

## THERMOPLASTIC POWDERS FOR POWDER BED FUSION

### Polyamide 11

**Rilsan® Invent Natural** and **Rilsan® Invent Black** are both polyamide 11 fine powders, a high performance polyamide 100% sourced from a renewable raw material. They have been specifically developed for 3D printing, with good control of particle size and thermal properties, providing a very good processability in LS machines. Parts made from Rilsan® polyamide powders display superior mechanical properties and weight saving compared to polyamide 12, with outstanding impact resistance, and higher ductility and elasticity. Combined with its low refreshing factor (typically 50% of part cake), Rilsan® polyamide 11 is the material of choice to design and manufacture final production parts by additive manufacturing. You can find parts in today's cars, trucks, planes and medical devices. Rilsan® polyamide 11 is now chosen by more and more companies for additive manufacturing projects thanks to its unparalleled mechanical strength and durability.

#### Key Attributes

- Black or Nat
- Polyamide 11 - 100% bio-based – not just castor... sustainable castor. This thermoplastic is recyclable, with a low life cycle assessment
- Excellent powder bed fusion processing characteristics
- Impact resistant
- Excellent elasticity and ductility
- Meets USP Class VI requirements
- Matte finish (mass coloration for black)



Courtesy of HEXR



Courtesy of Bowman

## Technical Properties\*

### Powder Typical Properties

Particulate Size Distribution:	Unit	Method	Rilsan® Invent Natural	Rilsan® Invent Black
Mean diameter	µm	ISO 13320	46	50
Fine Particles < 20 µm	-	ISO 13320	15% max	10% max
Coarse Particles > 100 µm	-	ISO 13320	10% max	10% max
Bulk Packed Density	g/m <sup>3</sup>	ISO 1068-1975	0.62	0.66
Melting Point	°C	ISO 11357-3	201	201

### Sintered Specimens - Typical Performances (x/y direction)

Sintered parts – typical properties	Unit	Method	Rilsan® Invent Natural	Rilsan® Invent Black
Tensile Modulus	MPa	ISO 527-2:93-1B	1500	1500
Tensile Strength At Break	MPa	ISO 527-2:93-1B	45	45
Elongation At Break	-	ISO 527-2:93-1B	45%	45%
Flexural Modulus	MPa	ISO 178 (23°C)	1200	1200
Unnotched Charpy impact strength	kJ/m <sup>2</sup>	ISO 179 IeU (23°C)	No break	No break
Hardness (Shore D - instantaneous)	-	ISO 868 (20°C)	77	77
Heat Deflection Temperature (HDT@1.8Mpa)	°C	ISO 75f	44	44

\*Typical values only. Not to be considered product specifications.

## Sustainably sourced

### The bean of the castor plant has a number of advantages as a sustainable feedstock:

- It generally does not compete with food. The castor bean provides little nutritional value for man or animals. Almost all of its downstream values are in industrial applications.
- It grows in semi-arid to sub-tropical regions, often in remote locations where little else can sustainably grow.
- The bean is non-GMO.
- The castor plant requires very little irrigation and is naturally pest and drought resistant.

Arkema is a member of the Pragati initiative in India, a cooperative project with BASF, Jayant Agro and the NGO Solidaridad. Pragati encourages and educates local farmers on sustainable and responsible castor plant farming.

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