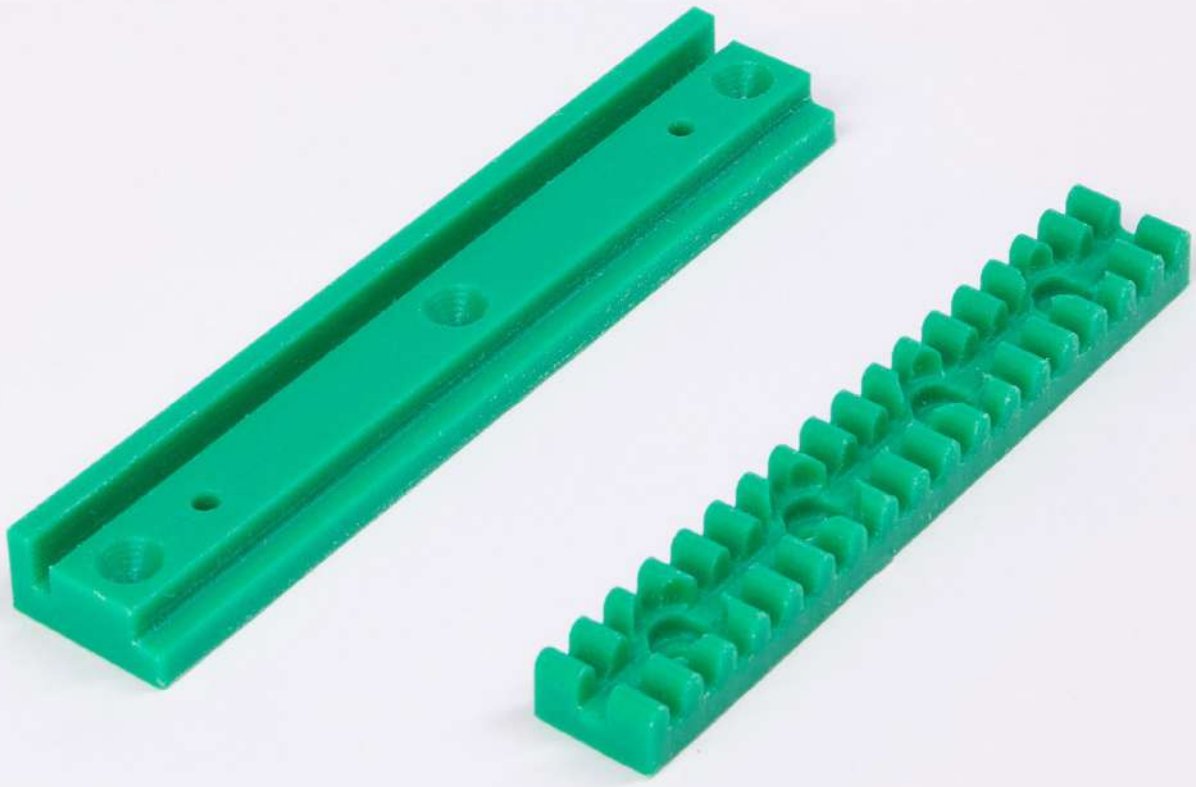
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 3 –12 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# LDPE

LDPE (Low–density Polyethylene) has excellent moisture resistance, plus it is softer, more malleable, and easier to form than other types of polyethylene. LDPE is a low–cost material that offers a good stability to temperature. It's often used for tanks, laboratory containers, bearings, and sliding rails.

Used for sliding rails, gibs, applications requiring low temperature flexibility, toughness, and durability.

Moisture resistance | FDA compliant



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●○○ | |
| Tensile Strength | 10 MPa | 1,450PSI |
| Elongation at Break | 549 % | |
| Hardness | Rockwell R10 | |
| Density | 0,91 g/cm$^3$ | 0.033 lbs / cu. in |
| Maximum Temp | 80 °C | 176 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 7–12 |
| 1 | 7–12 |
| 1.5 | 7–12 |

# PET

PET (Polyethylene Terephthalate) is a common thermoplastic polymer that's very strong and lightweight and exhibits excellent electrical insulating properties. PET has exceptional resistance to alcohols, oils, and greases and is widely used cosmetic containers, gear housings, and engine covers.

Used for casings, forms.

Water resistance | Durable | Good thermal isolating properties | FDA compliant | Immune to fracturing

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●●● | |
| Tensile Strength | 55 MPa | 8,000PSI |
| Elongation at Break | 125% | |
| Hardness | Rockwell R125 | |
| Density | 0.05 g/cm$^3$ | 1,38 lbs / cu. in |
| Maximum Temp | 150 °C | 302 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 3–12 |
| 1 | 3–12 |
| 1.5 | 5–12 |

# Carbon

Carbon is a composite material with an excellent strength–to–weightratio, high impact strength, low weight, and high–temperature tolerance. It's used as a lightweight alternative to materials like aluminum and for applications like industrial automation and robotics, drones, aerospace tooling, and manufacturing fixtures.

Used for drones, construction plates, industrial automation, robotics, aerospace tooling.

Lightweight | Sturdy | High stress resistance



info@novabeans.com I www.novabeans.com

# Material Properties Information

## Mechanical Properties

| | |
|---|---|
| Machining Difficulty | |
| Tensile Strength | |
| Elongation at Break | All properties are strongly dependent on force direction and material of composite matrix |
| Hardness | |
| Density | |
| Maximum Temp | |

## Work Parameters

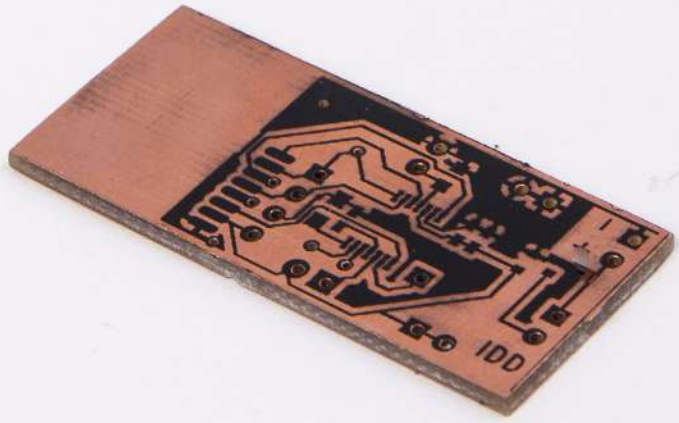
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–4 |
| 1 | 1–3 |
| 1.5 | – |

# CCL FR4

FR4 is a composite material composed of woven fiberglass cloth with an epoxyres in binder. It exhibits electrical isolation and mechanical strength and its the go-tooption for short-run PCB production and prototyping.

