Polybutylene Terephthalate (PBT)

DURANEX®

532AR

EF2001/ED3002

Alkali Resistance
Improved

POLYPLASTICS CO., LTD.

Introduction

DURANEX® PBT is a polybutylene terephthalate (PBT)-based crystalline engineering plastic**.**

With its particularly superior heat resistance and electrical properties as well as excellent molding properties, DURANEX® PBT has earned a strong reputation as a material ideally suited for use in electronic and electrical components, auto parts, various types of precision components, and more.

Here we will introduce **DURANEX® PBT 532AR**, a GF 30% alkali resistant, thermal shock resistant grade with excellent stress cracking resistance in alkaline environments.

General Properties of 532AR

table1-1 General Properties（ISO）

Item	Unit	Test Method	Alkali Resistance Improved
			532AR
			GF30% Reinforced, Hydrolysis Resistance
Color			EF2001/ED3002
ISO(JIS)quality-of-the-material display:		ISO11469 (JIS K6999)	>PBT-I-GF30<
Density	g/cm^3	ISO 1183	1.46
Water absorption (23°C,24hrs,1mmt)	%	ISO 62	0.2
Tensile strength	MPa	ISO 527-1,2	110
Strain at break	%	ISO 527-1,2	3.0
Flexural strength	MPa	ISO 178	170
Flexural modulus	MPa	ISO 178	8,000
Charpy notched impact strength (23℃)	kJ/m^2	ISO 179/1eA	15
Temperature of deflection under load (1.8MPa)	℃	ISO 75-1,2	202
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	-
Volume resistivity (Our standard)	Ω·cm		-
Tracking resistance (CTI)	V	IEC 60112	-
Rockwell hardness	M(Scale)	ISO2039-2	-
Flammability		UL94	HB
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. Alkali Resistance

2.1 Alkali resistance comparison

The illustration in Figure 2-1 shows how 1% warpage was applied to a weld test piece which was immersed in a 10% NaOH (sodium hydroxide) solution. We then measured the elapsed time until cracking occurred.

The chart in Figure 2-2 shows the markedly superior resistance of **532AR** compared to standard grade 3300 and thermal shock resistant grade 531HS.

Testing method

The weld part was cut in the shape of a strip from a perforated 80 x 1 mmt test piece to be used as the test piece for this comparison. It was then immersed in a strongly alkaline 10% sodium hydroxide solution at room temperature while 1% warpage was applied, and we measured the elapsed time until cracking occurred in the test piece.

