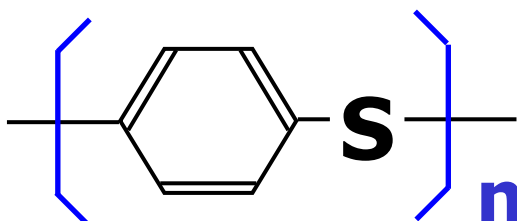


**"TORELINA" Low Price and High Performance**  
**GF/Filler reinforced grade**

***"TORELINA"* A310M N7, B7**

## I .Introduction

- Toray is a diversified chemical company and deals with ABS , PA, PBT, PPS, LCP and POM. Toray is vertically integrated, from polymerization to compounding.
- Toray PPS resin is an engineering plastic having thermoplastic properties and has the chemical structure as shown below.



- **“TORELINA”** is available in both cross-link types and linear types. Toray provides various grades of products from base polymers to compounds. The production capacity of PPS is 5,700 tons per year. **“TORELINA”** is developed for injection moldings, fibers, and film applications.
- Toray has developed PPS **“TORELINA”** which are shown in this brochure by utilizing our polymerization and compound technology.

### ■ Features of **“TORELINA”**

<b>Thermal resistance :</b>	Excellent long-term heat resistance properties (UL temperature index : 200–240°C, UL File No.E41797)
<b>Dimensional stability :</b>	Low mold shrinkage, Low linear thermal expansion, and low water absorption properties. Therefore, TORELINA shows an excellent dimensional stability even when it is used under high-temperature, high-humidity conditions.
<b>Chemical resistance :</b>	Excellent chemical resistance that is equivalent to that of fluorine resin.
<b>Mechanical properties :</b>	High strength, high rigidity, and low degradation characteristic even in high temperature conditions. It also shows excellent fatigue endurance and creep resistance
<b>Burning resistance :</b>	Passed the UL94V-0 standard without adding flame retardant. (UL File No. E41797)
<b>Electric characteristics :</b>	Excellent electric characteristics in high-temperature, high-humidity, and high-frequency conditions.
<b>Moldability :</b>	Good flow property, and it is possible to use the injection molding method by the same process as for engineering plastics commonly used.

## Typical properties of 'TORELINA'

Grade			<b>A310 N7,B7</b>		
Characteristic			Low price, High Performance		
Property	Unit	Method(ISO)	Natural / Black		
Density	kg/m <sup>3</sup>	1183	2020		
Water Absorption 24hrs in 23°Cwater	%	62	0.02		
Mechanical	Tensile Strength 23°C	MPa	527-1,-2	141	
	Elongation 23°C	%		0.9	
	Flexural Strength 23°C	MPa	178	240	
	Flexural Modulus 23°C	GPa		23.3	
	Shear Strength	—	ASTM D732	—	
	Charpy/Impact	V-notched 23°C	KJ/m <sup>2</sup>	179	8
		Unnotched 23°C	KJ/m <sup>2</sup>		—
	Rockwell Hardness	R scale	2039-2	123	
	Taper abrasion	mg/1000times	ASTM D1044	70	
	Coefficient of friction	vs. steel	—	—	0.30
Limit PV value	KJ/m <sup>2</sup> ·hr	Toray Method	815		
Thermal	Melting Point	°C	11357-3	278	
	Heat Deformation Temperature	1.82MPa	°C	75	>260
	Linear Thermal Expansion	MD	× 10 <sup>-5</sup> /K	Toray Method	1.6
		TD			2.3
Flammability	—	UL-94	V-0 (0.36mmt)		
Electrical	Volume resistivity	Ω·m	IEC60093	10 <sup>14</sup>	
	Dielectric strength	MV/m	IEC60243-1	19	
	Dielectric constant	10 <sup>6</sup> Hz	IEC60250	5.0	
	Dielectric factor	10 <sup>6</sup> Hz		0.002	
Moldability	Mold Shrinkage (3mm)	MD	%	Toray Method	0.15
		TD			0.50
	Min.Injection pressure 1/8"	MPa·G	Toray Method	5.4	
	Bar flow length 320°C, 98MPa, 1mm	× 10 <sup>-3</sup> m	Toray Method	90	

These values are typical data for this product under specific test conditions and not intended for use as limiting specifications.

## V .Injection molding for "*TORELINA*" PPS

A standard injection molding condition is as follows.

Predrying		130°C × 3 hour
Cylinder temperature	1 (hopper side)	290–300°C
	2	300°C
	3	310°C
	4 (cylinder side)	320°C
Nozzle temperature		310–320°C
Mold temperature		130–150°C(See Note.)
Injection Speed		Middle to high speed
Injection pressure		39–69MPa-G
Screw rotation speed		50–100 rpm

Note:

Although 'TOLERINA' absorbs little water, it is recommended to pre-dry it for more than 3 hours at 130°C for a better appearance.

When the mold temperature is varied, crystallinity of "*TORELINA*" changes considerably at around 90°C, which is the glass transition temperature of PPS.

The temperatures range from 80 to 110°C is called transition area where the crystallinity changes greatly with a mold temperature change. The transition area should be avoided because it is difficult to control the quality of molded products and carry out smooth mold releasing.