



Polyethylene (PE) [HDPE-PE300]

High density polyethylene (HDPE) is used in a variety of applications and industries where excellent impact resistance, high tensile strength, low moisture absorption and chemical- and corrosion-resistance properties are required.

Standard Colours: Black / White

Mechanical Properties		
Density DIN53 479	g/cm ³	0.95
Yield Stress DIN53 455	MPa	22
Elongation at break DIN53 455	%	330
Modules of elasticity resulting from tensile test DIN53 457	MPa	800
Modules of elasticity resulting from bending test DIN53 457	MPa	800
Flexural strength DIN53 452	MPa	32
Impact strength DIN53 453	KJ/m ²	o. B.
Notched-bar impact strength DIN 53 453	KJ/m ²	12
Ball indentation Hardness H _{358/30} DIN53 456	MPa	40
Creep rate stress at 1% elongation DIN53 444	MPa	3
Sliding friction coefficient against steel (dry running) ³	-	0.29
Sliding wear against steel (dry running) ³	µm/km	7.4
Thermal Properties		
Melting temperature DIN53 736	°C	128
Thermal conductivity DIN52 612	W/(k m)	0.38
Specific thermal capacity	J/(g K)	1.86
Coefficient of linear expansion	10 ⁻⁵ - K ⁻¹	18
Operating temperature range (long-term)	°C	-50 +50
Operating temperature range (short-term)	°C	+80
Fire behaviour after UL 94 IEC 60695	-	HB
Electrical Properties		
Dielectric constant DIN53 483	-	2.4
Dielectric loss factor DIN53 483	-	0.004
Specific volume resistance DIN53 482	Ω-cm	>10 ¹⁶
Surface resistance DIN53 482	Ω	10 ¹⁴
Dielectric strength DIN53 481	KV/mm	47
Creep resistance DIN53 480	-	KA 3c
Miscellaneous data		
Moisture absorption in natural Rubber until saturated DIN53 715	W(H ₂ O)%	<0.01
Water absorption until saturated DIN53 495	W _s %	<0.01
Specific properties		high chemical resistance, low density, high abrasion

Polyethylene is a semi-crystalline thermoplastic with high toughness and chemical resistance, but rather low mechanical strength in comparison to other plastics and cannot be used at high temperatures. The different polyethylene's differ in regard to their molar mass (molecular weight), which is important for the respective physical properties. This means that in addition to the common properties that all types have, certain ones have type-specific properties.

Fields of Application:

Food industry
 Mechanical engineering
 Transport and conveyor systems
 Brewery technology
 Fish and meat cutting boards,
 Food items preparation boards,
 Medical parts, water tanks,
 Carrying apparatus, sliding parts
 Blockhouse materials, ice rinks
 Truck haulage and dumper floor lining

Properties:

Good sliding properties
 High bending- and impact strength
 Easy to machine, easy for welding
 Anti-bacterial
 Good chemical and electrical resistance
 No humid or water absorption
 Wear and impact resistance is high
 low coefficient of friction

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Sliding properties PE-HD (PE 300; molar mass approx. 200,000 g/mol) is very suitable for welding due to its relatively low molar mass; however, it is not abrasion resistant and has low strength values. This leads to a high level of sliding abrasion, which excludes its use in sliding applications.

Chemical resistance

All PE types are resistant to acids, alkaline solutions, salts and salt solutions, alcohols, oils, fats, waxes and many solvents. Aromatics and halogenated hydrocarbons cause swelling. All PE types are not resistant to strong oxidising materials (e.g. nitric acid, chromic acid or halogens), and there is a danger of stress corrosion cracking.

Weathering effects

As a general rule, no PE types are resistant to UV rays. This does not apply to the black coloured types, which are resistant to UV rays also in combination with atmospheric oxygen.

Behaviour in fire All PE types are rated as normal flammable. When the source of ignition is removed they continue to burn and form droplets. However, apart from carbon dioxide, carbon monoxide and water, only small quantities of carbon black and molecular constituents of the plastic develop as conflagration gases. The oxygen index (the oxygen concentration required for combustion) at 18% is low compared to other plastics.

Machining In addition to the good welding properties of PE-HD and PE-HMW, all PE types can also be machined on 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. As a rule, no cooling or lubricating emulsion is necessary

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