

# FORTUS MATERIALS OVERVIEW

Fortus 3D Production Systems use a variety of production-grade thermoplastics to manufacture Real Parts™ direct from digital data. Fortus thermoplastics are environmentally stable, so overall shape and part accuracy don't change with ambient conditions over time, unlike the resins and powders in competitive processes. Materials are easy to change on Fortus systems, with no mess or complicated processes. When combined with Fortus systems, Fortus thermoplastics give you production quality thermoplastic parts that are ideal for concept modeling, functional prototyping, manufacturing tools, or end-use parts.



Material:	ABSplus	ABSi	ABS-M30	ABS-M30i	PC-ABS	PC-ISO	PC	ULTEM* 9085	PPSF
<b>System Availability</b>	Fortus 200mc	Fortus 400mc	Fortus 360mc Fortus 400mc Fortus 900mc	Fortus 400mc Fortus 900mc <sup>2</sup>	Fortus 360mc Fortus 400mc Fortus 900mc <sup>2</sup>	Fortus 400mc Fortus 900mc <sup>2</sup>	Fortus 360mc Fortus 400mc Fortus 900mc	Fortus 400mc Fortus 900mc <sup>2</sup>	Fortus 400mc Fortus 900mc
<b>Layer Thickness:</b>									
0.013 inch (0.330 mm)		X	X	X	X	X	X	X <sup>4</sup>	X <sup>4</sup>
0.010 inch (0.254 mm)	X	X	X	X	X	X	X	X	X
0.007 inch (0.178 mm)	X	X	X	X	X	X	X		
0.005 inch (0.127 mm)		X	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>				
<b>Support Structure</b>	Soluble	Soluble	Soluble	Soluble	Soluble	BASS	BASS	BASS	BASS
<b>Available Colors</b>	<ul style="list-style-type: none"> <li>□ Ivory</li> <li>■ Black</li> <li>■ Dark Grey</li> <li>■ Red</li> <li>■ Blue</li> <li>■ Olive Green</li> <li>■ Nectarine</li> <li>■ Fluorescent Yellow</li> </ul>	<ul style="list-style-type: none"> <li>■ Translucent Natural</li> <li>■ Translucent Amber</li> <li>■ Translucent Red</li> </ul>	<ul style="list-style-type: none"> <li>□ Ivory</li> <li>□ White</li> <li>■ Black</li> <li>■ Dark Grey</li> <li>■ Red</li> <li>■ Blue</li> </ul>	<ul style="list-style-type: none"> <li>□ Ivory</li> </ul>	<ul style="list-style-type: none"> <li>■ Black</li> </ul>	<ul style="list-style-type: none"> <li>□ White</li> <li>■ Translucent Natural</li> </ul>	<ul style="list-style-type: none"> <li>□ White</li> </ul>	<ul style="list-style-type: none"> <li>■ Tan</li> </ul>	<ul style="list-style-type: none"> <li>■ Tan</li> </ul>
<b>Tensile Strength<sup>3</sup></b>	5,200 psi (36 MPa)	5,400 psi (37 MPa)	5,200 psi (36 MPa)	5,200 psi (36 MPa)	5,900 psi (41 MPa)	8,265 psi (57 MPa)	9,800 psi (68 MPa)	10,390 psi (71.64 MPa)	8,000 psi (55 MPa)
<b>Tensile Elongation<sup>3</sup></b>	4.0%	4.4%	4.0%	4.0%	6.0%	4.3%	4.8%	5.9%	3.0%
<b>Flexural Stress</b>	7,604 psi (52 MPa)	8,980 psi (62 MPa)	8,800 psi (61 MPa)	8,800 psi (61 MPa)	9,800 psi (68 MPa)	13,089 psi (90 MPa)	15,100 psi (104 MPa)	16,700 psi (115.1 MPa)	15,900 psi (110 MPa)
<b>IZOD Impact, notched</b>	1.8 ft-lb/in (96 J/m)	1.8 ft-lb/in (96 J/m)	2.6 ft-lb/in (139 J/m)	2.6 ft-lb/in (139 J/m)	3.7 ft-lb/in (196 J/m)	1.6 ft-lb/in (86 J/m)	1.0 ft-lb/in (53 J/m)	2.0 ft-lb/in (106 J/m)	1.1 ft-lb/in (58.73 J/m)
<b>Heat Deflection</b>	204°F (96°C)	188°F (87°C)	204°F (96°C)	204°F (96°C)	230°F (110°C)	271°F (133°C)	280°F (138°C)	307°F (153°C)	372°F (189°C)
<b>Unique Properties</b>	Variety of color options	Translucent material	Variety of color options	ISO 10993 certified	Highest impact resistance	ISO 10993 certified	Highest tensile strength	Flame, smoke, toxicity (FST) certified	Highest heat and chemical resistance

<sup>1</sup>0.005 inch (0.127 mm) layer thickness not available for ABS-M30, ABS-M30i, and PC-ABS for Fortus 900mc.

