



MANTIS

430-10

CONNECTICUT

Design & Installation Guidelines



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Innovative Environmental Products and Solutions Since 1970

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Terms and Definitions

MANTIS 430-10

Each Mantis 430-10 unit is preassembled and are 5' in length as measured from the Support Distribution Pipe x 30" wide x 12" high. The system is installed in a minimum 42" wide trench with specified sand envelope around the Mantis units.

Specified Sand

The specified sand envelope around the Mantis units (6" minimum underneath, 6" minimum on the sides, 4" minimum on the top, and in between the Support Modules) shall meet the requirements as indicated in the Eljen Mantis Specified Sand Requirements chart listed below. This sand is a medium to coarse textured, washed, silica sand with less than 10% passing a #100 sieve and less than 5% passing a #200 sieve based on a wet sieve analysis. If your material falls outside of the specification, contact Eljen's Technical Resource Department at 1-800-444-1359 for a review of the sieve report. Eljen may approve the material under certain conditions to be used for the specified sand envelope around the Mantis units.

Some material suppliers are manufacturing their Connecticut Select Fill so that it will also meet the requirements of the Eljen Specified Sand Requirements specification, in such cases, that Connecticut Select Fill material can be used for the fill package and the sand envelope around the Mantis units as described above.

Ask your material supplier for a sieve analysis to verify that your material meets the required specifications.

Eljen Mantis Specified Sand Requirements		
Sieve Size	Sieve Square Opening Size	Specification Percent Passing Wet Sieve
0.375"	9.5 mm	100.0
#4	4.75 mm	95.0 – 100.0
#8	2.36 mm	80.0 – 100.0
#16	1.18 mm	50.0 – 85.0
#30	600 µm	25.0 – 60.0
#50	300 µm	5.0 – 30.0
#100	150 µm	< 10.0
#200	75 µm	< 5.0
Request a sieve analysis from your material supplier to ensure that the system sand meets the specification requirements listed above.		

CM

(Connection Module) There is one connection module per 5' unit. The top of the connection module is marked with a white paint stripe. The module design provides a 12" invert height for gravity, dosed, or pressure distribution systems.

LPP

(Low Pressure Pipe) used for systems under pressure. This is normally a 1.5" – 2.00" diameter pipe.

SM

(Support Module) 12" high, provides support for the internal Support Distribution Pipe (SDP). The top of the Support Modules also provide support for gravity and pressure pipe when a 12" invert height is required. All surfaces of the support modules allow absorption into the surrounding specified washed sand.

SDP

Internal (Support Distribution Pipe) Provides module support / internal distribution and a venting conduit. The SDP houses the LPP when 6" invert pressure distribution is required. The SDP is also used as the distribution pipe when using a 6" invert gravity configuration.

General Description

The Mantis 430-10 has a unique design. Aggregate is replaced with Support Modules (SM) evenly spaced along a HDPE Support Distribution Pipe (SDP). Support Modules provide structural integrity, flow channels, and void space. The SDP provides structural integrity, internal distribution and acts as a venting conduit with either gravity or pressure installations.

The standard Mantis 430-10 unit is (5' long) x (30" wide) x (12" high). Nine Support Modules (SM) and one Connection Module (CM) that are spaced evenly along a 5' SDP with approximately 3.0" of specified sand between each support module. Support and Connection Modules are constructed of recycled high impact polystyrene in flat and a variety of dimpled shaped configurations. Each module is individually protected with a factory installed high quality geotextile fabric that protects the tops and sides of all modules; bottom of the support modules are open and have no fabric covering.

Gravity Distribution Systems:

The product provides two invert height options for gravity distribution; 6" or 12". The 6" gravity option utilizes the factory installed Support Distribution Pipe (SDP). The 12" option requires the purchase of an additional 4" non-perforated distribution pipe (SDR 35) or equivalent placed on top of each Connection Module. 4" couplings are supplied for the SDP, the installing contractor will supply termination caps for 6" and 12" invert pipes and material for system venting if required. See Figures, 1 and 2 for placement of the 12" invert height and Figures 4 and 5 for the 6" invert height.

Pumped Distribution Systems:

There are two ways to distribute effluent in the Mantis systems when pumped systems are required: dosing, and pressure distribution. When dosing is used, pump up to an oversized distribution box with baffles or a velocity reduction tee and then gravity flow the wastewater to the Mantis system. This method is the most cost effective, and has ease of installation. Set pump floats or control panels to deliver a maximum of 9 gallons per 5' long Mantis 430-10 unit per dosing cycle with 12" invert installations, and 4.5 gallons per 5' long Mantis 430-10 unit per dosing cycle with 6" invert installations.

The second method of distributing effluent in pump systems is via pressure distribution. Pressure distribution utilizes low pressure pipe and specific orifice opening sizes based on a number of criteria. These systems are designed by professional engineers and are usually designed as part of a wastewater management program and require annual maintenance to be performed on the low pressure pipe network. System designers should contact Eljen's Technical Resource Department at 1-800-444-1359 for guidance when designing these types of systems.

Serial Distribution Systems:

Gravity or dosed Mantis systems on sloped sites shall be serially loaded and utilize a drop box or high-level overflow box on each trench line. This will ensure that there is a continuity of air transfer throughout the system. Refer to Figure 7 for drop box configurations.

System Venting:

Eljen mandates venting for the Mantis 430-10 when the system will have more than 18" of cover material as measured from the top of the unit to finished grade. This will ensure proper aeration of the modules and sand filter. The Mantis has aeration alleys between the Support Modules in each unit. Under normal operating conditions, only a fraction of the Support Modules is in use. The unused Support Modules remain open for intermittent peak flows and the transfer of air. The extension of the distribution pipe to the vent provides adequate delivery of air into the Mantis system.

Home plumbing operates under negative pressure due to hot water heating the pipes and reducing the density of air in the house vent. As hot air rises and exits the home, it must be replaced by air from the Mantis system. To maintain this air flow and fully aerate the Mantis system, it is important that air vents are located only on the distal end of each Mantis pipe network.

If a pumped system is specified and has more than 18" of cover as measured from the top of the unit to finished grade, an additional 2" air line must be extended from the Mantis system distribution box back to the

riser on the septic tank or the pump tank as shown in Figure 8. This maintains the continuity of air flow from the modules back into the house plumbing.

In the gravity fed Mantis system, the vent is usually a 4" diameter pipe extended to a convenient location behind shrubs. If the vent is extended, the pipe must not drain effluent and must have an invert higher than the system.

When venting a gravity or pump system, the use of a Granular Activated Charcoal (or Carbon) Filter will address any odor issues that may occur.

System Cover:

After backfill, there should be a minimum of 16" of material as measured from the top of the unit to the finished grade. Systems with more than 18" of cover material as measured from the top of the unit to the finished grade must be vented. Use clean native or fill material devoid of large rocks to complete the backfill process. Divert surface runoff with diversion ditches or berms. Finish grade excavated areas to prevent surface runoff from collecting on system disposal area. Seed or sod excavated areas to protect against erosion. As with all systems, do not drive or pave over the disposal area.

