

IAPD THERMOPLASTICS RECTANGLE

IMIDIZED

High Performance
High Temperature
High Cost

Key Characteristics

Very high cost per pound
Excellent physical properties above 400°F/205°C
Excellent electrical properties
Excellent dimensional stability
Low coefficient of friction (bearing grades)

Materials

Polyimide (PI)
Polyamide-Imide (PAI)
Polybenzimidazole (PBI)

AMORPHOUS HIGH PERFORMANCE THERMOPLASTICS

Key Characteristics

High cost
High temperature
High strength and good stiffness
Hot water and steam resistance

Materials

Polysulfone (PSU)
Polyetherimide (PEI)
Polyethersulfone (PES)
Polyphenylsulfone (PPSU)
Polyarylate (PAR)

SEMI-CRYSTALLINE HIGH PERFORMANCE THERMOPLASTICS

Key Characteristics

High cost
High temperature
High strength
Good chemical resistance
Good electrical properties
Low coefficient of friction (COF)
Good toughness

Materials

Polyvinylidene Fluoride (PVDF)
Polytetrafluoroethylene (PTFE)
Ethylene-Chlorotrifluoroethylene (ECTFE)
Fluorinated Ethylene Propylene (FEP)
Polychlorotrifluoroethylene (PCTFE)
Perfluoroalkoxy (PFA)
Polyphenylene Sulfide (PPS)
Polyetheretherketone (PEEK)

AMORPHOUS ENGINEERING THERMOPLASTICS

Key Characteristics

Moderate cost
Moderate temperature resistance
Moderate strength
Good to excellent impact resistance
Good dimensional stability

Materials

Polycarbonate (PC)
Polyphenylene Oxide (PPO)
Thermoplastic Polyurethane (TPU)

SEMI-CRYSTALLINE ENGINEERING THERMOPLASTICS

Key Characteristics

Moderate cost
Moderate temperature resistance
Moderate strength
Good chemical resistance
Good bearing and wear properties
Low coefficient of friction (COF)
Difficult to bond

Materials

Nylon/Polyamide (PA)
Acetal/Polyoxymethylene (POM)
Polyethylene Terephthalate (PET)
Polybutylene Terephthalate (PBT)
Ultra-High Molecular Weight Polyethylene (UHMW-PE)

AMORPHOUS COMMODITY THERMOPLASTICS

Key Characteristics

Low cost
Low temperature resistance
Low strength

Materials

Acrylic/Polymethyl Methacrylate (PMMA)
Polystyrene (PS)
Acrylonitrile-Butadiene-Styrene (ABS)
Polyvinyl Chloride (PVC)
Polyethylene Terephthalate Glycol Modified (PETG)
Cellulose Acetate Butyrate (CAB)
Polyvinyl Chloride and Acrylic Alloy Sheet (PVC/PMMA)

SEMI-CRYSTALLINE COMMODITY THERMOPLASTICS

Key Characteristics

Low cost
Low temperature resistance, strength
Low coefficient of friction (COF)
Near zero moisture absorption
Good electrical properties, toughness
Difficult to bond

Materials

High-Density Polyethylene (HDPE)
Low-Density Polyethylene (LDPE)
Polypropylene (PP)
Polymethylpentene (PMP)

AMORPHOUS KEY CHARACTERISTICS

Soften over a broad range of temperatures
Easy to thermoform
Tend to be translucent or transparent (typically, but not always)
Bond well using adhesives and solvents
Prone to stress cracking
Poor fatigue resistance
Structural applications only (not bearing and wear)

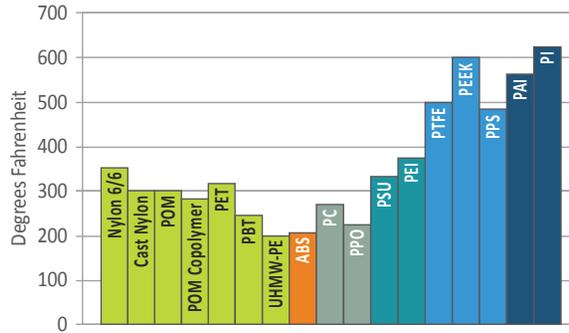
SEMI-CRYSTALLINE KEY CHARACTERISTICS

Sharp melting point
Difficult to thermoform
Tend to be opaque
Difficult to bond using adhesives and solvents
Good resistance to stress cracking
Good fatigue resistance
Good for bearing and wear and structural applications

