Version No.: 1.0/2022

# Tarfuse® PA

Filaments from the ***Tarfuse® PA*** product line are among the technical filaments, it is a group of advanced 3D printing materials that are produced on the basis of polyamide 6. Technological solutions of 3D filaments are based on comprehensive knowledge of the physicochemistry of polyamide 6, its modifications and unique technological solutions .
Thanks to the high interlayer strength (excellent layer adhesion) and high polymer crystallinity, the filament is dedicated to printing functional and technical parts. The printed parts are characterized by very good mechanical properties.

***Tarfuse PA ESD and Tarfuse PA CF10*** are a line of composite filaments.

***Tarfuse® PA ESD*** is an anti-static filament filled with ground carbon fiber. Printing speed comparable to unreinforced material due to the relatively low degree of filling and filler characteristics. Dedicated to printing details with good mechanical properties. The details are characterized by low warpage and low shrinkage.

***Tarfuse® PA CF10*** is a filament reinforced with chopped carbon fiber with antistatic and electrically conductive properties, designed for printing parts with high strength requirements. Details are characterized by reduced water absorption.

***Tarfuse® PA HS*** is a filament for special tasks - it is characterized by very good mechanical strength, contains a thermal stabilizer, which enables continuous operation of the manufactured details at an elevated temperature of up to 130◦C.

***Tarfuse® PA M***, apart from very good mechanical strength, is characterized by excellent tribological properties. Dedicated to parts working in friction nodes.

***Tarfuse® PA LM***, this special filament, thanks to the use of appropriate additives, enables laser marking of products with the use of a Nd / YAG laser.