Pre-Drilled Holes:

The Support Distribution Pipe (SDP) is pre-drilled at the factory with (3) 1.0" diameter holes at the 12:00, 5:00, 7:00 positions within each support and connection modules. These internal holes insure 100% positive effluent transfer and venting to all support and connection modules in the system. This design provides 100% usage of bottom area and sidewall.

Vehicular Traffic or Mantis Under Paving:

All vehicular traffic is prohibited over the Mantis system. This is due to the compaction of material required to support traffic loading which greatly diminishes absorption below system, and the void space that naturally exists in soils for oxygen transfer on top of the system is reduced by compaction from vehicular traffic or solid surfaces such as driveways or patios.

Non-Residential Buildings & Residential Institutions:

Determine daily design flow unless specific water use data is available for the facility. Design flow based on metered flows must use a minimum 1.5 safety factor applied to all metered average daily water use. See the Connecticut Public Health Code Tables 4, 7, and 8 for the applicable sizing requirements of these systems.

Garbage Disposals:

The use of a Garbage Disposal is not recommended and can cause major septic system problems as they generate a great amount of Suspended Solids, Grease and Nutrients than normally found in leaching systems. If a Garbage Disposal is installed, the septic tank volume must be increased by 250 gallons.

Water Softeners:

The Connecticut Public Health Code prohibits the discharge of wastewater from water treatment systems to subsurface sewage disposal systems unless otherwise authorized by the Department of Environmental Protection (DEP). Onsite disposal of water treatment system wastewater via a separate/dedicated subsurface disposal system shall be in accordance with DEP guidance or General Permit.

Large Tubs:

Many homes today have large capacity bathroom tubs. The Connecticut Public Health Code requires that the capacity of the septic tank be increased by 250 gallons for each 100 to 200 gallon tub, and the septic tank capacity be increased by 500 gallons for each tub over 200 gallons.

Septic Tank Effluent Filters:

Eljen Corporation recommends the use of an appropriate sized septic tank effluent filter on all Mantis systems.

Mantis Installation Checklist:

A installation checklist is included at the end of this manual and can be used by septic inspectors or contractors as supporting documentation for their client files.

Materials and Equipment Needed for Installation

It is best to have all tools on site at the time of installation. Listed below are the most common tools required for installation of the Mantis system.

- Mantis 430-10 Units.
- Safety Glasses
- Cordless Drill.
- 1" Diameter Drill Bit. A Forstner Bit Works Best on SDR 35 Pipe.
- 8" x 8" or 10" x 10" Hand Tamper.
- Utility Knife.
- Measuring Tape.
- Termination Caps.
- Non-Perforated SDR 35 Pipe for 12" Invert Installations.
- Pipe Glue.
- Laser, Transit, or Level.
- Rake and Shovel.
- Backhoe or Excavator.
- Stakes / Marking Paint.

12" Invert Gravity Installation Guidance

The 12" invert MANTIS 430-10 configuration requires the purchase of additional non-perforated SDR 35 distribution pipe and termination caps.

Note: Sand Filling Procedure Prior to Installing Distribution Pipe.

1. Carefully lay out the system components and boundaries defining the location and elevation for all trenches or beds, and distribution or drop boxes based on the outlet elevation of the septic tank and pipe grades required to maintain flow to each component.
2. Prepare the site according to state and local regulations. Do not install a system on frozen or saturated soils. When installing the Mantis in clayey soils, take precautions not to compact the area with heavy machinery.
3. Plan all drainage requirements above (up-slope) of the system and set soil grades to insure storm water drainage and ground water is diverted away from the absorption area once the system is complete.
4. Excavate a minimum forty-two inch (42") wide level trench.
5. Remove all organic soil and roots within the absorption trench or bed area.
6. Scarify receiving layers including sidewalls to eliminate soil smearing. Once scarifying is completed, avoid walking over prepared absorption area until 6" minimum of the specified sand has been placed on the bottom of the trench.
7. Along the trench bottom place, compact, and rake to a finished level of 6" minimum a layer of the specified sand as listed on the chart on Page 3 of this manual. Ask your sand supplier for a sieve analysis report to verify that the sand you are going to install meets this specification. A hand tamper is sufficient for compaction of the specified sand layer.
8. Place the Mantis units in the trench with the white painted stripe on the connection module facing up.
9. Adjust the support and connection modules to ensure they are centered over the pre-drilled holes in the Internal Support Distribution Pipe.
10. Center the units along the trench length. The remaining units are joined by connecting the Internal Support Distribution Pipe (SDP) to one another. Connections must be glued.
11. Install termination caps at the beginning and end of the Internal Support Distribution Pipe on each trench line to prevent soil intrusion into the Mantis units.
12. Direction changes are accomplished easily and quickly by using a variety of inexpensive off the shelf fittings. 90°, 45°, 22.5°, T, TY, and Y fittings are readily available at most local suppliers.
13. Specified sand filling must be completed prior to installing the distribution pipe on top of the Modules.
14. Specified sand filling between and over the units may begin once the units are in the trench. Specified sand must be placed lightly and may be accomplished with a backhoe or other suitable equipment.
 - a. Starting at the top center of the Mantis units, use a minimal amount of specified sand necessary to set in place the bottom section of the support modules at their correct spacing.
 - b. Using a standard 2" x 4" wood stud, tamp and compact the sand that is in-between the support modules. Ensure that the void area under the Support Distribution Pipe is filled with specified sand.
 - c. After the modules are set in place, cut the plastic straps holding the cardboard supports on the sides of the Mantis units.

- d. Remove the cardboard supports from the bottom of the Mantis units by sliding them outward and along the bottom of the trench.
 - e. Remove the cardboard supports that are on top of the Mantis units. Remove any remaining plastic straps from the cardboard supports from the trench.
 - f. Additional specified sand is lightly added between the support modules and along the sides of the Mantis units to bring the sand fill even to the top of the support modules.
 - g. Using a standard 2" x 4" wood stud, continue to moderately tamp and compact the sand that is in-between the support modules. Spread additional specified sand as necessary.
15. Set distribution box to the proper elevation.
16. Installing the Distribution Pipe: Refer to Figures 1 and 3 for details.
- a. Each Mantis unit has one connection module marked with a white painted stripe. Using a sharp utility knife, cut an opening in the geotextile on the connection module in the white striped marked area in a rectangular shape (4" x 3") to allow effluent to flow from the distribution pipe into the connection module.
 - b. Glue non-perforated SDR 35 pipe to the appropriate length accounting for connection into the distribution box. Insert distribution pipe into the pipe opening of the distribution box. Center the remaining distribution pipe on top of the Mantis units.
 - c. Using the cut opening of the geotextile in the connection module as an azimuth, drill a 1" diameter hole in the distribution pipe at the 12:00 position. You will only drill one hole for each Mantis unit.
 - d. Rotate the distribution pipe so that the drilled hole will be at the 6:00 position directly over the cut opening in the geotextile of the connection module.
 - e. Secure the distribution pipe using three wire clamps per Mantis unit (one in the connection module, and one in each support module on either side of the connection module).
 - f. Place a factory provided section of geotextile fabric over the distribution pipe and connection module opening and secure in place with specified sand.
 - g. Install a termination cap or vent piping if required at the distal (far) end of the distribution pipe.
17. System Venting: Venting is optional, but required when the system will have more than 18" of cover material as measured from the top of the unit to finished grade. If required, at the distal (far) end of the 12" invert distribution pipe install a 90° fitting. Install a section of non-perforated pipe extended above final grade. Plumb to prevent rain water and pest intrusion from entering the system by using two 90° fittings or a mushroom cap fitting as shown in Figure 2.
18. Prior to backfilling the system, provide 4" additional of the specified sand fill over the units to the top of the distribution pipe to account for sand settling.
19. Backfilling: Complete backfill over the units followed by loam to a depth of 16" – 18" as measured from the top of the units. Systems with total cover that exceeds 18" as measured from the top of the units to finished grade shall be vented at the distal (far) end of the system. Backfill material shall be well graded sandy fill; clean, porous, and devoid of large rocks. Divert surface runoff with diversion ditches or berms. Finish grade to prevent surface ponding. Seed or sod excavated areas to protect against erosion. As with all systems, do not drive or pave over the absorption area.

