# Mantis® DW SERIES

Wastewater Systems

# System Design & Installation Manual

eljen CORPORATION

*Innovative Environmental Products & Solutions Since 1970*

**February 2016**

**www.eljen.com**

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## Glossary of Terms

**Mantis Double-Wide Series**

The Eljen Mantis Double-Wide Series is a wastewater dispersal and disposal technology that applies clarified effluent to the native soil through a proprietary filtering process. The Mantis Double-Wide Series protects the native soil's long term acceptance rate by keeping the biological growth off the native soils and within the Mantis units. The Mantis Double-Wide utilizes *3-D Mini-Trenches*™ to improve effluent quality resulting in greater performance, reliability and ease of operation

**Mantis 100**

The Mantis 100 unit comes preassembled and is 5 feet in length (as measured from the Support Distribution Pipe) x 72" wide x 18" high. The system is installed in a minimum 84" wide trench with a Specified Sand envelope around the Mantis units**.**

**Mantis 58**

The Mantis 58 unit comes preassembled and is 5 feet in length (as measured from the Support Distribution Pipe) x 72" wide x 12" high. The system is installed in a minimum 84" wide trench with a Specified Sand envelope around the Mantis units.

**Filter Support Module**

There are 8 Filter Support Modules (FSM) for each Mantis Double-Wide unit. The Mantis 100 FSMs are 18" high while the 58 utilizes 12" high FSMs. The Support Distribution Pipe feeds the FSM which provides surface area for treatment and filtration of wastewater. All surfaces of the Filter Support Modules allow absorption into the surrounding specified sand.

**Support Distribution Pipe**

The Mantis Double-Wide Series Support Distribution Pipe (SDP) is 5 feet in length and constructed from crush resistant PVC Pipe. The pipe provides 3 pre-drilled 1 inch holes within each Filter Support Module at the 12, 4 and 8 o'clock position. The SDP provides module support and internal distribution for the FSMs. It can also be used as a venting conduit or house the LPP if pressure distribution is required. Each support distribution pipe is made of 3000 Triplewall HDPE 4" Pipe (ASTM F810) and fitted with a SDR-35 bell end.

**Design Flow**

Leaching system design flows for residential buildings are based on a design flow of 150 gallons per day (GPD) per bedroom, except for additional bedrooms beyond 4 in a single-family home which are based on a design flow of 75 GPD per bedroom.

Leaching system design flows for residential, nonresidential buildings, and residential institutions can be found in the CTDPH *Technical Standards for Subsurface Sewage Disposal Systems.*

Design flows based on metered use must use a minimum 1.5 safety factor applied to all metered average daily water use. Please see the CTDPH *Technical Standards for Subsurface Sewage Disposal Systems* for more information.

**Minimum Leaching System Spread (MLSS)**

All subsurface sewage disposal systems, when applicable, shall provide a leaching system spread that equals or surpasses the Minimum Leaching System Spread (MLSS).

MLSS is not applicable on sites that have a receiving soil depth exceeding 60", reserve areas, or on sites where a professional engineer has satisfactorily demonstrated through a hydraulic analysis or loading test that the receiving soil can disperse the building permitted flow without overflow or break out.

It is important to note that repair or upgrade systems (regardless of manufacturer) that are unable to meet full compliance of the MLSS requirement may be required to meet some portion of the MLSS. Best engineering practices recommends maximizing system length whenever possible. Please refer to the most current version of the CTDPH Technical Standards for Subsurface Sewage Disposal Systems, your local health department, or Eljen Corporations Technical Resources Department (800) 444-1359 for more information.

**Specified Sand**

The Specified Sand envelope around the Mantis Double-Wide Series units (6" minimum underneath – 6" minimum on the sides – 1" minimum on the top – 4" in-between the Filter Support Modules) shall meet the requirements as indicated in the Eljen Mantis Series Specified Sand Requirements chart 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 for use in the Specified Sand envelope around the Mantis Double-Wide Series units.

Some material suppliers are manufacturing their Connecticut Select Fill so that it will also meet the requirements of the Eljen Mantis Series Specified Sand requirements. In such cases, Connecticut Select Fill material can be used for the fill package (when required) and the sand envelope around the Mantis units as described above. Always ask your material supplier for a sieve analysis to verify that your material meets the required specifications.

*Note: All horizontal and vertical separation distances are measured from the Mantis Series unit and not the Specified Sand. If a fill package is required, the 6 inches of Mantis Series Specified Sand can be included in the overall minimum fill package dimensions.*

*Note: The Specified Sand does not need to be percolation tested if a Mantis system is being installed in native material with no requirement for the use of additional fill or fill package.*

*If a system is installed in CT Select Fill or in a fill package, only the select fill needs to be percolation tested not both the select fill and Mantis Series Specified Sand unless Mantis Double-Wide Series Specified Sand is used for fill or as the entire fill package.*

