1. GET IN THE RIGHT GROUP WHAT IS MOST IMPORTANT TO THE APPLICATION?

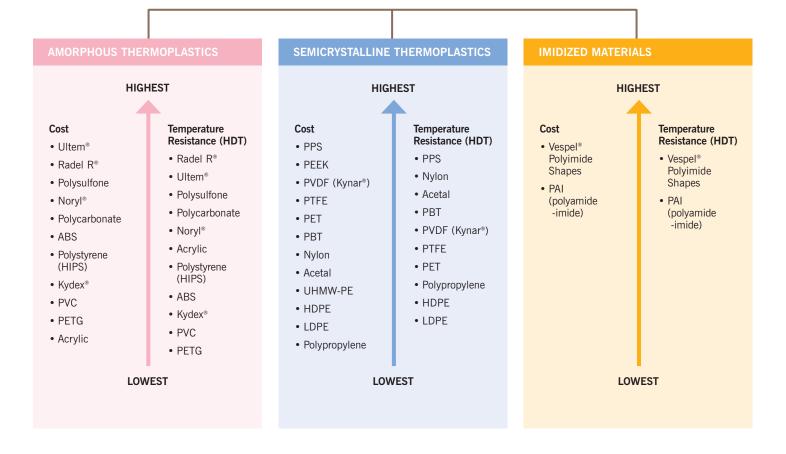
GENERAL GROUP CHARACTERISTICS AMORPHOUS THERMOPLASTICS SEMICRYSTALLINE THERMOPLASTICS **IMIDIZED MATERIALS** • Soften over a wide temperature range · Sharp melting point • Best physical properties above 400°F · Good formability Poor formability Best temperature resistance · Best bearing and wear capabilities Transparency Opaque · Good chemical resistance · Poor chemical resistance · Good chemical resistance • Bond well using adhesives · Difficult to bond using adhesives or solvents or solvents · Resistant to stress cracking · Prone to stress cracking • Poor fatigue resistance • Good fatigue resistance · Structural applications only · Good for bearing and wear (not suitable for bearing and wear) (as well as structural applications) POTENTIAL MATERIAL CHOICES POTENTIAL MATERIAL CHOICES ABS • Polystyrene (HIPS) Acetal • PET PAI (polyamide-imide) Polysulfone • HDPE Polypropylene Acrylic Vespel® • PVC • LDPE • PPS Kydex® Polyimide Shapes • Noryl® • Radel R® Nylon • PTFE • PETG • Ultem® • PBT • PVDF (Kynar®) • UHMW-PE Polycarbonate PEEK

This selector guide is intended to help you review the needs of your particular application and determine a few material candidates that can then be tested.

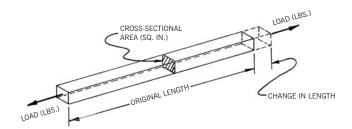
Although the information and statements herein are believed to be accurate, no guarantee of their accuracy is made. The statements and information are included for reference purposes only and are not intended and should not be construed as either a warranty of any type or representations applicable to the particular application, use or design of the buyer or user of the goods. In every case, we recommend that the purchaser or user before using or buying any product perform their own tests and make their own decision to determine to their own satisfaction whether the product is of acceptable quality, type and design and is suitable for the particular purposes under their own operating conditions.



2. CHOOSE THE BEST FAMILY IS TEMPERATURE A FACTOR? HOW CRITICAL IS COST?







3. COMPARE THE MECHANICAL PROPERTIES IS TENSILE STRENGTH (RESISTANCE TO BEING PULLED APART) IMPORTANT?

AMORPHOUS THERMOPLASTICS

Tensile strength - pull apart (psi)

• Ultem®	15,200
 Polysulfone 	10,200
• Radel R®	10,100
 Acrylic 	10,000
• Noryl®	9,600
 Polycarbonate 	9,500
• PETG	7,700
• PVC	7,500
• Kydex®	6,100
• ABS	4,100
 Polystyrene (HIPS) 	3,500

SEMICRYSTALLINE THERMOPLASTICS

Tensile strength - pull apart (psi)

renanc atrength pun	apart (psi)
• PEEK	14,000
 Nylon (6 cast) 	10,000-13,500
• PPS	12,500
• Nylon (6/6 extruded)	12,400
• PET	11,500
Acetal (Homopolymer)	10,000
 Acetal (Copolymer) 	9,800
• PBT	8,690
• PVDF (Kynar®)	7,800
Polypropylene (Homo	polymer) 5,400
• HDPE	4,000
Polypropylene (Copoly	ymer) 3,800
• UHMW-PE	3,100
• PTFE	1,500-3,000

1,400

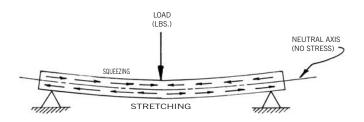
• LDPE

IMIDIZED MATERIALS

Tensile strength - pull apart (psi)

 PAI (polyamide-imide) 	21,000
• Vespel® Polyimide SP-1	12,500
Vespel® Polyimide SP-21	9,500
• Vespel® Polyimide SP-3	8,200
Vespel® Polyimide SP-22	7,500
Vespel® Polyimide SP-211	6,500





4. COMPARE THE MECHANICAL PROPERTIES IS FLEXURAL MODULUS (BENDING STIFFNESS) IMPORTANT?

AMORPHOUS THERMOPLASTICS

Flexural modulus - stiffness (psi)

