

# TECHNICAL DATA SHEET – SULAPAC UNIVERSAL MATERIAL FOR INJECTION MOLDING

Version No. 1.2  
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## RAW MATERIALS

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

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

<b>MECHANICAL PROPERTIES</b>		
MATERIAL	SULAPAC UNIVERSAL MATERIAL FOR INJECTION MOLDING	POLYPROPYLENE
<b>PHYSICAL PROPERTIES</b>		
Hardness (Shore D)	79-81	55-75
Material density (g/cm <sup>3</sup> )	1.27	0.90
Shrinkage (%)	0.1...0.2	1...2
<b>TENSILE PROPERTIES (ISO 527-1)</b>		
Tensile strength (MPa)	50-55	20
Tensile modulus (GPa)	4-6	1.20
Tensile strain (%)	1.0-1.5	100-600 (typical)
<b>FLEXURAL PROPERTIES (ISO 178)</b>		
Flexural strength (MPa)	80-85	25
Flexural modulus (GPa)	4-6	1.25
Flexural strain (%)	1.0-1.5	-
<b>IMPACT PROPERTIES (UNNOTCHED, ISO 179-1)</b>		
Charpy impact strength (kJ/m <sup>2</sup> )	7-9	165
<b>RHEOLOGICAL PROPERTIES (ISO 1133)</b>		
MFI (190°C/2.16 kg)	15-19 g/10 min	5-35 (typical)

FIRE PROPERTIES			
MATERIAL	SULAPAC UNIVERSAL MATERIAL FOR INJECTION MOLDING	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 <sup>2</sup> )	500-550	1672	-
Average smoke production ( $\cdot 10^{-3}$ m <sup>2</sup> /s)	4.5-5.0	98.7	-
CIT <sub>g</sub> (240 s)	0.04	0.09	1
CIT <sub>g</sub> (480 s)	0.04	0.91	1
D <sub>s</sub> (10)	46.4	755.1	-
RELEASE OF CERTAIN TOXIC GASES DURING COMBUSTION**			
MATERIAL	SULAPAC UNIVERSAL MATERIAL FOR INJECTION MOLDING	POLYPROPYLENE	SAFETY LIMIT
Concentration (mg/m <sup>3</sup> )	(at 480 s)		
CO <sub>2</sub>	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 <sub>x</sub>	0	310	38
SO <sub>2</sub>	0	29	262

CIT = *Conventional index of toxicity* (The toxic effect is reached when CIT<sub>g</sub> = 1)

D<sub>s</sub>(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 MATERIAL FOR INJECTION MOLDING

- 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 MATERIAL FOR INJECTION MOLDING

	TEMPERATURE	GENERAL INSTRUCTIONS
Throat	40-60°C	<ul style="list-style-type: none"> <li>- Typical settings may require optimization.</li> <li>- Both cold and hot runner systems are suitable for this material.</li> <li>- Valve gate systems can be used.</li> <li>- Avoid using temperatures above 200°C in order to lower the risk of wood and polymer degradation.</li> <li>- The dwell time of the material inside the machine shall be reduced to minimum in order to lower the risk of thermal degradation.</li> <li>- For improved visual quality, higher mold temperature on the cavity side may be tested (30–40°C).</li> </ul>
Feed zone	150-160°C	
Compression zone	160-170°C	
Homogenizing zone	175-190°C	
Machine nozzle	175-190°C	
Back pressure	50-100 bar	
Hot runner nozzle and pushing	200-220°C	
T <sub>mold</sub>	20-30°C	

### PURGING INSTRUCTIONS – SULAPAC UNIVERSAL MATERIAL FOR INJECTION MOLDING

NOTE: The material leaves residues in the units, and therefore, additional purging and mold cleaning may be required.

BEFORE PRODUCTION	DURING PRODUCTION	AFTER PRODUCTION
<ul style="list-style-type: none"> <li>- Purge the plastification unit and, if existing, the hot runner with PP or PE.</li> <li>- To purge the plastification unit and hot runner from residual PP, PE or previous production recipes, at least 30 pieces should be produced from Sulapac material before starting the actual production.</li> <li>- The operator must ensure that the quality of the products corresponds with the reference samples.</li> </ul>	<ul style="list-style-type: none"> <li>- The material has a tendency to degrade and therefore needs a constant melt flow.</li> <li>- 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.</li> <li>- If an extensive amount of burned polymer or wood fibers start to appear in the products, purge the plastification and hot runner system with PP or PE.</li> </ul>	<ul style="list-style-type: none"> <li>- Purge the plastification unit and, if existing, the hot runner with PP or PE.</li> <li>- In case there is a need to 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.</li> </ul>

## STORAGE CONDITIONS

- It is recommended to store the granules in their closed, original moisture barrier packaging at temperatures below 45°C.
- 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 45°C at any time.

## COLOR PALETTE

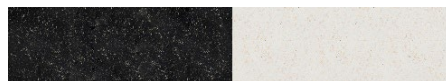
Sulapac's colors have been inspired by Nordic nature. The Sulapac Universal Material for Injection Molding is by default Natural Wood -colored. Sulapac has 8 food contact approved color masterbatches that can be used to color the natural Universal Material. For trialing purposes, the recommended loading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

### Default Color



Natural Wood

### Color Masterbatches



Warm  
Granite

First  
Snow



Wild  
Cloudberry

Hearty  
Pine

Sweet  
Blueberry

Blooming  
Blackberry

Summer  
Strawberry

Cherry  
Blossom