**TABLE: 1**
Eljen Mantis Series
Specified Sand Requirements

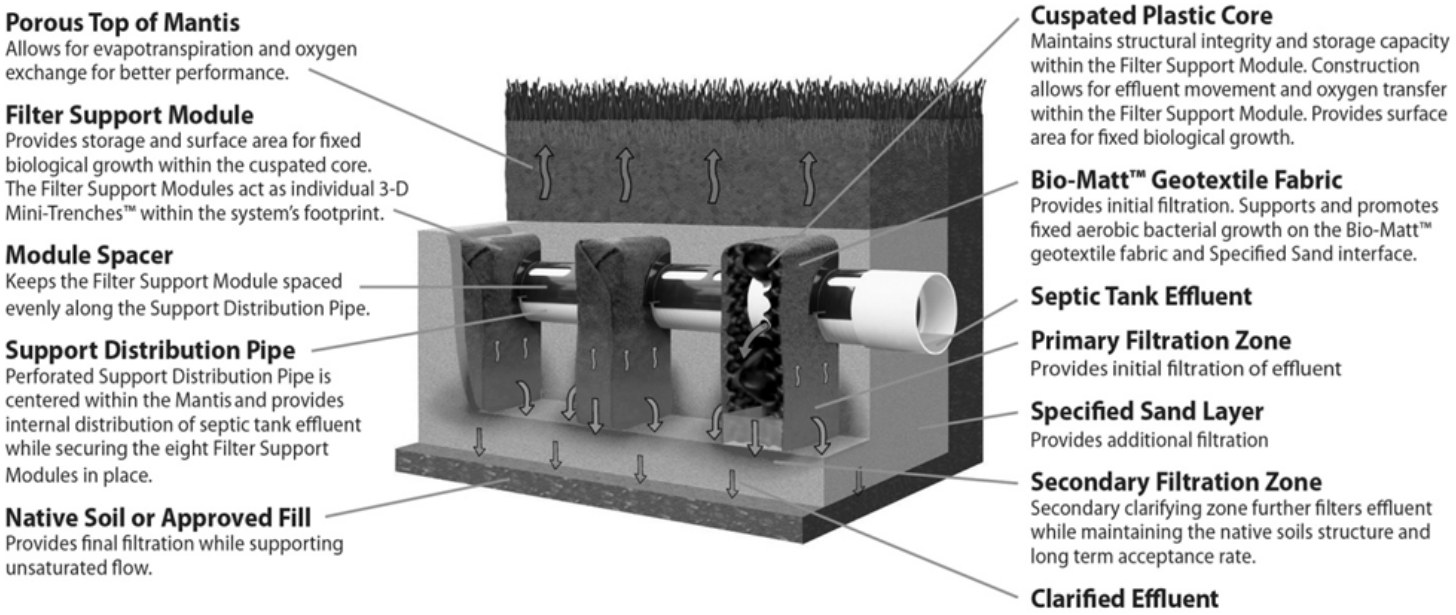
| Sieve Size | Sieve Square Opening Size (mm) | Specification Percent Passing (Wet Sieve) |
|---|---|---|
| 0.375" | 9.5 mm | 100.0 |
| #4 | 4.75 mm | 95.0 – 100.0 |
| #8 | 2.36 mm | 80.0 – 100.0 |
| #16 | 1.18 mm | 50.0 – 85.0 |
| #30 | 600 µm | 25.0 – 60.0 |
| #50 | 300 µm | 5.0 – 30.0 |
| #100 | 150 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. | | |

### How the Mantis Series System Works

The Eljen Mantis Series is a wastewater dispersal and disposal technology that applies clarified effluent to the native soil through a proprietary filtering process. The Mantis Series protects the native soils long term acceptance rate by keeping the biological growth off the native soils and within the Mantis units. The Mantis Series utilizes *3-D Mini-Trenches*™ to improve effluent quality resulting in greater performance, reliability, and ease of operation.

- The perforated Support Distribution Pipe is centered within the Mantis Series and provides internal distribution of septic tank effluent while securing the eight Filter Support Modules.
- The Filter Support Modules filter septic tank effluent and act as individual *3-D Mini-Trenches*™ within the systems footprint. Each module consists of a cuspated core surrounded by *Bio-Matt*™ geotextile fabric. The Mantis Series unique design increases the available surface area within each module. This is known as *Infiltrative Surface Optimization (ISO)* and provides a system surface area that greatly exceeds that of the Filter Support Module, a traditional gravel trench or that of gravel replacement technology.
- Open air channels within the Filter Support Modules support and promote fixed aerobic bacterial growth on the *Bio-Matt*™ geotextile fabric interface.
- Septic tank effluent migrates through the Filter Support Modules and into the Specified Sand layer which surrounds each Mantis Series unit. The Filter Support Module clarifies septic tank effluent and assists in its delivery to the Specified Sand. This process promotes unsaturated flow in the Specified Sand and native soils while maintaining the native soils structure, long term acceptance rate and its ability to effectively absorb the clarified effluent.
- The Specified Sand layer also protects the native soil from compaction, helps maintain existing pore spaces within the native soil column and preserves the native soil's natural infiltration capacity which is critical for long-term performance.

**FIGURE 1: MANTIS SERIES COMPONENTS**



# 1.0 Mantis Double-Wide Series General System Information

**1.1 Residential System Size & Number of Units:** System size will vary depending on the design flow (bedrooms) and percolation rate for the system. Tables 2 & 3 indicate the minimum number of Mantis Double-Wide Series units required for various soil percolation rates and design flows (bedrooms).

**1.2 Support Distribution Pipe:** No additional distribution pipe is needed to connect the units. The Support Distribution Pipe (SDP) runs through the center of the units and provides distribution for all configurations. The SDP is pre-drilled at the factory with 1-inch diameter holes at the 4, 8, & 12 o'clock positions within each Filter Support Module. These internal holes insure positive effluent transfer and venting to all modules in the system. 4-inch couplings are supplied for the SDP and come preinstalled. The installing contractor must supply termination caps for the invert pipe(s) and/or materials for system venting when required. Unlike previous Mantis models, distribution pipes are not permitted for use on top of the Mantis Double-Wide Series.

**1.3 Restaurants, Nonresidential Building & Residential Institutions with or without Problematic Sewage:** These systems require different sizing and design criteria as compared to residential systems. Please refer to the *CTDPH Technical Standards for Subsurface Sewage Disposal Systems* or call Eljen's Technical Resource Department at 1-800-444-1359 for more information on these types of systems.

**1.4 Depth to Ground Water or Ledge Rock:** As required by State regulations; a minimum separation distance of 18" is required to seasonal high water table or ground water and a minimum separation of 4 feet to ledge rock. If the design percolation rate is faster than 1.0 minute per inch the minimum separation to maximum groundwater shall be increased to 24 inches, and the minimum separation above ledge rock shall be increased to 8 feet or the distances shall be doubled from any water supply well in accordance with the special provisions in Table 1 (Item A) of the 2015 Technical Standards. Large (2,000 GPD or greater) leaching systems, and leaching systems in coastal areas on sites that have a groundwater table that is tidally impacted, shall provide a minimum of 24 inch separation above maximum groundwater.

*Note: All horizontal and vertical separation distances are measured from the Mantis Double-Wide Series unit and not the Specified Sand.*

**1.5 Trench Row Spacing:** The minimum separation distance (center to center) between any two trenches for the Mantis Double-Wide shall be 14 feet (8 feet edge to edge).

**1.6 Septic Tanks:** Eljen Corporation recommends the use of dual compartment tanks but is not required.

Single compartment septic tanks can be used as long as an appropriately sized effluent filter is installed. Repair systems with existing single compartment tanks must be structurally sound and in good working order. It is important to note that effluent filters installed within a single compartment septic tank may need more frequent maintenance.

**1.7 Septic Tank Effluent Filters:** Eljen Corporation requires the use of an appropriate sized septic tank effluent filter for all Mantis systems.

**1.8 Specified Sand Requirements:** The first 6" of Specified Sand immediately under, between Filter Support Modules, and around the perimeter of the Mantis Double-Wide Series system must meet the Eljen Mantis Series Specified Sand requirement. Please refer to the Specified Sand requirements (Table 1 on Page 4) for specific information or contact Eljen Corporations Technical Services Department at 1-800-444-1359.