Used for PCBs.

Sturdy | Bending resistance



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulity |  | |
| Tensile Strength | 262 MPa | 38,000PSI |
| Elongation at Break | 0.01% | |
| Hardness | Rockwell M110 | |
| Density | 1,88 g/cm$^3$ | 0.068 lbs / cu. in |
| Maximum Temp | 122 °C | 252 °F |

## Work Parameters

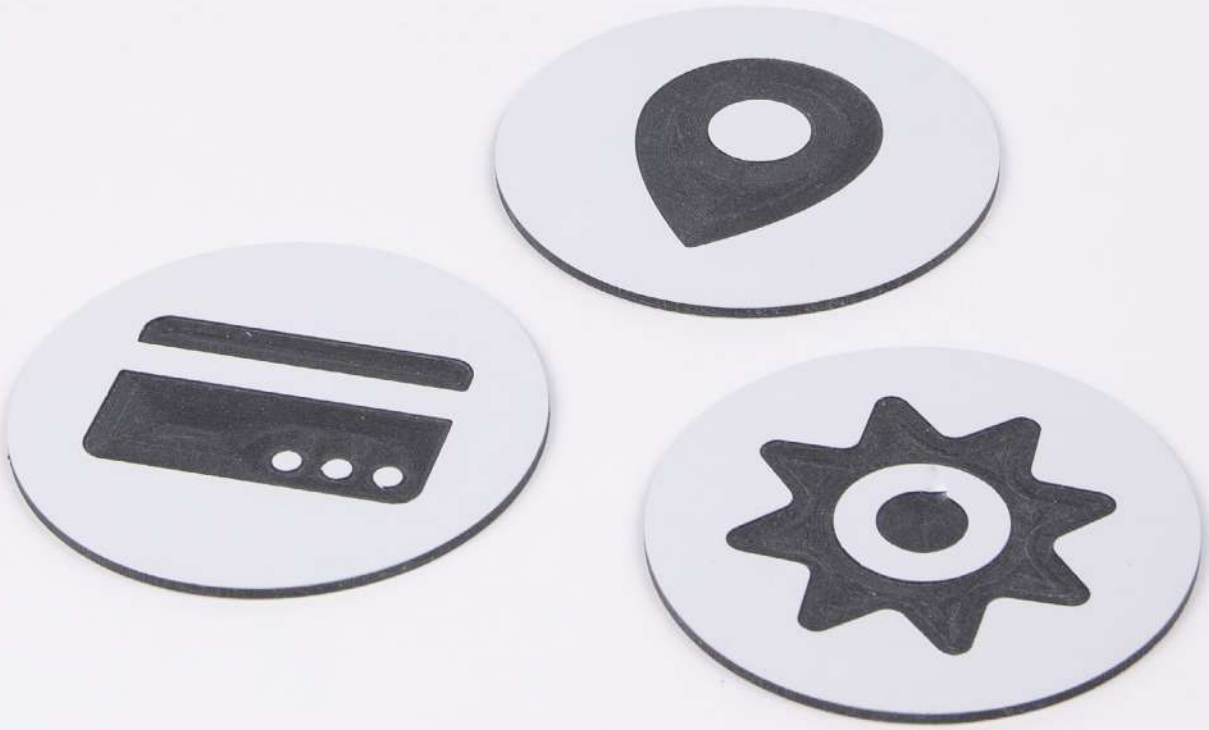
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–5 |
| 1 | 1–5 |
| 1.5 | 1–4 |

# Dibond

Dibond is a brushed aluminum composite sheet with polyethylene core known for its high--Strength and low-weight ratio. It's easily machinable and presents great damage resistance. Dibond is waterproof, and it's ideal for outdoor signage and advertising displays.

Used for casings, advertising materials, signs.

Lightweight Sturdy



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | 160 MPa | 23,200PSI |
| Elongation at Break | 3% | |
| Hardness | Rockwell M110 | |
| Density | Dependant on thickness of the material | |
| Maximum Temp | 80 °C | 176 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–5 |
| 1 | 1–5 |
| 1.5 | 1–5 |

