

Weld Strength

1. General

It is strictly impossible to reject the weld line at actual molded parts. The weld line should be classified two types based on formation process. One is called Hot-Weld as shown in Fig.1 and it is formed when the flow front is still melting. The other is Cold-Weld which is formed when flow front is already cool down or starting to be solid. Generally Hot-Weld has high weld strength than other. Strength level of molded parts is classified as follows;

Mold Flow Direction >> Transverse Direction > Weld-line

As the result, part design should be considered to reduce a stress concentration on weld line.

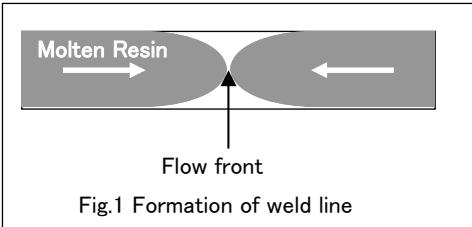


Fig.1 Formation of weld line

2. Molding condition and weld strength

Weld strength is affected by the molding condition as same as other mechanical property. Especially cylinder temperature has most influenced to the weld strength. Fig.2 shows relation between cylinder temperature and weld strength of FZ-1140. As the result, 310-340°C of cylinder temperature is suitable, lower than 300°C should be avoided. The specimens tested in Fig.2 have been molded under the condition of holding pressure; 60MPa, mold temperature; 150°C and injection time; 1.2sec.

In order to get good weld mechanical property, holding pressure should be high and mold temperature should be 120-160°C. Also, the use of mold release agent should be avoided because it may cause dropping down of weld strength.

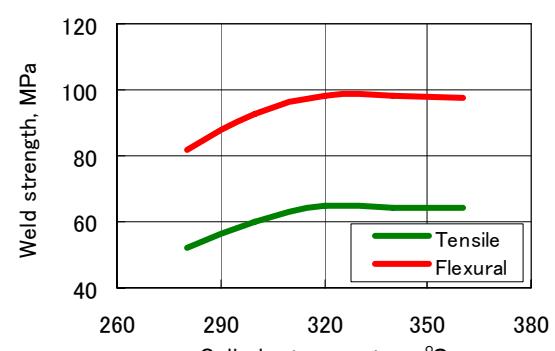


Fig.2 Weld strength vs. cylinder temp.

3. Effect of environmental temperature

In Fig.3, weld strength depend on environmental temperature is shown. In this figure, cylinder temperature is 320°C, and other molding conditions are as the same as the above data. Weld strength of GF40% grades; FZ-1140 and FZ-2140 is better than GF and mineral filled grades; FZ-3600 and FZ-6600. Also, FZ-2140 and FZ-6600 which are linear PPS polymer based compounds have better weld strength than FZ-1140 & FZ-3600 which are based cross-linked polymer. Super-tough grade; Z-230 has superior property, not only strength also elongation to prove it is suitable for molded parts used in mechanical impact, vibration and high pressure environment.

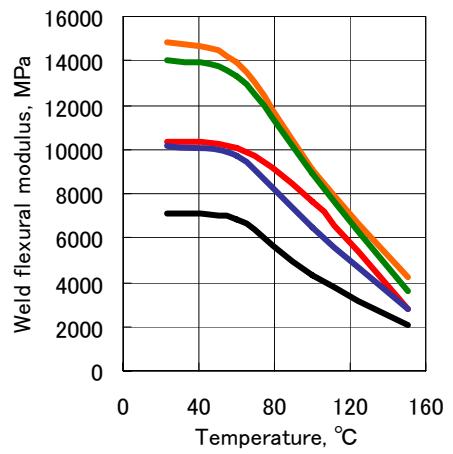
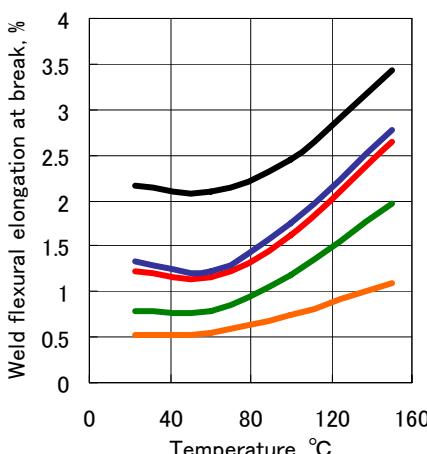
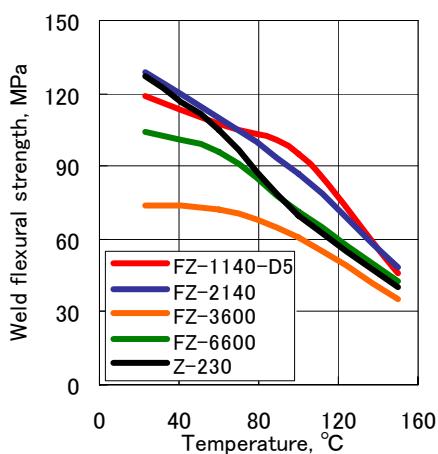


Fig.3 Weld flexural properties vs. temperature.

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