

TECHNICAL DATA SHEET – SULAPAC® UNIVERSAL FOR INJECTION MOLDING

Version No. 1.4
Updated 21.01.2020

RAW MATERIALS

Sulapac® Universal for Injection Molding (Sulapac Universal) is made of renewable, sustainable, 100 % biodegradable and microplastic-free raw materials. The main components of Sulapac Universal are wood chips from sustainably Nordic managed forests and plant-based binders.

The raw materials used are REACH and Proposition 65 compliant and meet the framework regulation (EC) No. 1223/2009 for cosmetic products.

MECHANICAL PROPERTIES		
MATERIAL	SULAPAC UNIVERSAL	POLYPROPYLENE
PHYSICAL PROPERTIES		
Hardness (Shore D)	79-81	55-75
Material density (g/cm ³)	1.27	0.90
Shrinkage (%)	0.1...0.2	1...2
TENSILE PROPERTIES (ISO 527-1)		
Tensile strength (MPa)	50-55	20
Tensile modulus (GPa)	4-6	1.20
Tensile strain (%)	1.0-1.5	100-600 (typical)
FLEXURAL PROPERTIES (ISO 178)		
Flexural strength (MPa)	80-85	25
Flexural modulus (GPa)	4-6	1.25
Flexural strain (%)	1.0-1.5	-
IMPACT PROPERTIES (UNNOTCHED, ISO 179-1)		
Charpy impact strength (kJ/m ²)	7-9	165
RHEOLOGICAL PROPERTIES (ISO 1133)		
MFI (190°C/2.16 kg)	9-15 g/10 min	5-35 (typical)

FIRE PROPERTIES			
MATERIAL	SULAPAC UNIVERSAL	POLYPROPYLENE	SAFETY LIMIT
ISO 1716			
Heat of combustion (MJ/kg)	19.0-19.5	45.1	-
ISO 5659-2			
Time to ignition (s)	20-22	32	-
Maximum heat release rate (kW/m ²)	500-550	1672	-
Average smoke production ($\cdot 10^{-3}$ m ² /s)	4.5-5.0	98.7	-
CIT _g (240 s)	0.04	0.09	1
CIT _g (480 s)	0.04	0.91	1
D _s (10)	46.4	755.1	-
RELEASE OF CERTAIN TOXIC GASES DURING COMBUSTION**			
MATERIAL	SULAPAC UNIVERSAL	POLYPROPYLENE	SAFETY LIMIT
Concentration (mg/m ³)	(at 480 s)		
CO ₂	49 856	82 439	72 000
CO	107	1 583	1 380
HBr	0	0	99
HCl	0	0	75
HCN	0	46	55
HF	0	0	25
NO _x	0	310	38
SO ₂	0	29	262

CIT = *Conventional index of toxicity* (The toxic effect is reached when CIT_g = 1)

D_s (10) = Specific optical density (the lower, the better)

** Values are based on IDLH (Immediately Dangerous to Life and Health) recognized as a limit for personal exposure to the gas component by NIOSH (National Institute for Occupational Safety and Health) (1997 version). If the concentration of harmful substances is IDLH, the worker must use the most reliable respirators.

PROCESSING INSTRUCTIONS FOR INJECTION MOLDING

MOISTURE AND DRYING – SULAPAC UNIVERSAL

- Before processing, the granules should be dried using a dehumidifying or vacuum dryer.
- If a dehumidifying dryer is used, the granules should be dried for at least 4 hours at 105°C.
- If a vacuum drying system is used, the granules should be first dried for at least 20 minutes at 105°C and then kept in the vacuum for at least 40 minutes.
- Avoid exposing the material to ambient conditions after drying.
- Moisture content can lead to hydrolysis.
- Dried granules should be mixed with the color masterbatch after the granules have cooled down in order to avoid the agglomeration of color masterbatch granules.

PROCESSING CONDITIONS – SULAPAC UNIVERSAL

	TEMPERATURE	GENERAL INSTRUCTIONS
Throat	40-60°C	<ul style="list-style-type: none"> - Typical settings may require optimization. - Both cold and hot runner systems are suitable for this material. - Valve gate systems can be used. - Avoid using temperatures above 200°C in order to lower the risk of wood and polymer degradation. - The dwell time of the material inside the machine shall be reduced to minimum in order to lower the risk of thermal degradation.
Feed zone	150-160°C	
Compression zone	160-170°C	
Homogenizing zone	175-190°C	
Machine nozzle	175-190°C	
Back pressure	5-10 bar	
Screw speed, max	< 0,25 m/s	
Hot runner nozzle and pushing	180-200°C	
Tooling temperature T _{mold}	20-40°C	

PURGING INSTRUCTIONS – SULAPAC UNIVERSAL

BEFORE PRODUCTION	DURING PRODUCTION	AFTER PRODUCTION
<ul style="list-style-type: none"> - Purge the plasticization unit and the hot runner with PP or PE. - To purge the plasticization unit and hot runner from residual PP, PE or previous production recipes, at least 10 cycles should be produced from Sulapac material before starting the actual production. 	<ul style="list-style-type: none"> - The material has a tendency to degrade 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. - If an extensive amount of burned material starts to appear in the products, try lowering processing temperature 	<ul style="list-style-type: none"> - Purge the plasticization unit and the hot runner with PP or PE. - Clean up the mold after production. The temperature of the mold is recommended to be elevated to 70°C. Generally used mold cleaning agents can be utilized.

STORAGE CONDITIONS

- It is recommended to store the granules in their closed, original moisture barrier packaging at temperatures below 45°C.
- Storage in dry conditions.
- Storage in direct sunlight should be avoided.
- Storage time of unopened bags may not surpass 12 months at room temperature (23°C).
- Temperatures during transportation may not exceed 60°C.

SULAPAC UNIVERSAL COLOR PALETTE

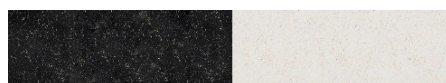
Sulapac's colors have been inspired by Nordic nature. The Sulapac Universal for Injection Molding is by default Natural Wood -colored. Sulapac has 8 food contact approved color masterbatches that can be used to color the natural Universal Material. For trialing purposes, the recommended loading percentage or dosage of the color masterbatches is 1-4 weight-%.

Default Color



Natural Wood

Color Masterbatches



Warm
Granite

First
Snow



Wild
Cloudberry

Hearty
Pine

Sweet
Blueberry

Blooming
Blackberry

Summer
Strawberry

Cherry
Blossom