12" Invert Sand Fill Cross Section

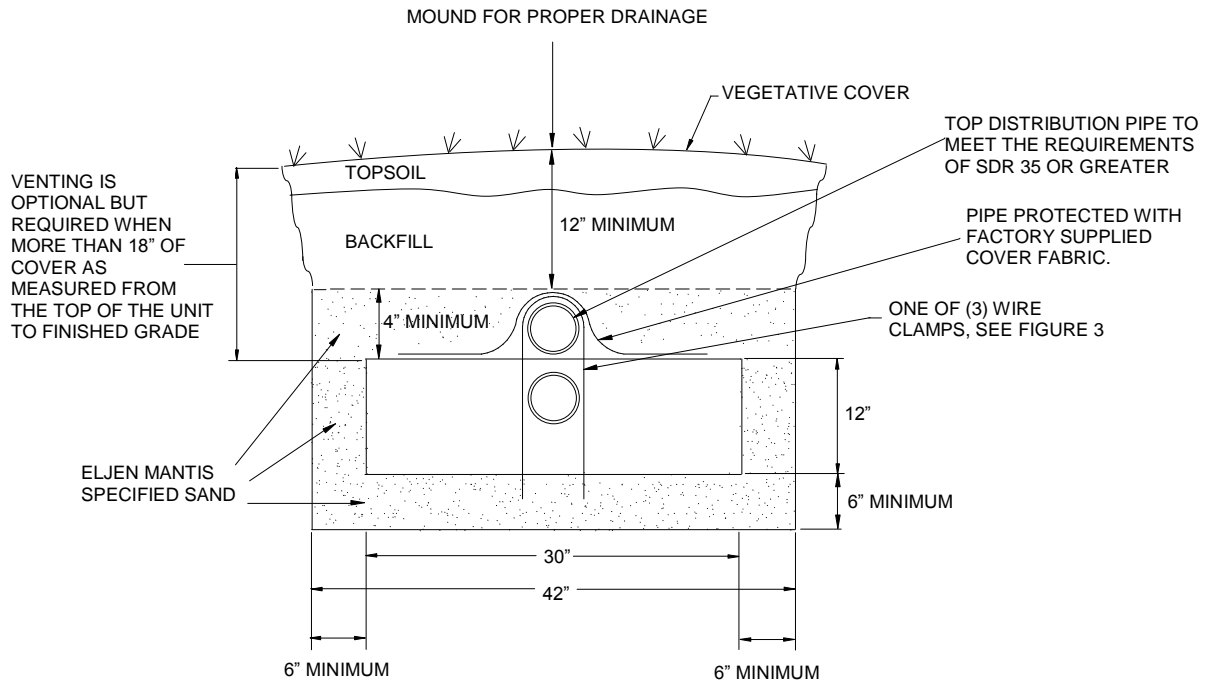


Figure 1

12" Invert Vent Detail

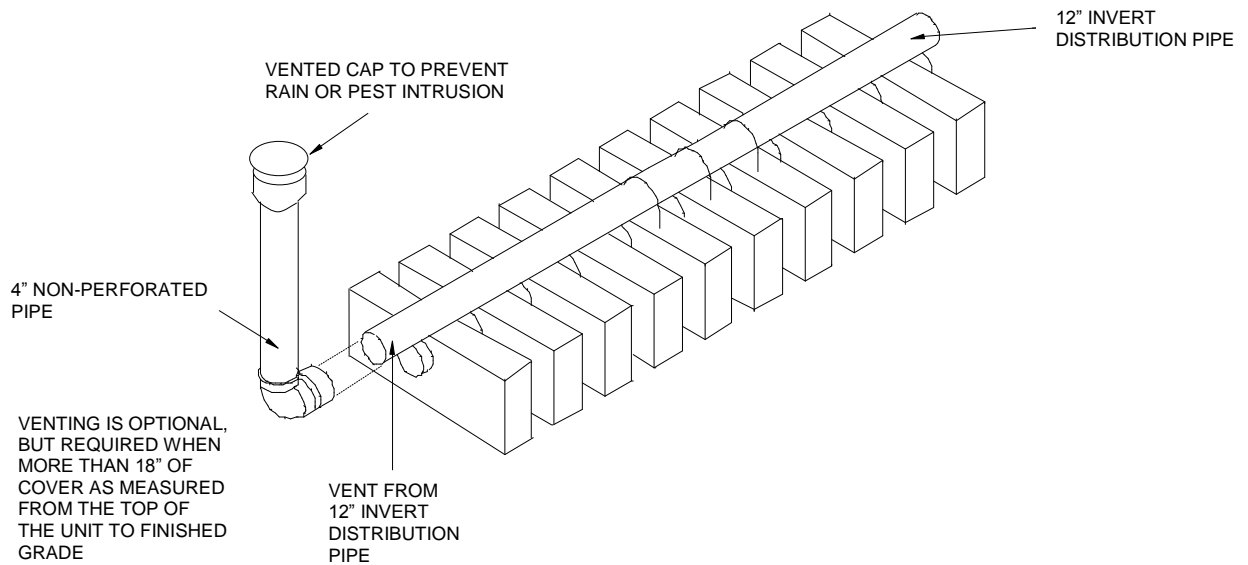


Figure 2

12" Invert Distribution Pipe Layout

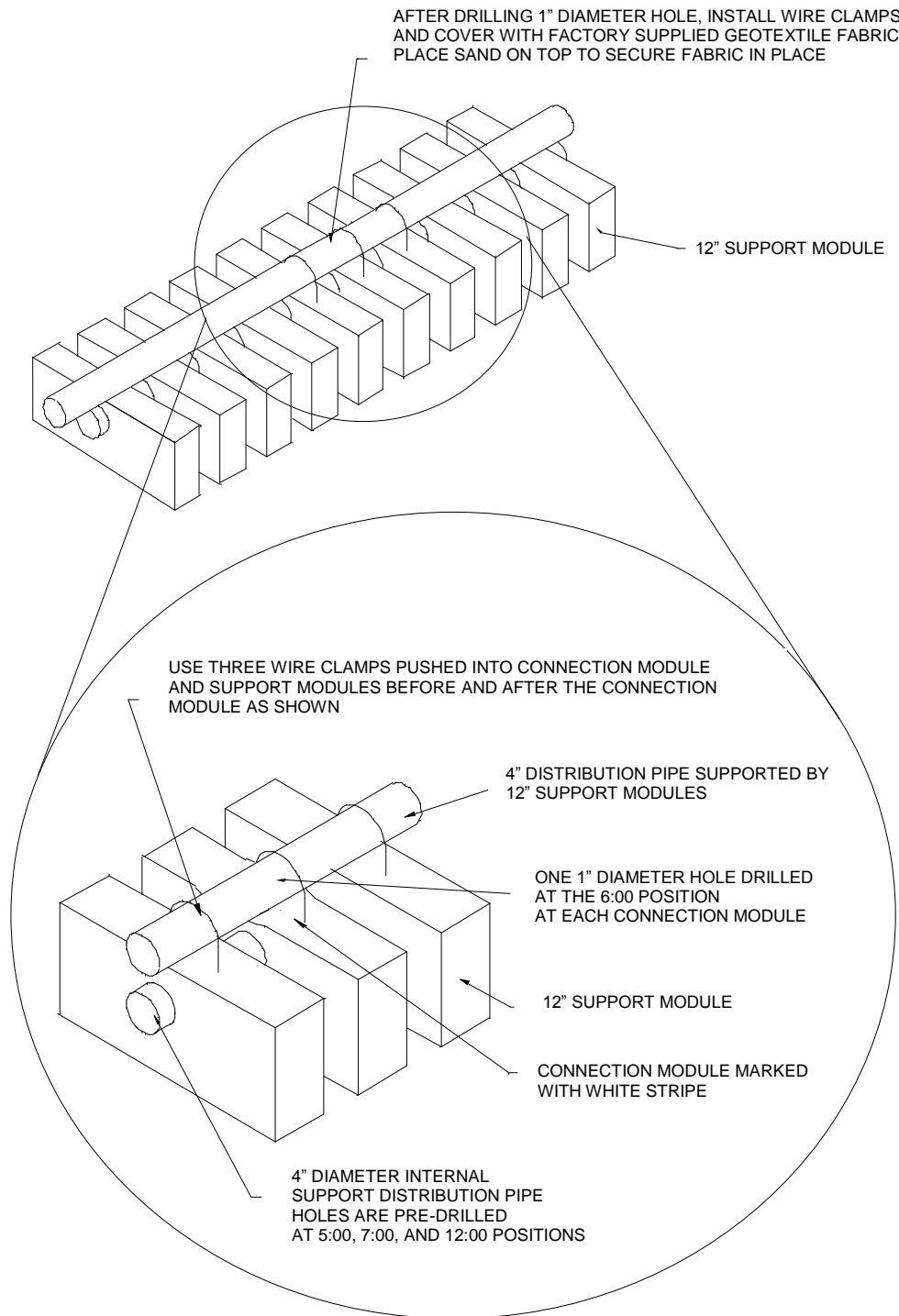


Figure 3

6" Invert Gravity Installation Guidance

The 6" invert MANTIS 430-10 configuration does not require a pipe on the top of the system. The pre-installed Support Distribution Pipe provides an exact 6" invert height.

1. Carefully lay out the system components and boundaries defining the location and elevation for all trenches or beds, and distribution or drop boxes based on the outlet elevation of the septic tank and pipe grades required to maintain flow to each component.
2. Prepare the site according to state and local regulations. Do not install a system on frozen or saturated soils. When installing the Mantis in clayey soils, take precautions not to compact the area with heavy machinery.
3. Plan all drainage requirements above (up-slope) of the system and set soil grades to insure storm water drainage and ground water is diverted away from the absorption area once the system is complete.
4. Excavate a minimum (42") wide level trench.
5. Remove all organic soil and roots within the absorption trench or bed area.
6. Scarify receiving layers including sidewalls to eliminate soil smearing. Once scarifying is completed, avoid walking over prepared absorption area until 6" minimum of the specified sand has been placed on the bottom of the trench.
7. Along the trench bottom place, compact, and rake to a finished level of 6" minimum a layer of the specified sand as listed on the chart on Page 3 of this manual. Ask your sand supplier for a sieve analysis report to verify that the sand you are going to install meets this specification. A hand tamper is sufficient for compaction of the specified sand layer.
8. Place the Mantis units in the trench with the white painted stripe on the connection module facing up.
9. Adjust the support and connection modules to ensure they are centered over the pre-drilled holes in the Internal Support Distribution Pipe.
10. Center the units along the trench length. The remaining units are joined by connecting the Internal Support Distribution Pipe to one another. Connections must be glued.
11. Install a termination cap on the Internal Support Distribution Pipe on the last Mantis unit at the distal (far) end of each trench line to prevent soil intrusion into the Mantis units if the system is not vented.
