Polybutylene Terephthalate (PBT)

DURANEX®

LT530FR

EF2001/ED3002

Hydrolysis resistant,high heat shock resistant

POLYPLASTICS CO., LTD.

Introduction

DURANEX® PBT is a crystalline engineering plastic with a polybutylene terephthalate (PBT) base.

In particular, it has excellent heat resistance and electrical properties. And because it also has excellent moldability, it has gained a high degree of reliability as a material suitable for electrical and electronic parts, automobile parts and a wide variety of precision parts.

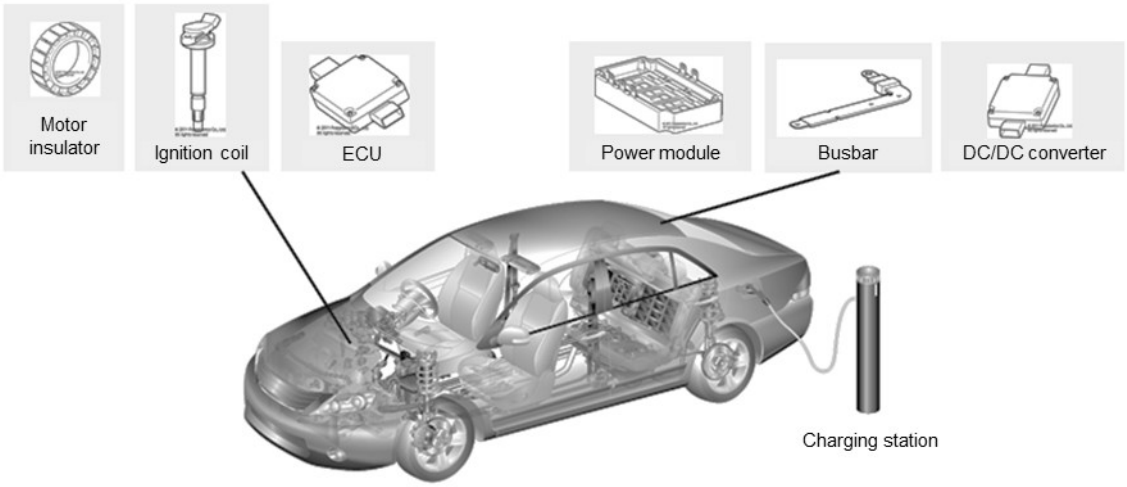
Here we introduce the **DURANEX® PBT LT** series which features greatly improved heat shock resistance as compared to conventional PBT.

Additionally, it is a GF 30% reinforced heat shock and hydrolysis resistant grade that improves the hydrolysis sensitivity of polyester resin.

DURANEX® PBT LT Series Grade Line-up

- **LT530HR** GF30% reinforced, HB, Hydrolysis resistance, High heat shock resistance
- **LT530FR** GF30% reinforced, V-0, Hydrolysis resistance, High heat shock resistance

[Examples of Practical Applications]



General Properties of LT530FR

table1-1 General Properties（ISO）

Item	Unit	Test Method	Hydrolysis resistant,high heat shock resistant
			LT530FR
			GF30% reinforced,Special
Color			EF2001/ED3002
ISO(JIS)quality-of-the-material display:		ISO11469 (JIS K6999)	>PBT-I-GF30<
Density	g/cm^3	ISO 1183	1.63
Water absorption (23°C,24hrs,1mmt)	%	ISO 62	-
Tensile strength	MPa	ISO 527-1,2	100
Strain at break	%	ISO 527-1,2	2.6
Flexural strength	MPa	ISO 178	155
Flexural modulus	MPa	ISO 178	8,500
Charpy notched impact strength (23℃)	kJ/m^2	ISO 179/1eA	10
Temperature of deflection under load (1.8MPa)	℃	ISO 75-1,2	205
Coefficient of linear thermal expansion (23 - 55℃、Flow direction)	x10^{-5}/℃	Our standard	-
Coefficient of linear thermal expansion (23 - 55℃、Transverse direction)	x10^{-5}/℃	Our standard	-
Electric strength (3mmt)	kV/mm	IEC 60243-1	-
Volume resistivity	Ω·cm	IEC 60093	-
Tracking resistance (CTI)	V	IEC 60112	-
Rockwell hardness	M(Scale)	ISO2039-2	-
Flammability		UL94	V-0
The yellow card File No.			E213445
Appropriate List number of Ministerial Ordinance for Export Trade Control			Item 16 of Appendix -1

All figures in the table are the typical values of the material and not the minimum values of the material specifications.

