

Flexibility & Bend Radius

Flexibility and minimum bend radius are important factors in hose design and selection if it is known that the hose will be subjected to sharp curvatures in normal use. When bent at too sharp an angle, hose may kink or flatten in the cross-section. The reinforcement may also be unduly stressed or distorted and the hose life thereby shortened.

Adequate flexibility means the hose should be able to conform to the smallest anticipated bend radius without over stress. The minimum bend radius is generally specified for each hose in this catalog. This is the radius to which the hose can be bent in service without damage or appreciably shortening its life. The radius is measured to the inside of the curvature.

Formula to determine minimum hose length given bend radius and degree of bend required:

$$L = \frac{A}{360^\circ} \times 2\pi B$$

Where:

L = Minimum length of hose to make bend (Bend must be made equally along this portion of hose length).

A = Angle of bend

B = Given bend radius of hose

π = 3.14

Example: To make a 60° bend at the hoses's rated minimum bend radius of 15 cm:

$$L = \frac{60}{360^\circ} \times 2 \times 3.14 \times 15 \cong 16 \text{ cm}$$

Thus, the bend must be made over approximately 16 cm of hose length. The bend radius used must be equal to or greater than the rated minimum bend radius. Bending the hose to a smaller bend radius than minimum may kink the hose and the result in damage and early failure.

Oil Resistance

The definition of Oil Resistance is currently related to Tensile Retention % and Volume Swell % of the tested material after immersion in ASTM No. 3 Oil and in ASTM Fuel B for 70 hours at 100°C (212°F). The hose industry is currently classifying the materials as follows:

Material Classification		Tensile Retention	Volume Swell
Maximum Oil Resistance	ASTM No. 3 Oil ASTM Fuel B	80% Min. 50% Min.	25% Max. 35% Max.
Medium Oil Resistance	ASTM No. 3 Oil ASTM Fuel B	40% Min. 35% Min.	100% Max. 60% Max.
None Oil Resistance	ASTM No. 3 Oil ASTM Fuel B	Less Than 40% Less Than 35%	More Than 100% More Than 80%

Safety Features

Air hose – 4:1 Safety factor. Burst vs Working pressure

Water hose – 3:1 Safety factor. Burst vs Working pressure

Steam hose – 10:1 Safety factor. Burst vs Working pressure