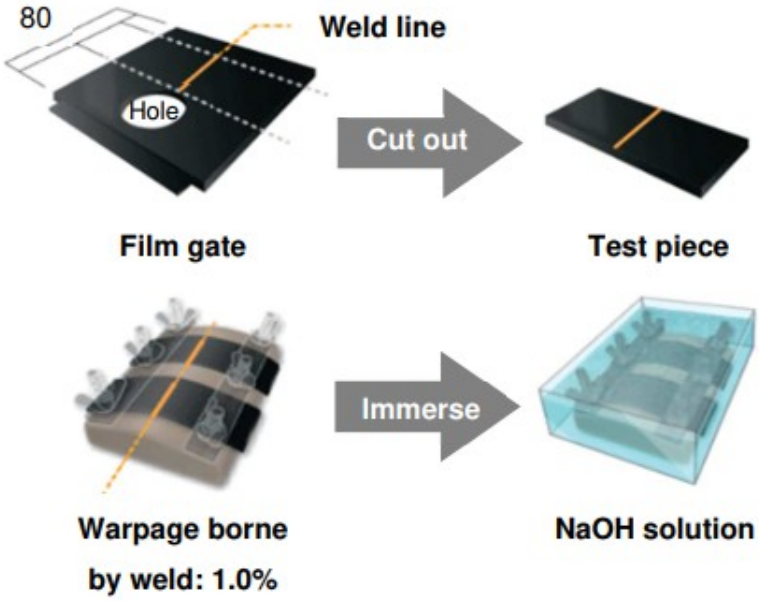


Figure 2-1: Overview of test piece and testing method

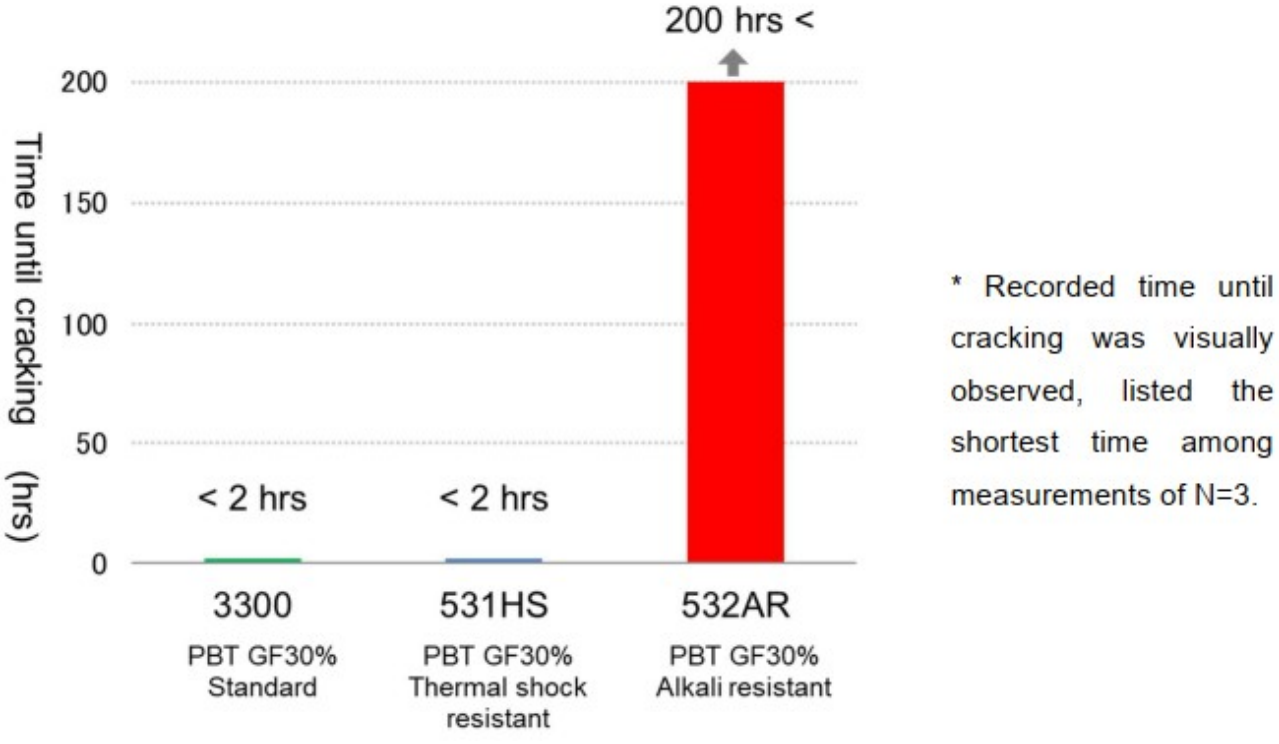


Figure 2-2: Elapsed time before stress cracking in alkaline environment

3. Thermal Shock Resistance

3.1 Thermal shock resistance comparison

When metal insert molded articles are used in wide-ranging conditions from high to low temperatures, internal stress from the difference in coefficient of linear expansion between the insert metal and the resin can sometimes cause them to fracture. For this reason, we conduct thermal shock resistance (cooling/heating cycle) tests to evaluate the long-term reliability of these articles.

Figure 3-1 compares the thermal shock resistance of **532AR** and two other existing grades. **532AR** displays excellent thermal shock resistance, equal or superior to that of our thermal shock resistant grade 531HS.