2. Heat Shock Resistance

2.1 Comparison of heat shock resistance

In the case of metal insert molded articles that envelop metal components, when thermal shock is applied to the molded article, expansion and contraction due to heat will be greater in the resin than in the metal, causing distortion (stress) to occur internally. As distortion is increased by repeated thermal shock, cracks are generated in the weld portions and the metal insert corner portions, which often interferes with product performance.

Heat shock resistance is improved in the **DURANEX® LT** series by improving the toughness of the resin itself and alleviating the stress that occurs.

Figure 2-1 shows the heat shock resistance of the **DURANEX® LT** series. Heat shock resistance has been vastly improved compared with conventional PBT.

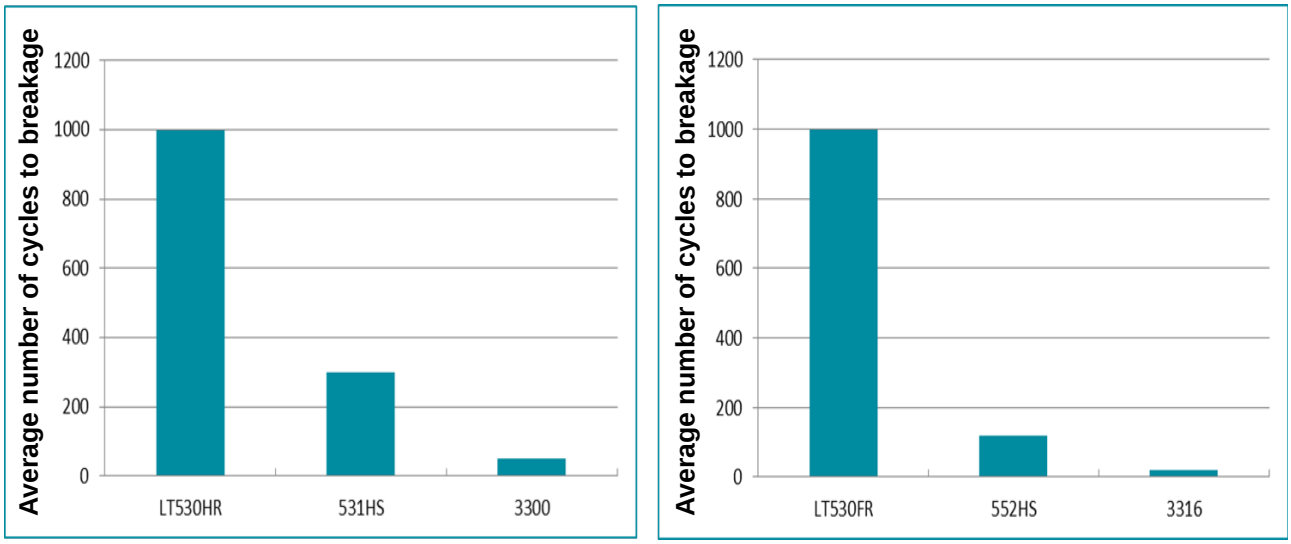
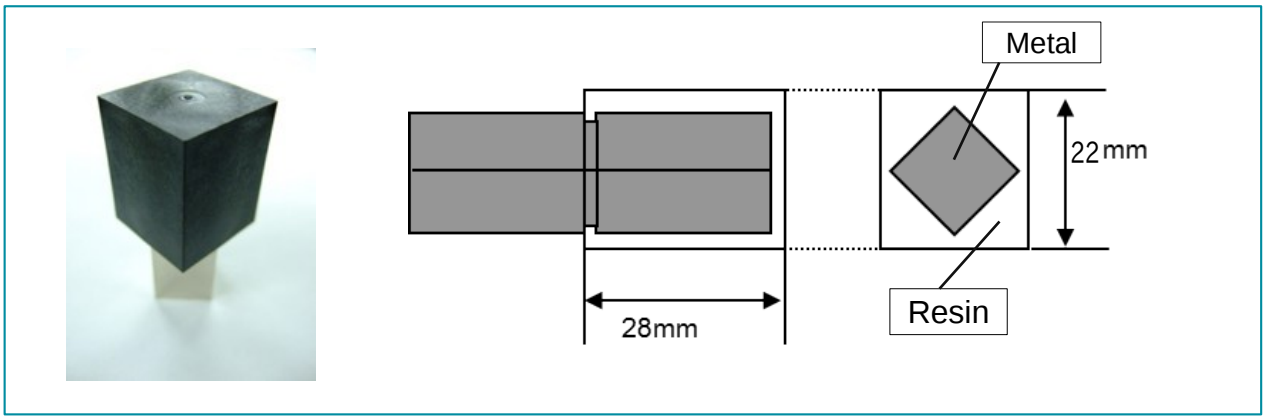