12. System Venting: Venting is optional, but required when the system will have more than 18" of cover material as measured from the top of the unit to finished grade. If required, at the distal (far) end of the distribution pipe install a 90° fitting. Install a section of non-perforated pipe extended above final grade. Plumb to prevent rain water and pest intrusion from entering the system by using two 90° fittings or a mushroom cap fitting.
13. Direction changes are accomplished easily and quickly by using a variety of inexpensive off shelf fittings 90°, 45°, 22.5°, T, TY, and Y fittings are readily available at most local suppliers.
14. Set distribution box to the proper elevation and connect to the Mantis Internal Support Distribution Pipe using non-perforated SDR 35 pipe.
15. Specified sand filling between and over the units may begin once the units are in the trench. Specified sand must be placed lightly and may be accomplished with a backhoe or other suitable equipment.
 - a. Starting at the top center of the Mantis units, use a minimal amount of specified sand necessary to set in place the bottom section of the support modules at their correct spacing.

- b. Using a standard 2" x 4" wood stud, tamp and compact the specified sand that is in-between the support modules. Ensure that the void area under the Support Distribution Pipe is filled with specified sand.
 - c. After the modules are set in place, cut the plastic straps holding the cardboard supports on the sides of the Mantis units.
 - d. Remove the cardboard supports from the bottom of the Mantis units by sliding them outward and along the bottom of the trench.
 - e. Remove the cardboard supports that are on top of the Mantis units. Remove any remaining plastic straps from the cardboard supports from the trench.
 - f. Additional specified sand is lightly added between the support modules and along the sides of the Mantis units to bring the specified sand fill even to the top of the support modules.
 - g. Using a standard 2" x 4" wood stud, continue to moderately tamp and compact the specified sand that is in-between the support modules. Spread additional specified sand as necessary to ensure that an additional 4" of specified sand fill is over the units to account for settling.
16. Backfilling: Complete backfill over the units followed by loam to complete a depth of 16" – 18" as measured from the top of the units. Systems with total cover that exceeds 18" as measured from the top of the units to finished grade shall be vented at the distal (far) end of the system. Backfill material shall be well graded sandy fill; clean, porous, and devoid of large rocks. Divert surface runoff with diversion ditches or berms. Finish grade to prevent surface ponding. Seed or sod excavated areas to protect against erosion. As with all systems, do not drive or pave over the absorption area.