<sup>2</sup>ABS-M30i, PC-ABS, PC-ISO, and ULTEM\* 9085 will be available Q2 2009 for Fortus 900mc.

<sup>3</sup>See individual material spec sheets for testing details.

<sup>4</sup>0.013 inch (0.330 mm) layer thickness not available for Fortus 900mc for PPSF and ULTEM\* 9085.

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Material	Highlights
 <p><b>ABS plus</b> (acrylonitrile butadiene styrene)</p>	<ul style="list-style-type: none"> <li>Environmentally stable - no appreciable warpage, shrinkage or moisture absorption</li> <li>40 percent stronger than standard Stratasys ABS material</li> <li>Available in a variety of colors</li> </ul>
 <p><b>ABS-M30</b> (acrylonitrile butadiene styrene)</p>	<ul style="list-style-type: none"> <li>Up to 70 percent stronger than standard Stratasys ABS material</li> <li>Greater tensile, impact, and flexural strength than standard Stratasys ABS</li> <li>Layer bonding is significantly stronger for a more durable part than standard Stratasys ABS</li> <li>Versatile Material: Good for form, fit and functional applications</li> </ul>
 <p><b>ABS-M30i</b> (acrylonitrile butadiene styrene)</p>	<ul style="list-style-type: none"> <li>Biocompatible (ISO 10993 certified) material</li> <li>Ideal material for medical, pharmaceutical and food packaging industries</li> <li>Sterilizable using gamma radiation or ethylene oxide (EtO) sterilization methods</li> <li>Best fit for applications requiring good strength and sterilization</li> </ul>
 <p><b>ABSi</b></p>	<ul style="list-style-type: none"> <li>Translucent material</li> <li>Ideal for automotive tail lens applications</li> <li>Good blend of mechanical and aesthetic properties</li> <li>Available in translucent natural, red and amber colors</li> </ul>
 <p><b>PC-ABS</b> (polycarbonate-acrylonitrile butadiene styrene)</p>	<ul style="list-style-type: none"> <li>Most desirable properties of both PC and ABS materials</li> <li>Superior mechanical properties and heat resistance of PC</li> <li>Excellent feature definition and surface appeal of ABS</li> <li>Highest impact strength</li> </ul>
 <p><b>PC</b> (polycarbonate)</p>	<ul style="list-style-type: none"> <li>Most widely used industrial thermoplastic</li> <li>Accurate, durable, and stable for strong parts</li> <li>Superior mechanical properties and heat resistant</li> <li>High tensile strength and can handle high temperatures</li> </ul>
 <p><b>PC-ISO</b></p>	<ul style="list-style-type: none"> <li>Biocompatible (ISO 10993 certified) material</li> <li>Ideal material for medical, pharmaceutical and food packaging industries</li> <li>Sterilizable using gamma radiation or ethylene oxide (EtO) sterilization methods</li> <li>Best fit for applications requiring higher strength and sterilization</li> </ul>
 <p><b>ULTEM * 9085</b></p>	<ul style="list-style-type: none"> <li>FST (flame, smoke, toxicity) certified thermoplastic</li> <li>High heat and chemical resistant</li> <li>Ideal for commercial transportation applications in airplanes, buses, trains, boats, etc.</li> <li>Highest tensile and flexural strength</li> </ul>
 <p><b>PPSF/PPSU</b> (polyphenylsulfone)</p>	<ul style="list-style-type: none"> <li>Highest heat and chemical resistance of all Fortus materials</li> <li>Mechanically superior material, greatest strength</li> <li>Sterilizable via steam autoclave, EtO, plasma, chemical, and radiation sterilization</li> <li>Ideal for applications in caustic and high heat environments</li> </ul>

For more information about Fortus systems, materials and applications, call 650-369-5335 x-11 or visit [www.protopulsion.com](http://www.protopulsion.com)

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3D PRODUCTION SYSTEMS