Polybutylene Terephthalate (PBT)

DURANEX®

SF733LD

EF2001/ED3002

Super High Flow, HB

POLYPLASTICS CO., LTD.

Introduction

DURANEX® PBT has excellent heat resistance and mechanical and electrical properties. It is used in various applications such as automotive, electrical and electronic, OA equipment, and industrial machine components.

In recent years, the market trend toward high functionality, modularization and integration of components is advancing, especially in the automotive industry and electrical and electronic industry. Accordingly, downsizing and wall thickness reduction of such components are progressing. Therefore, materials with high flowability, strength and stiffness are desired to meet such market requirements.

DURANEX® PBT SF Series are specialty grades to meet these market requirements.

DURANEX® PBT SF Series Properties

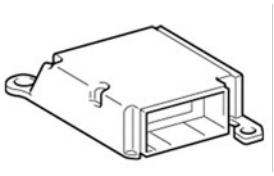
Compared to conventional PBT materials, flow length has improved by 30% ~ 100%, which may result in the following advantages:

1. **Thin, lightweight product design**
2. **Use of multi-cavity molds with a larger number of cavities**
3. **Shorter molding cycle due to thin-wall design**
4. **Wider window of molding process conditions**
5. **Longer mold life due to a reduction in injection peak pressure**

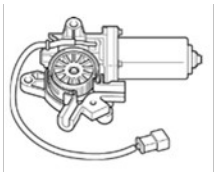
DURANEX® PBT SF Series Grade Line-up

- **SF3300** **GF30% reinforced, standard, high-cycle and high flowability**
- **SF733LD** **GF30% reinforced, low warpage, low specific gravity, high-cycle and high flowability**
- **SF755** **GF 55% reinforced, high rigidity, good surface appearance, high-cycle and high flowability**

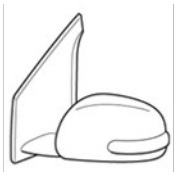
【Examples of Practical Applications】



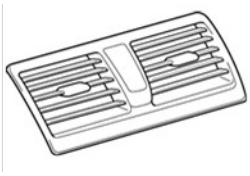
ECUs



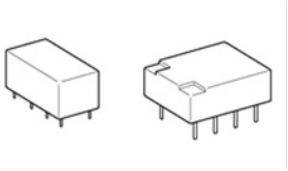
Actuators



Door mirror stays



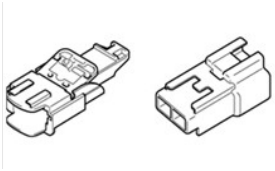
Ventilators



Relays

Bobbins

Smartphone parts



Connectors

1. SF733LD General Properties

Table 1- 1 SF733LD General Properties (ISO)

Item	Unit	Test method	High cycle High flow/Low warpage	Low warpage
			DURANEX SF733LD	DURANEX 733LD
			GF30%	GF30%
Color Number			EF2001/ED3002	EF2001/ED3002
ISO Marking Code		ISO11469 JIS K6999	>PBT+SAN-GF30<	>PBT+SAN-GF30<
Density	g/cm³	ISO 1183	1.46	1.46
Tensile strength	MPa	ISO 527-1,2	133	139
Strain at break	%	ISO 527-1,2	1.9	2.0
Flexural strength	MPa	ISO 178	178	180
Flexural modulus	MPa	ISO 178	9,000	9,000
Charpy notched impact strength	kJ/m²	ISO 179/1eA	8	7.6
Temperature of deflection under load (1.8MPa)	℃	ISO 75-1,2	197	195
Flammability		UL94	Equivalent HB	HB
UL Yellow Card file number.			-	E213445
Appropriate list number of Ministerial Ordinance for Export Trade Control			Item 16 of Appendix -1	Item 16 of Appendix -1

