

Polybutylene Terephthalate (PBT)

DURANEX®

531AR

ED3002

Alkali resistance
improved

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 **DURANEX® PBT 531AR**, a GF30% reinforced, alkali and heat shock resistant grade possessing excellent stress crack resistance in alkaline environments.



General Properties of 531AR

table1-1 General Properties (ISO)

Item	Unit	Test Method	Alkali resistance improved
			531AR
			GF30% reinforced
Color			ED3002
ISO(JIS)quality-of-the-material display:		ISO11469 (JIS K6999)	>PBT-I-GF30<
Density	g/cm ³	ISO 1183	1.50
Water absorption (23°C,24hrs,1mmt)	%	ISO 62	-
Tensile strength	MPa	ISO 527-1,2	109
Strain at break	%	ISO 527-1,2	2.9
Flexural strength	MPa	ISO 178	176
Flexural modulus	MPa	ISO 178	8,300
Charpy notched impact strength (23°C)	kJ/m ²	ISO 179/1eA	11
Temperature of deflection under load (1.8MPa)	°C	ISO 75-1,2	202
Coefficient of linear thermal expansion (23 - 55°C、 Flow direction)	x10 ⁻⁵ /°C	Our standard	-
Coefficient of linear thermal expansion (23 - 55°C、 Transverse direction)	x10 ⁻⁵ /°C	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	Equivalent HB
The yellow card File No.			-
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. Alkali Resistance

2.1 Comparison of alkali resistance

The test piece with weld in Fig. 2-1 is loaded to 1% distortion and immersed in a 10% NaOH aqueous solution as shown in Fig. 2-2. Time is measured until crack occurs.

As seen in Table 2-1, 531AR shows outstanding resistance when compared to standard grade 3300 and heat shock resistant grade 531HS.