Specified Sand should be placed in lifts and stabilized until a minimum of 1 inch of Specified Sand cover is achieved over the units. Please refer to Section 3.0 Mantis Double-Wide Series Trench Installation Guidance on page 10 for more information.

# 1.0 Mantis Double-Wide Series General System Information

**1.9 Systems Located in Fill Packages:** If a Mantis Double-Wide Series system is required to be installed in a fill package, the 6" below and to either side of the Mantis Double-Wide Series unit, as well as in between the individual modules, must be Specified Sand (see the Table 1 on Page 4). The remaining material can be Mantis Series Specified Sand or meet the minimum requirements of CTDPH Select Fill.

Leaching systems that are to be elevated in select fill require additional percolation tests after select fill placement to confirm the percolation rate of the select fill is not slower than the design rate.

Whenever a leaching system is elevated entirely in a select fill package, the system can be sized based on the percolation rate of the select fill. However, percolation tests of the select fill are required after fill placement to confirm fill suitability and consistency with the design.

*Note: If a fill package is required, it is important to note that the 6" of Mantis Double-Wide Series Specified Sand can be included in the overall minimum fill package dimensions*

**1.10 Overall System Length Measurement:** System row length is measured from the end of the Support Distribution Pipe to the end of the Support Distribution Pipe. Measuring the length of the system from fabric face to fabric face is no longer required.

**1.11 Pump & Pressure Distribution Systems:** Eljen requires the use of an oversized distribution box with baffles or a velocity reduction tee when pump dosing to a Mantis Double-Wide Series system. Set pump floats or control panels to deliver a maximum of 30 gallons per Mantis 100 unit or 18 gallons per Mantis 58 unit per dosing cycle for both pump and pressure distribution systems.

If a pump dose system is specified with more than 18" of cover as measured from the top of the unit to finished grade, an additional 2" airline must be extended from the Mantis systems distribution box back to the riser on the septic tank or the pump tank as shown in Figure 8.

If a pressure system is specified with more than 18" of cover as measured from the top of the unit to finished grade, please contact Eljen Corporations Technical Services Department at 800-444-1359 for more information.

**1.12 Vehicular Traffic and Paved Areas over Mantis Systems:** All vehicular traffic, post construction, is prohibited over the Mantis system. Do not install Mantis systems under driveways and parking areas. This is due to the compaction of material required to support traffic loading. Compaction greatly diminishes absorption below the system and reduces the void space that naturally exists in soils for oxygen transfer and water migration.

During construction, passage over the system should be kept to a minimum and only done with low pressure tracked vehicles. For shallow installations, light-weight track machines are best for setting the final grade. It is also permissible to back-blade the soil to set final minimum cover.

**1.13 System Venting:** Eljen mandates venting when the system has greater than 18" of cover material, as measured from the top of the unit, to finished grade. This will ensure proper aeration of the units with deep installs.

Vents are installed at the distal end of the system and are usually constructed of 4 inch PVC pipe. The vent can be run to an inconspicuous location for the benefit of the homeowner. Vents must be protected from rainwater intrusion. This can be accomplished by using two 90 degree fittings ("candy cane") or other acceptable means. Activated Granular Charcoal (or Carbon) Filters can be installed to address any odor concerns or issues and will protect the vent from rainwater intrusion.

If desired, vent lines can be tied together so only one vent is brought to the surface. Vent line elevations must be set so vents do not collect and distribute effluent inadvertently.

If a pump dose system is specified with more than 18" of cover as measured from the top of the unit to finished grade, an additional 2" airline must be extended from the Mantis systems distribution box back to the riser on the septic tank or the pump tank as shown in Figure 8.

If a pressure system is specified with more than 18" of cover as measured from the top of the unit to finished grade, please contact Eljen Corporations Technical Services Department at 800-444-1359 for more information.

# 1.0 Mantis Double-Wide Series General System Information

**1.14 Backfill and Finish Grading:** Complete backfill over the Mantis Double-Wide Series units followed by topsoil to a depth of 6" – 18" as measured from the top of the units. 1" of the backfill material is Specified Sand placed on top of the unit. 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.

**1.15 Garbage Disposals:** The use of a garbage disposal is not recommended as they can cause septic system problems by generating an increased amount of suspended solids, grease and nutrients.

When a domestic garbage grinder is proposed or installed, a dual compartment septic tank must be used and the minimum liquid capacity of the septic tank must be increased by 250 gallons. Design drawings shall include a note "Garbage disposals shall not be used with this system" if these modifications have not been made.

*NOTE: Eljen recommends the use of septic tank outlet effluent filters on all systems, especially on those systems that a garbage disposal is installed, even if the tanks design capacity has been increased. Effluent filters with higher filtration are recommended for systems with garbage disposals.*