6" Invert Sand Fill Cross Section

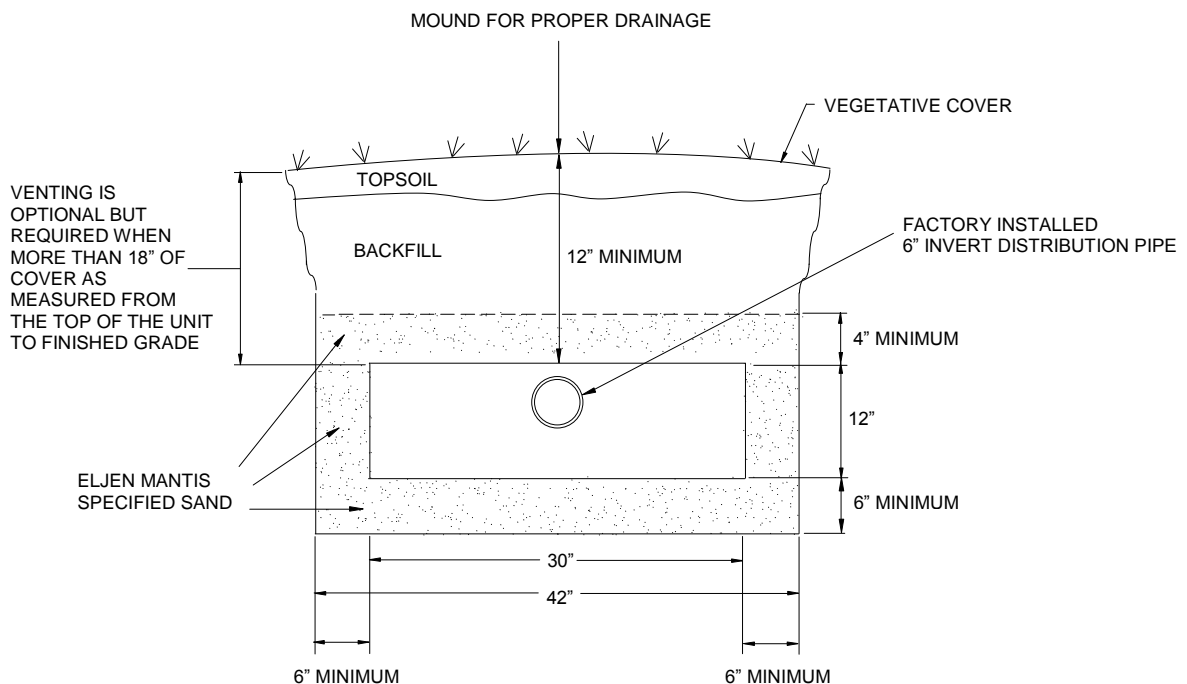


Figure 4

6" Invert Distribution Pipe Layout

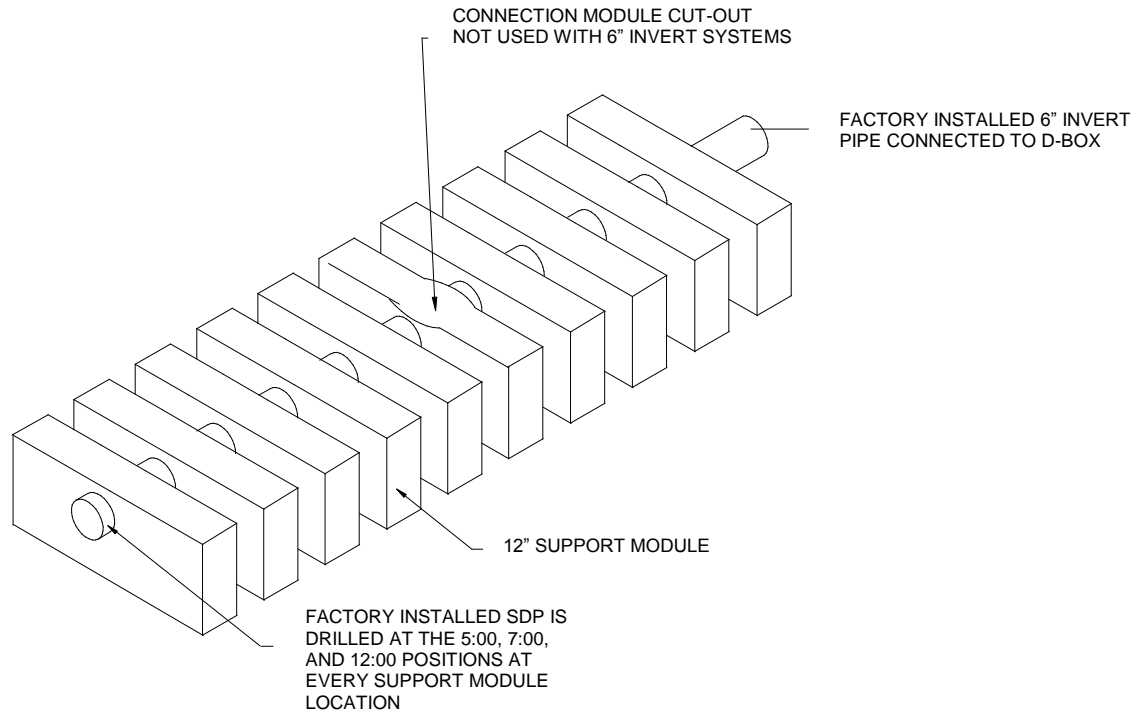


Figure 5

6" Invert Vent Detail

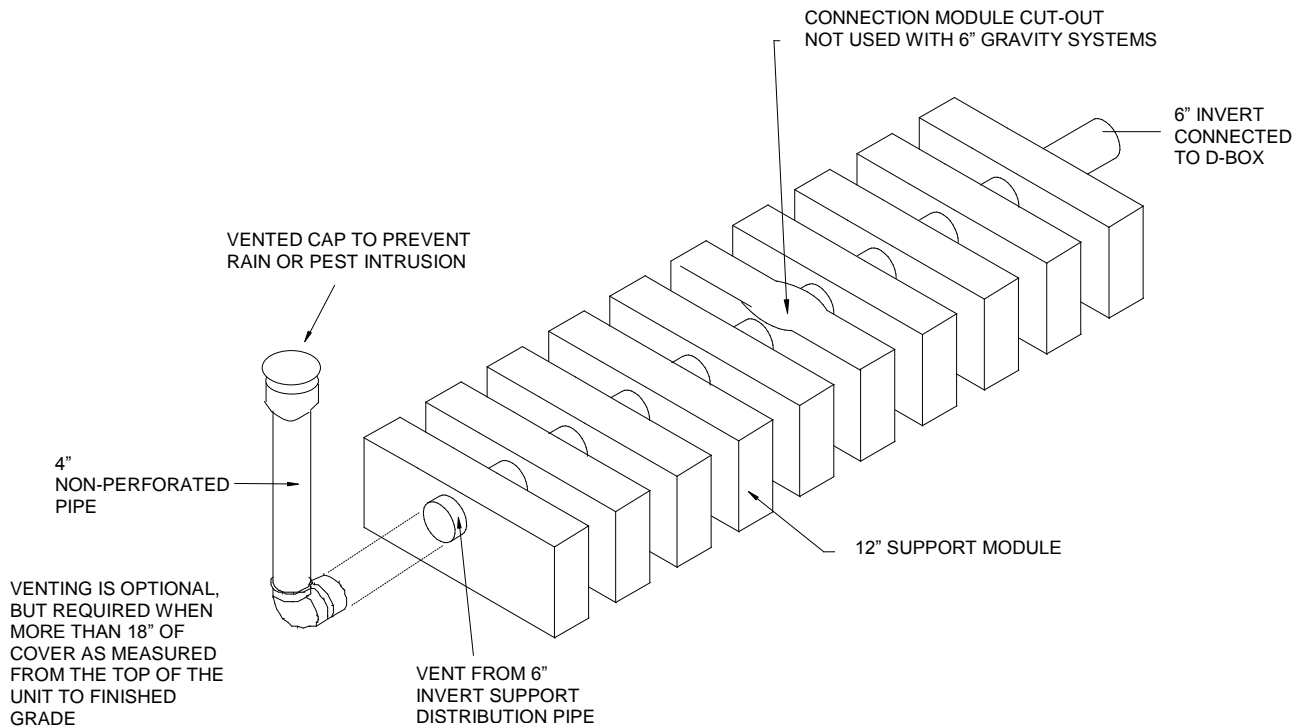


Figure 6

6" and 12" Invert Serial Distribution Installation Guidance

The MANTIS 430-10 can be utilized in serial distribution systems with either the 6" or 12" invert designs. Installation is similar to the gravity installation guidance with exception that there are multiple trenches at different elevations, and wastewater is managed between trenches via High-Level Overflow or Drop Boxes.

1. Carefully lay out the system components and boundaries defining the location and elevation for all trenches or beds, and distribution or drop boxes based on the outlet elevation of the septic tank and pipe grades required to maintain flow to each component.
2. Prepare the site according to state and local regulations. Do not install a system on frozen or saturated soils. When installing the Mantis in clayey soils, take precautions not to compact the area with heavy machinery.
3. Plan all drainage requirements above (up-slope) of the system and set soil grades to insure storm water drainage and ground water is diverted away from the absorption area once the system is complete.
4. Excavate a minimum (42") wide level trench.
5. Remove all organic soil and roots within the absorption trench or bed area.
6. Scarify receiving layers including sidewalls to eliminate soil smearing. Once scarifying is completed, avoid walking over prepared absorption area until 6" minimum of the specified sand has been placed on the bottom of the trench.
7. Along the trench bottom place, compact, and rake to a finished level of 6" minimum a layer of the specified sand as listed on the chart on Page 3 of this manual. Ask your sand supplier for a sieve analysis report to verify that the sand you are going to install meets this specification. A hand tamper is sufficient for compaction of the specified sand layer.
8. Place the Mantis units in the trench with the white painted stripe on the connection module facing up.
9. Adjust the support and connection modules to ensure they are centered over the pre-drilled holes in the Internal Support Distribution Pipe.
10. Center the units along the trench length. The remaining units are joined by connecting the Internal Support Distribution Pipe to one another. Connections must be glued.
11. Install termination caps on the Internal Support Distribution Pipe on the beginning and last Mantis units at each end of the trench line to prevent soil intrusion into the units when using the 12" invert configuration, and the distal (far) end of the trench line if the system is not vented for 6" invert configurations.
12. System Venting: Venting is optional, but required when the system will have more than 18" of cover material as measured from the top of the unit to finished grade. If required, at the distal (far) end of the distribution pipe install a 90° fitting. Install a section of non-perforated pipe extended above final grade. Plumb to prevent rain water and pest intrusion from entering the system by using two 90° fittings or a mushroom cap fitting. 12" invert systems are vented from the distribution pipe that is installed on top of the Mantis units, and 6" invert systems are venting from the factory installed Internal Support Distribution Pipe.
13. Direction changes are accomplished easily and quickly by using a variety of inexpensive off shelf fittings 90°, 45°, 22.5°, T, TY, and Y fittings are readily available at most local suppliers.
14. Place high-overflow or drop boxes at the beginning of each trench row of Mantis units to the proper elevation.
15. Specified sand filling between and over the units may begin once the units are in the trench. Specified sand must be placed lightly and may be accomplished with a backhoe or other suitable equipment.

- a. Starting at the top center of the Mantis units, use a minimal amount of specified sand necessary to set in place the bottom section of the support modules at their correct spacing.