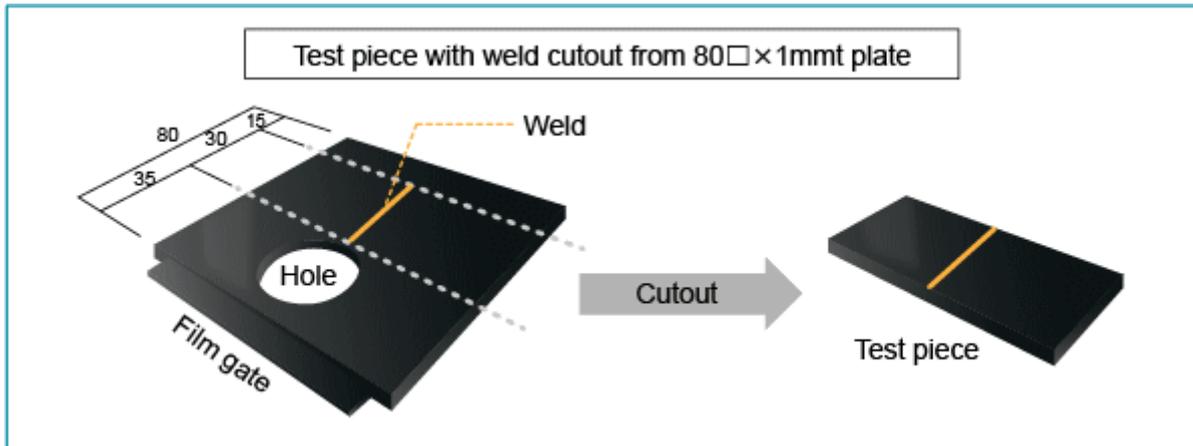


Fig. 2-1 Test piece summary

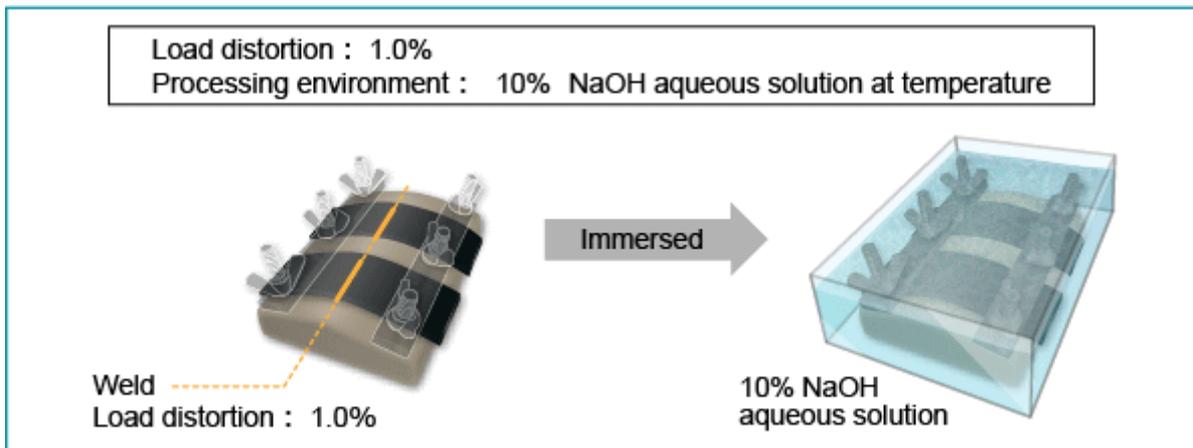


Fig. 2-2 Test method summary

Table 2-1 Time of Stress Crack Occurrence

Grade	Alkali resistance improved 531AR	Hydrolysis resistant, Heat shock resistant 531HS	HB, Standard 3300
Time (hours)	72	2	< 2

Note) Times of cracks were confirmed by visual inspection and the minimum times among 3 measurements were recorded.

3. Heat Shock Resistance

3.1 Comparison of heat shock resistance

When a metal insert molding is used in conditions ranging widely from high to low temperatures, breakage may occur from internal stress due to the difference in linear expansion coefficient between the insert metal and the resin. Therefore, to evaluate long-term reliability, heat shock resistance (thermal cycle) tests are conducted.

Figure 3-1 shows a heat shock resistance comparison of 531AR and an existing grade. 531AR is equivalent to our heat shock resistant grade 531HS and shows excellent heat shock resistance .

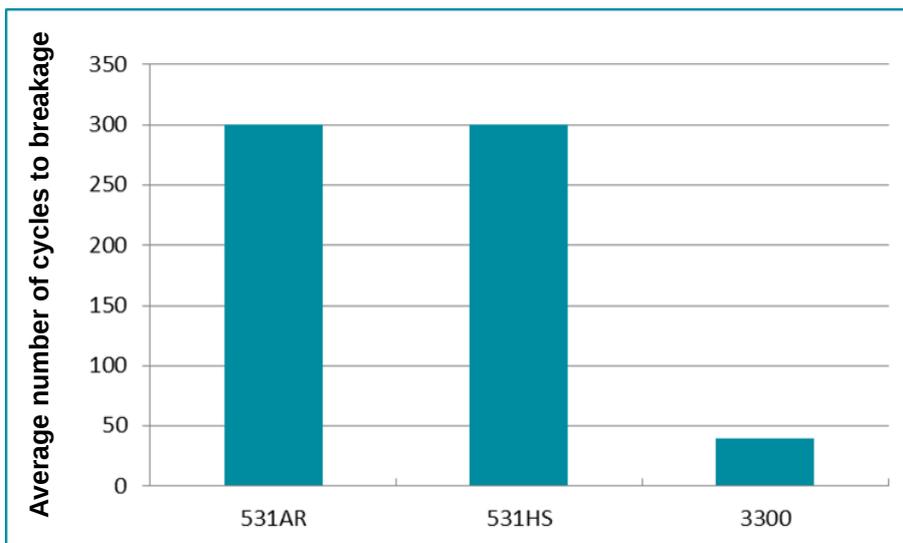
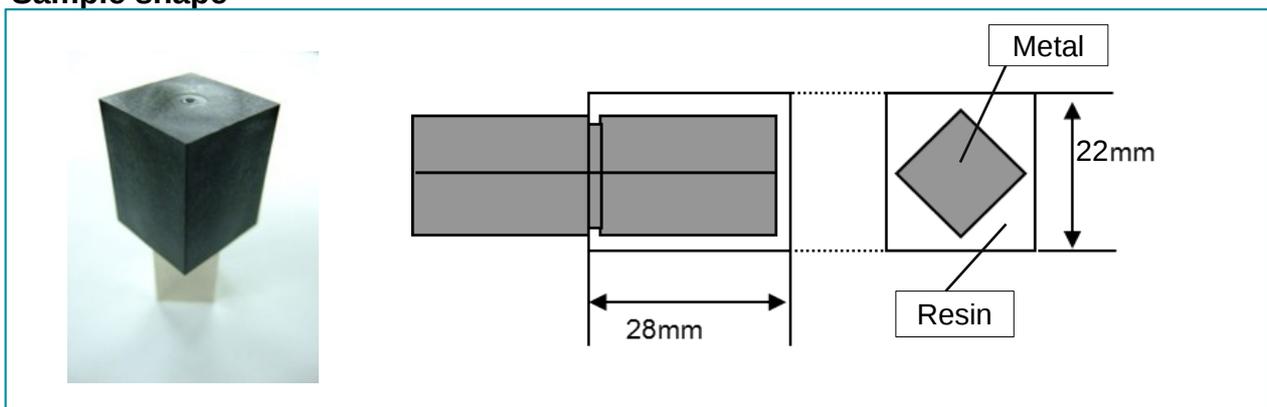