**1.16 Large 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.

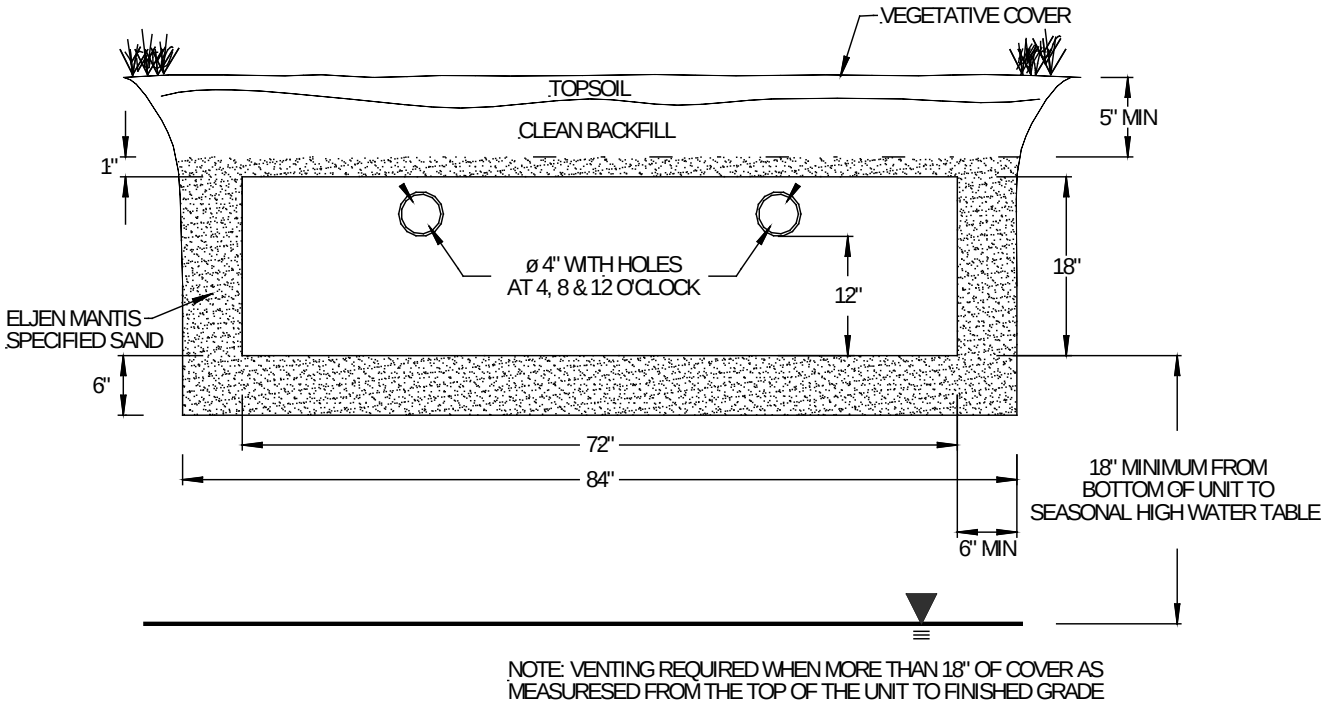
**1.17 Additional Factors Effecting Residential System Size**: Homes with expected higher than normal water usage should consider increasing the number of Mantis Double-Wide Series units and septic tank volume.

**1.18 Water Softeners and Conditioners:** The Connecticut Public Health Code prohibits the discharge of wastewater from a water treatment system to a subsurface sewage disposal system 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.

**1.19 Mantis Installation Check List:** An installation checklist is included at the end of this manual and may be used by septic inspectors or contractors as supporting documentation for their client files.

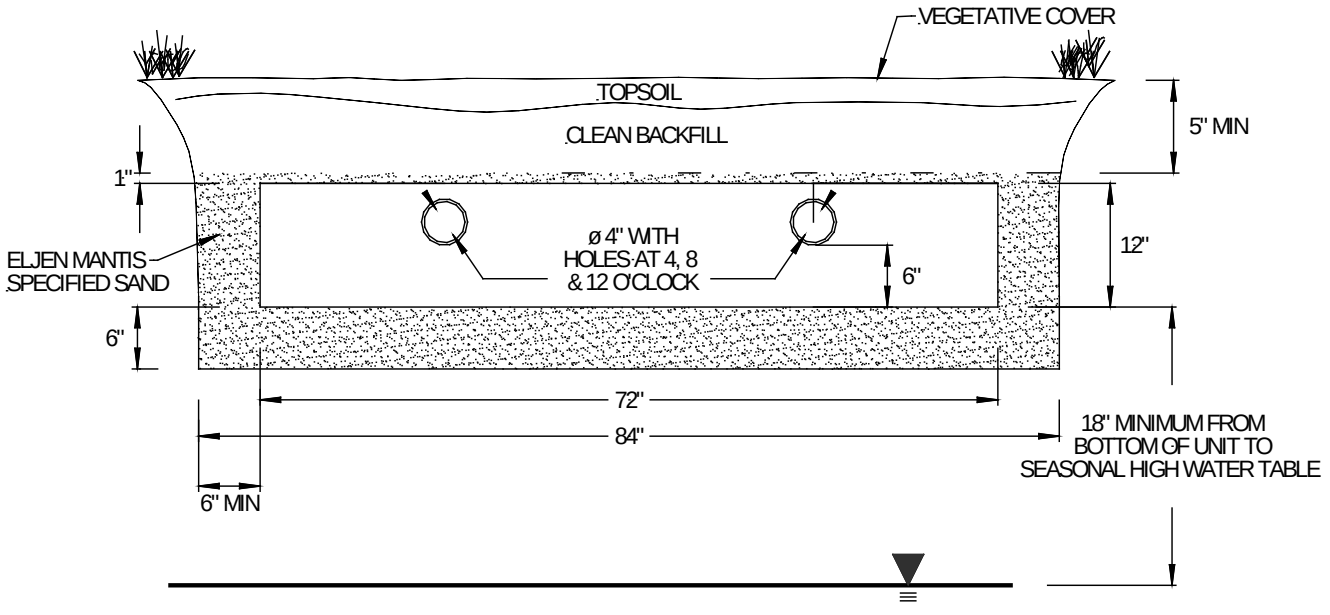
**1.20 Outbuildings:** Outbuilding means an ancillary structure served by a water supply and sewage system that is located on a lot with an associated primary residential building, which cannot be split off and sold separately from the primary building. Outbuildings include, but are not limited to plumbed (water & sewage system plumbing) detached garages, workshops, barns, pool houses, game rooms, guest houses, and in-law apartments. Reserve areas are not required for outbuildings with design flows of 150 gpd. One bedroom outbuildings on single-family residential building lots shall have a required ELA area equal to 50 percent of that required for a 2-bedroom residential building (noted as 1-bedroom in Table 2 and 3).

**FIGURE 2: MANTIS 100 CROSS SECTION**




NOTE: VENTING REQUIRED WHEN MORE THAN 18" OF COVER AS MEASURESED FROM THE TOP OF THE UNIT TO FINISHED GRADE

**FIGURE 3: MANTIS 58 CROSS SECTION**




NOTE: VENTING REQUIRED WHEN MORE THAN 18" OF COVER AS MEASURESED FROM THE TOP OF THE UNIT TO FINISHED GRADE

## 3.0 Mantis Double-Wide Series Trench Installation Guidance

1. Carefully lay out all boundaries defining the location and elevation for all system components.

2. Prepare the site according to state and local regulations. Do not install a system on frozen or saturated soils. Take precautions not to compact or smear the system area with machinery. If smearing occurs, rake out smeared areas.

3. Plan all drainage requirements above (up-slope) the system and set soil grades to insure storm water drainage and surface water is diverted away from the absorption area once the system is complete.

4. Excavate a minimum eighty-four inch (84") wide level trench and remove all organic soil and roots within the absorption trench area.

5. Scarify receiving layers including sidewalls to eliminate soil smearing. Once scarifying is completed, avoid walking over the prepared absorption area until a 6" minimum of the Specified Sand has been placed on the bottom of the trench.

