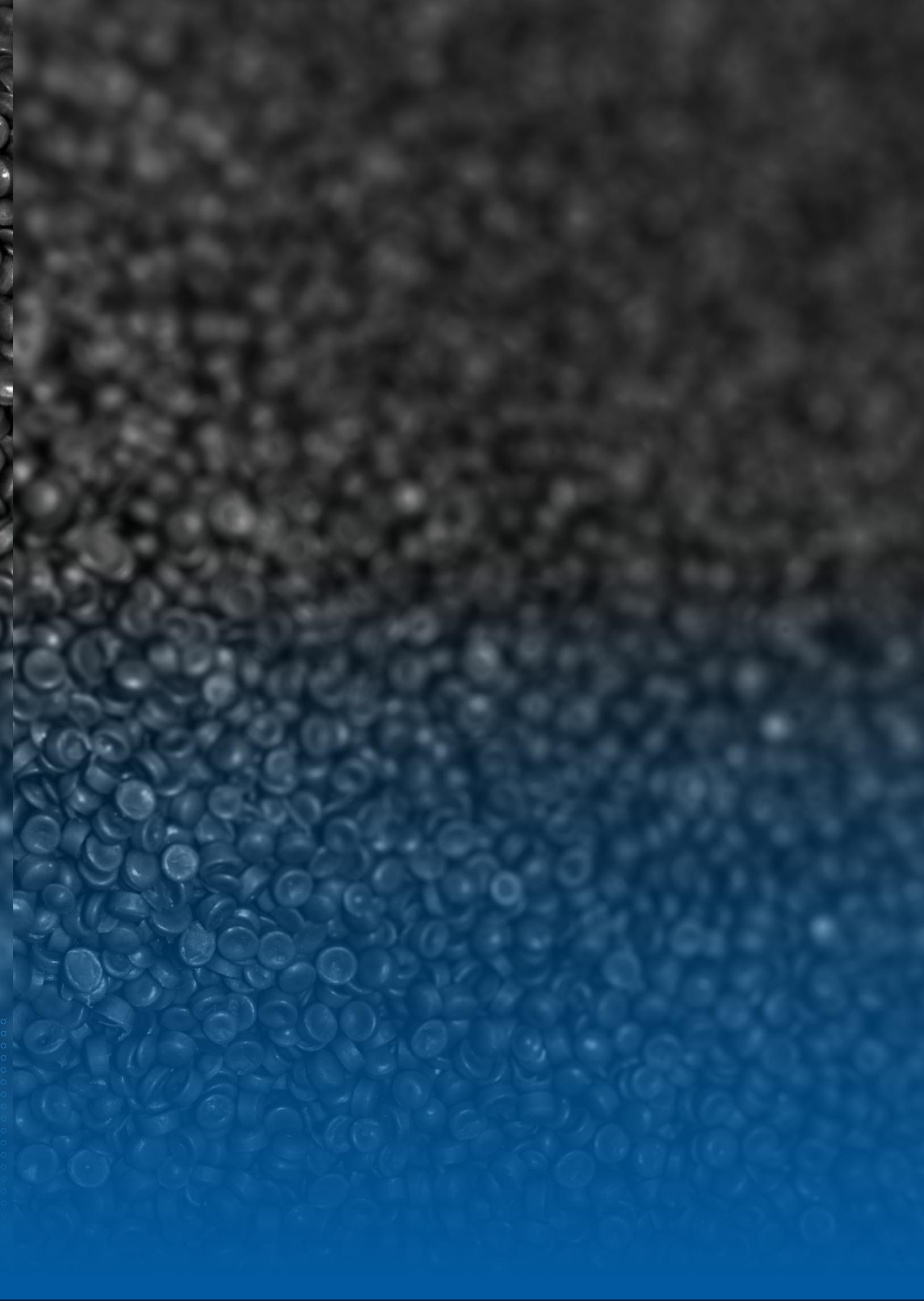




RAW MATERIAL **PE100**

ALROWAD PLASTIC PIPES





PHYSICAL AND MECHANICAL PROPERTIES OF THE MATERIAL



MATERIAL DATA SHEET:

Material data Sheet of High Density Polyethylene

Property	PE 100	PE 80	Unit	Test Method
Density (Compound)	959	956	Kg/m ³	ISO 1183
Melt flow Rate (MFR) 190°C / 2.16 kg	< 0.1	< 0.1	g/10 min	ISO 1133
Melt flow Rate (MFR) 190°C / 5.0 kg	0.25	0.3	g/10 min	ISO 1133
Tensile Stress at Yield 50mm/min	25	22	Mpa	ISO 527-2
Elongation at Break	>600	>600	%	ISO 527-2
Tensile Modulus 50mm/min	900	800	Mpa	ISO 527-2
Charpy Impact Notched at 10°	16	14	Kj/m ²	ISO 179/1eA
Hardness, Shore D	60	59	-	ISO 868
Carbon Black Content	2 - 2.5	2 - 2.5	%	ASTM D 1603
Carbon Black Dispersion	≤ Grade 3	≤ Grade 3	-	ISO 18553
Brittleness Temperature	< -70	< -70	°C	ASTM D 746
ESCR (10% Lgepal), F50	>10000	>10000	h	ASTM D 1693-A
Thermal Stability (210°C)	>20	>20	min	EN 72B
Total Volatiles	≤ 350	≤ 350	mg/kg	EN 12009
Water Content	≤ 300	≤ 300	mg/kg	EN 12118
Coefficient of Linear Thermal Expansion	20.x10-4	2.0x10-4	mm/mm°C	ASTM D 696
Thermal Conductivity	0.41	0.41	w/km	DIN 52612

MINIMUM REQUIRED STRENGTH : MRS

Material Designation	MRS Mpa
PE 100	10.0
PE 80	8.0
PE 63	6.3

CHEMICAL RESISTANCE :

Our HDPE pipes are generally resistant to the chemicals commonly used for water treatment and disinfection. Our HDPE pipes have excellent resistance to naturally occurring chemicals found in the soil for industrial purposes our HDPE 100 pipes have excellent resistance to different media.

Maximum Operating temperature for PE 100 in different media:

Medium	Maximum operating temperature°C PE 100
Sulphuric Acid	30% 60
Hydrochloric Acid	20% 60
Phosphoric Acid	85% 60
Nitric Acid	30% 40
Chromic Acid	20% 20
Hydrofluoric Acid	40%
Formic Acid	50% 40
Caustic Soda Solution	30% 60
Acetone	Technical Grade 40
Ethanol	95% 50





DESIGN LIFETIME :

HDPE Material has a 50 year life time at 20 °C, but for example PE 100 has actual strength greater than the design strength and hence the expected resulting service lifetimes are greatly in excess of the nominal 50-year requirement when the pipe is operating within its design envelope.

Allowable Working Pressure for Pipes Made of PE 100, Conveying water

Temperature °C	Years of service	Pipe series (S)						
		20	12.5	8.3	8	6.3	5	4
		Standard dimension ratio (SDR)						
		41	26	17.6	17	13.6	11	9
Allowable working pressure (Bar)								
10	5	5.0	7.9	11.9	12.5	15.8	19.9	25.1
	10	4.9	7.7	11.7	12.3	15.5	19.5	24.6
	25	4.8	7.6	11.5	12.0	15.2	19.1	24.1
	50	4.7	7.5	11.3	11.9	15.0	18.9	23.8
	100	4.5	7.3	11.1	11.7	14.7	18.5	23.3
20	5	4.2	6.6	10.0	10.5	13.3	16.7	21.0
	10	4.1	6.5	9.9	10.4	13.1	16.5	20.8
	25	4.0	6.4	9.7	10.1	12.8	16.1	20.3
	50	4.0	6.3	9.6	10.0	12.5	16.0	20.0
	100	3.9	6.1	9.4	9.8	12.3	15.5	19.5
30	5	3.5	5.6	8.5	8.9	11.2	14.1	17.8
	10	3.5	5.5	8.3	8.8	11.0	13.9	17.5
	25	3.4	5.4	8.2	8.6	10.9	13.7	17.3
	50	3.4	5.4	8.1	8.5	10.7	13.5	17.0
40	5	3.0	4.8	7.3	7.6	9.6	12.1	15.3
	10	3.0	4.7	7.1	7.5	9.5	11.9	15.0
	25	2.9	4.6	7.0	7.4	9.3	11.7	14.8
	50	2.9	4.6	6.9	7.3	9.1	11.5	14.5
50	5	2.6	4.2	6.3	6.6	8.3	10.5	13.3
	10	2.6	4.1	6.2	6.5	8.2	10.3	13.0
	15	2.6	4.1	6.2	6.5	8.2	10.3	13.0
	60	5	2.3	3.6	5.5	5.7	7.2	9.1
	70	2	2.1	3.3	5.0	5.2	6.6	8.3
								10.5

Safety factor C=1.25

Reference DIN 8074: 2011-12

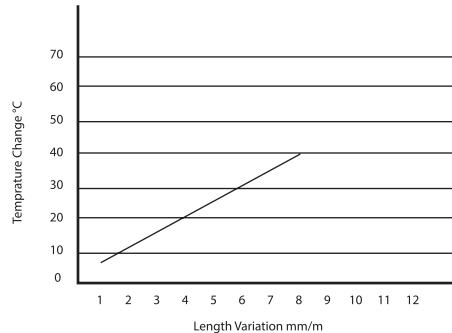
Allowable Working Pressure for Pipes Made of PE 80, (S) Conveying water