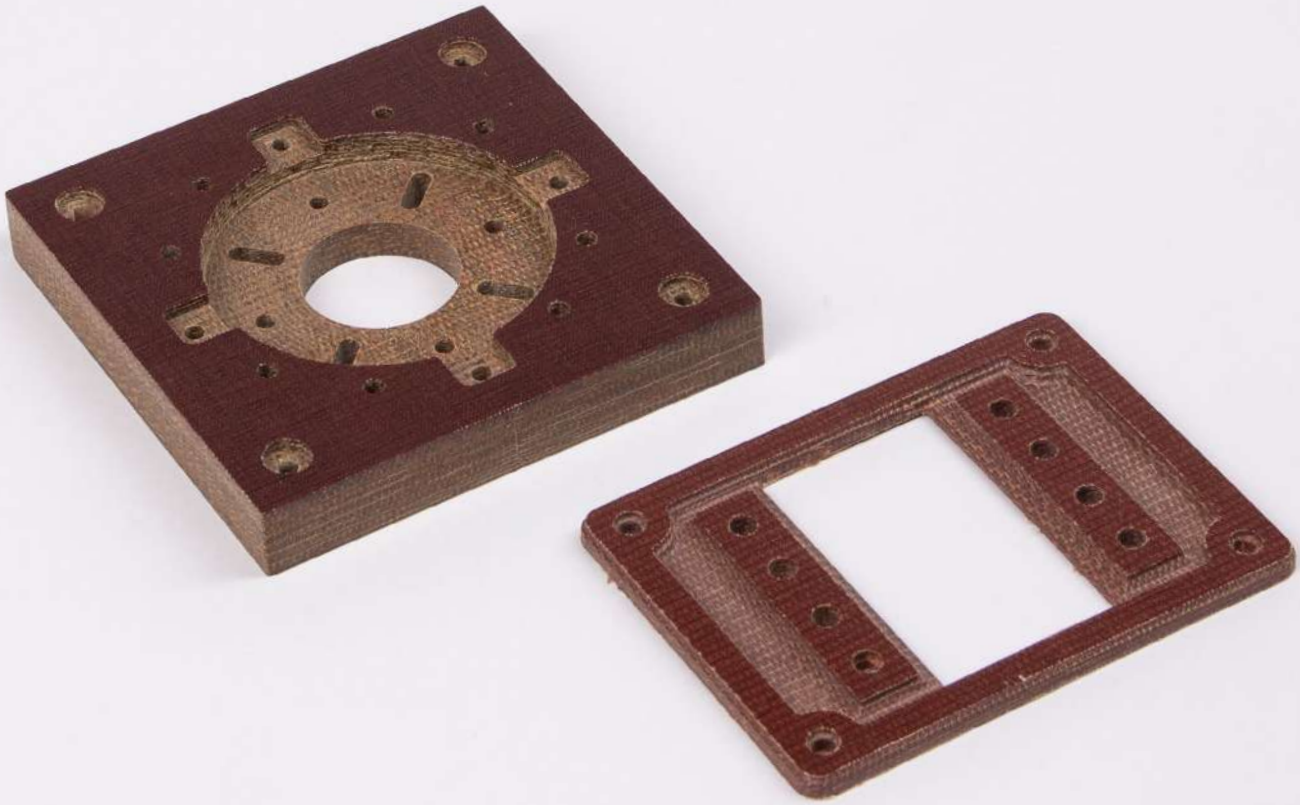
## CNC Milling -Composites

# TCF

TCF (Textolite Laminated Sheet) structural material that exhibits good mechanical and anti-friction characteristics. It's easy machinable and resistant to heat. TCF is used mainly for insulators, electrical winding insulation, and dielectric panels.

Used for electrical isolations, stencils.

High thermal durability



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty |  | |
| Tensile Strength | – | – |
| Elongation at Break | – | |
| Hardness | Brinell HB25 | |
| Density | 1,30 g/cm$^3$ | .047 lbs/cu. in. |
| Maximum Temp | 150 °C | 302 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

## CNC Milling –Wood derivatives

# Wood

Wood is one of the most common material for CNC milling and it's easily machinable. There are two different types of wood (hardwood and softwood), that differ from each other with hardness and density. Wood is commonly used for art projects, furniture, prototypes and more.

Used for art, reliefs, panels, casings.

Fully biodegradable | Good machinability

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●○○ | |
| Tensile Strength | 35 MPa | 5,100PSI |
| Elongation at Break | Depends on the type of wood | |
| Hardness | | |
| Density | | |
| Maximum Temp | | |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# Plywood

Plywood is a low-cost material made up from thin layers of wood sheets glued together. It's an exceptionally versatile material and a common choice for a wide range of applications such as packages, boxes, modeling, and constructing.

Used for mockups, prototypes, casings, constructing.

Excellent machinability | Lightweight

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●○○ | |
| Tensile Strength | 27 –34 MPa | 4000 –5000 PSI |
| Elongation at Break | | |
| Hardness | Depends on the type of plywood | |
| Density | | |
| Maximum Temp | | |

## Work Parameters

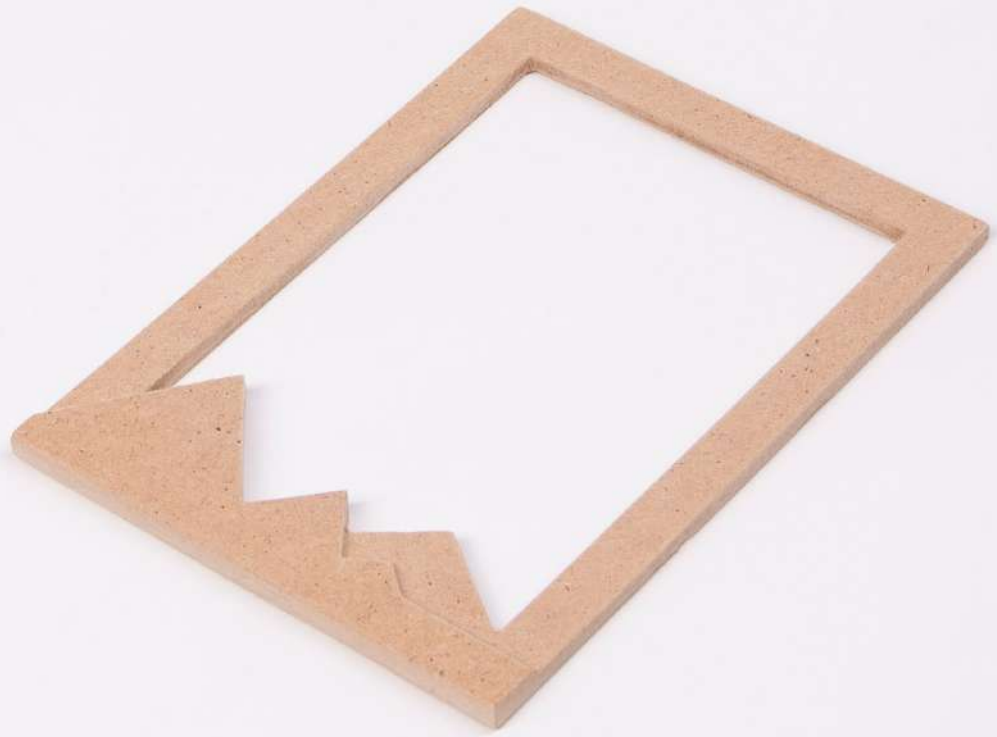
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# HDF

HDF (High-density fiberboard) is a type of engineered wood product made from wood fiber extracted from wood waste. HDF offers high dimensional stability, strength characteristics, and exceptional processing properties.