6. Place, stabilize and rake a minimum 6" finished level layer of Mantis Double-Wide Series Specified Sand along the trench bottom. The Specified Sand must meet the minimum requirements listed in Table 1 of this Manual. Ask your material supplier for a sieve analysis report to verify that the sand you are going to install meets this specification. A hand tamper or a vibratory plate compactor is sufficient for stabilization of the Specified Sand layer.

7. Place and center the Mantis Double-Wide Series units in the trench with the fabric side up.

8. Connect units by inserting the Support Distribution Pipes of one unit into another. Direction changes can be made by using a variety of standard pipe fittings. Ensure there is a 4" space (minimum) between Filter Support Modules where the direction change occurs. All pipe connections must be primed and glued. Adjust the modules to ensure they are spaced evenly and have not shifted during placement.

9. Install termination caps, vent piping, and/or a cross-over connection at the distal end (far end) of the Support Distribution Pipe on each trench line to prevent soil intrusion into the Mantis units.

10. Steps for placement of Mantis Double-Wide Series Specified Sand.

    a. Starting at the top center of the Mantis Double-Wide Series units, use a minimal amount of Specified Sand necessary to set in place the bottom section of the Filter Support Modules at their correct spacing. The Specified Sand must be placed lightly and stabilized in between each Filter Support Module. Placement of Specified Sand can be done by hand, backhoe or excavator. ***DO NOT*** dump full bucket loads of Specified Sand directly on the units.

    b. Using a standard 2" x 4" wood stud or equivalent, tamp and stabilize the Specified Sand that is in between the Filter Support Modules. Ensure that the void area under the Support Distribution Pipe is filled and stabilized with Specified Sand.

    c. After the Mantis Double-Wide Series units are set in place, cut the plastic straps holding the cardboard supports on the sides of the units.

    d. Remove the cardboard corner supports on top of the Mantis Double-Wide Series units.

    e. Remove the cardboard corner supports from the bottom of the Mantis Double-Wide Series units by sliding them outward and along the bottom of the trench. Remove any remaining plastic straps from the cardboard supports from the trench.

    f. Additional Specified Sand is lightly added in lifts and stabilized in between the Filter Support Modules and along the sides of the Mantis Double-Wide Series units until the sand fill is 1-inch above the Filter Support Modules.

    g. Using a standard 2" x 4" wood stud or equivalent, continue to moderately tamp and stabilize the sand that is in between the Filter Support Modules. Spread additional Specified Sand as necessary.

11. Set distribution box to the proper elevation.

12. Make the connection to the beginning of the first Mantis row from the distribution box with SDR-35 pipe.

13. If venting is desired or required, install a 90° fitting at the distal (far) end of the SDP. Install a section of non-perforated pipe extended above final grade. *Note: Vent lines can be tied together so only one vent is brought to the surface Vent line elevations must be set so vents do not collect and distribute effluent inadvertently.*

    Plumb to prevent rain water and pest intrusion from entering the system by using two 90° fittings ("candy cane"), a mushroom cap fitting or any approved equivalent.

14. Prior to backfilling the system, provide 1 additional inch of the Specified Sand fill over the top of the units to account for sand settling.

15. Complete backfill over the units followed by topsoil to a minimum depth of 6" as measured from the top of the units to grade. 1" the backfill is Specified Sand immediately on top of the unit. 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 4: MANTIS DOUBLE-WIDE SERIES MULTIPLE TRENCH CROSS SECTION**

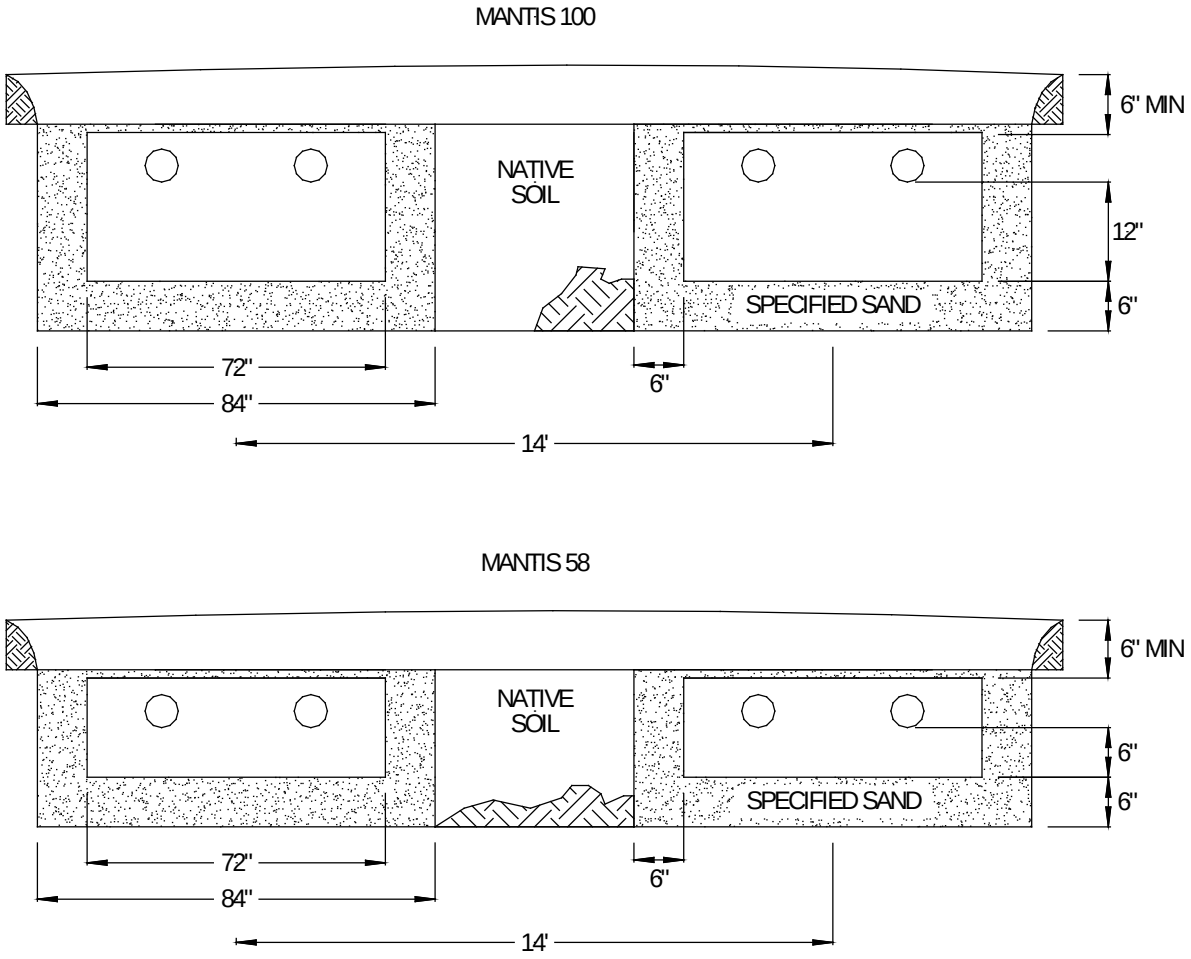
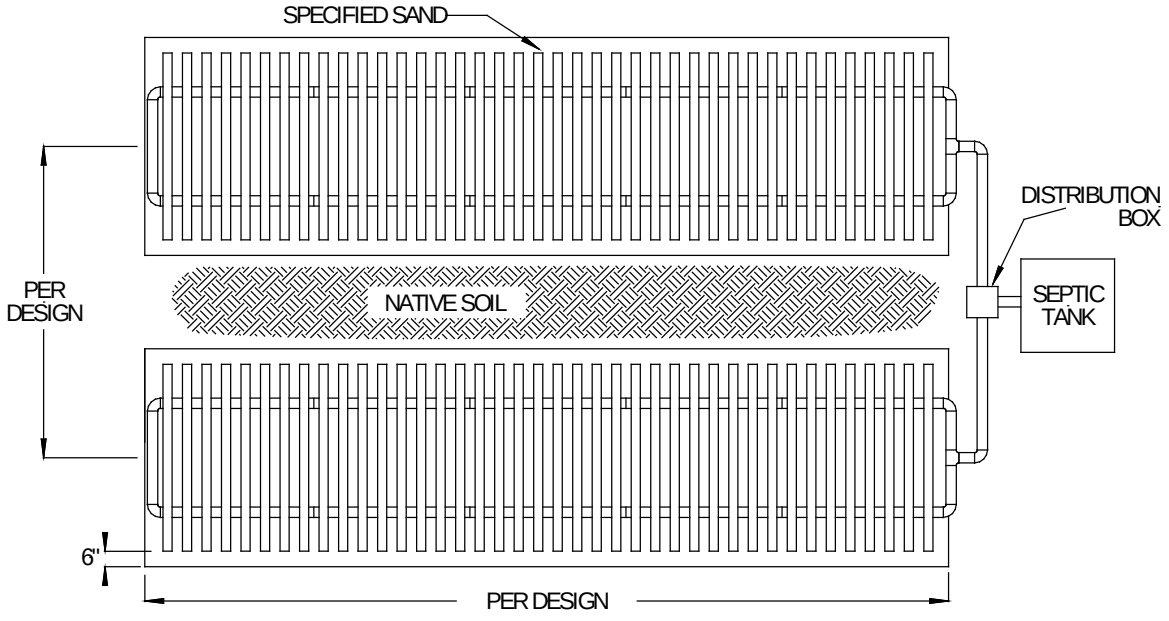



