

3 Akatherm HDPE properties

Polyethylene, PE for short, is a semi crystalline thermoplastic and is a generic term for different kinds of PE. By colouring with 2% of 'carbon black' the PE gets its black colour.

The following kinds of PE are generally used:

- LDPE (Density 0,90-0,91 g/cm³)
- MDPE (Density 0,93-0,94 g/cm³)
- HDPE (Density 0,94-0,97 g/cm³)

In pipe systems generally only HDPE is used. HDPE has a high resistance against acids, bases and aqueous salt-solutions. Below 60°C it is practically unsolvable in organic solutions. HDPE has a good resistance against light ionised radiation without becoming radioactive itself. In paragraph 3.4 the properties and benefits of the Akatherm HDPE are highlighted.

3.1 Technical specifications

	Unit	Test method	Value
Density at 23°C	g/cm ³	ISO 1183	0,954
Elasticity modulus	N/mm ²	ISO 527	850
Bending creep modulus	N/mm ²	DIN 54852-Z4	1000
Tensile strength at 23°C	N/mm ²	ISO 527	22
Elongation at break	%	ISO R 527	300
Linear expansion coefficient	mm/mK	DIN 53752	0,18
Indentation hardness	N/mm ²	ISO 2039	36 - 46
Ignition temperature	°C	-	~350
Thermal conductivity	W/m . K	DIN 52612	0,37 - 0,43
Shore hardness		ISO 868	61
Crystallite melting range	°C		125 - 131
Operational temperature range	°C	-	-40 - +80*
Melt Flow Rate MFR 190/5	g/10 min	ISO 1133	0,43

* up to 100°C for short periods of time.

Table 3.1

3.2 Ecological properties of Akatherm HDPE

Akatherm polyethylene consists of only carbon and hydrogen atoms. These substances are not harmful to humans, animals and plants. Akatherm uses High Density Polyethylene classified with recycle mark 2.



Illustration 3.1

Polyethylene is made from oil and electricity without chemical additives released during production. It is not broken down by bacteria very fast and has a long lifetime. The total energy consumption during production and transport is very low compared to steel, copper or cast iron.

Because PE is a thermoplastic polymer it can be melted at the end of its technical lifetime and used for other applications. When PE is burnt, only non-toxic carbon dioxide and water is released.

3.3 Chemical resistance

When transporting chemical waste waters the following factors have to be taken in account:

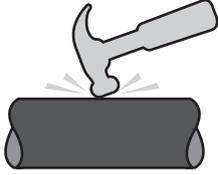
- The medium
- The concentration of this medium
- Temperature
- Duration of exposure
- Volume

Refer to appendix A for a complete chemical resistance table of Akatherm HDPE.

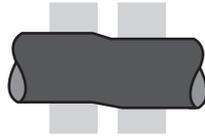
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3.4 Properties and benefits

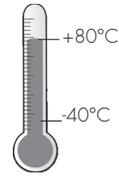
+ Material advantages



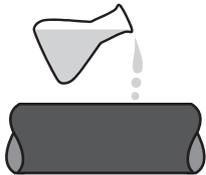
Impact-resistant and tough:
Unbreakable at temperatures above 5°C



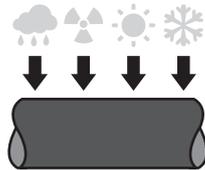
Elastic and flexible:
Adjusts to local ground movement for underground use



Thermal resistant:
Applications possible between -40°C and 80°C. Up to 100°C for short periods of time.



Chemical resistant:
Suitable for transport of polluted waste water

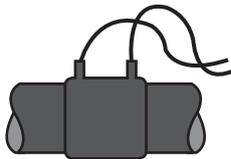


UV & weather resistant:
Unrestricted outside use through carbon black additives

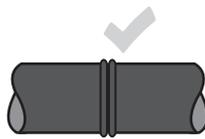


Wear resistant:
Lower cost due to long lifetime

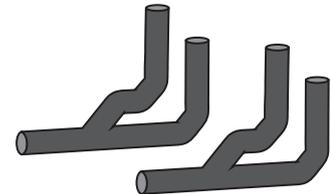
+ System advantages



Welded system:
Simple and secure installation using butt-welding and electrofusion



Homogeneous welded joints:
Pull tight and leak proof for a completely closed system



Prefabrication:
Fast and cost-saving installation of repetitive systems



Light in weight:
Cost saving in transport and handling



Low heat conductivity:
No condensation insulation required during short periods of cooling



Non-toxic:
100% recyclable and environmental friendly