

PBT(Polybutylene terephthalate)

DURANEX[®]

2016

3116

3216

3226

3316

(Glass Fiber
-Reinforced,
UL94 V-0 Grades)

WinTech Polymer Ltd.

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NOTES TO USERS

- All property values shown in this brochure are the typical values obtained under varying conditions prescribed by applicable standards and test method.
- 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 Material Safety Data Sheet **“MSDS”** of the proper material.
- This brochure is edited based on reference literatures, information and data currently available to us. So the contents of this brochure are subject to change without notice due to 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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* WinTech Polymer Ltd. is a member of the Polyplastics Group, while the “DURANEX®” PBT resin manufactured and sold by that firm is marketed by Polyplastics affiliated companies.

Introduction

The superior heat resistance, mechanical properties, and electrical properties of **Duranex** are utilized in wide variety of applications, including electrical and electronic, and automotive uses.

In recent years, globalization of the electronic components industry, a user of self-extinguishing types of **Duranex**, is particularly notable, and market demands for easy material procurement regardless of the region and standardization of performance and quality are very evident.

The Duranex -16 series is a self-extinguishing series of grades rated at UL94 V-0 that was developed in response to the need for common performance and quality worldwide. The series is supplied globally through Polyplastics (Japan), and Ticona (the US and Germany).

In addition, **the Duranex -16 series** is a product that follows in the steps of the performance standards set by the high-productivity, non-bleed grades that we have marketed for some time now. **The -16 series** is characterized by the

1. High strength and stiffness
2. Excellent heat resistance and thermal stability
3. Superior flowability
4. Excellent electrical characteristics
 - UL certified CTI: Rank 2
 - 1/64": V-0, 1/16": 5V
5. Use of 50% recycled content is possible (UL certified)

1. General physical properties of DURANEX® -16 series

Table 1-1 General physical properties (ISO)

Item	Unit	Testing method	Standard, FR, 50% regrind				
			V-0				
			2016	3116	3216	3226	3316
			Unfilled	G • F 7.5%filled	G • F 15%filled	G • F 20%filled	G • F 30%filled
Density	g/cm ³	ISO 1183	1.43	1.49	1.54	1.57	1.66
Stress at yield	MPa	ISO 527-1, 2	59	91	113	123	143
Strain at break	%	ISO 527-1, 2	35*	3.4	2.7	2.3	2.0
Flexural strength	MPa	ISO 178	98	144	173	189	224
Flexural modulus	MPa	ISO 178	2,850	4,710	6,050	7,390	10,000
Charpy notched impact strength	kJ/m ²	ISO 179/1eA	4.6	5.1	7.1	8.0	10.0
Temperature of deflection under load (1.80MPa)	°C	ISO 75-1, 2	82	201	208	206	211
Coefficient of linear thermal expansion (23-55°C) Parallel	×10 ⁻⁵ /°C	ISO 11359-2	—	5	4	3	2
Coefficient of linear thermal expansion (23-55°C) Transverse	×10 ⁻⁵ /°C	ISO 11359-2	—	10	10	10	9
Electric strength	kV/mm	IEC 60243-1	24	22	20	20	20
Volume resistivity	Ω • cm	IEC 60093	4×10 ¹⁶	3×10 ¹⁶	2×10 ¹⁶	1×10 ¹⁶	1×10 ¹⁶
Surface resistivity	Ω	IEC 60093	1×10 ¹⁷	3×10 ¹⁶	4×10 ¹⁶	1×10 ¹⁶	1×10 ¹⁷
Comparative tracking index	CTI	IEC 60112	250	250	250	250	250
Flammability		UL94	V-0	V-0	V-0	V-0	V-0

* Nominal strain at break

- All figures in the table are the typical values of the material and not the minimum values of the material specifications.
- For qualified values of UL (Underwriters Laboratories Inc.) refer to the yellow card (File No.E213445) issued by UL

Table 1-2 General physical properties (ASTM)

