

INSTALLATION:

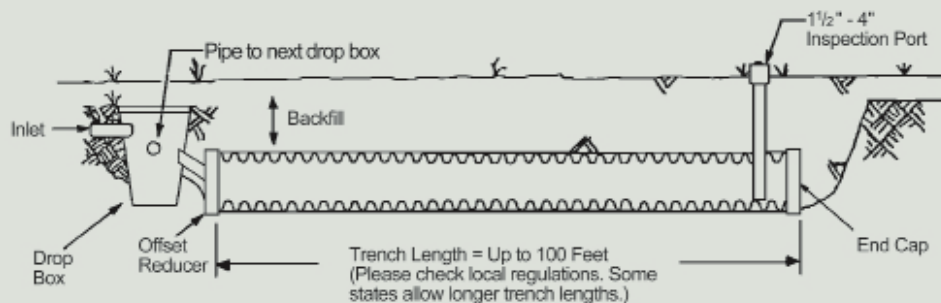
GOLDLINE GLP®

GENERAL REQUIREMENTS: Gravel-less Leachbed Pipe (GLP) can be installed in any application where conventional gravel-filled systems are allowed. Gravel-less systems are meant to be a direct replacement for gravel-filled systems and perform equally well. These systems should be installed in accordance with state and local codes.

PRINCIPAL INSTALLATION REFERENCES:

ASTM F 481: Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields.

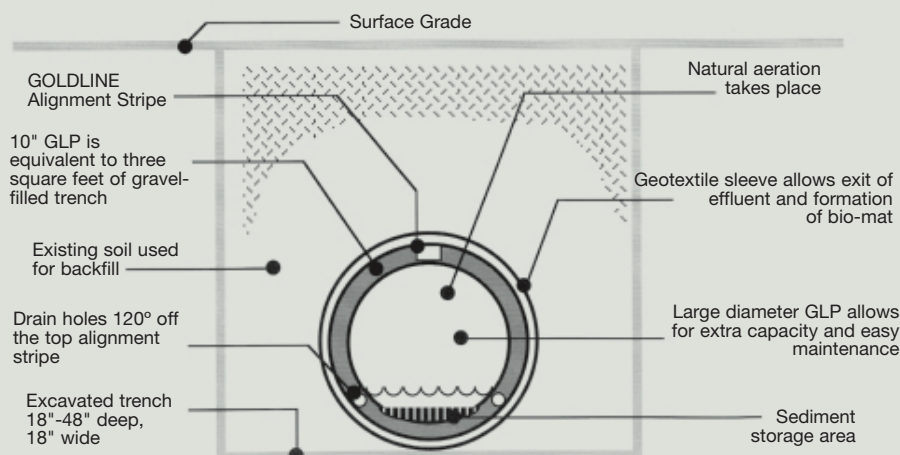
TRENCHES: A gravel-less system trench should have a minimum width of 18 inches and a maximum depth of 48 inches. If a rounded bottom trench is used, then the trench width may be as narrow as the pipe that is being installed. After installation, the GLP should have a minimum cover of six inches. Keep the pipe as close as possible to the more porous soil near the surface. This provides greater capillary action to wick the effluent around the pipe and away from the system. By keeping the pipe near the surface, you will allow greater distances between the GLP system and existing water table or bedrock. Trench grade should be kept as close to zero as possible, with no more than 0.5 inches per 100 feet allowable. This will provide more consistent dispersion of the effluent.



INSTALLATION: System design and installation from the house to the GLP drain field is the same as for standard gravel-filled systems in accordance with state and local codes.

The invert of the septic system discharge line should be a minimum of one inch higher than the GLP pipe. This will allow for maximum loading of the GLP System. At the inlet end of the GLP System, install an offset connector with the four inch opening placed at the top. Install a four inch PVC pipe from the outlet to the offset connector. Insert the PVC pipe four inches to six inches into the gasketed opening of the offset fitting. Lateral, drop box or serial system designs can be used, as required by state or local code.

As you lay the GLP pipe, make sure the Goldline alignment stripe is at top dead center to assure proper dispersion of the effluent. Connect each length of Gravel-less Leachbed Pipe together, pulling the fabric over each joint, making sure it is stretched tightly and then securely tape the fabric together. Continue laying and connecting additional sections of GLP in this manner until the drain field is complete. At the end of each line, remove the last coupler and cap the end, install an inspection port as per local codes.



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INSPECTION PORT: If local codes require, install an inspection port at the end of each line. This will allow constant evaluation of the drain field. To build an inspection port, cut a hole in the GLP pipe at the end of each line and install a length of PVC perforated pipe to act as an inspection pipe. Cut the pipe at the surface grade and cap.

BACKFILL: Backfilling should be done carefully, making sure that the grade of the pipe is not affected and that the alignment stripe remains in its correct position. Make sure that backfill completely surrounds the pipe and that excessive compaction does not take place. Keep a small amount of backfill excess remaining on the trench to allow for some eventual settling to occur. Sod or seed the trench area to prevent excessive infiltration and soil erosion from the backfilled trench.

SYSTEM SIZING: Acceptable methods for estimating sewage flow, required soil treatment area and system sizing for Goldline GLP are listed in the tables below. Table One provides average design flow rates for residential dwellings. Table Two lists lineal footage sizing requirements of 10" GLP based on soil percolation rates. Table Three (page 40) lists lineal footage sizing requirements of 10" GLP based on detailed soil descriptions.

