ABM COMPOSITE
Arctic Biomaterials

ArcBiox™ BGF30-A19

Technical data sheet

October 13th, 2017

ArcBiox™ materials are biodegradable glass fiber reinforced) or unreinforced composites. These high performance biocomposites provide sustainable green alternatives for demanding technical applications.*

*) *The proprietary fiber technology of Arctic biomaterials Oy is based on Long Fiber reinforced Thermoplastic (LFT) technology.*

ArcBiox™ BGF30-A19

Long glass fiber reinforced impact modified PLA (Polylactic acid) for injection moulding

- ✓ Reinforced with biodegradable glass fiber
- ✓ PLA is made from 100% renewable resources
- ✓ Increased end-of-life options
- ✓ Good flowability
- ✓ Excellent flatness & dimensional stability
- ✓ High temperature resistance
- ✓ High stiffness & strength

Property	Typical value		Test method
Density	1.5	g/cm^3	ISO 1183 A
Tensile strength at break	131	MPa	ISO 527
Flexural strength	196	MPa	ISO 178
Flexural Modulus	11	GPa	ISO 178
Izod impact strength	33	kJ/m^2	ISO 180/U
Izod notched impact strength	13	kJ/m^2	ISO 180/A
HDT/A 1.8 MPa	153	°C	ISO 75
Vicat /B 50	140	°C	ISO 306

The properties stated above are not for specification purposes.
Parts moulded to 110 °C mould.

ArcBiox™ BGF30-A19 is a possible alternative for applications where currently composites like glass reinforced PBT, PP and PA are used.

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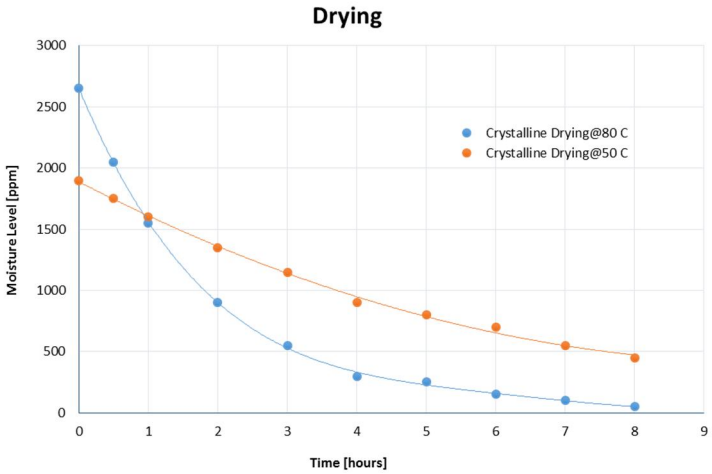
Best Practices: Injection moulding of ArcBiox™ Materials

Drying

ArcBiox™ materials must be always dried before processing with dehumidifying dryer, due to fact that insufficient drying before processing will cause loss of mechanical properties. Please note that a combination of a very long drying time and high temperature may cause degradation and agglomeration of pellets and may cause yellowing.



Moisture content of less than 0.025% (250 ppm) is recommended to prevent loss of mechanical properties.

Recommended drying time

80 °C 4-5 h

In order to avoid moisture pick-up during processing, the following points should be followed:

- Remaining granules should be stored in air-tight containers
- Residence time inside the hopper should stay below 1 hour
- Dry-air filters should be used in hot-humid climate conditions
- Do not open cold material containers inside normal temperature environment as the granules will act as condensation points (bring containers into production some hours before use)
- Empty machine hopper and store material air-tight in case of production stops

Screw & barrel

When using ArcBiox™ glass fiber reinforced grades wear protected conventional 3-zone screws with L/D-ratio between 18:1 and 22:1 and low compression ratio of 2:1 to 2.5:1 are recommended. Proposed flight depth for metering zone is at minimum 3.5 mm and for feed zone 7.5 mm.
Screws with integrated mixing elements, venting screws with double compression zones or screws with other shear elements are not recommended for the processing of ArcBiox™ glass fiber reinforced grades.

Nozzle

General purpose nozzle tips are recommended. Open nozzles are preferred to nozzles equipped with shut-off devices. The configuration of the bore of the nozzle should closely correspond to the screw tip and the diameter of the nozzle bore must be slightly smaller than the outer sprue bush diameter to allow demolding of the sprue and runner.

Hopper & other connections selection

The hopper should have, preferably, a discharge angle of at least 45°, better 60 °C, flat bottoms and long transition tubes to the feed throat must be avoided. Small feed throat diameters and safety bars, magnets or other inserts can lead to flow stagnations. Allow at least 15 mm free space for the pellets to move. All inside seams must be flush, circular sections are preferred over rectangular flow channels.

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Tooling

Due to low shrinkage of material draft angles need to be higher than with unreinforced grades. Following table should be considered in part design on visual surfaces

VDI 3400 ref	12	15	18	21	24	27	30	33	36	39
Ra (µm)	0.4	0.56	0.8	1.12	1.6	2.24	3.14	4.5	6.3	9
Draft angle	1.5	2	2.5	3	3.5	5	4.5	5	5.5	6

Gate should be located in thickest section of the part and recommended size is 0.8 x wall thickness and also round sprues are recommended with diameter of 1.5 x biggest wall thickness. Venting of the tool is very important to avoid burn marks and flashes, where proposed venting depth 0.01 mm and venting channel distance from cavity edge 2-2.5mm.

Processing Parameters

Melt Temperature	180 – 200 °C
Feed Throat	30 – 50 °C
Feed Temperature	160 – 190 °C
Compression Section	170 – 190 °C
Metering Section	180 – 200 °C
Nozzle	180 – 210 °C
Screw Speed	low to medium to avoid glass fiber breakage
Back Pressure	3 – 5 bars (0.3 – 0.5 MPa)
Change-over point	Change-over point should be always checked visually by setting holding pressure to 0 bar/MPa to avoid over filling and flashes. Part should be 95 – 98% filled before changing to holding pressure.
Holding pressure	60% of max injection pressure
Mold Temperature	30 – 50 °C amorphous, after shrinkage & warpage may occur in higher temperature 100 – 120 °C crystalline, shrinkage flow 0.2% and xflow 0.45% (tool dimension 4x70x150 mm)
Cooling time	Minimum cooling time is 50 s (holding pressure time is part of cooling time and can be decreased from this value) to enable good crystallization level with relatively thick walled products > 3 mm
Purging / Cleaning of screw	Use low MFR Polypropylene to clean the screw and barrel

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