

KEY EFFECTS OF ELEVATED TEMPERATURES ON PVC AND THERMOPLASTIC HOSES

Reduction in Working Pressure Capacity:

- At higher temperatures, PVC and **thermoplastic materials become more pliable**, causing a decline in pressure ratings.
- A typical PVC hose rated for **200 PSI at 70°F (21°C)** may experience a **pressure drop to 100 PSI at 120°F (49°C)**, illustrating a significant reduction in strength.
- Most manufacturers provide **pressure derating charts** to adjust for temperature effects.

Softening and Material Deformation:

- PVC hoses begin softening **above 100°F (38°C)** and can lose their shape under pressure.
- Prolonged exposure to elevated temperatures can lead to **permanent deformation or kinking**, affecting flow efficiency and durability.

Coupling and Fitting Retention Issues:

- High temperatures cause **hose expansion**, which can result in **loosening of fittings or couplings**.
- Hose assemblies should be tested in real-world conditions to verify secure fitting retention, especially in high-pressure applications.

Loss of Abrasion and Chemical Resistance:

- At high temperatures, **PVC and thermoplastics may experience increased permeability**, making them more susceptible to fluid absorption and chemical attack.
- Some materials become brittle after prolonged exposure to high temperatures, leading to cracking or premature failure.

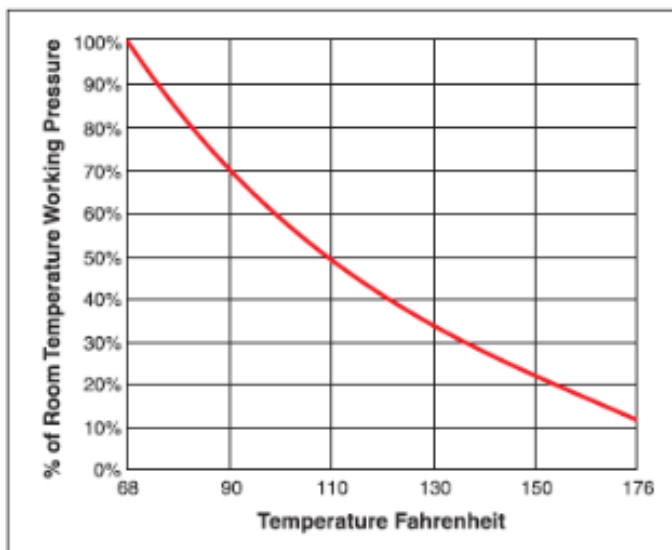
Temperature Cycling Stress:

- Applications with frequent **temperature fluctuations** can accelerate hose degradation.
- Expansion and contraction cycles **weaken the hose walls over time**, reducing service life.

TYPICAL PRESSURE DERATING CHART FOR PVC/THERMOPLASTIC HOSES

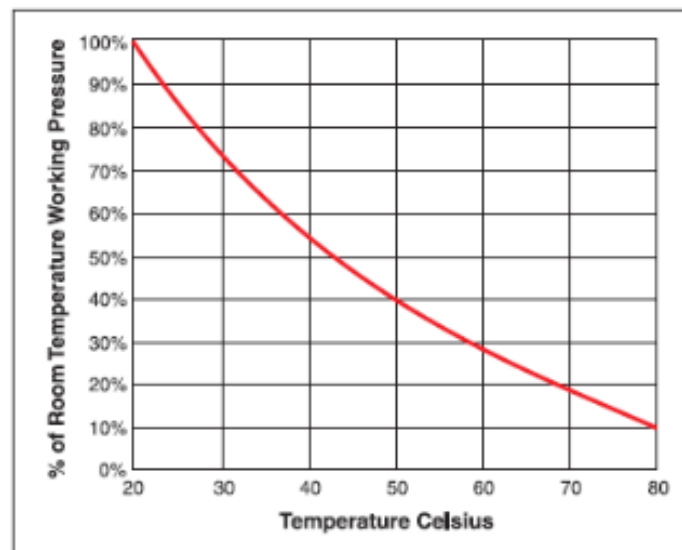
| Temperature (°F) | Working Pressure Reduction (%) |
|------------------|--------------------------------|
| 70°F (21°C) | 100% (Full Rated Pressure) |
| 90°F (32°C) | 80% |
| 100°F (38°C) | 62% |
| 120°F (49°C) | 50% |
| 140°F (60°C) | 35% |
| 160°F (71°C) | 20% |
| 180°F (82°C) | Not Recommended |

Note: These values above are general estimates. Always refer to the hose manufacturer's specific pressure-temperature ratings for exact data.



Example from the Fahrenheit Chart

If Working Pressure at 68°F is 200 PSI, then the WP at 110°F is $200 \times 50\%$, or 100 PSI.



Example from the Celsius Chart

If Working Pressure at 20°C is 14 bar, then the WP at 50°C is $14 \times 40\%$, or 5.6 bar.