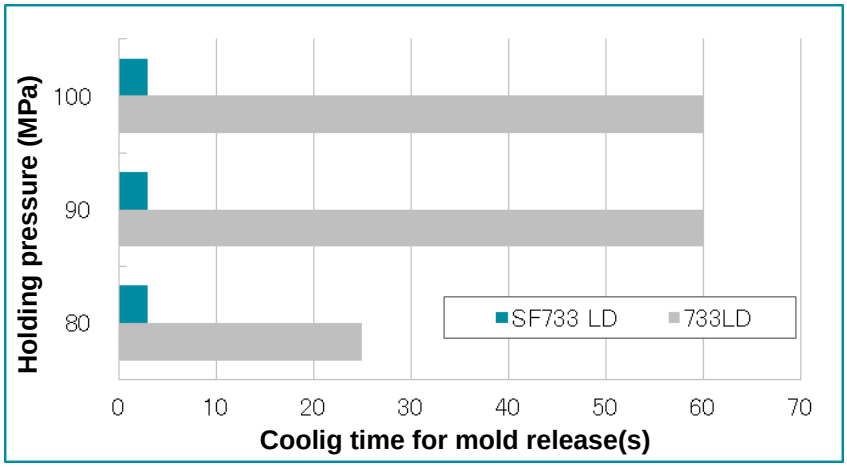
The above values are representative values obtained by injection molding. They are not minimum values of the Materialspecifications.
The data shown here cannot necessarily be applied "as is" to parts that are utilized under different Conditions.

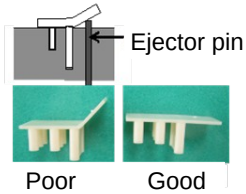
2. High-Cycle Properties

2.1 Mold Release Performance

Figure 2-1 shows the cooling time for mold release at each holding pressure with use of molding cycle evaluation mold .

SF733LD shows excellent mold release performance, with enables high-cycle molding as compared to conventional material.





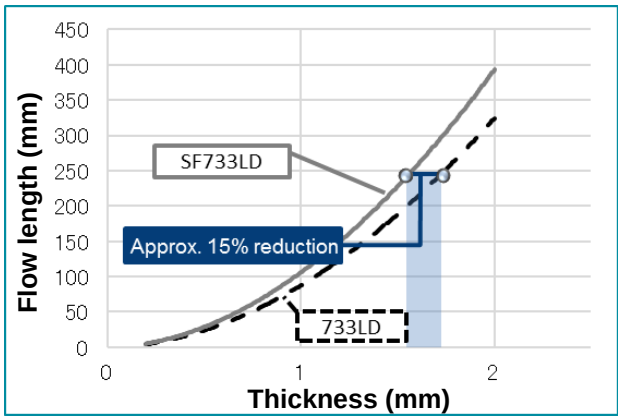
< Molding conditions >
Cylinder temp: 250℃
Mold temp: 60℃
Holding time: 4sec
Injection molding machine:
Toshiba EC40
Mold: Molding cycle evaluation mold

Figure 2-1 Comparison of SF733LD and 733LD Mold Release Performance

Note) This is based on the assumption that molding cycle is determined by release performance. The degree of improvement varies with the mold design and molding conditions.

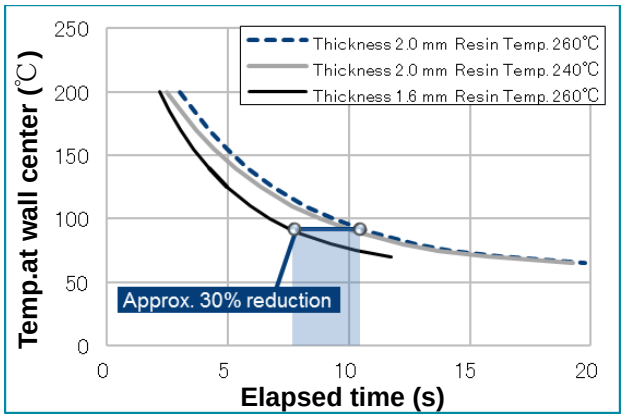
2.2 Shorter Cycle Time

SF733LD, with its high flow properties, enables a reduction in wall thickness. This leads to a shorter solidification time and hence a shorter cycle time.



SF733LD can reduce product wall thickness by 15%, compared to 733LD.

Figure 2-2 Flowability and Thinning



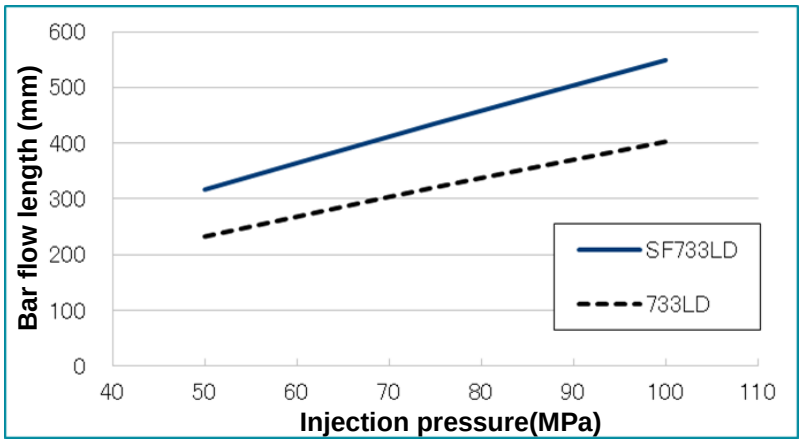
15% wall thickness reduction brings in 30% shorter <<holding pressure +cooling>> time.