Used for furniture, mockups, casings, art.

Paintable



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●○○ | |
| Tensile Strength | – | – |
| Elongation at Break | – | – |
| Hardness | – | – |
| Density | 10,49 g/cm$^3$ | 0.018 lbs/cu. in. |
| Maximum Temp | – | – |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# Cardboard

Cardboard is a paper-based material exhibiting good mechanical attributes. Cardboard is a durable and fully recyclable material that can be easily customized.

Used for packaging goods, hardcovers for books, advertising materials.

Eco-friendly | Cheap | Insulating

# Material Properties Information

## Mechanical Properties

| | |
|---|---|
| Machining Difficulity | |
| Tensile Strength | |
| Elongation at Break | All properties are strongly dependent on type of cardboard |
| Hardness | |
| Density | |
| Maximum Temp | |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# Aluminum

Aluminum 5754 is one of the most popular metals in the world with an exceptional strength-to-weight ratio, excellent machinability, and great corrosion resistance. Aluminum 5754 exhibits higher strength than 5251 and it's often used for prototyping and end parts manufacturing.

Used for casings, radiators, fastenings, art.

Lightweight | Good machinability | Good heat transfer

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulity | ●●● | |
| Tensile Strength | 310 MPa | 45,000PSI |
| Elongation at Break | 12% | |
| Hardness | Rockwell B60 | |
| Density | 2,71 g/cm$^3$ | 0.098 lbs / cu. in |
| Maximum Temp | 200 °C | 392 °F |

## Work Parameters

| Operation | Cutting/Engraving |
|---|---|
| Cutting Speed | 1.50 mm/s |
| Lead in/out speed | 1.25 mm/s |
| Max. step down | 0.15 mm |

# Brass

Brass M63 is an alloy of Copper and Zinc that is easily machinable, corrosion resistant and exhibits low friction. Thanks to its properties brass is often used for decorative items, gears, locks, and bushings.

Used for heating elements, casings, reliefs, sliding elements.

Good heat transfer | Self lubricating

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulty | ●●● | |
| Tensile Strength | 496 MPa | 72,000PSI |
| Elongation at Break | 53% (UNS C36000) | |
| Hardness | Rockwell B70 | |
| Density | 7,75 g/cm$^3$ | 0.28 lbs / cu. in |
| Maximum Temp | 149 °C | 300 °F |

## Work Parameters (Brass M63)

| Operation | Cutting/Engraving |
|---|---|
| Cutting Speed | 1.50 mm/s |
| Lead in/out speed | 1.00 mm/s |
| Max. step down | 0.10 mm |

## Work Parameters (Brass MZN12)

| Operation | Cutting/Engraving |
|---|---|
| Cutting Speed | 1.00 mm/s |
| Lead in/out speed | 0.8 mm/s |
| Max. step down | 0.05 mm |

# Copper

Copper M1ER a popular metal with exceptional electric conductivity, high corrosion resistance, and great thermal conductivity. Copper is easily machinable and often used in applications like cooling systems, heat exchangers, valves and radiators.

Used for radiators, heating elements.

Great heat transfer | Good machinability

# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulity | ●●● | |
| Tensile Strength | 210 MPa | 30,500PSI |
| Elongation at Break | 60 % | |
| Hardness | Rockwell B51 | |
| Density | 8,96 g/cm$^3$ | 0.324 lbs / cu. in |
| Maximum Temp | 260 °C | 500 °F |

## Work Parameters

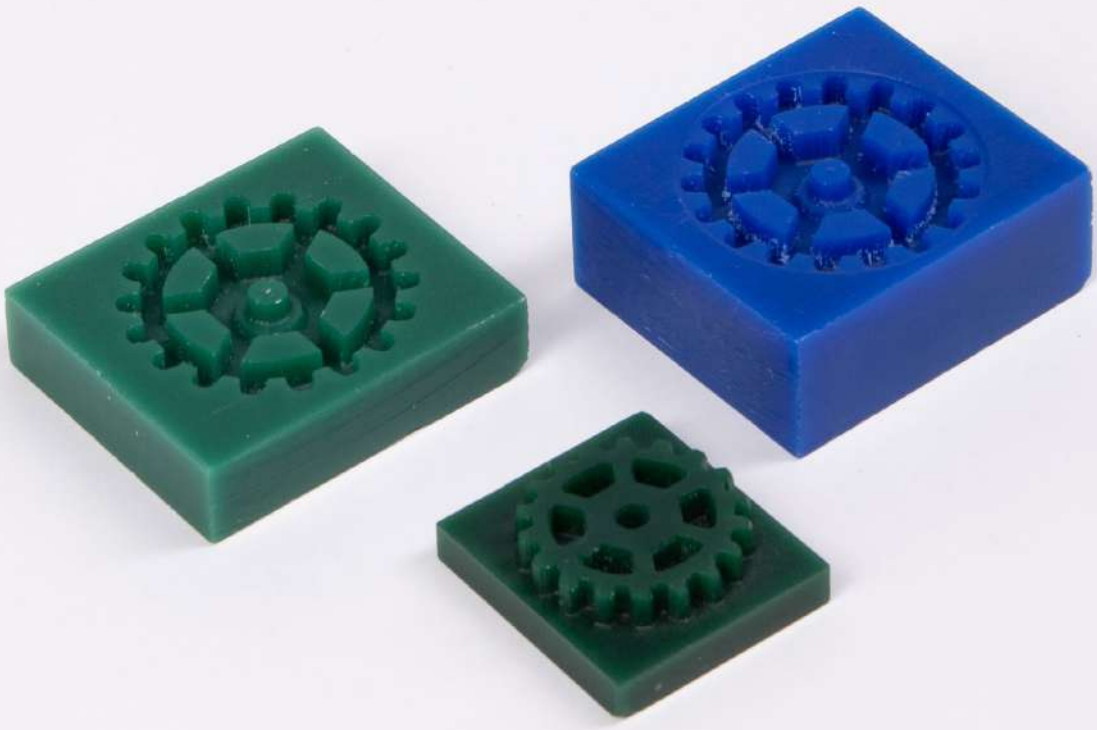
| Operation | Cutting/Engraving |
|---|---|
| Cutting Speed | 1.75 mm/s |
| Lead in/out speed | 1.25 mm/s |
| Max. step down | 0.15 mm |

# MachiningWax

Machining Wax is an exceptionally hard synthetic wax mixed with plastic that delivers excellent machining properties, quality of finish and dimensional accuracy. Machining Wax is recyclable and reusable, and it's used to produce accurate molds, prototypes, and jewelry.

