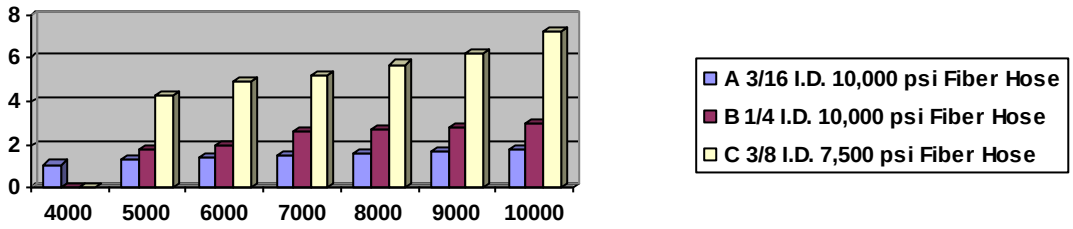
HOSE DATA

VOLUMETRIC EXPANSION OF HOSES

As pressure increases in a hose it causes the internal volume of the hose to increase. This is known as volumetric expansion, which can be extremely important to the efficient operation of some types of hydraulic equipment. The manner in which volumetric expansion data is presented in some hose manufacturer's catalogs can mislead the reader into thinking that the volume expansion of the hose is extremely small and can be neglected. The graph shown below represents common fiber reinforced hose. ***Hose A****, when pressurized at 4,000 psi, has a volume expansion of 1.10 cc/ft. When fully pressurized at 10,000 psi it has increased to 1.9 cc/ft, representing an increase in volume by 47%.* ***Hose B*** *and* ***Hose C*** *represent volume increases of 31% and 24.5%, respectively.*

The amount of liquid that is required to inflate Hose A to 10,000 psi would be an additional 4c.c. for every 10c.c. of hose internal volume. Even more misleading are specifications for some types of fiber reinforced hoses which say, "Hose length increases by less than 2%". This does not say anything about the volume expansion properties of these hoses. Rubber hoses which can double in volume due to pressure often show zero or even negative changes in length.

The best way to compare the volume expansion properties of different types and sizes of hoses is to show the change in volume at pressure as a percentage increase over their original volume. The best way to think of volume expansion is in terms of the amount of fluid needed to inflate the hose until reaches its working pressure. The following graphs show volume expansion properties of 5mm, 6mm and 8mm thermoplastic hose types in percentage of expansion.



Formula to convert cc/ft to % vol. expansion:

$(.785) \times (\text{diameter})^2 \times (12) = \text{Vol. } (\text{in}^3)$
(Vcu in) x (16.4) = Vol. (cc)

$$\frac{\text{(V.E. cc/ft) x (100)}}{\text{Vol. cc}} = \%$$

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