MITSUBISHI CHEMICAL

DURABIO™

21 Januari 2020

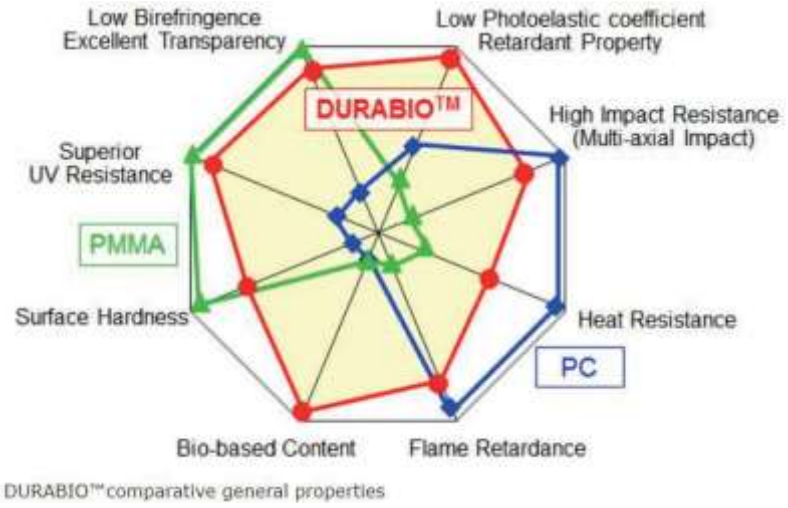
DURABIO™ a transparent bio-based engineering polymer developed by Mitsubishi Chemical. DURABIO™ its transparency similar to that of PMMA but with a much better impact behavior and an improved heat resistance. DURABIO™ beats the well-known inferior properties of PC in regards to scratch resistance, hardness and chemical resistance. That is why DURABIO™ closes the gap between PC and PMMA.

KEY FEATURES

- Excellent optical and mechanical properties
- Superb UV-resistance
- Ductility, with strong impact resistance
- High heat resistance
- Scratch resistance
- Chemical inertness
- BPA free, Biobased
- Easy to print

COLOURS

Black White Clear



DURABIO™ comparative general properties

Filament Specs.

Size	Ø tolerance	Roundness
1.75mm	± 0,05mm	≥ 95%
2.85mm	± 0,10mm	≥ 95%

Material Properties

Description	Testmethod	Typical value
Specific gravity	ISO 1183	1,31 g/cm³
MFI 230°C/2,16kg	ISO 1183	13 g/10min
Tensile Strength at Yield	ISO 527	64 MPa
Elongation-Strain at Break	ISO 527	130%
Tensile (E) modulus	ISO 527	2300 MPa
Impact Strength Charpy method 23°C (notched)	ISO 179	9 kJ/m²
Flexural Modulus	ISO 178	2100 MPa
Flexural Strength	ISO 178	94 MPa
Heat deflection temperature HDT B	ISO 75	92°C
Heat deflection temperature HDT A	ISO 75	82°C
Transmittance	ISO 13468	92%

Print Properties

Description	Typical value
Nozzle Size	0.4mm
Bed Adhesion	Dimafix *
Nozzle Temperature	240±10°C
Bed Temperature	≥100°C
Layer Height	0.2mm
Print Speed	50 mm/s
Fan Speed	50%
Extrusion Multiplier / Material Flow	100%
Retraction Distance	5.5mm
Retraction Speed	35 mm/s
Difficulty to Print	easy
Drying Required	min. 5 hours suggested

** Dimafix is used with a glass buildplate.*

ADDITIONAL INFO

DURABIO™ is particularly designed for applications requiring exceptional visual appearance with scratch and impact resistance as well as chemical inertness.

For information about Durabio™ filament you can contact:

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Mechanical Specifications

During additional research a print profile has been made which was optimized for achieving a highest possible tensile performance. Table 1 shows the typical values of an injection moulded specimen compared to a 3D-printed specimen in both the X-Y axis (3D-printed horizontally) and the Z-axis (3D-printed vertically). After that, some important parameters are given and the corresponding trend is briefly described.

Table 1: Tensile data of both injection moulded and 3D-printed specimens.*

	Injection Moulded	3D-Printed X-Y	3D-Printed Z
Young's Modulus [MPa]	2267	2283	2380
Stress at Yield [MPa]	64	69	55
Stress at Break [MPa]	53	56	56
Strain at Yield [%]	6	6	4
Strain at Break [%]	75	11	5
			

Most important parameters:

When increasing the Nozzle Temperature the Stress at Yield will increase

An increase of up to 106% could be achieved in the vertical print orientation (Z-axis) compared to a visually optimized profile

When decreasing the Fan Speed the Stress at Yield will increase

An increase of up to 154% could be achieved in the vertical print orientation (Z-axis) compared to a visually optimized profile

When increasing the Material Flow the Stress at Yield will increase

An increase of up to 40% could be achieved in the vertical print orientation (Z-axis) compared to a visually optimized profile

Print Conditions

All specimens have been printed using a 0.4mm nozzle and the layer height was set to 0.2mm. The room in which the 3D-printer was located had an environmental temperature of ± 25˚C.

*Test Conditions

The tensile tests have been carried out according to ISO-527 using modified 1BA specimens (3D-printing) and 1A specimens (injection moulding). The room in which the Universal Testing Machine was located had an environmental temperature of ± 20˚C.

MCPP Netherlands B.V. cannot be held responsible for any inaccuracies. No guarantees can be given since differences in data could be caused by differences between individual 3D-printers.