***Tarfuse® PA AM*** has antibacterial properties, confirmed by tests according to the PN-EN-ISO 846: 2019-05E standard.

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| Mechanical Properties | J.M. | ISO standard | Test conditions | Tarfuse® PA | Tarfuse® PA AM | Tarfuse® PA LM | Tarfuse® PA CF10 | Tarfuse® PA ESD | Tarfuse® PA HS | Tarfuse® PA M |
|---|---|---|---|---|---|---|---|---|---|---|
| **Physical Properties** | | | | | | | | | | |
| Melting temperature; DSC | °C | 11357-1-3 | 10°C/min. | 220 | 220 | 220 | 220 | 220 | 220 | 220 |
| Glass transition temperature; DSC | °C | 11357-1-3 | 50°C/min. | 55-57 | 55-57 | 55-57 | 55-57 | 55-57 | 55-57 | 55-57 |
| Crystalization temperature ; DSC | °C | 11357-1-3 | 10°C/min. | 160-170 | 160-170 | 160-170 | 160-180 | 160-180 | 160-170 | 160-170 |
| Density | g/cm$^3$ | 1183 | - | 1,13 | 1,13 | 1,13 | 1,18 | 1,18 | 1,13 | 1,13 |
| Melt volume-flow rate MVR | cm$^3$/10 min | 1133 | 275°C/5 kg | 25 | 15 | 25 | 55 | 15 | 25 | 25 |
| **Mechanical Properties** | | | | | | | | | | |
| Tensile strength | | | | | | | | | | |
| [XY] | MPa | 527-1,-2 | 50mm/min | 72 | 72 | 72 | 80 | 80 | 72 | 72 |
| [XZ] | MPa | 527-1,-2 | 50mm/min | 70 | 70 | 70 | 96 | 63 | 70 | - |
| [ZX] | MPa | 527-1,-2 | 50mm/min | 24 | 24 | 24 | - | 20 | 24 | - |
| Elongation at break | | | | | | | | | | |
| [XY] | % | 527-1,-2 | 50mm/min | 4,1 | 4,1 | 4,1 | 2 | 3,5 | 4,1 | 4,1 |
| [XZ] | % | 527-1,-2 | 50mm/min | 4 | 4 | 4 | 2 | 3,2 | 4 | - |
| [ZX] | % | 527-1,-2 | 50mm/min | 3 | 3 | 3 | - | 1 | 3 | - |
| Tensile E-modulus | | | | | | | | | | |
| [XY] | MPa | 527-1,-2 | 1mm/min | 2400 | 2400 | 2400 | 5100 | 4900 | 2400 | 2400 |
| [XZ] | MPa | 527-1,-2 | 1mm/min | 2500 | 2500 | 2500 | 7000 | 4800 | 2500 | - |
| [ZX] | MPa | 527-1,-2 | 1mm/min | 2400 | 2400 | 2400 | - | 2600 | 2400 | - |
| Flexural strength | | | | | | | | | | |
| [XY] | MPa | 178 | 2mm/min | 73 | 73 | 73 | 110 | 68 | 73 | 73 |
| [XZ] | MPa | 178 | 2mm/min | 72 | 72 | 72 | 4900 | 120 | 72 | - |
| [ZX] | MPa | 178 | 2mm/min | 38 | 38 | 38 | - | - | 38 | - |
| Flexural modulus | | | | | | | | | | |
| [XY] | MPa | 178 | 2mm/min | 1800 | 1800 | 1800 | - | 3000 | 1800 | 1800 |
| [XZ] | MPa | 178 | 2mm/min | 1900 | 1900 | 1900 | - | 4700 | 1900 | - |
| [ZX] | MPa | 178 | 2mm/min | 2200 | 2200 | 2200 | - | - | 2200 | - |
| Charpy impact strength | | | | | | | | | | |
| [XY] | kJ/m$^2$ | 179-1 | 1eU | 75 | 75 | 75 | - | - | 75 | 75 |
| [XZ] | kJ/m$^2$ | 179-1 | 1eU | 100 | 100 | 100 | - | - | 100 | - |
| [ZX] | kJ/m$^2$ | 179-1 | 1eU | 5,4 | 5,4 | 5,4 | - | - | 5,4 | - |
| Charpy notched impact strength | | | | | | | | | | |
| [XY] | kJ/m$^2$ | 179-1 | 1eA | 4,5 | 4,5 | 4,5 | - | - | 4,5 | 4,5 |
| [XZ] | kJ/m$^2$ | 179-1 | 1eA | | | | | | | |
| [ZX] | kJ/m$^2$ | 179-1 | 1eA | | | | | | | |
| Vicat softening point | °C | 306 | 50N | | | | | | | |
| Heat deflection temperature | °C | 75-1,-2 | 1,8 MPa | | | | | | | |