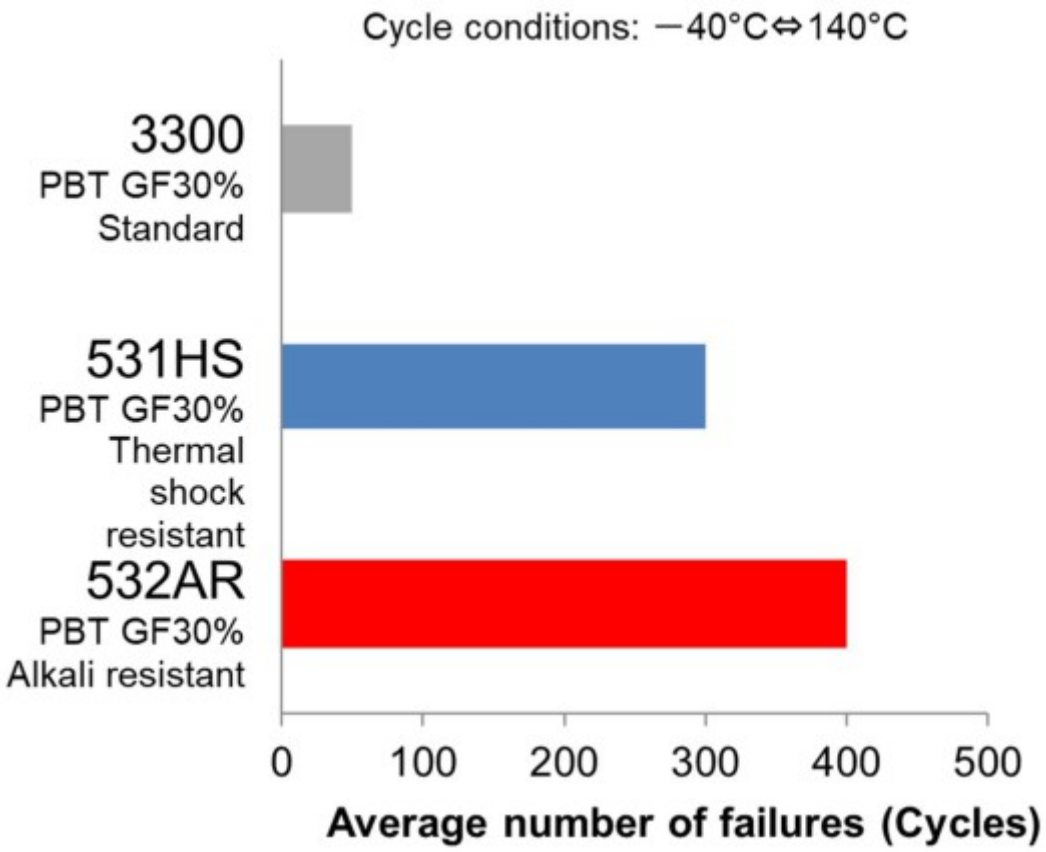
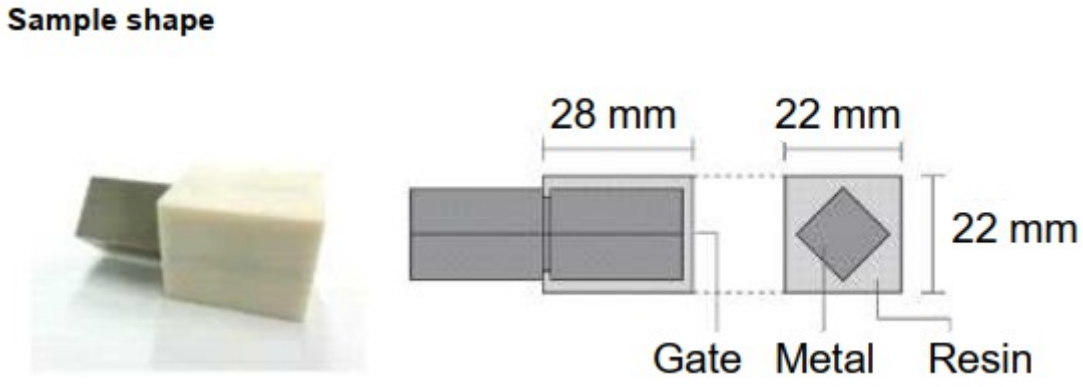


Figure 3-1: Thermal shock resistance of DURANEX® PBT 532AR and 531HS



4. Durability

4.1 Hydrolysis resistance comparison

Figure 4-1 compares the hydrolysis resistance of **532AR** and two other existing grades. 532AR displays excellent hydrolysis resistance compared to hydrolysis resistant and thermal shock resistant grade 531HS.