**FIGURE 5: MANTIS DOUBLE-WIDE SERIES MULTIPLE TRENCH PLAN VIEW**



# 4.0 Pumped & Pressure System Guidance

**4.1 Pump Dosed Distribution Box:** Eljen requires the use of an oversized distribution box with baffles or a velocity reduction tee when pump dosing to a Mantis Double-Wide Series system.

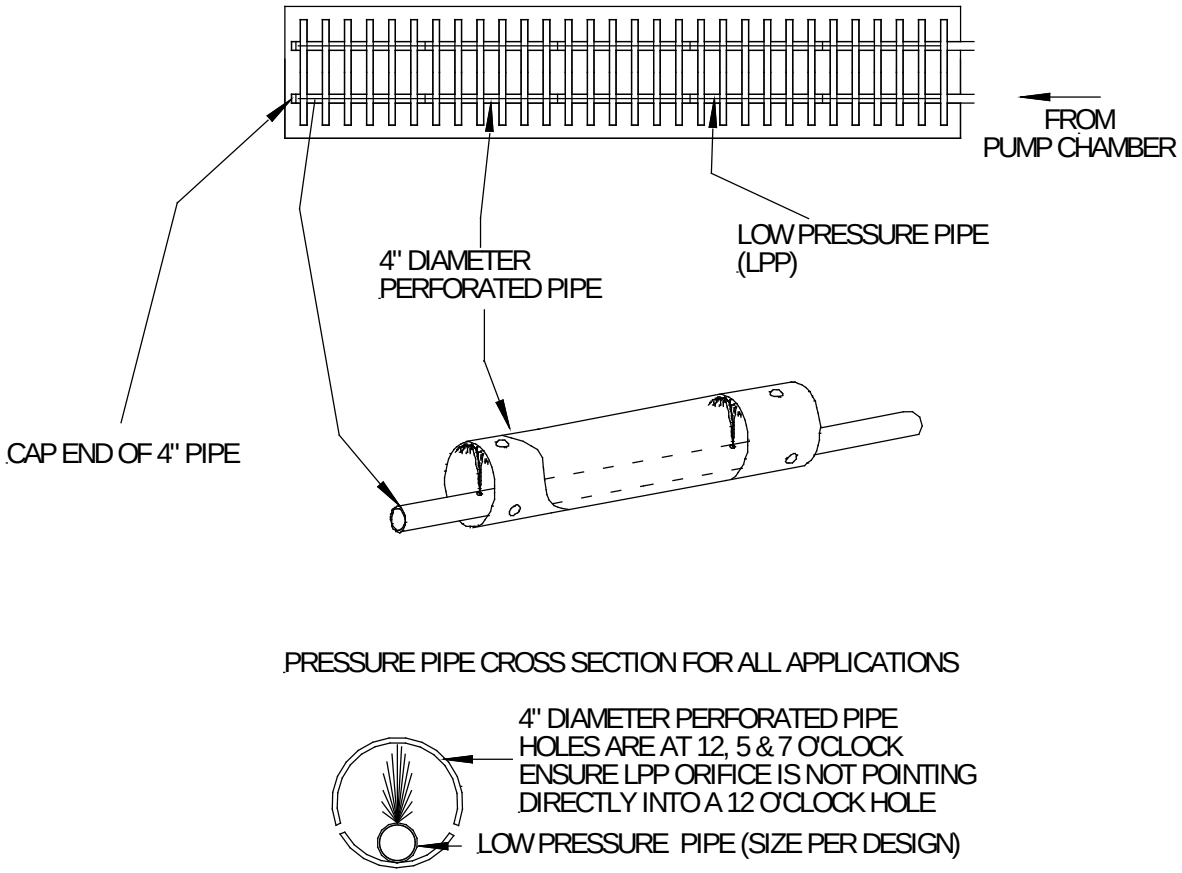
**4.2 Pressure or Pumped Dosed Design Criteria:** Dosing volume must be set to deliver a maximum of 30 gallons per Mantis 100 unit or 15 gallons per Mantis 58 unit per dosing cycle for both pump and pressure distribution systems. The dose volume prescribed in this section meets the 20% internal storage volume requirement of the CTDPH *Technical Standards for Subsurface Sewage Disposal Systems.* No further adjustments are required.

