

Material Selection Guide for Factory Floors

Additive manufacturing allows users to address complicated factory-floor problems with simple, targeted tooling solutions. Use this material selection guide as the first step to tailor your solution to the needs of your factory, employees, or your customers. Currently, when you design production tools, different materials are used, based on the requirements of the process. You can use that same approach with FDM additive manufacturing, which provides a variety of materials to fit the various needs of your production facility.

The materials listed in this guide are presented with tooling use case best fits based on the successful experience of other users. However, the capabilities of these materials are not limited to the listed applications and use cases.

FDM Thermoplastics

Material	FDM 3D Printer					Advantages	Limitations	Best Fits	Tensile Strength, Yield MPa (psi)	Tensile Modulus ksi (GPa)	Elongation at Break	Flexural Strength psi (MPa)	Flexural Modulus ksi (GPa)	Glass Transition (Tg) °C (°F)
	Fortus 380mc CFE™	Stratasys F370™	Fortus 380mc™	Fortus 450mc™	Stratasys F900™									
ABS-M30	○	●	●	●	●	Aesthetics UV stable – long-term tooling Moderate toughness Color-coded tooling T40 tip compatible Mild alcohol resistance	Low flexural modulus Low heat resistance Poor chemical resistance	Nests and cradles Kit boxes Surrogate parts Go/no-go gauges Hand tools Trim jigs Drill jigs	4,550 (31.4)	350 (2.41)	7%	60 (8,700)	300 (2.07)	226 (108)
ASA	●	●	●	●	●	Aesthetics UV stable – long-term tooling Moderate toughness Color-coded tooling T40 tip compatible Mild alcohol resistance	Low flexural modulus Low heat resistance Poor chemical resistance	Nests and cradles Kit boxes Surrogate parts Go/no-go gauges Hand tools Trim jigs Drill jigs	4,200 (29)	290 (2.0)	9%	60 (8,700)	270 (1.86)	226 (108)
PC	○	○	●	●	●	Moderate temperature resistance Mechanical strength Lubricious surface	Poor chemical resistance Vulnerable to stress-cracking Moisture sensitive	CMM fixtures Trim jigs Metal form tooling Hand tools Thermoforming Weld fixtures	5,800 (40)	282 (1.94)	4.8%	90 (13,000)	291 (2.0)	322 (161)
FDM Nylon 12™	○	○	●	●	●	High toughness Best fatigue resistance Mild chemical resistance	Moisture sensitive Dimensional stability over time	End effectors Feeders Machine guards Metal tool guards Automation equipment	4,600 (32)	186 (1.28)	30%	67 (9,700)	185 (1.28)	352 (178) ¹ [131 (55)] ²
FDM Nylon 12CF™	●	○	○	●	●	High stiffness High strength Mild chemical resistance Uncharacterized ESD properties	Anisotropic mechanical properties Potentially abrasive Aesthetics	End effectors Hand tools Drill jigs Metal form tooling Soft jaws	9,190 (63.4)	1,500 (10.3)	1.9%	142 (20,660)	1,100 (7.6)	433 (223) ¹ [289 (143)] ²
ULTEM™ 9085	○	○	○	●	●	FST High temperature resistance Ductility	Price point Stiffness	Thermoforming End effectors Lifting aids Paint masking fixtures	6,800 (47)	312 (2.15)	5.8%	112 (16,200)	331 (2.28)	367 (186)
ULTEM 1010	○	○	○	●	●	High strength High stiffness High temperature resistance Low isotropic CTE Good chemical resistance Food-grade rated material T40 tip compatible	Brittle Susceptible to acetone Price point	Clean room fixtures Paint masking fixtures Automation equipment Thermoforming	9,300 (64)	402 (2.77)	3.3%	144 (21,000)	409 (2.82)	419 (215)
Antero 800NA™	○	○	○	●	○	High Chemical resistance High temperature High strength FST	Price point	Masking fixtures Tools in contact with aggressive chemicals	13,500 (93.1)	449 (3.1)	6.4%	20,550 (142)	446 (3.1)	300 (149)

¹ Melt Point ² HDT (264 psi)

The information in this guide represents typical values intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. End-use material performance can be impacted by, but not limited to, part design, end-use conditions, test conditions, etc. Actual values will vary with build conditions. Product specifications are subject to change without notice. Refer to the material data sheets at [Stratasys.com](https://www.stratasys.com) for specific material information.

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