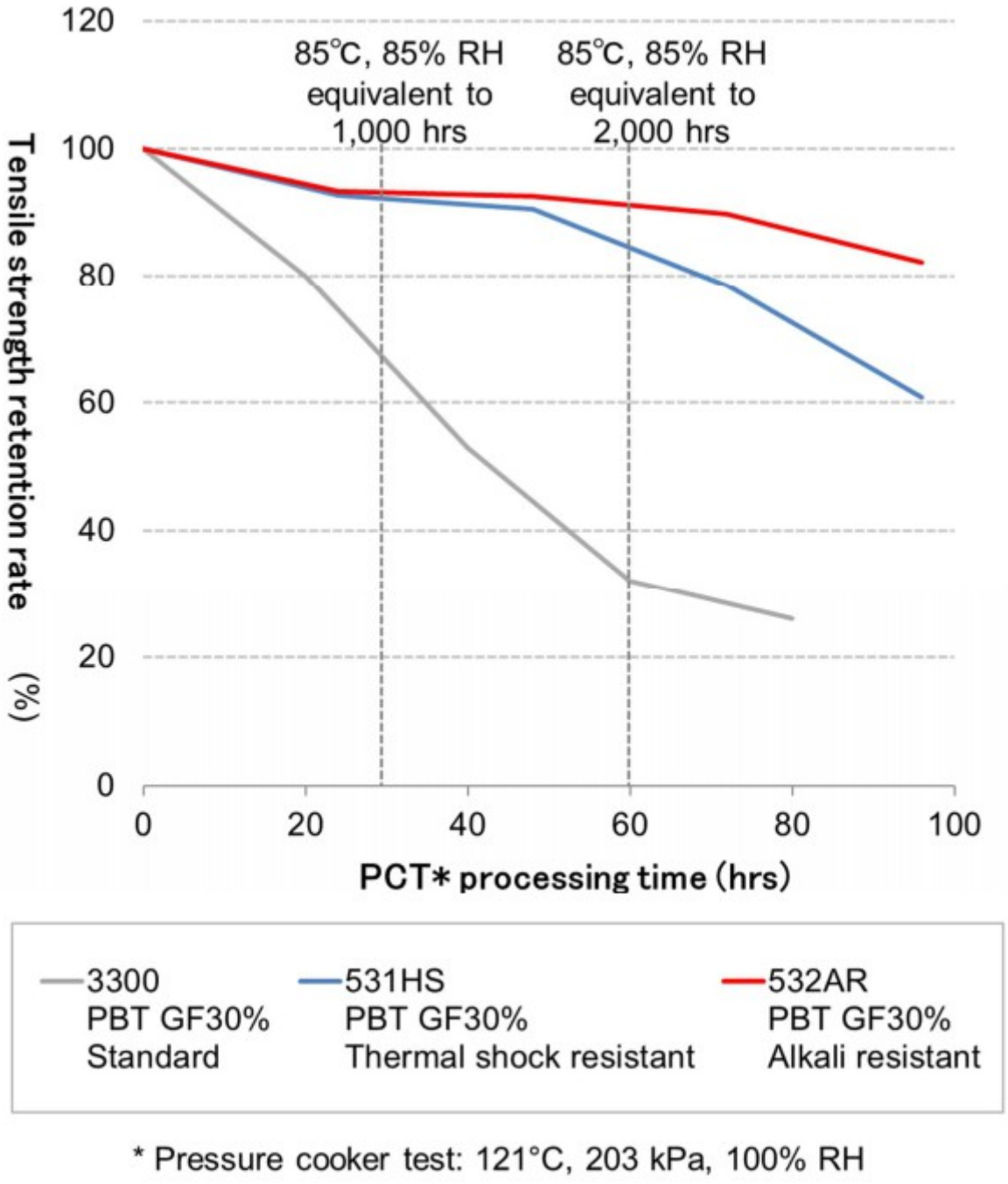
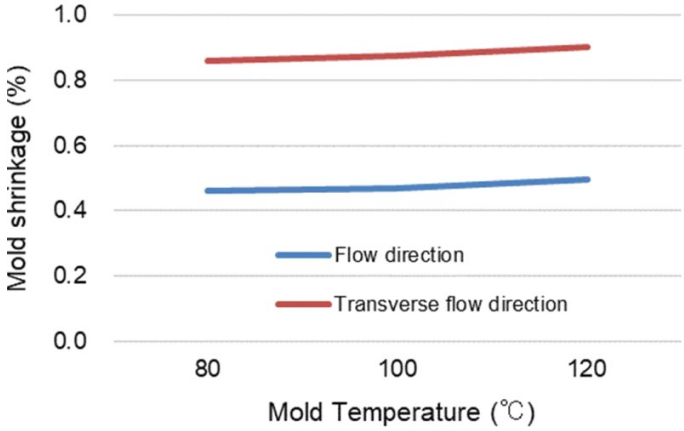


