PPS (Polyphenylene Sulfide)

General information

Overview

The most widely used sulfone polymer.

Strengths

Very good temperature resistance (continuous use temperature 200-240 °C (400-460 °F), maximum service temperature is 300 °C (570 °F)). Excellent solvent and chemical resistance (no known organic solvent under 200 °C (400 °F)), good flame resistance, resistant to radiation, reasonable UV resistance (stabilized/pigmented grades better). Good dimensional stability.

Limitations

Difficult to pigment - only dark colors available. Relatively notch sensitive, relatively poor tracking resistance. Higher gas permeability than for other semi-crystalline plastics, attacked by oxidizing agents, e.g. nitric acid. Brittle (so rarely used unfilled).

Designation

PPS is also the term given to polypropylene sulfide.

Tradenames

Ryton,

Typical uses

Electrical components, chemical pumps, under-bonnet components, coatings for chemical and/or abrasion resistance.

Composition overview

Compositional summary

(S-(C6H4))n

Material family	Plastic (thermoplastic, semi-crystalline)
Base material	PPS (Polyphenylene sulfide)
CAS number	9016-75-5

Processing properties

First commercial production	1968

Forming

Suitable for injection molding, extrusion difficult, high melt temperatures (up to 370 °C (700 °F)), higher mold temperatures for smooth and glossy finish, lower for improved toughness. Pre-drying only necessary in special cases, low melt viscosity, suitable for pressing or sintering (oxidative cross-linking required for sufficient melt viscosity).

Machining

Difficult to machine. Carbide tools recommended for highly filled grades.

Joining

Very difficult to bond though good bonding with two-component adhesives like polyurethane are possible, very suitable for friction welding, suitable for hot plate and ultrasonic welding. Very difficult to hot gas weld and radio freq. welding not possible. Suitable for laser welding. Suitable for one-time snap-fit assemblies, self-tapping screws can be used. Suitable for staking though high temperatures are required and post annealing necessary for crystallinity.

Surface treatment

Suitable for painting (not in CF reinforced or PTFE grades). Pre-treating by flame, plasma or PUR primer necessary.

Geo-economic data for principal component

Annual world production	5.22e4	-	7.58e4	ton/yr