# ERTALON 6PLA -odlewany – PA6G



**Opis:**

Rodzaj poliamidu, który dzięki szczególnemu procesowi produkcji jest tworzywem o budowie wielocząsteczkowej i wysokim stopniu krystaliczności. Poliamid ten wyróżnia się znakomitymi właściwościami fizyko – mechanicznymi. Oprócz wysokiej wytrzymałości mechanicznej, sztywności oraz twardości, wyróżnia go dobra odporność na pełzanie i ścieranie, a także wysoka zdolność tłumienia drgań. Jest on również stosunkowo lekkim tworzywem. Dzięki niskiemu współczynnikowi tarcia, elementy wykonane z PA6G pracują efektywnie bez smarowania. Materiał ten bardzo dobrze się obrabia, dlatego też bardzo często wykorzystywany jest m. in. na łożyska ślizgowe.

**Właściwości:**

- duża sztywność oraz wytrzymałość mechaniczna (wyższa od PA6),
- bardzo duża udarność mierzona dla próbek zwykłych jak i z karbem,
- duża stabilność kształtu w warunkach oddziaływania obciążeń cieplnych,
- dobra odporność na zużycie oraz odporność na zużycie ścierne,
- dobre właściwości ślizgowe oraz przeciwcierne,
- podobnie jak PA6 wytwarza efekt Slip – Stick (nie nadaje się do wykonania dwóch części współpracujących ze sobą ciernie),
- korzystne cechy przeciwzapalne,
- duża zdolność tłumienia drgań,
- względnie duża podatność na pochłanianie wilgoci – niska stabilność wymiarowa (zwiększona udarność i elastyczność, obniżona wytrzymałość na rozciąganie i zginanie),
- dobra obrabialność,
- dobra odporność chemiczna na oleje, tłuszcze, benzynę itp.
- słaba odporność na działanie mocnych kwasów.

**Zastosowanie:**

- koła zębate i łańcuchowe
- łożyska ślizgowe
- listwy ślizgowe
- tarcze i koła krzywkowe
- krążniki

- prowadnice tłoków
- odboje
- krążki liniowe i pasowe
- tuleje, nakrętki ruchowe
- ślimaki transportowe
- obudowy i osłony
- koła napędowe i bierne
- prowadnice łańcuchowe