 - b. Using a standard 2" x 4" wood stud, tamp and compact the specified sand that is in-between the support modules. Ensure that the void area under the Support Distribution Pipe is filled with specified sand.
 - c. After the modules are set in place, cut the plastic straps holding the cardboard supports on the sides of the Mantis units.
 - d. Remove the cardboard supports from the bottom of the Mantis units by sliding them outward and along the bottom of the trench.
 - e. Remove the cardboard supports that are on top of the Mantis units. Remove any remaining plastic straps from the cardboard supports from the trench.
 - f. Additional specified sand is lightly added between the support modules and along the sides of the Mantis units to bring the specified sand fill even to the top of the support modules.
 - g. Using a standard 2" x 4" wood stud, continue to moderately tamp and compact the specified sand that is in-between the support modules. Spread additional specified sand as necessary to ensure that an additional 4" of specified sand fill is over the units to account for settling.
16. Installing the distribution pipe for 6" invert applications: Refer to Figure 7 for drop box drawings.
- a. Using non-perforated SDR 35 pipe, connect the high-level overflow or drop box to the Internal Support Distribution Pipe of the Mantis unit at the beginning of the trench. Ensure that a termination cap is installed at the distal (far) end of the Internal Support Distribution Pipe if the system is not vented.
 - b. A second non-perforated pipe is plumbed to the next down slope high-level overflow or drop box.
 - c. Continue this process for the designed number of trenches.
17. Installing the distribution pipe for 12" invert applications: Refer to Figure 7 for drop box drawings.
- a. Each Mantis unit has one connection module marked with a white painted stripe. Using a sharp utility knife, cut an opening in the geotextile on the connection module in the white striped marked area in a rectangular shape (4" x 3") to allow effluent to flow from the distribution pipe into the connection module.
 - b. Glue non-perforated SDR 35 pipe to the appropriate length accounting for connection into the high-level overflow or drop box. Insert distribution pipe into the pipe opening of the high-level overflow or drop box. Center the remaining distribution pipe on top of the Mantis units.
 - c. Using the cut opening of the geotextile in the connection module as an azimuth, drill a 1" diameter hole in the distribution pipe at the 12:00 position. You will only drill one hole for each Mantis unit.
 - d. Rotate the distribution pipe so that the drilled hole will be at the 6:00 position directly over the cut opening in the geotextile of the connection module.
 - e. Secure the distribution pipe using three wire clamps per Mantis unit (one in the connection module, and one in each support module on either side of the connection module).
 - f. Place a factory provided section of geotextile fabric over the distribution pipe and connection module opening and secure in place with specified sand.
 - g. Install a termination cap or vent piping if required at the distal (far) end of the distribution pipe.

- h. A second non-perforated pipe is plumbed to the next down slope high-level overflow or drop box.
 - i. Continue this process for the designed number of trenches.
18. Backfilling: Complete backfill over the units followed by loam to complete a depth of 16" – 18" as measured from the top of the units. Systems with total cover that exceeds 18" as measured from the top of the units to finished grade shall be vented at the distal (far) end of the system. Backfill material shall be well graded sandy fill; clean, porous, and devoid of large rocks. Divert surface runoff with diversion ditches or berms. Finish grade to prevent surface ponding. Seed or sod excavated areas to protect against erosion. As with all systems, do not drive or pave over the absorption area.

