SULAPAC

TECHNICAL DATA SHEET

Updated 30.06.2022

Version 3.0

SULAPAC BARRIER – BA2002

MATERIAL FEATURES

Sulapac's patent pending innovation is a perfect fit for cosmetic brands, looking for a biodegradable barrier solution for water-based emulsions. Sulapac Barrier is made from sustainably sourced plant-based biopolymers and naturally occurring clay minerals. It is certified 98% biobased according to ASTM D6866 under the USDA BioPreferred® program.

It sets a new standard when comparing biodegradable materials to conventional plastics as it biodegrades without leaving permanent microplastics behind[1].

Sulapac Barrier is certified as industrially compostable by Biodegradable Products Institute BPI up to thickness of 107 microns. As the compostability of the end product is also dependent on the geometry of product, it is the responsibility of the manufacturer of the end product to ensure compliance with the regulations.

This drop-in solution material can be mass produced with minor, or no changes, to the existing injection molding machinery.

For more details, visit www.sulapac.com/key-features

1. Biodegradation of >90% after 56 days in the marine environment (30C / 86 °F) (ASTM D6691). Not considered degradable in California.
Biodegradation of 70% after 21 days in soil (ASTM D5988).
Tested according to ASTM D5511 (99 °F) which simulates a solid-state anaerobic condition and represents an accelerated biodegradation in a landfill.

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MECHANICAL PROPERTIES	
MATERIAL	SULAPAC BARRIER
PHYSICAL PROPERTIES	
Hardness (Shore D)	85
Material density (g/cm^3)	1.49
Shrinkage (%)	1.0
TENSILE PROPERTIES (ISO 527-1)	
Tensile strength (MPa)	44
Tensile modulus (GPa)	8.7
Tensile strain (%)	1.1
FLEXURAL PROPERTIES (ISO 178)	
Flexural strength (MPa)	65
Flexural modulus (GPa)	8.2
Flexural strain (%)	1.1
IMPACT PROPERTIES (Unnotched, ISO 179-1)	
Charpy impact strength (kJ/m^2)	8.7
RHEOLOGICAL PROPERTIES (ISO 1133)	
MFI (190°C/2.16 kg)	8,0 – 13,0 (g/10 min)

BARRIER PROPERTIES		
MATERIAL	**SULAPAC BARRIER**	**POLYPROPYLENE**
WVTR (g/m^2/day) ASTM F1249 (23 C/85%)	0.01	0.01
OTR (cm3/m^2/day) ASTM D3985 (23 C/0%)	2.3	35-377*

WVTR = water vapor transmission rate
OTR = oxygen transmission rate
* Based on literature

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PROCESSING INSTRUCTIONS FOR INJECTION MOLDING

MOISTURE AND DRYING
INSTRUCTIONS
• It is recommended that the temperature of granules is stabilized to room temperature before drying. • Before processing, the granules should be dried using a dehumidifying or vacuum dryer. • The granules should be dried for at least 4 hours at 80-90 °C (not exceeding 100 °C). • Avoid exposing the material to the ambient conditions after drying. • Moisture content together with exceeded temperatures and long residence times can lead to thermal degradation of the material.

PURGING INSTRUCTIONS		
BEFORE PRODUCTION	**DURING PRODUCTION**	**AFTER PRODUCTION**
• Purge the plasticization unit and, if existing, the hot runner with low MFI PP or PE at least for 10-30 minutes. • Introduce high melt flow PP and change to SULAPAC BARRIER material with resin operating temperatures, and purge for 10-30 minutes. • It is critical that all drying and conveying/receiving systems are free of any residual PP/PE/PET before adding SULAPAC BARRIER material. • The operator must ensure that the quality of the products corresponds with the reference samples.	• The material is sensitive to prolonged dwell time and therefore needs a constant melt flow. • The condition of the mold should be regularly monitored and, if necessary, the mold should be cleaned using, e.g., a glass fiber brush or mold cleaning agents.	• Purge the plasticization unit and, if existing, the hot runner with PP or PE.

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PROCESSING CONDITIONS

GENERAL INSTRUCTIONS

- Typical starting parameters are shown in the table below.
- Due to normal variation between different processing batches, suitable final parameters may require adjustments.
- Material has relatively narrow processing window (sensitive for temperature adjustments), thus correct processing parameters must be ensured.
- An end user is solely responsible to verify the correct processing parameter set for each material batch.
- Both cold and hot runner systems are suitable for this material.
- Valve gate systems can be used.
- Tool temperature must be kept at given temperature interval due to secure barrier properties and easy ejection of the final part from the mold.

	TEMPERATURE
Throat	40-60°C
Feed zone	165°C
Compression zone	175°C
Homogenizing zone	180°C
Machine nozzle	180°C
Back pressure	5-10 bar
Hot runner nozzle and bushing	180-183°C
$T_{mold, Front}$	60-70°C
$T_{mold, Back}$	60-70°C

TROUBLESHOOTING

- Too high processing temperatures may cause flashing, material degradation, and lower than typical pressure values for a manufactured product.
    - Typical solution: gentle temperature decrease.
- Too low processing temperatures cause incomplete mold filling, and higher than typical pressure values for a manufactured product.
    - Typical solution: gentle temperature increase.
- Too low mold temperatures may make it difficult to eject a product from the mold and hinder crystallization which may lead to compromised barrier properties.
    - Typical solution: use 60 - 70°C mold temperature.

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STORAGE AND TRANSPORTATION INSTRUCTIONS

STORAGE AND TRANSPORTATION CONDITIONS
GRANULES
• It is recommended to store granules in their closed, original moisture barrier packaging. • Storage in direct sunlight or in rain should be avoided. • Storage time of unopened bags at room temperature (23 °C) may not surpass 12 months. • Temperatures during transportation and storage may not exceed 60°C at any time.

COLOURING INSTRUCTIONS

COLOURING INSTRUCTIONS
TWO POSSIBLE COLORS
• White: Artic White MB, dosing max. 2 % • Black: MB, dosing max. 1 %

Sulapac is proud to be an ISO 9001 and ISO 14001 certified company

kiwa certified ISO 9001 ISO 14001 Inspecta Sertifiointi Oy

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