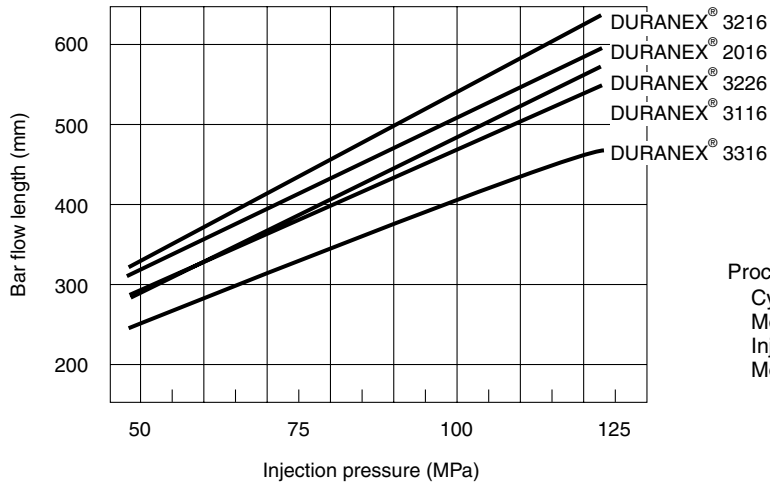
Item		Unit	Testing method	Standard, FR, 50% regrind				
				V-0				
				2016	3116	3216	3226	3316
				Unfilled	G • F 7.5%filled	G • F 15%filled	G • F 20%filled	G • F 30%filled
Specific gravity		g/cm ³	D 792	1.43	1.49	1.54	1.57	1.66
Tensile strength		MPa	D 638	54	85	112	127	147
Tensile elongation		%	D 638	25.0	4.5	3.5	3.4	2.7
Flexural strength		MPa	D 790	98	132	166	186	225
Flexural modulus		MPa	D 790	2,840	4,410	6,080	7,250	9,610
Izod impact strength (with notch)	Notch side	J/m	D 256	39	49	58	78	98
	Reversed notch	J/m	D 256	440	440	440	530	680
Deflection temperature under load (1.82MPa)		°C	D 648	99	202	208	211	212
Coefficient of linear thermal expansion (Short-time test: 2mmt)		×10 ⁻⁵ /°C	—	9	2 ~ 7	2 ~ 7	2 ~ 7	2 ~ 7
Dielectric breakdown strength (Short-time test: 2mmt)		MV/m	D 149	24	22	20	20	20
Volume resistivity (3mmt)		Ω • cm	D257	4×10 ¹⁶	3×10 ¹⁶	2×10 ¹⁶	1×10 ¹⁶	1×10 ¹⁶
Surface resistivity		Ω	D257	4×10 ¹⁶	3×10 ¹⁶	3×10 ¹⁶	1×10 ¹⁶	1×10 ¹⁶
Arc resistance		s	D495	(62)	(65)	(70)	(77)	92
Tracking resistance		V	(IEC)	(250)	(250)	(250)	(265)	250
Flammability (UL94)		—	(UL94)	V-0	V-0	V-0	V-0	V-0

- All figures in the table are the typical values of the material and not the minimum values of the material specifications.
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2. Processing characteristics of DURANEX® -16 Series

2.1 Flow characteristics

Figure 2-1 Bar flow length (2 mm ϕ)



Processing parameters
Cylinder temperature: 250-250-230-210°C
Mold temperature: 65°C
Injection speed: 67mm/sec
Mold: Bar flow test mold