For multiple dwelling units, the estimated design sewage flow shall consist of the sum of the flows of each individual unit. If there is a discrepancy between the soil texture and the percolation rate, the larger soil sizing factor should be used.

Ten-inch diameter Goldline GLP is equivalent to a three-foot-wide, rock-filled trench with six inches of rock below the distribution pipe. Eight-inch-diameter Goldline GLP is equivalent to a two-foot-wide rock-filled trench with six inches of rock below the distribution pipe.

Average Design Flow (ADF) shall be used to size soil treatment systems. The estimated flow shall be based on a minimum of two bedrooms with an average design flow of 150 gallons per day from each bedroom. Table One listed below should be used in determining ADF.

TABLE ONE: AVERAGE Design FLOW - TYPE I HOMES

# of Bedrooms	Gallons Per Day
2	3007
3	450
4	600
5	750
6	900

TABLE TWO: LINEAL FOOTAGE OF 10" GOLDLINE GLP USING PERCOLATION TESTS

Percolation Rate (MPI)	Soil Texture	Soil Treat. Area Sq.Ft./Gallon	2-Bedroom 300 gal ADF	3-Bedroom 450 gal ADF	4-Bedroom 600 gal ADF	5-Bedroom 750 gal ADF
Faster than 0.1*	Course Sand	----	----	----	----	----
0.1-5**	Sand	1.27	130'	190'	260'	320'
	Loamy Sand					
0.1-5	Fine Sand	1.67	170'	250'	340'	420'
6-15	Sandy Loam	1.27	130'	190'	260'	320'
16-30	Loam	1.67	170'	250'	340'	420'
31-45	Silt Loam	2.00	200'	300'	400'	500'
	Silt					
46-60	Sandy Clay Loam	2.20	220'	330'	440'	550'
	Silty Clay Loam					
	Clay Loam					
61-120	Silty Clay	----	----	----	----	----
	Sandy Clay					
	Clay					

If you are using 8" GOLDLINE GLP, multiply the lineal footage in Table Two by 1.5 to determine the necessary lineal footage.

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TABLE THREE: LINEAL FOOTAGE OF 10" GOLDLINE GLP USING DETAILED SOIL DESCRIPTION

Soil Texture	Soil Structure	Soil Treat. Area Sq.Ft./Gallon	2-Bedroom 300 gal ADF	3-Bedroom 450 gal ADF	4-Bedroom 600 gal ADF	5-Bedroom 750 gal ADF
Course Sand*	Single Grain	-----	-----	-----	-----	-----
Sand, Loamy Sand**	Single Grain	1.27	130'	190'	260'	320'
Fine Sand, Loamy Fine Sand	Single Grain	1.67	170'	250'	340'	420'
Very Fine Sand Loamy Very Fine Sand	Single Grain	2.00	200'	300'	400'	500'
Sandy Loam	Moderate to Strong	1.27	130'	190'	260'	320'
Sandy Loam	Weak or Platy	1.67	170'	250'	340'	420'
Sandy Loam	Massive	2.00	200'	300'	400'	500'
Loam	Moderate to Strong	1.67	170'	250'	340'	420'
Loam	Weak or Platy	2.00	200'	300'	400'	500'
Loam	Massive	2.50	250'	375'	500'	625'
Silt Loam	Moderate to Strong	2.00	200'	300'	400'	500'
Silt Loam	Weak or Platy	2.50	250'	375'	500'	625'
Silt Loam	Massive	3.00	300'	450'	600'	750'
Sandy Clay Loam	Moderate to Strong	2.20	220'	330'	440'	550'
Sandy Clay Loam	Weak or Platy	3.20	320'	480'	640'	800'
Sandy Clay Loam	Massive	-----	-----	-----	-----	-----
Clay Loam	Moderate to Strong	2.20	220'	330'	440'	550'
Clay Loam	Weak or Platy	-----	-----	-----	-----	-----
Clay Loam	Massive	-----	-----	-----	-----	-----

If you are using 8" GOLDLINE GLP, multiply the lineal footage in Table three by 1.5 to determine the necessary lineal footage.

* Soil treatment systems placed in soils with percolation rates of less than one-tenth minute per inch or in a texture of course sand must provide at least one of the following treatment techniques: 1. A mound system or 2. A trench system with at least one foot of clean sand placed between the excavation bottom and sidewalls. Distribute the effluent by pressure over the absorption area or divide the total soil treatment system into at least four parts with no part larger than 25 percent of the area required and the parts constructed for serial application.

** Soil absorption area with a soil percolation rate of 0.1 to 5 minutes per inch that is not a fine sand or a soil texture of sand or loamy sand must use at least one of the following treatment techniques. 1. Distribute the effluent by pressure over the absorption area. Divide the soil treatment system into at least four parts with no part larger than 25 percent of the area required and the parts constructed for serial application. This soil type has also used a sizing factor of 0.83. If a sizing factor of 0.83 is used, make every effort to determine that the soil characteristics are correct.

These tables were compiled in part from the State of Minnesota, Pollution Control Agency, Water Quality Division, Individual Sewage Treatment Systems Standards, Chapter 7080. For drainfield sizing in other states, you may need to check locally for guidelines and sizing requirements.