Fig. 2-1 Heat shock resistance of DURANEX® PBT LT series
(Test conditions: 1 cycle is -40 ℃×1.5 hours ⇔ 140℃×1.5 hours)

Sample shape



3. Durability

3.1 Hydrolysis resistance

PBT resin possesses an ester group in its main chain. Unlike other resins that do not contain such an ester group like PPS resin, when PBT resin is exposed to high temperature and high humidity environments, severance of the polymer chain by water (hydrolysis) can occur and this causes a fall-off in strength.

The **DURANEX® LT** series has succeeded in dramatically improving hydrolysis resistance, which is a fundamental weakness of PBT.

Figure 3-1 and Figure 3-2 show the hydrolysis resistance of the **DURANEX® LT** series. **DURANEX® LT530HR** and **LT530FR** possess an extremely high hydrolysis resistance.

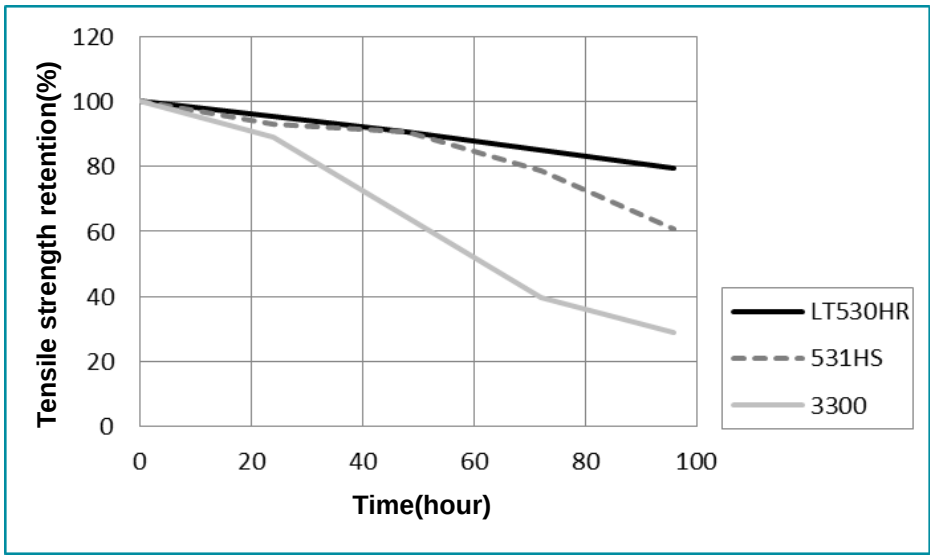


Fig. 3-1 DURANEX® PBT LT530HR hydrolysis resistance

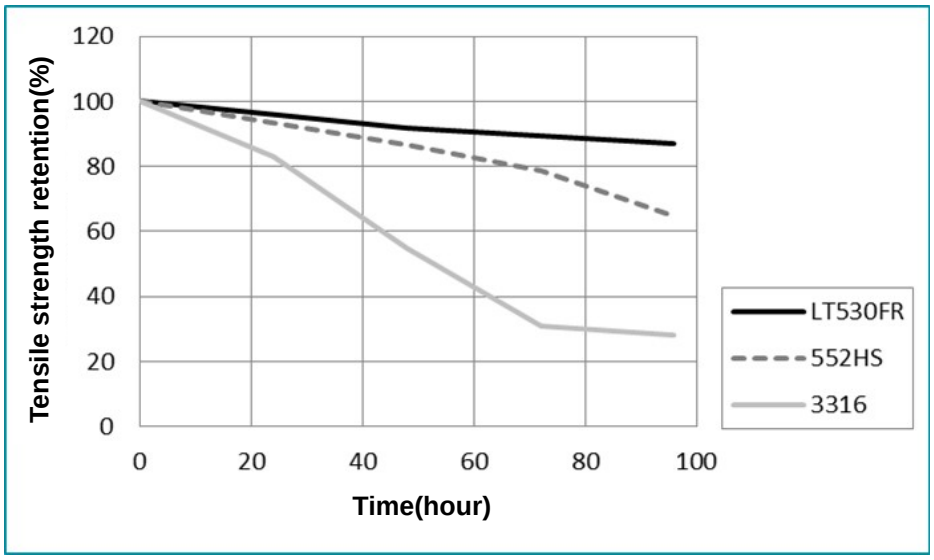


Fig. 3-2 DURANEX® PBT LT530FR hydrolysis resistance

4. Moldability

4.1 Mold shrinkage

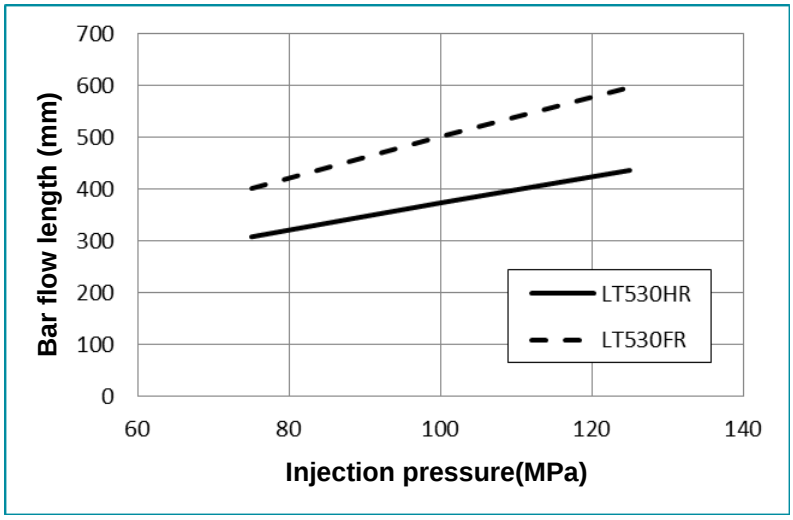
Table 4-1 Mold shrinkage of DURANEX® PBT LT530HR and LT530FR

（Unit %）

Holding pressure		LT530HR	LT530FR
60MPa	Flow direction	0.3	0.3
	Transverse direction	1.0	1.0
70MPa	Flow direction	0.2	0.2
	Transverse direction	0.9	1.0

<Molding condition>
Cylinder temperature : 260℃
Mold temperature : 65℃
Injection speed :17mm/sec
Mold :120×120×2mmt Flat plate
Side gate :4w×2t

4.2 Bar flow length



<Molding condition>
Cylinder temperature :260℃
Mold temperature :65℃
Injection speed :70mm/sec
Mold：Bar flow test mold (2mm thick)

Fig. 5-1 Bar flow length of DURANEX® PBT LT530HR and LT530FR

＜Recommendation upon Material Handling＞

Due to its grade uniqueness, molding and obtaining desired properties with LT grade would require a special care.

- Good ventilation during drying process and molding process
- Do not inhale the gas generated from the molten polymer
- Follow the instructions written on Safety Data Sheet
- Follow the recommended molding conditions as follows
  1) Pre-drying: 120°C, 5 hours or longer
  2) Resin temperature: 240°C ～ 260°C (Do not exceed 260°C)
  3) Annealing temperature: up to 120°C

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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.
- It is the users' responsibility to investigate patent rights, service life and potentiality of applications introduced in this brochure. Materials we supply are not intended for the implant applications in the medical and dental fields, and therefore are not recommended for such uses.
- For all works done properly, it is advised to refer to appropriate technical catalogs for specific material processing.
- For safe handling of materials we supply, it is advised to refer to the Safety Data Sheet "**SDS**" of the proper material.
- This brochure is edited based on reference literature, information and data available to us at the time of creation. The contents of this brochure are subject to change without notice upon achievement of new data.
- Please contact our office for any questions about products we supply, descriptive literatures or any description in this brochure.

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