Used for casting, casting cores, molds, CNC program proofs.

Excellent machinability



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulity | ●○○ | |
| Tensile Strength | – | – |
| Elongation at Break | – | – |
| Hardness | Rockwell B110–113 | |
| Density | 0,91 g/cm$^3$ | 0.034 lbs / cu. in |
| Maximum Temp | 69 °C | 157 °F |

## Work Parameters

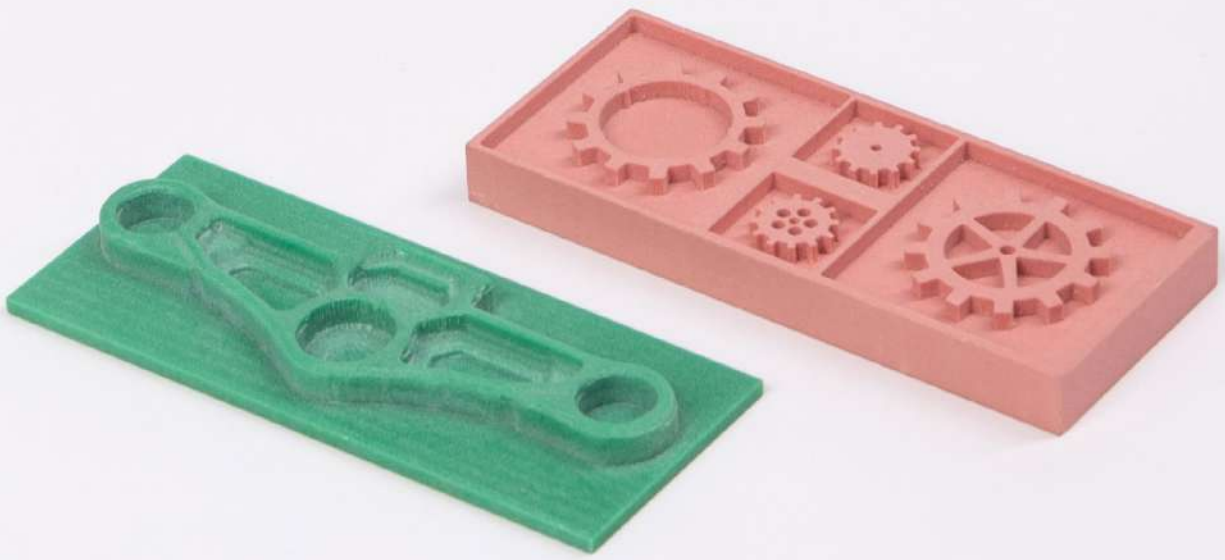
| Operation | Cutting/Engraving |
|---|---|
| Cutting Speed | 1.75 mm/s |
| Lead in/out speed | 1.25 mm/s |
| Max. step down | 0.15 mm |

# Modelling Board

Modelling Board (Polyurethane Tooling Block) a highly machinable pored polyurethane–based light molding material compatible with a wide range of finishes and releases agents. Modelling Board offers great surface finish and is used mainly for molding whenever quick and accurate prototypes are needed. Modeling Boards differs from each other with density and temperature resistance.

Used for casting, casting cores, molds.

Excellent machinability



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulity | ●○○ | |
| Tensile Strength | 19 –75 MPa | 2,800 –10,900 PSI |
| Elongation at Break | – | |
| Hardness | – | |
| Density | – | – |
| Maximum Temp | – | – |

## Work Parameters

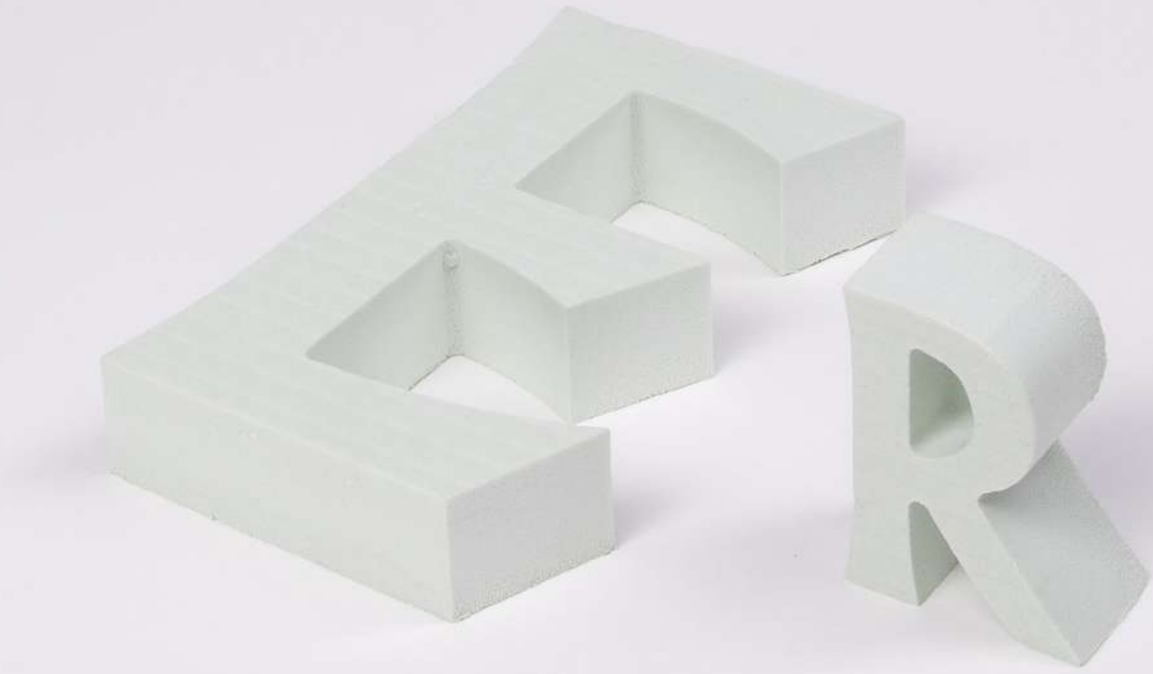
| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |

# Styrodur

Extruded Polystyrene Foam also known as Styrodur offers high stiffness, surface roughness, and reduced thermal conductivity. Extruded Polystyrene Foam is used for crafts, architectural models, and for advertising applications.