Figure 4-1: Hydrolysis resistance of DURANEX® PBT 532AR

5. Molding Properties

5.1 Mold shrinkage

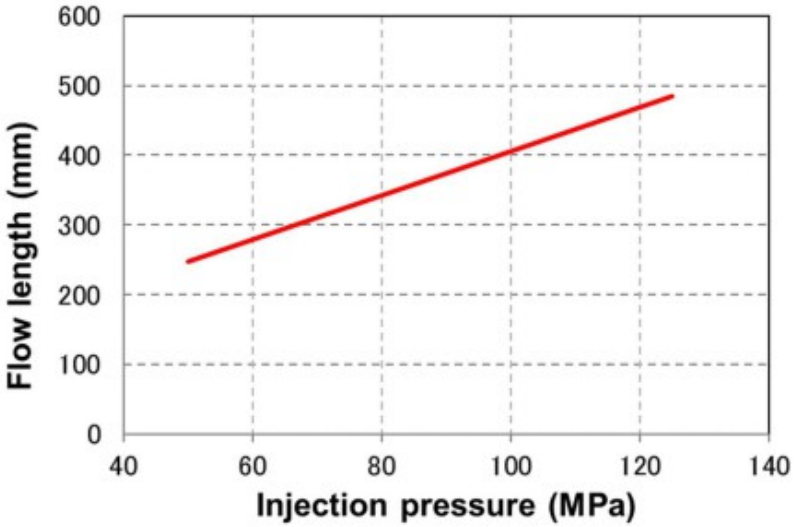


Mold shrinkage:
Flow direction : 0.5%
Transverse direction : 0.9%

Molding conditions:
Cylinder temperature : 260°C
Mold temperature : 80-120°C
Injection speed : 24 mm/s
Cavity pressure : 60 MPa
Mold used : 60 x 60 x 2 mmt flat plate
Film gate

Figure 5-1: Mold shrinkage of DURANEX® PBT 532AR

5.2 Flowability



Molding conditions:
Cylinder temperature: 260°C
Mold temperature: 60°C
Injection speed: 66.7 mm/s
Mold used: 2 mmt bar flow test mold

Figure 5-2: Flowability of DURANEX® PBT 532AR

Recommended molding conditions:

532AR can be molded using typical PBT molding conditions. The appearance of the molded product (surface transferability) may be insufficient depending on the product shape and the mold. Appearance is likely to improve by adjusting to the recommended conditions below.

1. Mold surface temperature : 80°C or higher, up to maximum of around 120°C recommended. Be careful about deformation and mold releasability at high temperatures.
2. Injection speed : Trends toward improvement as a result of high injection speeds. Be careful about gas burns at the flow end.
3. Resin temperature : Raise to around 270°C. Make sure to purge if retention has continued for 15 minutes or longer at 270°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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