Figure 2-3 Cycle Shortening by Thinning

3. SF733LD Moldability

3.1 Flowability

SF733LD shows improved flow properties as compared to **733LD.**



<Molding conditions >
Cylinder temp: 260℃
Mold temp: 65℃
Injection speed:70mm/s
Injection mloding machine:
Nissei ES3000
Mold:Bar flow test mold (2mm thick)

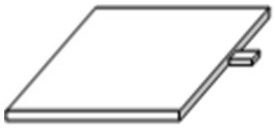
Figure 3-1 Bar Flow Length (2mmt)

3.2 Mold Shrinkage

Table 3-1 Mold shrinkage(2mmt)

（Unit %）

		High cycle	Low warpage
		High flow・Low warpage	
		SF733LD	733LD
		GF30%	GF30%
Holding pressure: 60MPa	Flow direction	0.2	0.2
	Transverse direction	0.6	0.7
	Average	0.4	0.4
Holding pressure: 70MPa	Flow direction	0.1	0.2
	Transverse direction	0.5	0.6
	Average	0.3	0.4



<Molding conditions >
Cylinder temp: 260℃
Mold temp: 65℃
Injection speed:17mm/s
Injection mloding machine:Nissei ES3000
Mold:120×120×2mmt Flat plate
Side gate:4w×2t

3.3 Warpage (Flatness)

Table 3-2 Flatness of flat plate

（Unit mm）

	High cycle	Low warpage
	High flow・Low warpage	
	SF733LD	733LD
	GF30%	GF30%
Holding pressure: 70MPa	3	4

SF733LD has the equivalent flatness to **733LD.**

<Molding conditions >
Cylinder temp: 260℃
Mold temp: 65℃
Injection speed:17mm/s
Injection mloding machine:Nissei ES3000
Mold:120×120×2mmt Flat plate
Side gate:4w×2t

4. Heat and moisture resistance (PCT)

SF733LD has almost the same heat and moisture resistance as **733LD.**

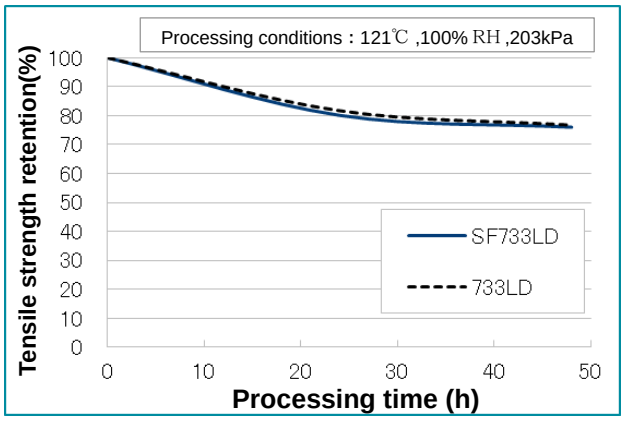


Figure 4-1 Comparison of heat and moisture resistance (Tensile strength)

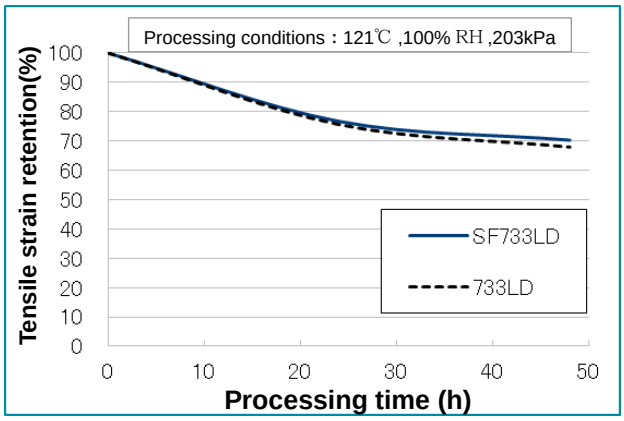


Figure 4-2 Comparison of heat and moisture resistance (Tensile strain at break)

