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ENGINEERING BULLETIN #163

How Much Weight Can a Hose Hung Vertically Support?

Hoses are sometimes hung vertically. Oftentimes, it's for a temporary application and, typically, it's a large bore hose that's being used. In these situations, a user may wonder how long the hose can be before the combination of its own weight and the weight of media flowing through it become too much.

The long and the short of it is it's unlikely that there would be an issue.

FINDING THE IMPACT ON PRESSURE RATINGS

Braided hoses are designed to resist internal pressure as noted by their pressure ratings, and when a hose hangs vertically, some of the pressure carrying capacity does get "used up."

What gets "used up" is determined by the weight of the hose, braid, end fittings, and flow media. Totaling these forces, converting the sum into units of pressure, and subtracting the result from catalog ratings will give you the updated pressure limits.

EXAMPLE USING PENFLEX SINGLE BRAIDED 10" 700 SERIES

Let's say we are using a 10" x 12' hose to direct water from a container above into a pit below. The assembly has a slip-on flange at each end. We calculate the weight of the hose, braid and end fittings as follows.

	Item	Weight per Unit	Total Weight
Hose	716-160	12.85 lb./ft	154.2 lbs.
Braid	1SB-160	6.1 lb./ft	73.3 lbs.
End Fittings	SOF	43 lbs.	86 lbs.

To determine the weight of flow media, multiply the hose's total volume by media density. Penflex's 716-1SB-160 has a volume per foot of 1018.96 in^3. In a 12' run, the total volume will be 12,227.52 in^3.

	Item	Weight per Unit	Total Weight
Flow Media	Water	.0361 lbs./in^3	441.41 lbs.

Total Weight of Hose and Media	**754.9 lbs.**

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To convert force to pressure, divide by the net effective area. This is the area of the hose using the radius which comes from the average of the inner and outer diameters. The ID of 716-160 is 9.82” and its OD is 11.18.” Using the formula below, we find the effective net area is 86.56 in^2.

$$E = ((I + O)/4)^2 \times \pi$$
$$E = 27.56 \times \pi$$
$$E = 86.59\ in^2$$

Then, to finish the conversion, divide total weight by net effective area.

$$Pressure = 754.9\ lbs./86.59\ in^2$$
$$Pressure = 8.72\ PSI$$

716-1SB-160 has a MAWP of 230 PSI. Just 8.72 PSI will be “used up” when this hose hangs vertically. As mentioned earlier, unless the operating pressures are close to the MAWP, or hose lengths are quite long, installing a hose in a vertical configuration will not meaningfully impact pressure ratings.