SULAPAC

TECHNICAL DATA SHEET

Version date 19.11.2021

Version 2.2

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. 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]. 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.

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

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