Technical data sheet

Product name: **Bio-Flex® F 2110**
Date of issue: 28 April 2020 Version: 3.0

Designation of product, preparation and manufacturer

Trade name:	Bio-Flex® F 2110
Use of product:	Biodegradable and compostable polymer compound suitable for blown film applications. Certified as compostable according to EN 13432 with a maximum thickness of 154 µm. The biobased carbon content (BCC) is 30 % (calculated). Used in applications such as bags, deep freeze bags and VFFS application.
Manufacturer:	FKuR Kunststoff GmbH Siemensring 79 D - 47 877 Willich Phone: + 49 (0) 2154 / 92 51-0 Fax: + 49 (0) 2154 / 92 51-51 Mail: info@fkur.com Web: www.fkur.com

Mechanical properties

Modulus of elasticity	730	[MPa]	ISO 527
Tensile strength	20	[MPa]	ISO 527
Tensile strain at tensile strength	> 300	[%]	ISO 527
Flexural modulus	680	[MPa]	ISO 178
Flexural strain at break	no break	[%]	ISO 178
Flexural stress at 3.5 % strain	17	[MPa]	ISO 178
Notched impact strength (Charpy), RT	83	[kJ/m²]	ISO 179-1/1 eA
Impact Strength (Charpy), RT	no break	[kJ/m²]	ISO 179-1/1 eU

The values listed have been established on standardized test specimens (DIN EN ISO 3167, type A) at standard temperature and humidity conditions.

Film properties (thickness 30 µm, BUR 2.3)

Tensile modulus MD/TD	1030 / 310	[MPa]	ISO 527-3
Tensile strength (yield stress) MD/TD	22 / 33	[MPa]	ISO 527-3
Tensile strain at tensile strength MD/TD	2.7 / 460	[%]	ISO 527-3
Tensile stress at break MD/TD	45 / 33	[MPa]	ISO 527-3
Tensile strain at break MD/TD	270 / 460	[%]	ISO 527-3
Elmendorf tear resistance MD/TD	16 / 20	[N/mm]	ASTM D 1922
Impact strength (Spencer Impact Test)	350	[N/mm]	ASTM D 3420

MD= machine direction, TD = transverse direction
The values listed have been established on films at standard temperature and humidity conditions.

Film properties (thickness 50 µm, BUR 2.3)

Tensile modulus MD/TD	970 / 270	[MPa]	ISO 527-3
Tensile strength (yield stress) MD/TD	21 / 31	[MPa]	ISO 527-3
Tensile strain at tensile strength MD/TD	2.7 / 460	[%]	ISO 527-3
Tensile stress at break MD/TD	41 / 31	[MPa]	ISO 527-3
Tensile strain at break MD/TD	340 / 460	[%]	ISO 527-3
Elmendorf tear resistance MD/TD	22 / 16	[N/mm]	ASTM D 1922
Impact strength (Spencer Impact Test)	290	[N/mm]	ASTM D 3420

MD= machine direction, TD = transverse direction
The values listed have been established on films at standard temperature and humidity conditions.

Barrier properties (thickness 30 µm)

Water Vapour	130	[g/(m²•d)]	ISO 15 106-3
Oxygen	1450	[cm³/(m²•d•bar)]	ISO 15 105-2
Nitrogen	230	[cm³/(m²•d•bar)]	DIN 53380-2

Physical properties

Melt flow rate (190 °C/2.16 kg)	3.7	[g/10 min]	ISO 1133
Melting temperature	145 - 160	[°C]	ISO 3146-C
Vicat A softening temperature	78	[°C]	ISO 306
Density	1.27	[g/cm³]	ISO 1183

The figures should be regarded as guide values only. Under certain conditions the properties can be influenced to a significant extent by the processing conditions.

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Processing and Handling Information

General

Bio-Flex® is a biodegradable plastic based on PLA and other biopolymers. Moisture content can lead to hydrolysis. Residual moisture content of more than 0.2 % can result in fish eyes and/or pin holes during processing.

Drying

We recommend drying Bio-Flex® at 60°C for a period of 2 - 4 hours.

Storage

If not specified otherwise product life is 6 month after shipment from Sellers warehouse if product is in its original packaging, stored under dry (max. 70% relative humidity) and dark conditions (not exposed to sunlight at a temperature of 5 °C to max. 30°C (ambient temperature). It is important to observe that a major drop in external air temperature (e.g. during transportation) can result in a development of water condensate. Prior to the processing of the material, it should be ensured that there is no condensate on the packaged product.
Finished products made from Bio-Flex® must be stored dry and cold. It is recommended to wrap goods in black PE liners to protect them against moisture and UV radiation. Storage time depends on processing parameters and of climate conditions in the respective area. Because of these essential and complex interacting parameters, FKuR Kunststoff GmbH cannot give any shelf life guarantees for finished products. Please notice that the conditions mentioned above depend on experience of our customers. Each customer should execute individual storage tests according to product specifications and storage requirements.

Processing conditions for blown film extrusion

Machine equipment: Standard low-density polyethylene screw.

Machine settings:			
	Feeding Zone	40 - 60	[°C]
	Zone 1	160	[°C]
	Zone 2	170	[°C]
	Zone 3	170	[°C]
	Zone 4	170	[°C]
	Adapter	175	[°C]
	Die	175	[°C]
	Mass temperature	max. 190	[°C]
	Die gap	0.8 - 1.4	[mm]
	Die diameter	up to 400	[mm]
	Blow up ratio	2.5 - 4.0	[-]

Start at temperatures given above. If gel particles or die lines appear, increase temperature stepwise by 5°C up to a maximum of 190°C melt temperature.

Purging advice for blown film extrusion

Before production: Ensure that all temperature zones work correctly. Purge the extruder with low melting LDPE, MFR approx. 4 - 6 g/10 min using the above temperature settings. Purging time: approximately 10 - 20 minutes. We recommend to change the screen before production.

During production: Use sufficient cooling for extruder and bubble, a dual lip air ring and/or inner bubble cooling system is preferred with chilled air, as the bubble stability is low when emerging from the die.

After production: Purge the extruder with an LDPE (MFR 0.4 - 2.0 g/10min). Do not allow material to remain hot inside the machine for extended periods as the material will degrade.

Legal notice