Used for advertising materials, composite cores, acoustic diffuser.

Great insulator



# Material Properties Information

| Mechanical Properties | Metric | Imperial |
|---|---|---|
| Machining Difficulity | ●○○ | |
| Tensile Strength | – | – |
| Elongation at Break | – | – |
| Hardness | – | – |
| Density | 0,04 g/cm$^3$ | 0.001 lbs / cu. in |
| Maximum Temp | 75 °C | 167 °F |

## Work Parameters

| Stepdown [mm] | Speeds [mm/s] |
|---|---|
| 0.5 | 1–15 |
| 1 | 1–15 |
| 1.5 | 1–15 |


Zmorph
GARDEN

ZMorph Materials Library

# Laser Cutting & Engraving

Laser engraving workflow uses a laser diode to engrave objects. The laser is programmed in software to follow a pre-designedpath in a 2D model. The same workflow applies to laser cutting, but in this type of subtractive manufacturing, the laser usually follows the path more than once or much lower speed is applied. Laser cutting & engraving are fast and clean processes that allow a much more precise job than manual labor. This type of manufacturing is mostly used for signage & customization. The main advantages of laser are:

Accuracy | Speed | Repeatability | Clean process

Laser PRO Toolhead enables to turn ZMorph VX Multitool 3D Printer into a laser cutter & engraver that works with a wide range of materials including plastics, composites or foams. A dedicated worktable comes with preset holes for better material holding.

| Technical Specs | Metric | Imperial |
|---|---|---|
| Working area | 235 x 250 x 85mm | 9.25 x 9.8 x 3.35 inch |
| Laser power | 2.8W Blue Diode | |
| Maximum working speed | 150 mm/s | 5.9 in/s |
| Resolution | 0.12 mm | 0.0047 inch |
| Noise level | 36 db | 36 db |
| Wavelength | 450 nm | 450 nm |

Following materials may be dangerous for your health. During laser cutting and engraving always make sure that you and your surroundings are protected against all hazardous factors.

# Leather

A very versatile tough and durable material that can be used for various leather goods like purses, wallets, cases, belts, labels or decorative elements. Both genuine and artificial leather can be laser cut or engraved on.

Used for jewelry, engraved accessories, leather labels

Engraving Cutting

## Laser Cutting & Engraving

# Felt

A soft textile material used mostly for decorations. It's made of fibers condensed and pressed together. It can be efficiently laser cut in order to obtain custom shapes.

Used for jewelry and decorations, furniture pads, coasters.

Engraving Cutting

V1 03.2019

# Laser Foil

An elastic and flexible material ready for laser engraving and cutting. It's thin and resistant to high temperatures, dissolvents and abrasion.

Used for stickers, advertising materials.

Engraving Cutting

novabeans

## Laser Cutting & Engraving

# Cardboard

The biggest advantage is the price. It can be easily cut with laser and therefore works great as stencils.

Used for blanking dies, stencils, French curves.

Engraving Cutting


V1 03.2019

# Foamiran

A delicate and elastic foam that can be laser-cutwith ease. Its structure and features make It's a good choice for decorative elements.

Used for jewelry and decorations, paddings.

Engraving Cutting

novabeans

## Laser Cutting & Engraving

# Wood fibre board

A composite wood product made from sawmill shavings or wood chips. It's used in furniture and can be laser engraved on to achieve custom designs or signatures.

Used for stencils, frame engraving.

Engraving

V1 03.2019 

# Plywood

Composed of thin layers of wood veneer. Laser engraving & cutting in plywood is mostly used for decorative elements, art and crafts.

Used for decorations, pictures.

Engraving

novabeans

## Laser Cutting & Engraving

# Wood

Wood can be easily engraved on and therefore allows for custom designed shapes and signage. Wood comes in various shapes and forms and it's best to laser engrave on end products.

Used for engraving on end products.

Engraving

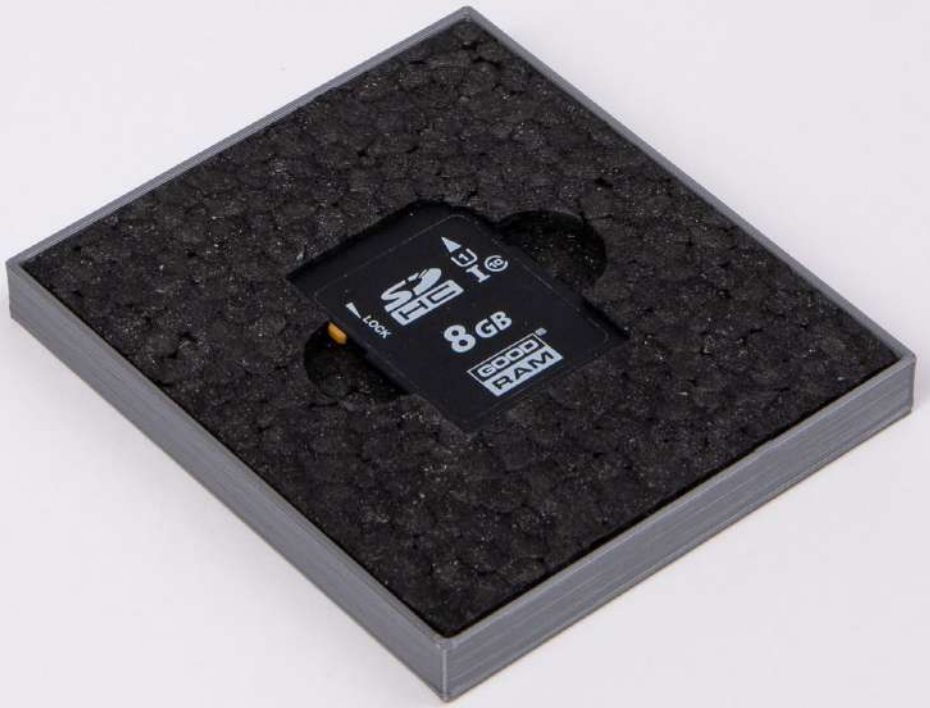
V1 03.2019

# EPP

EPP is resistant to most solvents, water and humidity. EPP usually comes in blocks that can be laser cut out to custom shapes. Use it as a filling in packages to safely store small elements or products.