## Physical properties (indicative values ▪)

| PROPERTIES | | Test methods | Units | VALUES |
|---|---|---|---|---|
| Colour | | - | - | natural (ivory)/ black |
| Density | | ISO 1183-1 | g/cm³ | 1.15 |
| Water absorption: | | | | |
| - after 24/96 h immersion in water of 23 °C (1) | | ISO 62 | mg | 44 / 83 |
| | | ISO 62 | % | 0.65 / 1.22 |
| - at saturation in air of 23 °C / 50 % RH | | - | % | 2.2 |
| - at saturation in water of 23 °C | | - | % | 6.5 |
| **Thermal Properties (2)** | | | | |
| Melting temperature (DSC, 10 °C/min) | | ISO 11357-1/-3 | °C | 215 |
| Glass transition temperature (DSC, 20 °C/min) - (3) | | ISO 11357-1/-2 | °C | - |
| Thermal conductivity at 23 °C | | - | W/(K.m) | 0.29 |
| Coefficient of linear thermal expansion: | | | | |
| - average value between 23 and 60 °C | | - | m/(m.K) | 80 x $10^{-6}$ |
| - average value between 23 and 100 °C | | - | m/(m.K) | 90 x $10^{-6}$ |
| Temperature of deflection under load: | | | | |
| - method A: 1.8 MPa | + | ISO 75-1/-2 | °C | 80 |
| Max. allowable service temperature in air: | | | | |
| - for short periods (4) | | - | °C | 170 |
| - continuously : for 5,000 / 20,000 h (5) | | - | °C | 105 / 90 |
| Min. service temperature (6) | | - | °C | -30 |
| Flammability (7): | | | | |
| - "Oxygen Index" | | ISO 4589-1/-2 | % | 25 |
| - according to UL 94 (3 / 6 mm thickness) | | - | - | HB / HB |
| **Mechanical Properties at 23 °C (8)** | | | | |
| Tension test (9): | | | | |
| - tensile stress at yield / tensile stress at break (10) | + | ISO 527-1/-2 | MPa | 86 / - |
| | ++ | ISO 527-1/-2 | MPa | 55 / - |
| - tensile strength (10) | + | ISO 527-1/-2 | MPa | 88 |
| - tensile strain at yield (10) | + | ISO 527-1/-2 | % | 5 |
| - tensile strain at break (10) | + | ISO 527-1/-2 | % | 25 |
| | ++ | ISO 527-1/-2 | % | > 50 |
| - tensile modulus of elasticity (11) | + | ISO 527-1/-2 | MPa | 3600 |
| | ++ | ISO 527-1/-2 | MPa | 1750 |
| Compression test (12): | | | | 0 |
| - compressive stress at 1 / 2 / 5 % nominal strain (11) | + | ISO 604 | MPa | 34 / 64 / 93 |
| Charpy impact strength - Unnotched (13) | + | ISO 179-1/1eU | kJ/m² | no break |
| Charpy impact strength - Notched | + | ISO 179-1/1eA | kJ/m² | 3 |
| Ball indentation hardness (14) | + | ISO 2039-1 | N/mm² | 165 |
| Rockwell hardness (14) | + | ISO 2039-2 | - | M 88 |
| **Electrical Properties at 23 °C** | | | | |
| Electric strength (15) | + | IEC 60243-1 | kV/mm | 25 |
| | ++ | IEC 60243-1 | kV/mm | 17 |
| Volume resistivity | + | IEC 60093 | Ohm.cm | > $10^{14}$ |
| | ++ | IEC 60093 | Ohm.cm | > $10^{12}$ |
| Surface resistivity | + | IEC 60093 | Ohm | > $10^{13}$ |
| | ++ | IEC 60093 | Ohm | > $10^{12}$ |
| Relative permittivity $\varepsilon_r$ : - at 100 Hz | + | IEC 60250 | - | 3.6 |
| | ++ | IEC 60250 | - | 6.6 |
| - at 1 MHz | + | IEC 60250 | - | 3.2 |
| | ++ | IEC 60250 | - | 3.7 |
| Dielectric dissipation factor tan δ: - at 100 Hz | + | IEC 60250 | - | 0.012 |
| | ++ | IEC 60250 | - | 0.14 |
| - at 1 MHz | + | IEC 60250 | - | 0.016 |
| | ++ | IEC 60250 | - | 0.05 |
| Comparative tracking index (CTI) | + | IEC 60112 | - | 600 |
| | ++ | IEC 60112 | - | 600 |

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1 kV/mm = 1 MV/m.

**Legend:**

\+ : values referring to dry material
++ : values referring to material in equilibrium with the standard atmosphere 23 °C / 50 % RH (mostly derived from literature)

(1) According to method 1 of ISO 62 and done on discs Ø 50 mm x 3 mm.
(2) The figures given for these properties are for the most part derived from raw material supplier data and other publications.
(3) Values for this property are only given here for amorphous materials and not for semi-crystalline ones.
(4) Only for short time exposure (a few hours) in applications where no or only a very low load is applied to the material.
(5) Temperature resistance over a period of 5,000/20,000 hours. After these periods of time, there is a decrease in tensile strength – measured at 23 °C – of about 50 % as compared with the original value. The temperature values given here are thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note, however, that the maximum allowable service temperature depends in many cases essentially on the duration and the magnitude of the mechanical stresses to which the material is subjected.
(6) Impact strength decreasing with decreasing temperature, the minimum allowable service temperature is practically mainly determined by the extent to which the material is subjected to impact. The value given here is based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limit.
(7) These estimated ratings, derived from raw material supplier data and other publications, are not intended to reflect hazards presented by the material under actual fire conditions. There is no 'UL File Number' available for Ertalon 6 PLA stock shapes.
(8) The figures given for the properties of dry material (+) are for the most part average values of tests run on test specimens machined out of rods Ø 50 mm. Except for the hardness tests, the test specimens were then taken from an area mid between centre and outside diameter, with their length in longitudinal direction of the rod.
(9) Test specimens: Type 1 B
(10) Test speed: 50 mm/min (chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle))
(11) Test speed: 1 mm/min
(12) Test specimens: cylinders Ø 8 mm x 16 mm
(13) Pendulum used: 4 J
(14) Measured on 10 mm thick test specimens (discs), mid between centre and outside diameter.
(15) Electrode configuration: Ø 25 / Ø 75 mm coaxial cylinders ; in transformer oil according to IEC 60296 ; 1 mm thick test specimens.

▪ This table, mainly to be used for comparison purposes, is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties. **However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design.**