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ERTALYTE – Polyethylene Terephthalate (PET)

The molecule structure of polyethylene terephthalate can be produced either as an amorphous or semi-crystalline thermoplastic. The amorphous type is crystal clear with lower mechanical stability and inferior sliding properties. The semi-crystalline types, on the other hand, have a high level of hardness, rigidity and stability with excellent sliding properties and low sliding abrasion. Because of its good creep resistance, low level of moisture absorption and excellent dimensional stability, the material is ideally suited for complex parts with the highest demands on dimensional stability and surface finish. For the reasons mentioned above, only the semi-crystalline type is suitable for sliding applications.

Standard Colours: White / Black

Mechanical Properties		
Density DIN53 479	g/cm ³	1.38
Yield Stress DIN53 455	MPa	80
Elongation at break DIN53 455	%	40
Modules of elasticity resulting from tensile test DIN53 457	MPa	3,000
Modules of elasticity resulting from bending test DIN53 457	MPa	2,600
Flexural strength DIN53 452	MPa	125
Impact strength DIN53 453	KJ/m ²	o. B.
Notched-bar impact strength DIN 53 453	KJ/m ²	>4
Ball indentation Hardness H _{358/30} DIN53 456	MPa	140
Creep rate stress at 1% elongation DIN53 444	MPa	13
Sliding friction coefficient against steel (dry running) ³	-	0.25
Sliding wear against steel (dry running) ³	µm/km	0.35
Thermal Properties		
Melting temperature DIN53 736	°C	+255
Thermal conductivity DIN52 612	W/(k m)	0.24
Specific thermal capacity	J/(g K)	1.1
Coefficient of linear expansion	10 ⁻⁵ - K ⁻¹	7-8
Operating temperature range (long-term)	°C	-20 +100
Operating temperature range (short-term)	°C	+160
Fire behaviour after UL 94 IEC 60695	-	HB
Electrical Properties		
Dielectric constant DIN53 483	-	3.6
Dielectric loss factor DIN53 483	-	0.008
Specific volume resistance DIN53 482	Ω-cm	10 ¹⁶
Surface resistance DIN53 482	Ω	10 ¹⁴
Dielectric strength DIN53 481	KV/mm	60
Creep resistance DIN53 480	-	KC 350
Miscellaneous data		
Moisture absorption in natural Rubber until saturated DIN53 715	W(H ₂ O)%	0.25
Water absorption until saturated DIN53 495	W _s %	0.5
Specific properties		tough, hard, negligible cold flow, dimensionally stable

PETP is a semi-crystalline thermoplastic polyethylene terephthalate. This material features wear levels that are better than those of POM and also less moisture absorption than POM. PETP is especially suitable for complex precision parts.

Due to its good creep strength, low moisture absorption and outstanding dimensional stability, PET is extremely well-suited for applications where complex parts and the highest requirements regarding dimensional accuracy and surface quality are needed.

- high strength
- high rigidity and hardness
- very low moisture absorption
- very low creep resistance
- very high dimensional stability
- low sliding friction and sliding wear
- resistant to hydrolysis (up to +70 °C)
- not suitable for contact with media containing >50% alcohol
- good adhesion and welding ability

Steelplast CC
Reg. No. 2010/113200/23
VAT No. 4240263444
P.O. Box 11099
Selcourt, 1567
www.steelplastsa.com

Johannesburg - Head Office
Cnr Innes & Shorten Roads,
Shop 6, Nuffield, Springs
Phone: +27 (0) 11 363-3722/23
Fax: +27 (0) 86 725 0725
E-mail: henkl@steelplast.co.za

Cape Town Branch
10 Garden Street, Hopefield
Western Cape
Phone: +27 (0) 22 723 1301
Fax: +27 (0) 86 563 6649
E-mail: annemarie@steelplast.co.za

Members:
Annemarie De Meyer
Laurens Van Zanten
Henk Lourens



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Main properties

- High stability
- High rigidity
- High hardness
- Low moisture absorption (at saturation 0.5%)
- Very good creep resistance
- Very high dimensional stability
- Constantly low sliding friction
- Very little sliding abrasion
- Resistant to hydrolysis



Sliding properties

PET has excellent sliding properties, very good wear resistance and, in combination with its other properties, is an excellent material for highly loaded sliding applications. This also applies to applications where high levels of humidity or moisture are expected.

Weathering effects

PET is not resistant to UV rays. The material surface changes when subjected to UV rays in combination with atmospheric oxygen. If the material is to be subjected to UV rays for longer periods, a black coloured type is recommended.

Chemical resistance

PET is resistant to weak acids and alkaline solutions, salt solutions, perchlorinated and fluorinated hydrocarbons, oils, fuels, solvents and surface-active substances. Strong polar solvents have an irreversible swelling effect. PET is not resistant to strong acids or alkaline solutions, esters, ketones or chlorinated hydrocarbons.

Behaviour in fire

PET is rated as normal flammable. When the source of ignition is removed, PET continues to burn, forming droplets. The oxygen index (the oxygen concentration required for combustion) at 23% is average compared to other plastics.

Machining

PET develops a brittle, flowing chip and is suitable for machining on automatic lathes, but it can also be machined on cutting machine tools. The semi-finished products can be drilled, milled, sawed, planed and turned on a lathe. It is also possible to cut a thread into the material or insert a threaded element. Generally, no cooling or lubricating emulsion is necessary.

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