

# 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)

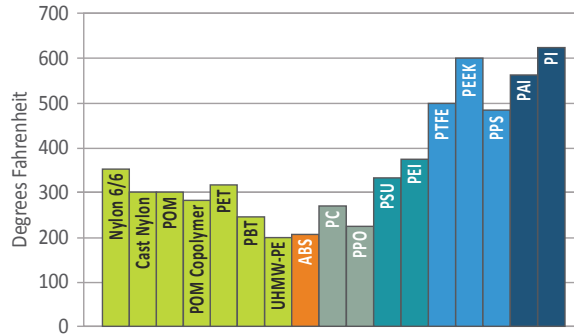
## SEMI-CRYSTALLINE KEY CHARACTERISTICS

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

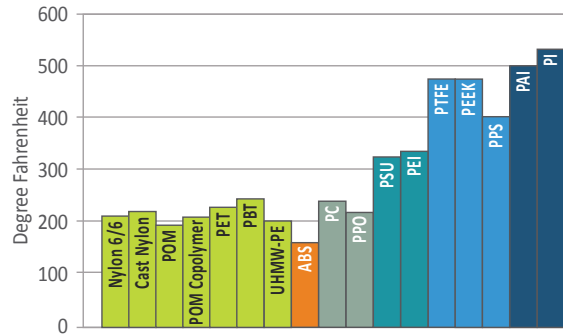
Performance (Chemical Resistance and Thermal Stability)

# PLASTIC PROPERTY COMPARISON GRAPH

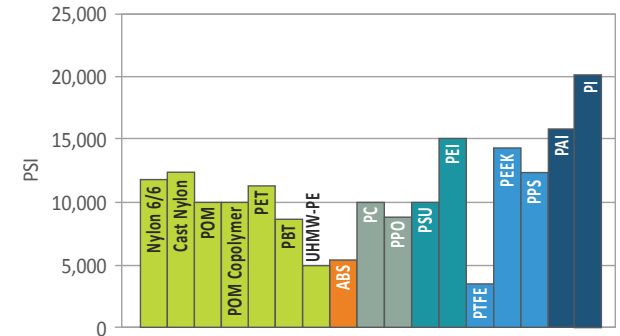
### Operating Temperature Short Term



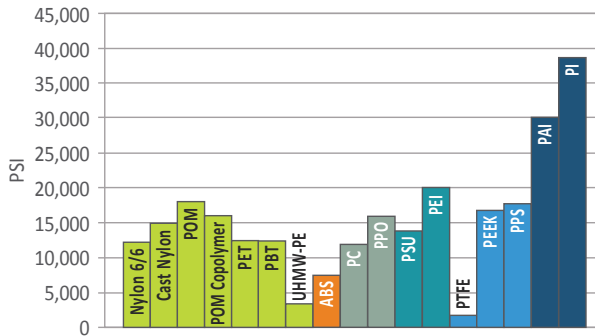
### Operating Temperature Long Term (Constant)



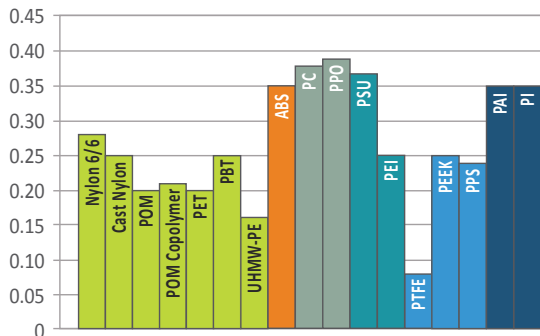
### Tensile Strength



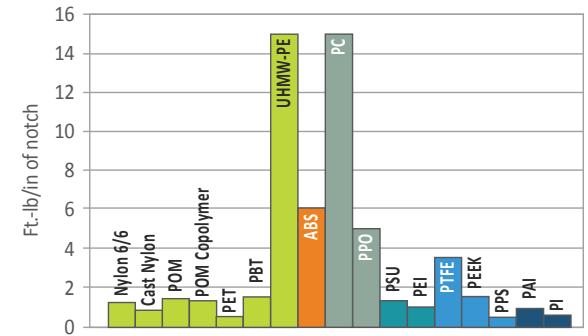
### Compressive Strength



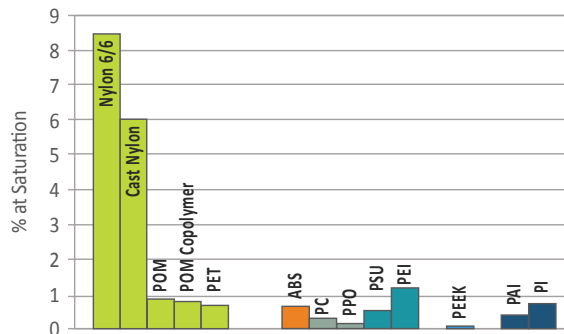
### Coefficient of Friction (Lower has less friction)



### Impact Strength (The higher the impact the better)



### Moisture Absorption



### Cost Comparison