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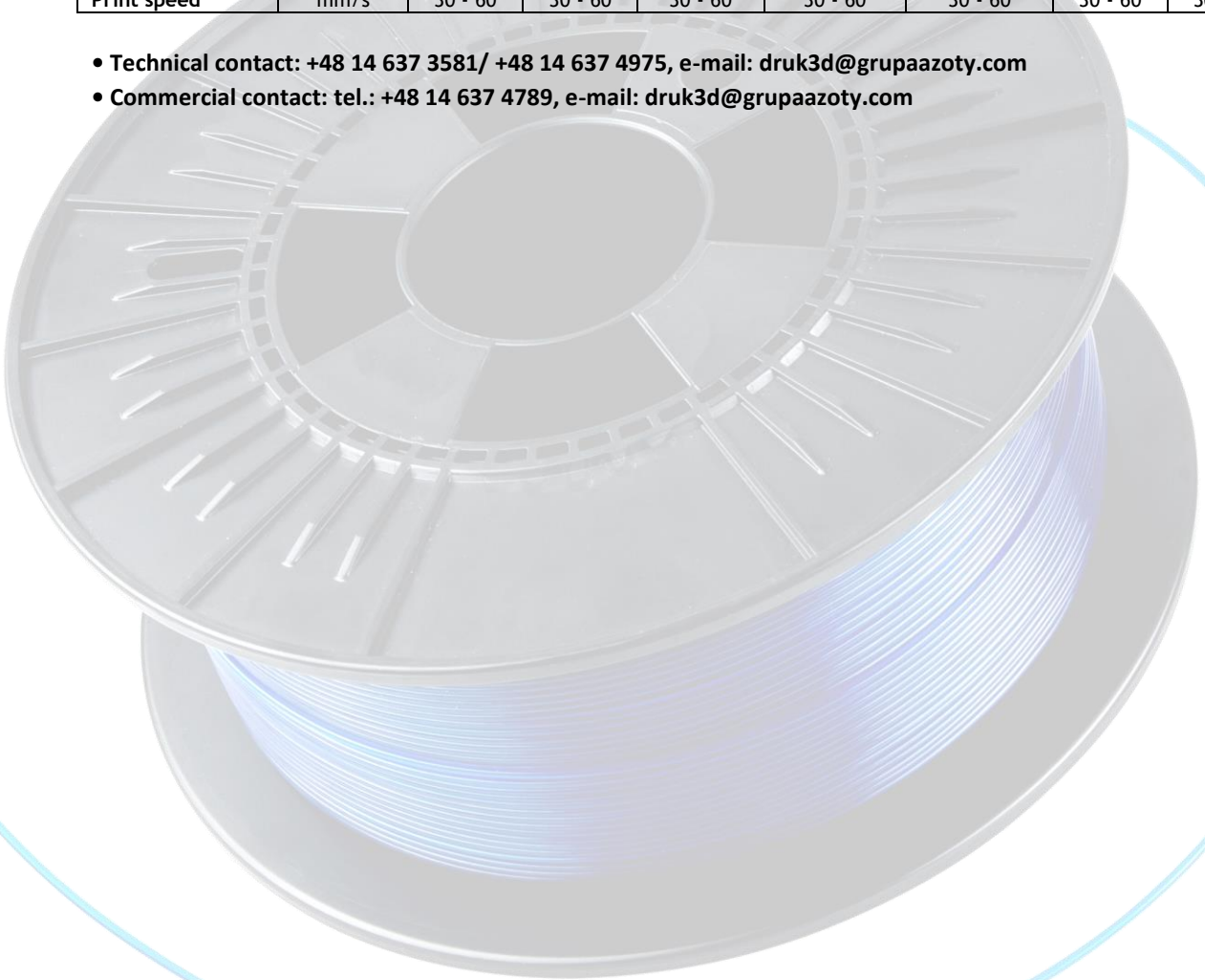
| RECOMMENDED PRINT PROCESSING PARAMETERS | | Tarfuse® PA | Tarfuse® PA AM | Tarfuse® PA LM | Tarfuse® PA CF10 | Tarfuse® PA ESD | Tarfuse® PA HS | Tarfuse® PA M |
|---|---|---|---|---|---|---|---|---|
| **Nozzle temperature** | °C | 270 - 300 | 270 - 300 | 270 - 300 | 270 - 280 | 270 - 300 | 270 - 300 | 270 - 300 |
| **Build chamber temperature** | °C | 20 - 70 | 20 - 70 | 20 - 70 | 20 - 90 | 20 - 70 | 20 - 70 | 20 - 70 |
| **Bed temperature** | °C | 30 - 110 | 40 - 110 | 30 - 110 | 30 - 110 | 40 - 110 | 40 - 110 | 40 - 110 |
| **Bed material** | | glass, PC or PA mat + PVA glue | glass, PC or PA mat + PVA glue | glass, PC or PA mat + PVA glue | glass, PC or PA mat + PVA glue | glass, PC or PA mat + PVA glue | glass, PC or PA mat + PVA glue | glass, PC or PA mat + PVA glue |
| **Nozzle diameter** | mm | ≥ 0,4 | ≥ 0,4 | ≥ 0,4 | ≥ 0,4 | ≥ 0,4 | ≥ 0,4 | ≥ 0,4 |
| **Print speed** | mm/s | 30 - 60 | 30 - 60 | 30 - 60 | 30 - 60 | 30 - 60 | 30 - 60 | 30 - 60 |



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