Fig. 3-1 Heat shock resistance of DURANEX® PBT 531AR and 531HS
(Test conditions: 1 cycle is $-40^{\circ}\text{C}\times 1.5\text{ hours} \Leftrightarrow 140^{\circ}\text{C}\times 1.5\text{ hours}$)

Sample shape



4. Durability

4.1 Hydrolysis resistance

Figure 4-1 shows a hydrolysis resistance comparison of 531AR and existing grades. Compared to hydrolysis resistant and heat shock resistant grade 531HS, it is somewhat low. Compared to standard grade 3300, it shows excellent hydrolysis resistance.

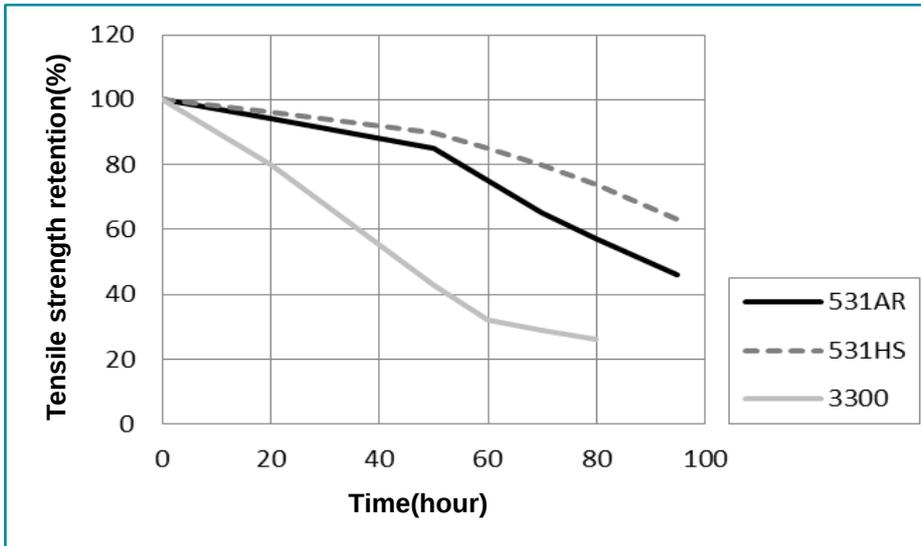


Fig. 4-1 DURANEX® PBT 531AR hydrolysis resistance



5. Moldability

5.1 Mold shrinkage

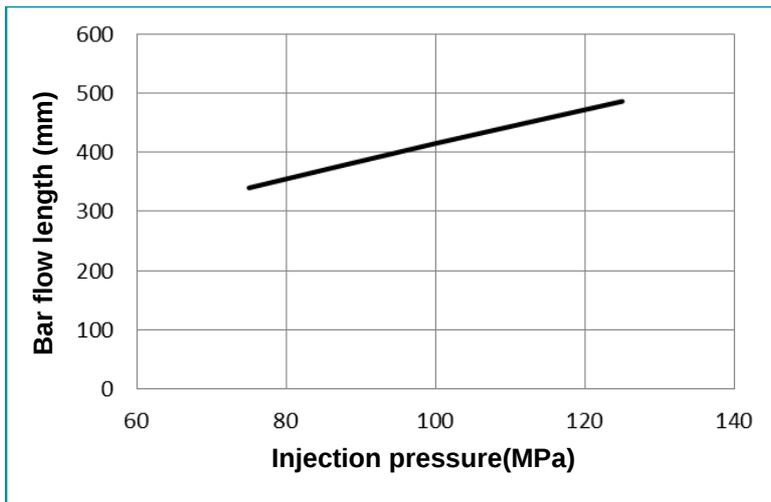
Table 5-1 Mold shrinkage of DURANEX® PBT 531AR

(Unit %)

Holding pressure		531AR
60MPa	Flow direction	0.3
	Transverse direction	0.9
70MPa	Flow direction	0.2
	Transverse direction	0.8

<Molding condition>
 Cylinder temperature : 260°C
 Mold temperature : 60°C
 Injection speed : 17mm/sec
 Mold : 120×120×2mm Flat plate
 Side gate : 4w×2t

5.2 Bar flow length



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

Fig. 5-1 Bar flow length of DURANEX® PBT 531AR



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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