

# Nylon 6/6 glass fiber reinforced (PA66-GF)

## General properties

### Source

Based on the MaterialUniverse record 'PA (type 66, 30-33% glass fiber)'

### Designation

Polyamide (Nylon) (Type 66, 30-33% Glass Fiber) Note: Polyamides are moisture sensitive. Density, mechanical, impact, and electrical properties on this datasheet are for material conditioned at 50% relative humidity and 23°C. These are more typical of in-use performance than the properties of the dry material. Other properties are for the dry-as-molded material.

Density 1400 kg/m<sup>3</sup>

Price 4.2 to 4.9 USD/kg

### Tradenames

Akromid, Akulon, Amilan, Aquamid, Ashlene, Badamid, Bergamid, Celstran, ComAlloy, Daunyl, Durethan, Econyl, Edgetek, Frianyl, Grilon, Kepamid, Kopa, Leona, LubriOne, Lumid, Miramid, Nilamid, Niretan, Novamid, Nylene, Nylfor, Nymax, Orgalloy PA Ecotan, Plus Tek, Polytron, Radiflam, Radilon, Reconyl, RTP, Schulamid, Technyl, Ultramid, Vydyne, Wellamid, Zytel

### Composition (summary)

$(\text{NH}-(\text{CH}_2)_6-\text{NH}-\text{CO}-(\text{CH}_2)_4-\text{CO})_n + \text{glass filler}$

## Primary material production: energy, CO2 and water

Embodied energy, primary production 110 to 120 MJ/kg

CO2 footprint, primary production 6.5 to 7.2 kg/kg

Water usage 600 to 660 l/kg

## Material processing: energy

Polymer molding energy 21 to 23 MJ/kg

Polymer extrusion energy 5.9 to 6.5 MJ/kg

Painting energy 11 to 14 MJ/m<sup>2</sup>

## Material processing: CO2 footprint

Polymer molding CO2 1.6 to 1.7 kg/kg

Polymer extrusion CO2 0.44 to 0.49 kg/kg

Painting CO2 0.80 to 1.2 kg/m<sup>2</sup>

## Material recycling: energy, CO2 and recycle fraction

<u>Recycle fraction in current supply</u>	0.10 %
<u>Heat of combustion (net)</u>	20 to 21 MJ/kg
<u>Combustion CO2</u>	1.5 to 1.6 kg/kg
<u>A renewable resource?</u>	No

## Bio-data

<u>Food contact</u>	Yes
<u>RoHS (EU) compliant grades?</u>	Yes

## Geo-economic data for principal component

<u>Principal component</u>	Nylon
<u>Annual world production</u>	3.5e6 to 3.9e6 tonne/yr
<u>Reserves</u>	8.7e7 to 9.7e7 tonne

## Mechanical properties

<u>Young's modulus</u>	6.1 to 7.6 GPa
<u>Poisson's ratio</u>	0.34 to 0.36
<u>Yield strength (elastic limit)</u>	120 to 150 MPa
<u>Tensile strength</u>	110 to 140 MPa
<u>Compressive strength</u>	140 to 160 MPa
<u>Elongation</u>	4.8 to 6.9 % strain

## Thermal properties

<u>Maximum service temperature</u>	90 to 130 °C
<u>Minimum service temperature</u>	-81 to -71 °C
<u>Thermal conductivity</u>	0.40 to 0.49 W/m.°C
<u>Specific heat capacity</u>	1500 J/kg.°C
<u>Thermal expansion coefficient</u>	27 to 97 µstrain/°C

## Electrical & optical properties

<u>Electrical resistivity</u>	2.0e11 to 4.9e12 µohm.cm
<u>Transparency</u>	Opaque

<b>Durability</b>	
<u>Flammability</u>	Slow-burning
<u>Organic solvents</u>	Excellent
<u>UV radiation (sunlight)</u>	Poor
<u>Water absorption @ 24 hrs</u>	0.51 to 0.83 %
<u>Water (fresh)</u>	Excellent
<u>Water (salt)</u>	Excellent

## **Notes**

Typical uses  
Gears; cams; rollers; bearings; nuts and bolts; power tool housing; electrical connectors; combs; coil formers; fuel tanks for cars; kitchen utensils.