North American Pipe Corporation®

TECHNICAL BULLETIN

PVC Pipe Engineering Properties

Mechanical Properties			
Property	**Value**		**Restrictions**
Tensile Yield Strength	7,000 psi	48.3 MPa	Class 12454 PVC at 73°F/23°C, ASTM D638
	6,000 psi	41.4 MPa	Class 12364 PVC at 73°F/23°C, ASTM D638
Hydrostatic Design Basis	4,000 psi	27.6 MPa	Pressure Rated PVC 1120 Materials, ASTM D2837 at 73°F/23°C
Specific Gravity	1.4		Varies Slightly Depending on Specific Compounds
Poisson Ratio	0.38		None
Tensile (Young's) Modulus of Elasticity	400,000 psi	2,758 MPa	Class 12454 PVC at 73°F/23°C, ASTM D638
	440,000 psi	3,034 MPa	Class 12364 PVC at 73°F/23°C, ASTM D638
Flexural Yield Strength	800 psi	5.51 MPa	AWWA C900 & C900 Certa-Lok® Pressure-rated pipe made from Class 12454 PVC at 73°F/23°C
	1,000 psi	6.89 MPa	ASTM D1785, ASTM D2241, D2241 Certa-Lok® Pressure-rated pipe made from Class 12454 PVC at 73°F/23°C
	2,000 psi	13.79 MPa	Non-pressure-rated pipe made from Class 12454 PVC at 73°F/23°C
	1,600 psi	11.03 MPa	Non-pressure-rated pipe made from Class 12364 PVC at 73°F/23°C

Thermal De-Rating Factors

The Tensile Yield Strength, Hydrostatic Design Basis, Tensile Modulus of Elasticity, and Flexural Yield Strength values in the Mechanical Properties table must be adjusted by using the table below at temperatures above 73°F/23°C. (These factors can also be applied to the related Pressure Rating and Pipe Stiffness values stated on our literature.) For temperatures not shown in the table, linear interpolation can be used to obtain the de-rating factor.

Thermal De-Rating Factors				
Temperature		**Hydrostatic Design Basis (Pressure Class) Flexural Yield Strength**	**Tensile Yield Strength**	**Modulus of Elasticity (Pipe Stiffness)**
°F	**°C**			
≤ 73	**≤ 23**	1.00	1.00	1.00
80	**27**	0.88	0.95	0.98
90	**32**	0.75	0.87	0.93
100	**38**	0.62	0.79	0.88
110	**43**	0.50	0.71	0.84
120	**49**	0.40	0.63	0.79
130	**54**	0.30	0.55	0.75
140	**60**	0.22	0.47	0.70

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Fluid Dynamics Properties			
Property	**Value**		**Restrictions**
Hazen Williams Flow Coefficient	150		None
Equivalent Roughness	0.000084 in	0.00021 cm	None
Manning's n	0.007 – 0.011 0.009 Recommended for Design		For Smooth-Walled Pipe

Thermal Properties			
Property	**Value**		**Restrictions**
Coefficient of Thermal Expansion	0.36 in/100ft/10°F	5.4 mm/10m/10°C	None
Maximum Operating Temperature	140°F	60°C	Pressure Pipe Derating above 73°F/23°C
Coefficient of Thermal Conductivity		0.175 W/(m-K)	@ 68°F/20°C
Deflection Temperature Under Load (264 psi)	158°F	70°C	ASTM D648, For Compounds Meeting xxxx4 Cell Classification According to ASTM D1784
Glass Transition Temperature	180°F	82°C	None
Self-Ignition Temperature	849°F	454°C	None
Specific Heat		0.92 J/(g-°C)	@73°F/23°C

References

All data is obtained from the reference materials listed. The values are not a guarantee of performance and should be used for estimating purposes.

- PVC Pipe Association. *Handbook of PVC Pipe Design and Construction.* 5th Ed. 2012.
- C.E. Wilkes, J.W. Summers, C.A. Daniels (Editors). *PVC Handbook*. 1st Ed. 2005.

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