

Just How Far Can This Thing Pump?

Clients and homeowners will often ask how far can we pump with an Environment One® system.

Environment One Pressure Sewers utilize a high head capable pump that can reach TDH (Total Dynamics Head) conditions of 185 feet. So what does that mean to you? TDH is a measure of a combination of elevation head or lift the pump needs to overcome, plus the friction loss or resistance in the discharge pipeline. Friction loss is measure in feet of elevation equivalent per 100 feet of length. So when we are asked how far we can pump; we also need to know how high we have to lift to properly answer the question.

How far we can pump also depends on the pipeline size and type of pipe we use. Pipeline material will have friction loss values based on the flow rate in the pipeline. The more we push through the pipe line the higher the friction loss.

Environment One Pressure Sewers are designed based on the following pump performance curve. You will see that the pump flow rate is very consistent over a wide range of TDH or head conditions. It is therefore much easier to predict the friction loss that will be seen in a pressure sewer system.

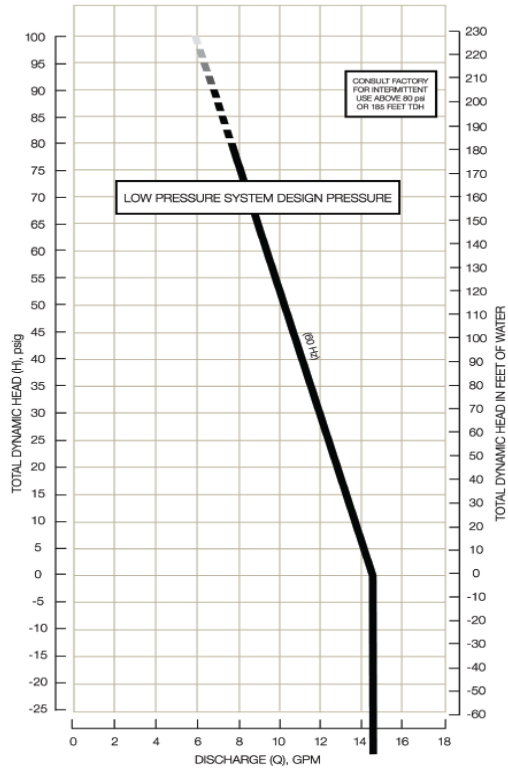
So if we want our pump to operate at 11 gpm as the mid point of our curve we could overcome conditions in the system up to 90 feet of TDH. Using our standard discharge pipe of 1-1/4 inch SDR 11 HDPE pipe we can see that the friction loss can be determined from pipeline friction tables. Flowing at 11 gpm that value is 1.88 ft/100ft.

Single Pump Example:

So if we are pumping level grade with no lift we could pump:

$\frac{1.88}{100} = \frac{90}{X}$	$X = 4,787 \text{ feet}$
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GRINDER PUMP PERFORMANCE CHARACTERISTICS



With 40 feet of lift or static head this would change to the following:

$\frac{1.88}{100} = \frac{(90-40)}{X}$	$X = 2,695 \text{ feet}$
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While this tells us how far we can physically pump, it does not tell the whole story. We must also look at the system retention time or fluid changes to be sure that the system will properly flush the pipeline and not generate nuisance odors. We must therefore look at the expected water use in the home and determine if the system will perform as desired.

Using an average water use in the North American home of 168 gpd as reported by the AWWA Research Foundation. We can calculate the fluid changes in our pipeline. The same pipeline used above has a fluid capacity of 7.5 gallons for a 100 foot length.

So to properly operate this pipeline for one home using 169 gpd we would want to limit the pipeline length to 1,680 feet to maintain a system retention time under 18 hours.

Desired Fluid Changes per day;

$$\frac{24 \text{ Hours}}{18 \text{ Hour R.T.}} = 1.33$$

$$\text{Pipeline Volume Limit } \frac{168 \text{ gpd}}{1.33} = 126 \text{ Gallons}$$

Pipeline Volume with 1.25 inch SDR 11 HDPE

$$7.5 \text{ gallons/100 ft.} = 0.075 \text{ gpf}$$

Maximum Length Desired:

$$\frac{126 \text{ Gallons}}{0.075} = 1,680 \text{ ft.}$$

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Can't Afford Your "free" Gravity Sewer Project?

Unprecedented times demand unprecedented savings. Do you have rocky, hilly, wet or even extremely flat land where conventional gravity sewers are too expensive — or simply impossible to put in place? We can help you.

Environmentally Sensitive, Economically Sensible

With an E/One system, there's no need for massive gravity trenches, huge mains or costly lift stations. The E/One pressure sewer uses a small main in a shallow trench that follows the contour of the land making for a gentler environmental footprint.

It lets you sewer virtually anywhere. Including sites where old septic systems may be dying and polluting. With over 40 years of experience, E/One provides a highly reliable sewer solution with no preventive maintenance, and virtual transparency to the homeowner.

Let us prove it – free

Send us the topo map for your next project. We'll show you how an E/One system can make your project viable once again.

Call, or visit us online.

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