Used for package fillings for better product holding (e.g. small SD cards).

Engraving Cutting



novabeans

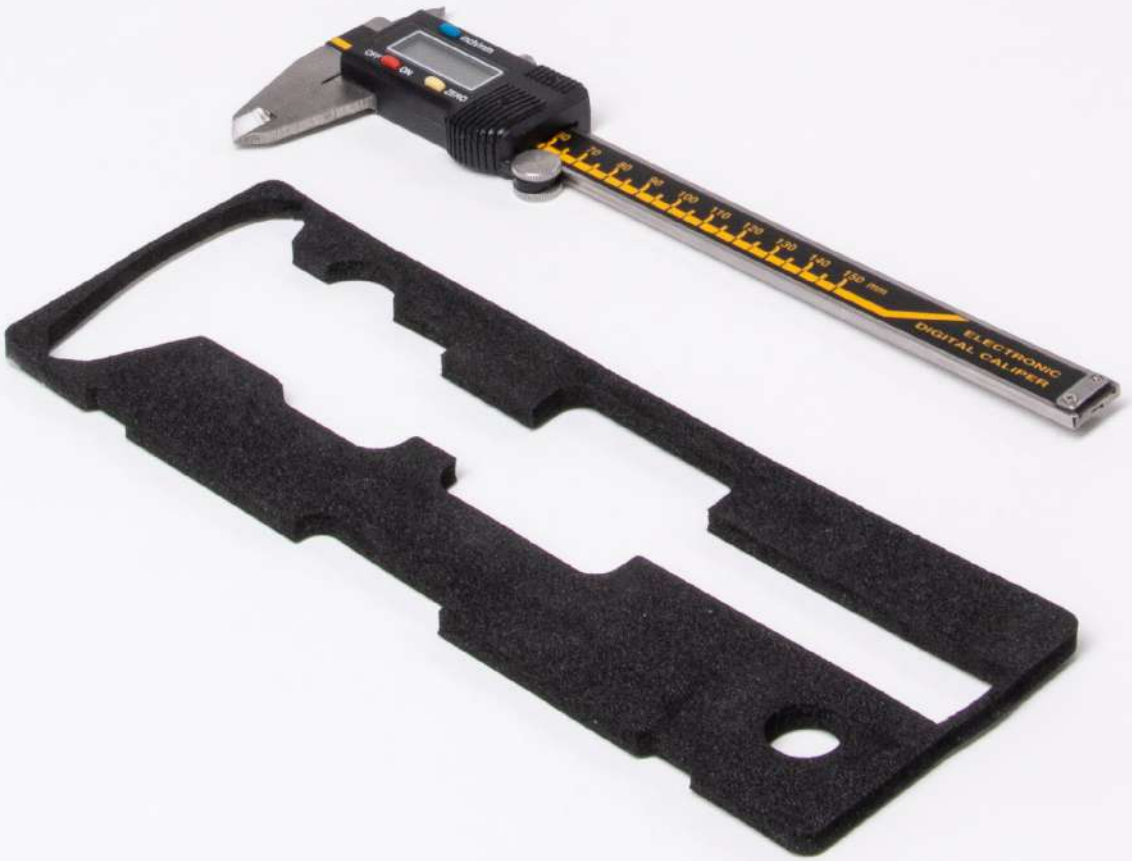
## Laser Cutting & Engraving

# EVA Foam

Thanks to a high density of cells, EVA foam is a good material for laser cutting. It's main characteristsic are very low water absorption, softness, good shock-absorptionand resistance to atmospheric agent.

Used for accessories, casings.

Engraving Cutting



## The Official ZMorph Applications Catalog

Discover true versatility –explore 90+pages of stunning creations made with ZMorph Multitool 3D Printer. Con–cept models, functional prototypes, low volume production and more. It's all in the catalog.

Click here to start exploring ZMorph Applications Catalog.

## ZMorph Academy

Comprehensive online platform for ZMorph VX users. With almost 100 courses full of videos, pictures, and exercises, ZMorph Academy is designed to create and build your skills with 3D printing, CNC milling, and laser engraving. After finishing, the user will be able to make custom working PCBs and other complex projects.