	•
• Ultem® (30% glass-filled)	1,300,000
 Polycarbonate (20% glass-filled) 	800,000
• PVC	481,000
• Ultem®	480,000
Acrylic	480,000
 Polysulfone 	390,000
• Noryl®	370,000
• Radel R®	350,000
 Polycarbonate 	345,000
• Kydex®	335,000
 Polystyrene (HIPS) 	310,000
• PETG	310,000
• ABS	304.000

SEMICRYSTALLINE THERMOPLASTICS

Flexural modulus - stiffness (psi)

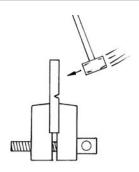
• PPS		600,000
• PEEK		590,000
• Nylon (6 cast)	420,000	-500,000
Acetal (Homopolym	er)	420,000
• Nylon (6/6 extrude	ed)	410,000
• PET		400,000
Acetal (Copolymer)		370,000
• PBT		330,000
• PVDF (Kynar®)		310,000
Polypropylene (Hor	nopolymer)	225,000
Polypropylene (Cop	oolymer)	215,000
• HDPE		200,000
• UHMW-PE		110,000
• PTFE		72,000
• LDPE		30,000

IMIDIZED MATERIALS

Flexural modulus - stiffness (psi)

• PAI (polyamide-imide)	711,000
Vespel® Polyimide SP-22	700,000
• Vespel® Polyimide SP-21	550,000
• Vespel® Polyimide SP-3	475,000
• Vespel® Polyimide SP-211	450,000
Vespel® Polyimide SP-1	450,000





5. COMPARE THE MECHANICAL PROPERTIES IS IZOD IMPACT (TOUGHNESS) IMPORTANT?

AMORPHOUS THERMOPLASTICS

Izod impact (notched) - toughness (ft-lbs/in) • Kydex® 18

11,50011	
 Polycarbonate 	12.0-16.0
• Radel R®	13
• ABS	7.7
• Noryl®	3.5
 Polystyrene (HIPS) 	2.0
• PETG	1.7
 Polysulfone 	1.3
• Ultem®	1.0
• PVC	1.0

Acrylic

SEMICRYSTALLINE THERMOPLASTICS

Izod impact (notched) - toughness (ft-lbs/in) • LDPE no break • UHMW-PE 18.0

12.5

• PTFE 3.5 • PVDF (Kynar®) 3.0

• PEEK 1.6 • PBT 1.5

• Polypropylene (Copolymer)

Acetal (Homopolymer) 1.5Polypropylene (Homopolymer) 1.2

Nylon (6/6 extruded) 1.2Acetal (Copolymer) 1.0

• Nylon (6 cast) 0.7-0.9 • PET 0.7

• PPS 0.5

IMIDIZED MATERIALS

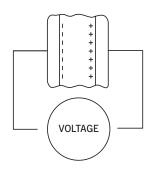
Izod impact (notched) - toughness (ft-lbs/in)

PAI (polyamide-imide) 2.3Vespel® Polyimide SP-21 0.8

• Vespel® Polyimide SP-1 0.8

• Vespel® Polyimide SP-3 0.4





6. COMPARE THE PROPERTIES IS DIELECTRIC STRENGTH (ELECTRICAL INSULATION) IMPORTANT?

410

AMORPHOUS THERMOPLASTICS

Dielectric strength - insulation (v/mil) • Ultem® 830 • PVC 544 • Kydex® 514 • Noryl® 500 • Acrylic 430 • Polysulfone 425

Polycarbonate 380Radel R[®] 360

• PETG

SEMICRYSTALLINE THERMOPLASTICS

Dielectric strength - insulation (v/mil)• Nylon (6 cast) 500-600

Acetal (Homopolymer)
 Acetal (Copolymer)
 PTFE
 400-500
 PEEK
 PPS
 PET
 400
 PBT
 PBT

• PVDF (Kynar®) 280

300-400

• Nylon (6/6 extruded)

IMIDIZED MATERIALS

Dielectric strength - insulation (v/mil)

• PAI (polyamide-imide) 600

• Vespel® Polyimide SP-1 560



7. THINK ABOUT THE APPLICATION - IS FDA COMPLIANCE IMPORTANT?

AMORPHOLIS THERMOPI ASTICS

FDA compliant grades available:

- Acrylic
- Polysulfone
- PETG
- PVC
- Polycarbonate
- Radel R®
- Polystyrene (HIPS) Ultem®

SEMICRYSTALLINE THERMOPLASTICS

FDA compliant grades available:

- Acetal
- PET
- HDPE
- Polypropylene
- LDPE
- PTFE
- Nylon
- PVDF (Kynar®)
- PBTPEEK
- UHMW-PE

The virgin, natural, unfilled formulations of the sheet, rod, tube, and film products listed here are available from Curbell Plastics, Inc. in grades that comply with one or more of the FDA's guidelines for direct food contact at room temperature.

It is important to specify FDA compliant material at the time of the order to ensure that FDA compliant material is provided.

8. THINK ABOUT THE APPLICATION - IS CHEMICAL RESISTANCE IMPORTANT?

SEMICRYSTALLINE THERMOPLASTICS

Good chemical resistance:

- Acetal
- PET
- HDPE
- Polypropylene
- LDPE
- PPS
- Nylon
- PTFE
- PBTPEEK
- PVDF (Kynar®)UHMW-PE
- See pages 76-77 for more specific information

IMIDIZED MATERIALS

Good chemical resistance:

- PAI (polyamide-imide)
- Vespel® Polyimide Shapes

See pages 76-77 for more specific information

