TSD-1013 April, 2008

Properties Affected by Glass Fiber Content. (No.1 Mechanical Property)

PPS compound which is filled with fibrous reinforcement possesses superior properties. As reinforcement, glass fiber (GF) and carbon fiber is suitable and especially GF is most popular reinforcement. Improved key properties by the reinforcement are as follows;

- ■Mechanical property: Strength, stiffness and creep resistance.
- ■Heat resistance: DTUL and mechanical property under elevated temperature.
- ■Dimensional stability under high temperature and humidity environment
- ■Low thermal expansion and mold shrinkage.

In this section, the mechanical properties affected by glass fiber content are described.

1. Basic properties of PPS polymer and GF

The PPS compounds are composed of PPS neat polymer and GF, the property of compounds is relied on that of these raw materials shown in Table 1.

Table 1. Properties of GF and PPS polymer at RT.

Properties	Unit	PPS Polymer	Glass fiber
Specific gravity	-	1.362	2.545
Melting point	℃	280	-
Tg	℃	90	845
Tensile strength	MPa	60	2000
Young's modulus	MPa	4500	74000
Thermal expansion	m/mK	50 X 10^{-6}	5 X 10^{-6}

2. Mechanical property

Relation between GF content and strength of mold flow direction is shown in Fig.1 and 2. Maximum strength is realized at 40-45wt% content. Main reason of strength deterioration at over 50wt% is that GF is crashed each other during compounding process.

In Figs.3 and 4, the modulus and elongation at depending on GF content are shown. From this result, flexural modulus is increasing in proportion to GF content and elongation is decreasing. As shown in Figs.5 and 6, also impact strength is same tendency as tensile and flexural strength.

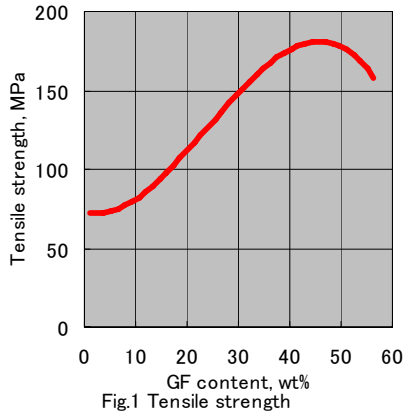

Fig.1 Tensile strength

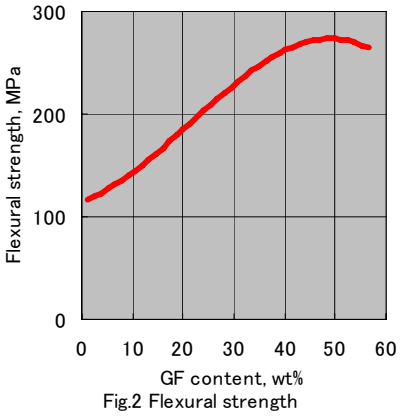

Fig.2 Flexural strength

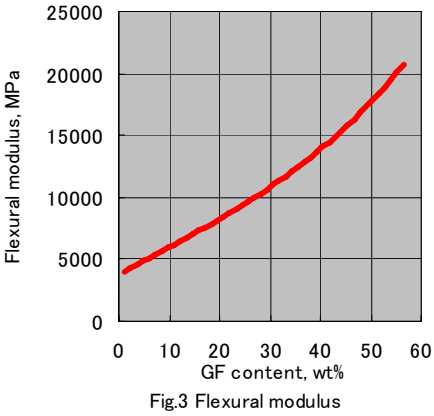

Fig.3 Flexural modulus

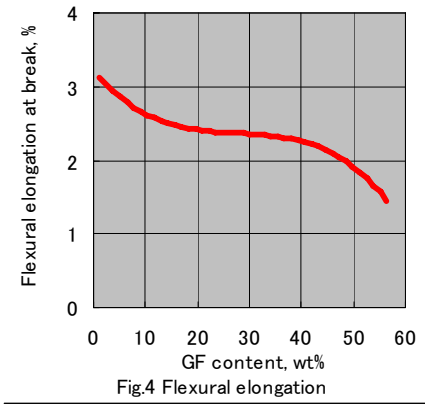

Fig.4 Flexural elongation

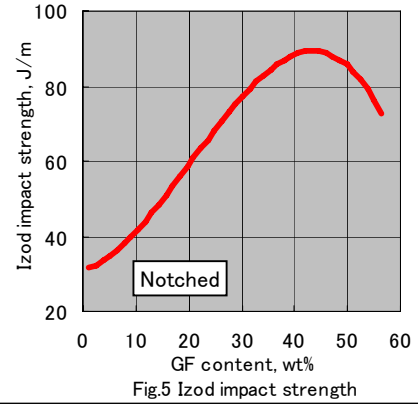

Fig.5 Izod impact strength

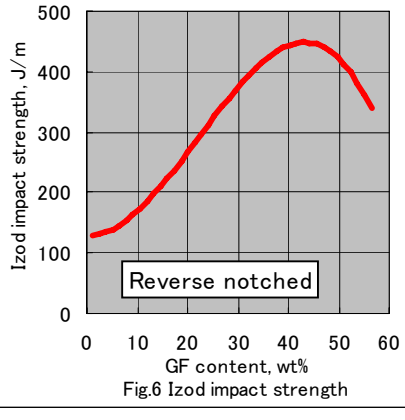

Fig.6 Izod impact strength