MATERIAL

TYPICAL PROPERTIES

Properties of PVC

Property	Value	Conditions and Remarks
Physical properties		
Molecular weight (resin)	140,000	cf: K57 PVC 70,000
Relative density	1.42 - 1.48	cf: PE 0.95 - 0.96, GRP 1.4 - 2.1, CI 7.20, Clay 1.8 - 2.6
Water absorption	0.12%	23°C, 24 hours cf: AC 18 - 20% AS1711
Hardness	80	Shore D Durometer, Brinell 15, Rockwell R 114, cf: PE Shore D 60
Impact strength - 20°C	20 kJ/m2	Charpy 250 µm notch tip radius
Impact strength - 0°C	8 kJ/m2	Charpy 250 µm notch tip radius
Coefficient of friction	0.4	PVC to PVC cf: PE 0.25, PA 0.3
Mechanical properties		
Ultimate tensile strength	52 MPa	AS 1175 Tensometer at constant strain rate cf: PE 30
Elongation at break	50 - 80%	AS 1175 Tensometer at constant strain rate cf: PE 600-900
Short term creep rupture	44 MPa	Constant load 1 hour value cf: PE 14, ABS 25
Long term creep rupture	28 MPa	Constant load extrapolated 50 year value cf: PE 8-12
Elastic tensile modulus	3.0 - 3.3 GPa	1% strain at 100 seconds cf: PE 0.9-1.2
Elastic flexural modulus	2.7 - 3.0 GPa	1% strain at 100 seconds cf: PE 0.7-0.9
Long term creep modulus	0.9 - 1.2 GPa	Constant load extrapolated 50 year secant value cf: PE 0.2 - 0.3
Shear modulus	1.0 GPa	1% strain at 100 seconds G=E/2/(1+µ) cf: PE 0.2
Bulk modulus	4.7 GPa	1% strain at 100 seconds K=E/3/(1-2µ) cf: PE 2.0
Poisson's ratio	0.4	Increases marginally with time under load. cf: PE 0.45
Electrical properties		
Dielectric strength (breakdown)	14 - 20 kV/mm	Short term, 3 mm specimen PE 70-85
Volume resistivity	2 x 1014Ω.m	AS 1255.1 PE > 1016
Surface resistivity	1013 - 1014 Ω	AS 1255.1 PE > 1013
Dielectric constant (permittivity)	3.9 (3.3)	50 Hz (106 Hz) AS 1255.4
Dissipation factor (power factor)	0.01 (0.02)	50 Hz (106 Hz) AS 1255.4

Thermal properties		
Softening point	80 - 84°C	Vicat method AS 1462.5 (min. 75°C for pipes)
Max. continuous service temp.	60°C	cf: PE 80*, PP 110*
Coefficient of thermal expansion	7 x 10-5/K	7 mm per 10 m per 10°C cf: PE 18 - 20 x 10-5, DI 1.2 x 10-5
Thermal conductivity	0.16 W/[m.K]	0 - 50°C PE 0.4
Specific heat	1,000 J/[kg.K]	0 - 50°C
Thermal diffusivity	1.1 x 10-7 m2/s	0 - 50°C
Fire performance		
Flammability (oxygen index)	45%	ASTM D2863 Fennimore Martin test, cf: PE 17.5, PP 17.5
Ignitability index	10 - 12 (/20)	cf: 9 - 10 when tested as pipe AS 1530 Early Fire Hazard Test
Smoke produced index	6 - 8 (/l0)	cf: 4 - 6 when tested as pipe AS 1530 Early Fire Hazard Test
Heat evolved index	0	
Spread of flame index	0	Will not support combustion. AS 1530 Early Fire Hazard Test

Abbreviations

PE Polyethylene
PP Polypropylene
PA Polyamide (nylon)
CI Cast Iron
AC Asbestos Cement
GRP Glass Reinforced Pipe

Conversion of Units

1 MPa = 10 bar **= 9.81 kg/cm2** **= 145 lbf/in2**