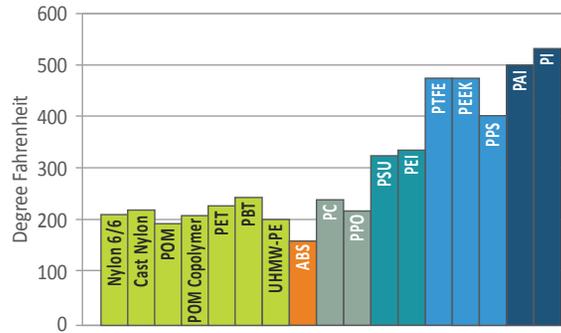
Performance (Chemical Resistance and Thermal Stability)

PLASTIC PROPERTY COMPARISON GRAPH

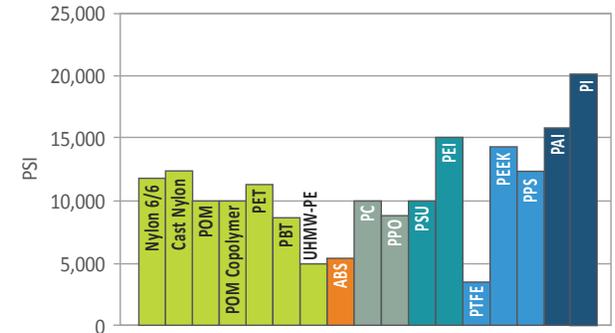
Operating Temperature Short Term



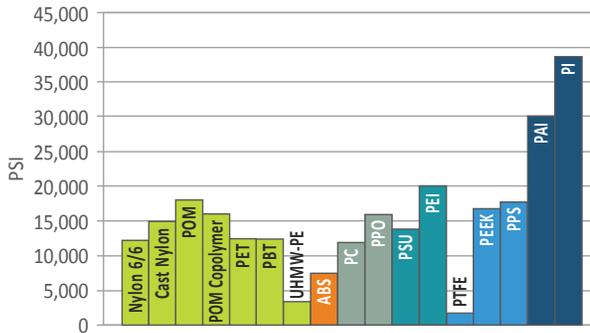
Operating Temperature Long Term (Constant)



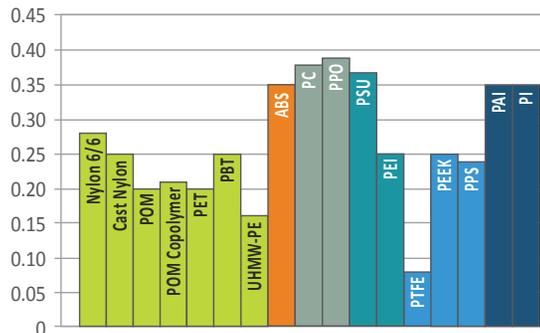
Tensile Strength



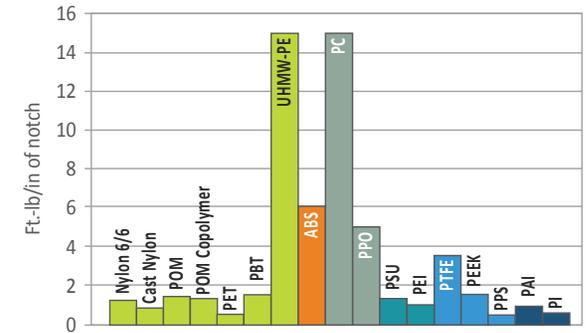
Compressive Strength



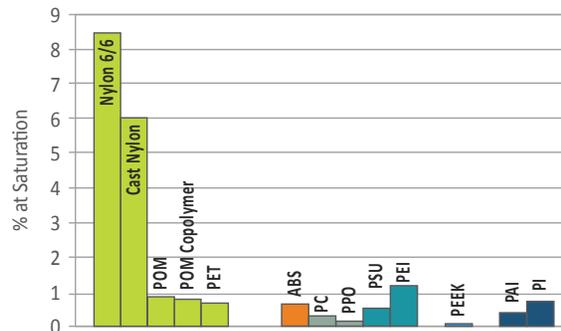
Coefficient of Friction (Lower has less friction)



Impact Strength (The higher the impact the better)



Moisture Absorption



Cost Comparison

