



# PP (Polypropylene)

## Description

PP is a general-purpose thermoplastic with high production volume and a wide range of applications. It is mainly classified into:

1. Homopolymer PP (PPH): High rigidity, moderate toughness;
2. Block Copolymer PP (PPB): Good low-temperature impact resistance;
3. Random Copolymer PP (PPR): Transparent, good toughness, commonly used for pipes;

Characteristics: It has the lowest density among common plastics, excellent chemical resistance, ease of processing, and low cost, making it one of the most widely used plastics.

## Features

1. Lowest density: It is the lightest among common plastics, with a density of approximately  $0.90\text{--}0.91\text{ g/cm}^3$ , making it lighter than water and able to float.
2. Mechanical properties: It has moderate strength and rigidity; excellent flexural fatigue resistance (hinges, snap-fits withstand repeated bending without breaking). Homopolymer PP is somewhat brittle, while copolymer PP offers significantly improved low-temperature toughness.
3. Heat resistance:  
Melting point:  $160\text{--}170^\circ\text{C}$ ; Heat deflection temperature:  $100\text{--}110^\circ\text{C}$ ; It can withstand boiling water and steam sterilization, making it suitable for food packaging, meal containers, and piping;





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4. Excellent chemical resistance: Resistant to acids, alkalis, oils, and solvents; virtually non-hygroscopic and resistant to hydrolysis.
5. Processing & applications: Easy to process via injection molding, extrusion, blow molding, and filament drawing; non-toxic and odorless, commonly used in food-grade and medical-grade applications. However, its surface is difficult to print on and bond.
6. Disadvantages: Prone to brittleness at low temperatures (impact resistance decreases below  $< 0^{\circ}\text{C}$ ); Moderate weather and UV resistance; UV stabilizers are required for outdoor use. Flammable and not inherently flame retardant (unless flame retardant additives are used).

## Parameters (Homopolymer PP – Standard)

### Physical Properties

Density: 0.90~0.91 g/cm<sup>3</sup>

Water absorption: 0.01~0.03%

Mold shrinkage: 1.1~ 1.3%

### Mechanical Properties

Tensile strength: 25~35 MPa

Flexural modulus: 1.2~ 1.8 GPa

Izod impact strength (notched):

23°C: Good

0°C: Significantly reduced

Rockwell hardness: R80–100