For designs that may need to exceed the prescribed dosing volumes please contact Eljen Corporations Technical Services Department at 800-444-1359 for more information.

If a pump dose system is specified with more than 18" of cover as measured from the top of the unit to finished grade, an additional 2" airline must be extended from the Mantis systems distribution box back to the riser on the septic tank or the pump tank as shown in Figure 8.

If a pressure system is specified with more than 18" of cover as measured from the top of the unit to finished grade, please contact Eljen Corporations Technical Services Department at 800-444-1359 for more information.

**FIGURE 6: MANTIS DOUBLE-WIDE SERIES PRESSURE DISTRIBUTION – ORIFICE LAYOUT**



# 5.0 System Ventilation Guidance

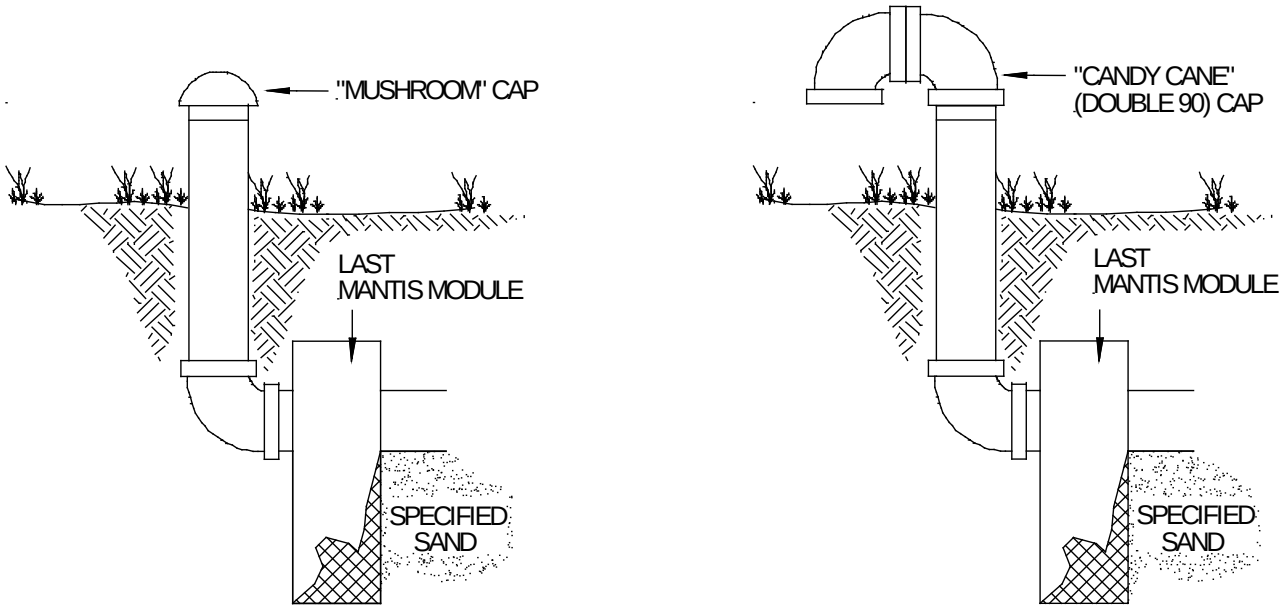
**5.1 System Ventilation:** Eljen mandates venting when the system has greater than 18" of cover material, as measured from the top of the unit, to finished grade. This will ensure proper aeration of the units with deep installs.

Vents are installed at the distal end of the system and are usually constructed of 4" PVC pipe. The vent can be run to an inconspicuous location for the benefit of the homeowner. Vents must be protected from rainwater intrusion. Accomplish this by using two 90 degree fittings ("candy cane") or other acceptable means. Activated Granular Charcoal (or Carbon) Filters can be installed to address any odor concerns or issues and will protect the vent from rainwater intrusion.

If desired, vent lines can be tied together so only one vent is brought to the surface. Vent line elevations must be set so vents do not collect and distribute effluent inadvertently.

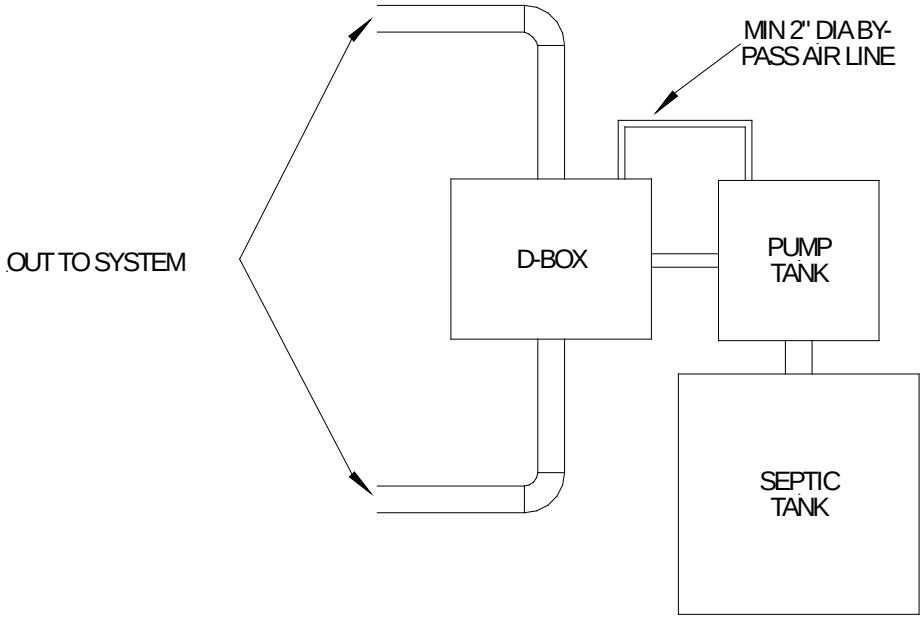
If a pump dose system is specified with more than 18" of cover as measured from the top of the unit to finished grade, an additional 2" airline must be extended from the Mantis systems distribution box back to the riser on the septic tank or the pump tank as shown in Figure 8.