Tempera ture °C	Years of service	Pipe series (S)											
		25	20	16	12.5	10.5	10	8.3	8	6.3	5	4	
		Standard dimension ratio (SDR)											
		51	41	33	26	22	21	17.6	17	13.6	11	9	
Allowable working pressure (Bar)													
10	5	3.2	4.0	5.1	6.4	7.7	8.1	9.7	10.1	12.8	16.1	20.3	
	10	3.1	4.0	5.0	6.3	7.6	8.0	9.5	10.0	12.6	15.9	20.0	
	25	3.1	3.9	4.9	6.1	7.4	7.8	9.3	9.8	12.3	15.5	19.5	
	50	3.0	3.8	4.7	6.0	7.2	7.6	9.1	9.5	12.0	15.1	19.0	
	100	2.9	3.7	4.7	5.9	7.2	7.5	8.9	9.4	11.8	14.9	18.8	
20	5	2.7	3.4	4.2	5.4	6.5	5.8	8.1	8.5	10.7	13.5	17.0	
	10	2.6	3.3	4.1	5.2	6.3	6.6	7.9	8.3	10.4	13.1	16.5	
	25	2.5	3.2	4.1	5.1	6.2	6.5	7.7	8.1	10.3	12.9	16.3	
	50	2.5	3.2	4.0	5.0	6.0	6.4	7.4	8.0	10.0	12.5	16.0	
	100	2.4	3.1	3.9	4.9	5.9	6.2	7.4	7.8	9.8	12.3	15.5	
30	5	2.2	2.8	3.5	4.5	5.4	5.7	6.8	7.1	9.0	11.3	14.3	
	10	2.2	2.8	3.5	4.4	5.3	5.6	6.7	7.0	8.8	11.1	14.0	
	25	2.1	2.7	3.4	4.3	5.2	5.5	6.5	6.9	8.7	10.9	13.8	
	50	2.1	2.7	3.4	4.2	5.1	5.4	6.4	6.7	8.5	10.7	13.5	
	100	1.9	2.4	3.0	3.8	4.7	4.9	5.8	6.1	7.7	9.7	12.3	
40	5	1.9	2.4	3.0	3.8	4.6	4.8	5.7	6.0	7.6	9.5	12.0	
	10	1.9	2.4	3.0	3.8	4.6	4.8	5.6	5.9	7.4	9.3	11.8	
	25	1.8	2.3	2.9	3.7	4.5	4.7	5.6	5.9	7.2	9.1	11.5	
	50	1.8	2.3	2.9	3.6	4.4	4.6	5.5	5.7	7.2	9.1	11.5	
	100	1.6	2.1	2.6	3.3	4.0	4.2	5.0	5.2	6.6	8.3	10.5	
50	5	1.6	2.0	2.5	3.2	3.9	4.1	4.9	5.1	6.4	8.1	10.2	
	10	1.6	2.0	2.5	3.2	3.9	4.1	4.9	5.1	6.4	8.1	10.2	
	15	1.6	2.0	2.5	3.2	3.9	4.1	4.9	5.1	6.4	8.1	10.2	
	60	5	1.4	1.8	2.3	2.9	3.5	3.7	4.4	4.6	5.8	7.3	9.2
	70	2	1.3	1.6	2.0	2.6	3.1	3.3	3.9	4.1	5.2	6.5	8.2

Safety factor C=1.25
Reference DIN 8074: 2011-12

HDPE pipe length variation due to temperature change (°C)

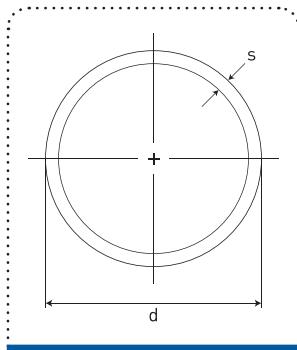
Temperature Change (°C)	Length Variation mm/meter
5	1
10	2
15	3
20	4
25	5
30	6
35	7
40	8





PRESSURE :

Maximum Sustained Temperature. [°C]	Multiply working pressure at (20°C) by these factors
20	1
25	0.92
30	0.84
35	0.78
40	1.72



$$\text{Maximum operating pressure (MOP)} = \frac{20 \times MRS}{C \times (SDR - 1)} \text{ where } C \text{ is design safety factor}$$

STANDARD DIMENSION : SDR

Relationship between the admissible nominal pressure PN, SDR and Performance classes PE 100 (for water 20 °C, 50 years service life and C=1.25)

Nominal Pressure PN (Bar)	SDR PE 80	SDR PE 100
3.2	41	-
4	33	41
5	26	33
6	22	-
6.3	21	26
8	17	21
10	13.6	17
12.5	11	13.6
16	9	11
20	7.4	9
25	6	7.4

PRODUCTION FLOW CHART