2.2 Mold shrinkage ratio

Figure 2-2 DURANEX® 3316

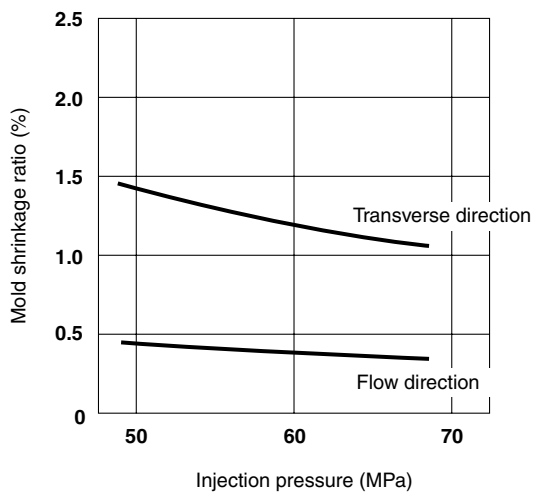


Figure 2-3 DURANEX® 3226

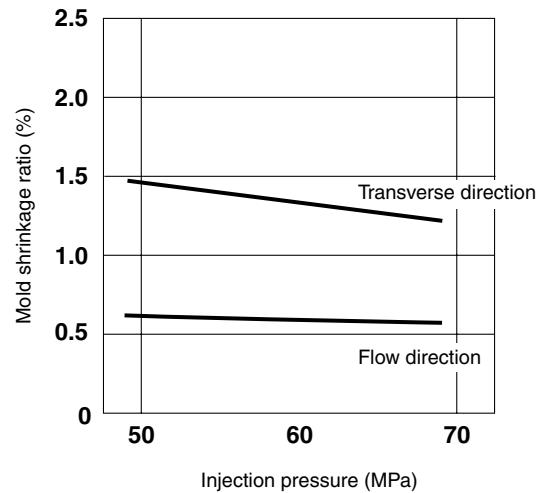


Figure 2-4 DURANEX® 3216

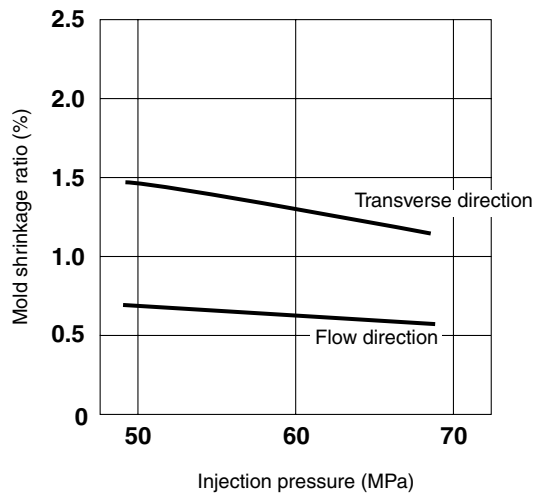


Figure 2-5 DURANEX® 3116

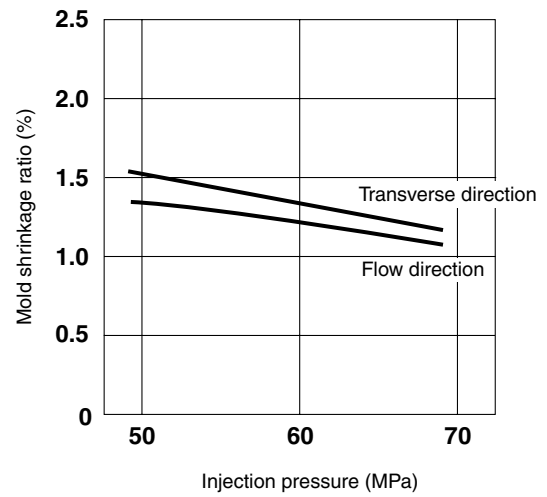
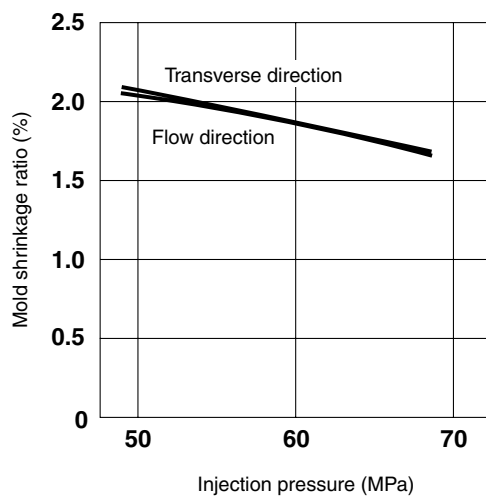


Figure 2-6 DURANEX® 2016



Processing parameters

Cylinder temperature: 250-250-230-210°C

Mold temperature: 65°C

Injection speed: 17mm/sec

Mold: 120□×2mm t flat plate
(side gate; 4 (W)×2 t)

3. DURANEX® -16 series UL certification values

Table 3-1 UL certification values: Temperature ratings

Grade	UL94 flammability	Elec. :°C	Mech. with Imp :°C	Mech. w/o Imp :°C
DURANEX®3316	V-0 0.4mm (1/64")	140	130	140
Polyplastics existing grade	5V 1.5mm (1/16")	140	130	140
DURANEX®3226	V-0 0.75mm (1/32")	130	120	130
Polyplastics existing grade	5V 3.0mm (1/8")	140	130	140
DURANEX®3216	V-0 0.75mm (1/32")	130	120	130
Polyplastics existing grade	5V 3.0mm (1/8")	140	130	140
DURANEX®3116	V-0 0.75mm (1/32")	130	120	130
Polyplastics existing grade	5V 3.0mm (1/8")	140	130	140
DURANEX®2016	V-0 0.75mm (1/32")	130	120	130
Polyplastics existing grade	5V 3.0mm (1/8")	140	130	140

Table 3-2 UL certification values: Electrical insulation resistance index rating

Grade	HWI	HAI	HVTR	D495	CTI
DURANEX®3316	1	0	0	6	2
Polyplastics existing grade	2	3	3	6	3
DURANEX®3226	2	0	3	6	2
Polyplastics existing grade	0	4	1	6	3
DURANEX®3216	2	0	3	6	2
Polyplastics existing grade	2	4	3	6	3
DURANEX®3116	2	0	3	6	2
Polyplastics existing grade	2	3	3	6	3
DURANEX®2016	2	0	3	6	2
Polyplastics existing grade	2	0	3	6	3

Table 3-3 UL certification values: Upper recycled content limit

DURANEX® grade	Upper recycled content limit
3316, 3226, 3216, 3116, 2016	50%

Polyplastics



ISO 9001:2000
Certified
JQA-1283



ISO14001 Certified
JQA-EM0337 Research & Development Div.
JQA-EM0414 Fuji Plant

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