5. Heat resistance (Heat aging test)

SF733LD has almost the same heat resistance as **733LD.**

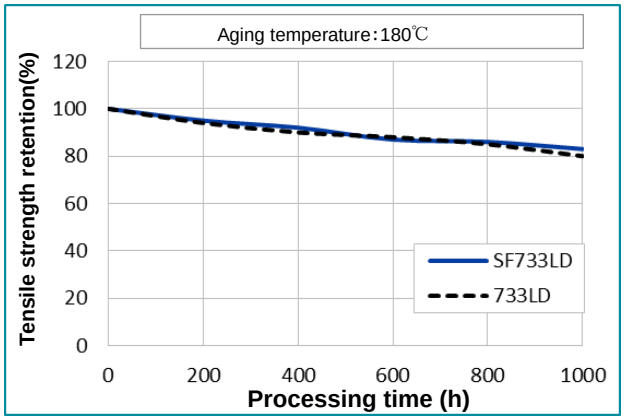


Figure 5-1 Comparison of heat resistance (Tensile strength)

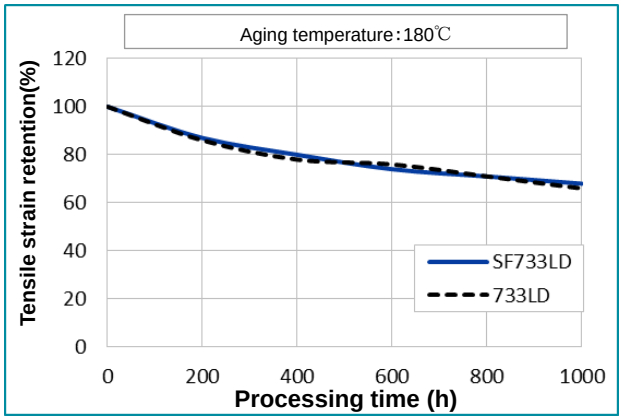


Figure 5-2 Comparison of heat resistance (Tensile strain at break)

6. Effects of temperature on tensile properties

SF733LD shows almost the same temperature dependency as **733LD** on tensile properties.

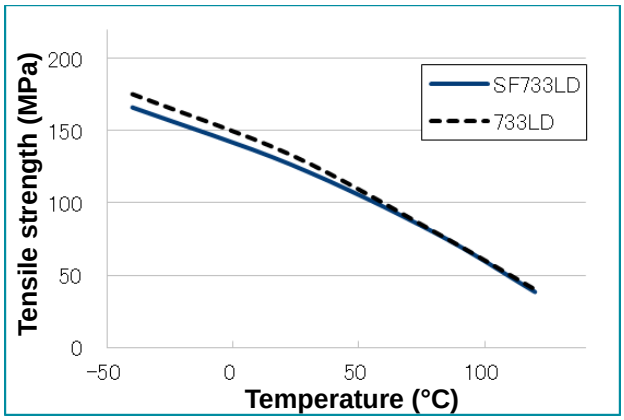


Figure 6-1 Effects of temperature on tensile strength

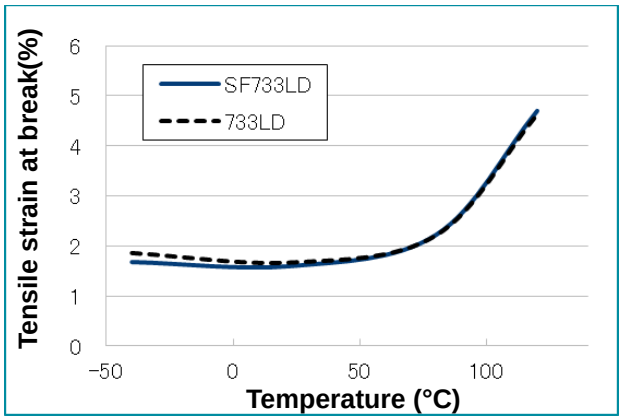


Figure 6-2 Effects of temperature on tensile strain

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NOTES TO USERS

- All property values shown in this brochure are the typical values obtained under conditions prescribed by applicable standards and test methods.
- This brochure has been prepared based on our own experiences and laboratory test data, and therefore all data shown here are not always applicable to parts used under different conditions. We do not guarantee that these data are directly applicable to the application conditions of users and we ask each user to make his own decision on the application.
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- For safe handling of materials we supply, it is advised to refer to the Safety Data Sheet "**SDS**" of the proper material.
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