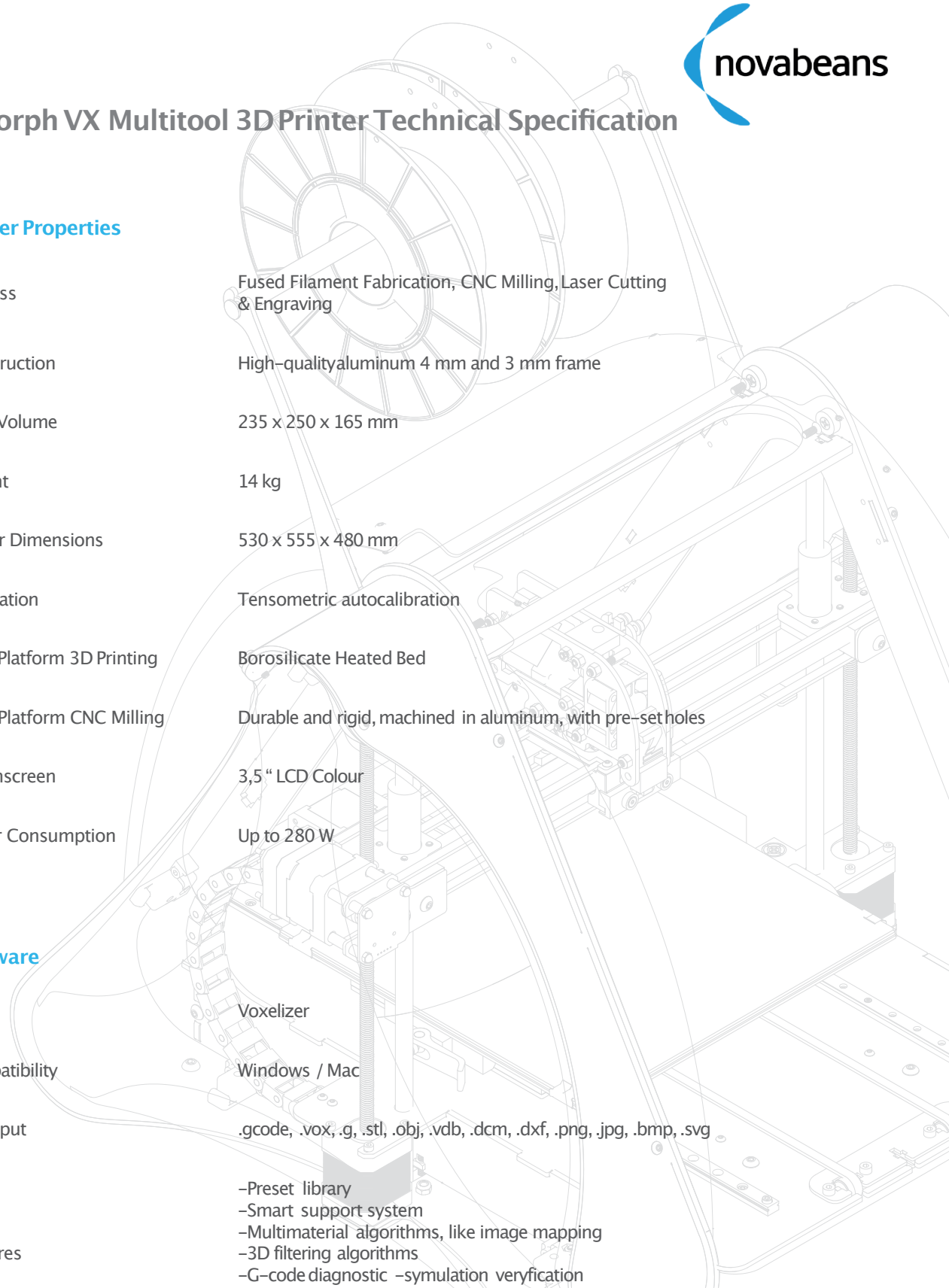
Click here to enroll for free at academy.zmorph3d.com.

## Voxelizer Software

ZMorph's original Voxelizer software is the intelligence behind the machine. It allows you to control all fabrication methods of ZMorph VX and gives you access to the most advanced 3D printing capabilities.

Click here to try Voxelizer Software at voxelizer.com

# ZMorph VX Multitool 3D Printer Technical Specification

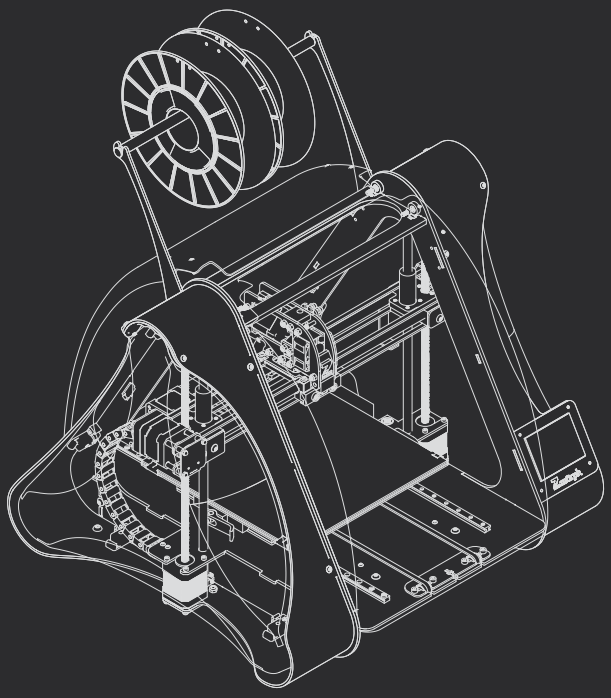


## Printer Properties

| | |
|---|---|
| Process | Fused Filament Fabrication, CNC Milling, Laser Cutting & Engraving |
| Construction | High-qualityaluminum 4 mm and 3 mm frame |
| Build Volume | 235 x 250 x 165 mm |
| Weight | 14 kg |
| Printer Dimensions | 530 x 555 x 480 mm |
| Calibration | Tensometric autocalibration |
| Build Platform 3D Printing | Borosilicate Heated Bed |
| Build Platform CNC Milling | Durable and rigid, machined in aluminum, with pre-set holes |
| Touchscreen | 3,5 " LCD Colour |
| Power Consumption | Up to 280 W |

## Software

| | |
|---|---|
| App | Voxelizer |
| Compatibility | Windows / Mac |
| File Input | .gcode, .vox, .g, .stl, .obj, .vdb, .dcm, .dxf, .png, .jpg, .bmp, .svg |
| Features | -Preset library<br>-Smart support system<br>-Multimaterial algorithms, like image mapping<br>-3D filtering algorithms<br>-G-code diagnostic -symulation veryfication<br>-CNC Workflow<br>-Laser Workflow |
| System Requirements | Windows 7 64-bitor macOS 10.13,4GB RAM, GPU with OpenGL 3.3 support, Internet connection. Minimum screen size: 1280 x 720 pixels |



ZMorph VX Multitool 3D Printer

Multifunctional environment with dedicated software ready to be the center of manufacturing companies, science labs, FabLabs, and academic institutions.

www.novabeans.com

ZMorph

novabeans

For more information
Visit: www.novabeans.com
Email: info@novabeans.com