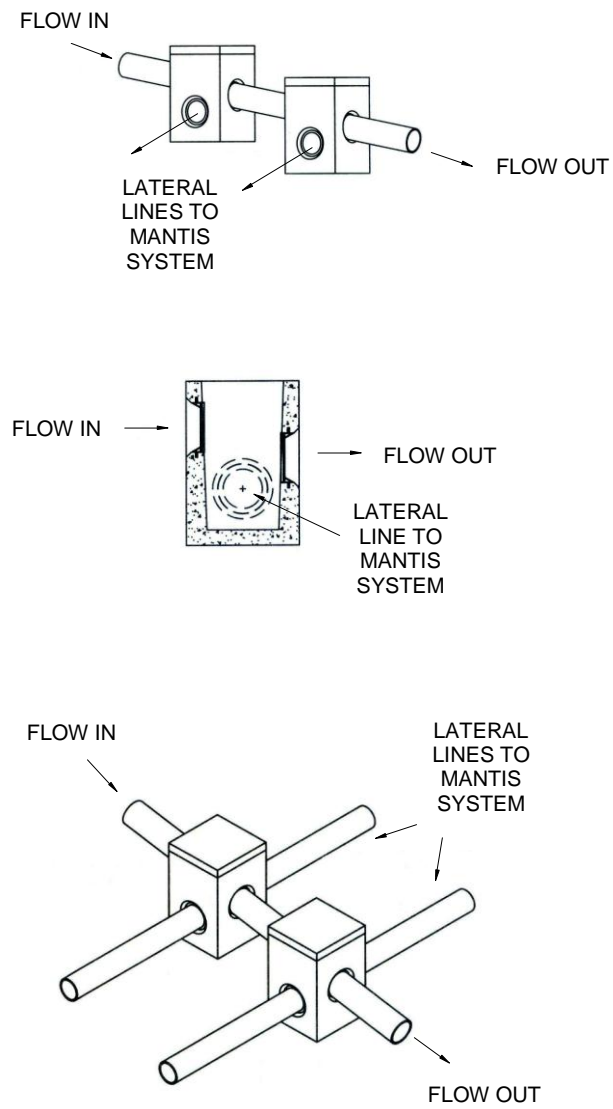


Figure 7

6" and 12" Invert Pumped System Installation Guidance

There are two ways to distribute effluent in the Mantis systems when pumped systems are required: dosing, and pressure distribution.

Dosing:

When dosing is used, pump up to an oversized distribution box with baffles or a velocity reduction tee and then gravity flow the wastewater to the Mantis system. The construction of the Mantis absorption field will be the same as the 6" or 12" Invert Gravity Installation Guidance found in this manual. Refer to the appropriate section based on the system design. The dosing method is the most cost effective, and has ease of installation. Set pump floats to deliver a maximum of 9 gallons per Mantis 430-10 unit per dosing cycle with 12" invert installations, and 4.5 gallons per Mantis 430-10 unit per dosing cycle with 6" invert installations.

Pressure Distribution:

The second method of distributing effluent in pump systems is via pressure distribution. Pressure distribution utilizes low pressure pipe and specific orifice opening sizes based on a number of criteria. These systems are designed by professional engineers and are usually designed as part of a wastewater management program and require annual maintenance to be performed on the low pressure pipe network. System designers should contact Eljen's Technical Resource Department at 1-800-444-1359 for guidance when designing these types of systems.

Venting of Pumped Systems:

If a pumped system is specified and there is more than 18" of cover material as measured from the top of the Mantis units to finished grade, an additional 2" air line must be extended from the Mantis system distribution box back to the riser or knock out on the septic tank or the pump tank as shown in Figure 8. The vent on the distal (far) end of the Mantis system will be constructed the same as for either 6" or 12" invert gravity systems. This will maintain the continuity of air flow from the Mantis units back into the house plumbing.

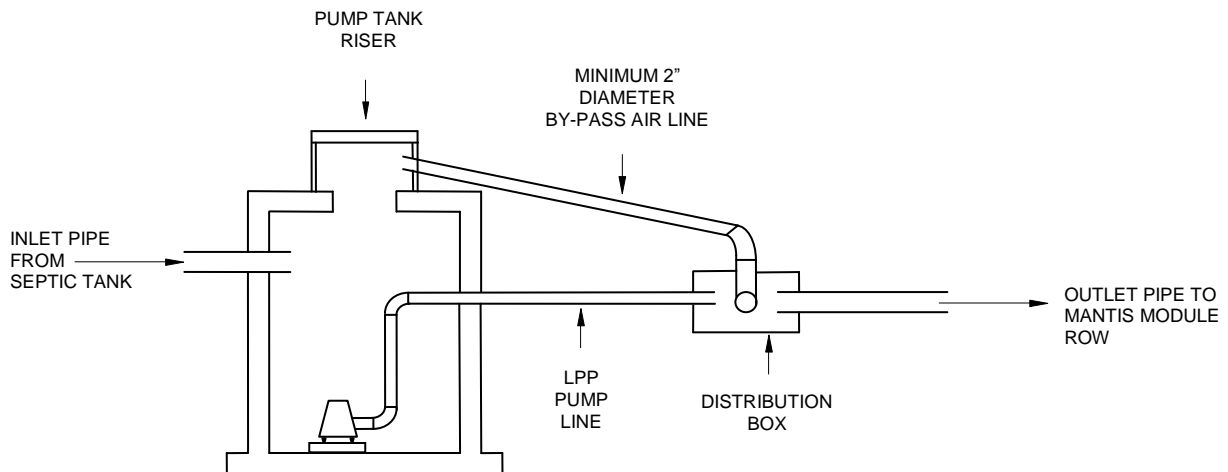


Figure 8

Shipping Configuration

Cardboard Corners and Straps are Removed During Specified Sand Placement

Cardboard edges protect and stabilize the unit during shipment and must be removed during placement of the specified sand as outlined in the Installation Guidance sections contained in this manual.