**FIGURE 7: MANTIS DOUBLE-WIDE SERIES VENTING DIAGRAM**



## 5.0 System Ventilation Example Drawing

**FIGURE 8: MANTIS DOUBLE-WIDE SERIES 2” BY-PASS LINE – CLOSE UP**



## 6.0 Recommended Notes on Design Plans

- This system is not designed for backwash from a water softener.
- This system (is/is not) designed for the use of a garbage disposal.
- The Mantis system is not for use under vehicular traffic or for under paving applications.
- Organic topsoil layer must be removed from trench and slope extension areas prior to placement of approved fill or Specified Sand. Scarify subsoil prior to select fill or Specified Sand placement.
- All Mantis Series installations utilize a Specified Sand envelope around the Mantis units. 6" minimum underneath, 6" minimum on the sides, 1" minimum on top, and 4" in between the Filter Support Modules of the Mantis units. The Mantis Specified Sand specification is listed below.

**SPECIFIED SAND SIEVE REQUIREMENTS**

| Eljen Mantis Series<br>Specified Sand Requirements | | |
|---|---|---|
| Sieve Size | Sieve Square Opening Size (mm) | 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. | | |

*NOTE: Under certain conditions, Eljen may approve alternate material to be used for the Specified Sand envelope around the Mantis Double-Wide Series units.*

- Eljen Corporation recommends the use of an appropriate sized septic tank effluent filter for all Mantis systems.
- Pumped systems shall have an oversized distribution box utilizing a velocity reduction tee or baffle.
- Eljen mandates venting 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 6 of material as measured from the top of the Filter Support Modules to the finished grade. The first inch of that fill is Mantis Double-Wide Series Specified Sand.
- Backfill and Finish Grading: Carefully place backfill over the units, followed by a total minimum depth of 6 - 18 inches of well graded sandy fill; clean, porous, and devoid of rocks, as measured from the top of the Filter Support Modules. Finish grade must divert surface runoff from the soil treatment area and prevent surface ponding. Protect the system area from erosion by loaming and seeding or by using other approved methods of erosion control.
- For pumped systems, set pump floats or pump control panels to deliver a maximum of 30 gallons per Mantis 100 unit or 15 gallons per Mantis 58 per dosing cycle.
- This design complies with and must be installed in accordance with the most current Eljen Connecticut Mantis Double-Wide Series Design and Installation Manual.

### Table 2: Mantis 100 Simplified Sizing Chart

Effective Leaching Area = 20.0 sf/lf or 100 sf/unit

| Percolation Rate (Minutes to Drop One Inch) | Minimum Mantis 100 Units Required | | | | | |
|---|---|---|---|---|---|---|
| | 1-Bedrooms* | 2-Bedrooms | 3-Bedrooms | 4-Bedrooms | Each Bedroom Above 4 | |
| | | | | | Single Family | Multi-Family |
| Less than 10.1 | 2 | 4 | 5 | 7 | 1 | 2 |
| 10.1 - 20.0 | 3 | 5 | 7 | 9 | 2 | 3 |
| 20.1 - 30.0 | 3 | 6 | 8 | 10 | 2 | 3 |
| 30.1 - 45.0 | 4 | 7 | 9 | 12 | 2 | 3 |
| 45.1 - 60.0 | 4 | 8 | 10 | 14 | 2 | 4 |

### Table 3: Mantis 58 Simplified Sizing Chart

Effective Leaching Area = 11.6 sf/lf or 58 sf/unit

| Percolation Rate (Minutes to Drop One Inch) | Minimum Mantis 58 Units Required | | | | | |
|---|---|---|---|---|---|---|
| | 1-Bedrooms* | 2-Bedrooms | 3-Bedrooms | 4-Bedrooms | For Each Bedroom Above 4 | |
| | | | | | Single Family | Multi-Family |
| Less than 10.1 | 4 | 7 | 9 | 12 | 2 | 3 |
| 10.1 - 20.0 | 5 | 9 | 12 | 16 | 2 | 4 |
| 20.1 - 30.0 | 5 | 10 | 13 | 18 | 3 | 5 |
| 30.1 - 45.0 | 6 | 12 | 16 | 21 | 3 | 6 |
| 45.1 - 60.0 | 7 | 13 | 18 | 23 | 3 | 6 |

Notes:

- (*) 1 Bedroom designs are for residential outbuildings on single family residential building lots.
- Partial units are rounded up to the next highest number.
- Trenches require six (6) inches of Specified Sand at the beginning and end of each row.
- Vertical and horizontal separation distances are measured from the Mantis Double-Wide units not the Specified Sand.
- Sizing charts do not reflect MLSS requirements.
- Multiple trench configurations will utilize 14’ center to center spacing between Mantis rows.
- Distribution pipes are not permitted for use on top of the Mantis Double-Wide Series.

# Mantis Double-Wide Series
# 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

Unit used: 100 58

Number of Mantis 536-8 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 536-8 Series Installation Checklist Continued**

Mantis Specified Sand Supplier: _____ Location: _____

Copy of Mantis Specified Sand Sieve Report: ☐ No ☐ Yes

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

☐ 1” Minimum of Mantis Specified Sand on Top of Mantis Units

☐ Cardboard Corners Removed from Mantis Units

☐ Termination Caps Installed where needed

Distribution Box Installed: ☐ No ☐ Yes

Vents Installed: ☐ No ☐ Yes

☐ Final Grade to Prevent Storm Water Intrusion

☐ Septic Tank Effluent Filter installed

**System Layout Drawing**

## COMPANY HISTORY

Established in 1970, Eljen Corporation created the world's first prefabricated drainage system for foundation drainage and erosion control applications. In the mid-1980s, we introduced our Geotextile Sand Filter products for the passive advanced treatment of onsite wastewater in both residential and commercial applications. Today, Eljen is a global leader in providing innovative products and solutions for protecting our environment and public health.

## COMPANY PHILOSOPHY

Eljen Corporation is committed to advancing the onsite industry through continuous development of innovative new products, delivering high quality products and services to our customers at the best price, and building lasting partnerships with our employees, suppliers, and customers.

eljen CORPORATION

*Innovative Environmental Products & Solutions Since 1970*

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