



Pulp Series

# Pulp-Injection

For past decades of years plastic injection molding has been one of Nissha's core businesses gaining a deep knowledge in this technology.

As Nissha had committed to achieve sustainable growth for the company and society, Nissha started to develop a new injection molding technology using pulp instead of plastics.

Pulp-Injection molded products are mainly made from natural origins: pulp, starch and water. Thanks to the unique material composition, the final products have a silky touch texture, and they are disposable in wastepaper bins.

Pulp-Injection can achieve complex designs with high dimensional accuracy while keeping good mechanical strength. Stackable and nestable designs to reduce total packaging volume are achievable.

**Nissha offers full service:**

**Product design & feasibility study, prototyping and mass production in Central Germany.**





## Product examples

### ✓ Primary Packaging

- Components of self-injection-devices
- Plunger rods
- Bottle closures

### ✓ Secondary Packaging

- Trays for autoinjectors and ampoule cases



#### Complex and precise product design

Pulp-Injection can achieve similar design to existing rigid plastic packaging.



#### High rigidity and impact strength

Thin wall design contributes minimization of packaging size while keeping high protection.



#### Paper recyclability

Pulp-Injection packaging is recyclable in the paper recycling system in proportions up to 10% (PTS RH:021/97:2012).



#### Reduction of plastic usage

Pulp-Injection is made mainly from pulp and starch. It reduces usage of plastic and the carbon footprint.

## Process and material properties

### molding process

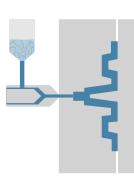


Pulp moistured with water

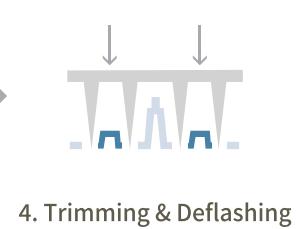
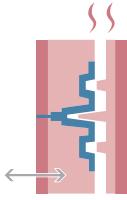
#### 1. Material preparation



#### 2. Inject molding



#### 3. Drying in mold



#### 4. Trimming & Deflashing

The material is mainly made of pulp, starch and water. Products are formed by injection molding and dried in a cavity.

	Industrial plastics		NISSHA Pulp-Injection material
	Polystyrene	Polypropylene	
<b>Specific gravity</b>	1.05	0.9	<b>0.85</b>
<b>Impact strength (Mpa)</b>	6	6.6	<b>11.5</b>
<b>Tensile strength (%)</b>	28	19	<b>29</b>
<b>Flexural property (Mpa)</b>	40	80	<b>8.5</b>
<b>Bending strength (Mpa)</b>	47	33	<b>24.5</b>
<b>Bending elasticity (Kj/m<sup>2</sup>)</b>	2,500	1,200	<b>2,900</b>

Maximum size (mm)	300×300×50	Minimum radius (mm)	0.5	Standard thickness (mm)	0.6 ~ 1.0
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