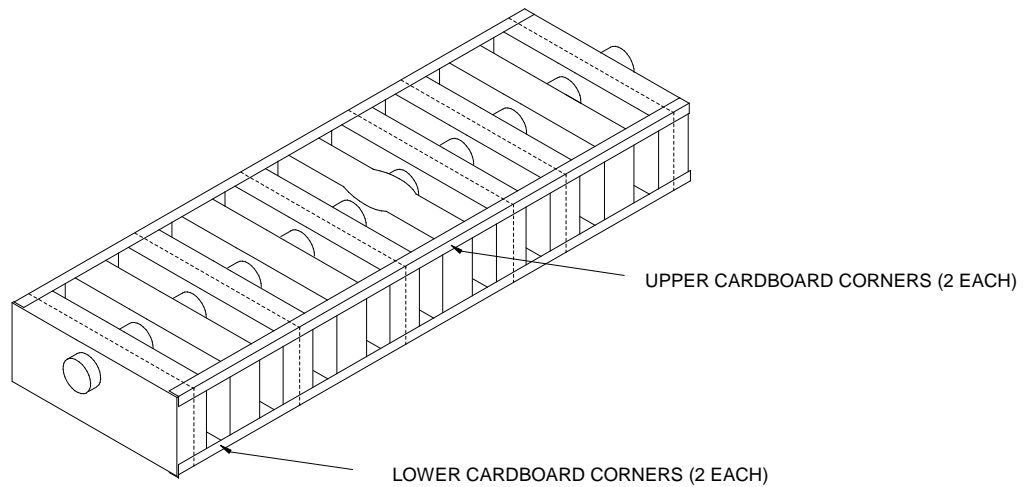


Figure 9

Required Notes on Design Plans

- This system is not designed for backwash from a water softener.
- The Mantis system is not for use under vehicular traffic or for under paving applications.
- Organic loam layer must be removed from trench and slope extension areas prior to select fill or specified sand placement.
- Scarify subsoil prior to select fill or specified sand placement.
- All Mantis installations utilize a specified sand envelope around the Mantis units: 6" minimum underneath, 6" minimum on the sides, 4" minimum on top, and between the Support Modules of the Mantis units. The Mantis specified sand specification is listed below:

Eljen Mantis Specified Sand Requirements		
Sieve Size	Sieve Square Opening Size	Specification Percent Passing Wet Sieve
0.375"	9.5 mm	100.0
#4	4.75 mm	95.0 – 100.0
#8	2.36 mm	80.0 – 100.0
#16	1.18 mm	50.0 – 85.0
#30	600 µm	25.0 – 60.0
#50	300 µm	5.0 – 30.0
#100	150 µm	< 10.0
#200	75 µm	< 5.0
Request a sieve analysis from your material supplier to ensure that the system sand meets the specification requirements listed above.		

- 12" invert installations require the use of 4" SDR35 pipe or greater for the top distribution pipe.
- Pumped systems shall have an oversized distribution box utilizing a velocity reduction tee or baffle.
- Eljen mandates venting for the Mantis 430-10 when the system will have more than 18" of cover material as measured from the top of the unit to finished grade.
- After backfill, there should be a minimum of 12" of material as measured from the top of the distribution pipe to the finished grade.
- For pumped systems, set pump floats to deliver a maximum of 9 gallons per Mantis 430-10 unit per dosing cycle with 12" invert installations, and 4.5 gallons per Mantis 430-10 unit per dosing cycle with 6" invert installations.
- Non-residential buildings and residential institutions shall be designed using daily design flow unless specific water use data is available for the facility. Design flow based on metered flows must use a minimum 1.5 safety factor applied to all metered average daily water use. See Connecticut Public Health Code, Tables 4, 7 and 8.

MANTIS 430-10 Simplified Sizing Chart 6" Invert Gravity and Pressure Dosed Systems

Effective Leaching Credit = 6.5 Square Feet / Linear Foot

Multiple trench configurations will utilize 9' center to center spacing between Mantis rows.

Percolation Rate	2 Bedrooms		3 Bedrooms		4 Bedrooms		Each Bedroom Above Four			
	Trench Length	Units*	Trench Length	Units*	Trench Length	Units*	Single Family		Multi-Family	
Less Than 10.1	58	12	81	16	106	21	15	3	30	6
10.1 – 20.0	77	16	106	21	141	28	20	4	35	7
20.1 – 30.0	87	18	121	24	156	31	20	4	40	8
30.1 – 45.0	104	21	141	28	186	37	25	5	50	10
45.0 – 60.0	115	23	156	31	206	41	30	6	55	11
Greater Than 60.0	UNSUITABLE FOR LEACHING SYSTEMS									

- * Partial units are rounded up to the next highest number.
- Sizing charts do not reflect MLSS requirements.

Table 1

MANTIS 430-10 Simplified Sizing Chart 12” Invert Gravity and Pressure Dosed Systems

Effective Leaching Area = 11.0 Square Feet / Linear Foot

Multiple trench configurations will utilize 12’ center to center spacing between Mantis rows.

Percolation Rate	2 Bedrooms		3 Bedrooms		4 Bedrooms		Each Bedroom Above Four			
	Trench Length	Units*	Trench Length	Units*	Trench Length	Units*	Single Family		Multi-Family	
							Trench Length	Units*	Trench Length	Units*
Less Than 10.1	34	7	46	9	61	12	10	2	15	3
10.1 – 20.0	45	9	66	13	86	17	15	3	25	5
20.1 – 30.0	51	11	71	14	96	19	15	3	25	5
30.1 – 45.0	61	13	86	17	111	22	15	3	30	6
45.0 – 60.0	68	14	91	18	121	24	15	3	30	6
Greater Than 60.0	UNSUITABLE FOR LEACHING SYSTEMS									

* Partial units are rounded up to the next highest number.

- Sizing charts do not reflect MLSS requirements.

Table 2



Mantis Installation Checklist

Date: _____

Installation Address

Address: _____

City: _____

State: _____ Zip Code: _____

Contractor Information

Contractor Name: _____

Company Name: _____

Address: _____

City, State, Zip code: _____

Email: _____

Phone #: _____ Fax#: _____

Dwelling Information

Number of Bedrooms: 1 2 3 4 5 6 7 8 9 10

Number of Occupants: Adults _____ Children _____

Is Dwelling Occupied year round: No Yes

Water Supply to Dwelling: Well Municipal

Septic Tank Size: _____ Gallons Number of Compartments: 1 2 3

Pump Chamber Size: _____ Gallons

Soil Percolation Rate: _____ MPI

Number of Mantis 430-10 Units: _____

Number of Garbage Disposals: 0 1 2 3 4 5

Number of Sewage Grinder Pumps: 0 1 2

Sump Pump: No Yes Discharged To: Septic Tank Dry Well Surface

Water T/S: No Yes Discharged To: Septic Tank Dry Well Surface

Swimming Pool: No Yes Above Ground In-Ground

Is Swimming Pool Up Slope of Mantis System: No Yes

Mantis Installation Checklist

Mantis Specified Sand Supplier: _____ Location: _____

Copy of Mantis Specified Sand Sieve Report: No Yes

System Invert Height: 6" 12"

Distribution: Gravity Pump Floats Set to Deliver _____ Gallons / Unit / DC

Installation: Regular Trench Fill Package Depth: _____" Width: _____"

Scarification of Excavation

6" Minimum of Mantis Specified Sand Underneath Mantis Units

6" Minimum of Mantis Specified Sand on Each Side of Mantis Units

Mantis Specified Sand Placed Between Support Modules and Under Internal Pipe

4" Minimum of Mantis Specified Sand on Top of Mantis Units

Cardboard Corners Removed from Mantis Units

Opening Cut in Geotextile on Each Connection Module

SDR 35 Pipe Installed for 12" Invert Applications

1" Diameter Hole Drilled in SDR35 Pipe over Each Connection Module and Oriented at the 6 O'Clock Position

3 Wire Clamps Installed on each Mantis Unit

Geotextile Cover Fabric Installed on each Mantis Unit

Termination Caps Installed on Support Distribution Pipe

Distribution Box Installed: No Yes

Vents Installed: No Yes

Final Grade to Prevent Stormwater Intrusion

System Layout Drawing