AGENDA

Benefits

How it works

Sand

MA Approval

System Sizing and Design Variables

Installation Procedures
History

- Eljen Corporation founded in 1970.
- All products are manufactured at our facility located in Windsor, CT.
INTRODUCTION

Manufacturer of multiple industry products.

Over 100,000 systems installed and growing.

Worldwide use.

Course content prepared by Eijen Corporation.
ELJEN PRODUCT FAMILY

Manufacturer of:

Course content prepared by Eljen Corporation.
ELJEN GSF PRODUCT OVERVIEW
ELJEN GSF PRODUCT OVERVIEW

• Uses Treatment Application Rates

• Feed using gravity, pump to gravity or pressure distribution

• Trenches, Beds, and Mounds

• Use a minimum of 5 B43’s per bedroom

• Use a minimum of 6 A42’s per bedroom
ELJEN GSF PRODUCT OVERVIEW

- 3 feet in width
- 4 feet in length
- 7 inches in height
- 84 sf surface area

B43 Module

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ELJEN GSF PRODUCT OVERVIEW

- 2 feet in width
- 4 feet in length
- 7 inches in height
- 65 sf surface area

A42 Module

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Course content prepared by Eljen Corporation.
WHITE STRIPE UP!
HOW THE ELJEN GSF WORKS
F.W. Kropf (1977)

- LTAR = stable equilibrium in the soil – Biological clogging defines absorption rates and equals 0.2 to 0.5 gpd/ft².

Laak (1995)

- Geotextiles protect the LTAR of underlying soils allowing biological growth to form on geotextile not native soil.

Tyler, Converse, and Keys (2001)

- Loading rates of highly pretreated wastewater might be 2 (Clay) to 16 (Sand) times greater than rates recommended for straight septic tank effluent.
UNIQUE DESIGN

- Increases surface area within each system
- The geometry of the product is not as important as the surface area it yields.
- More surfaces, increases the number of biomat growth zones.
- Open air channels within the modules support aerobic bacterial growth
HOW THE ELJEN GSF WORKS
HOW THE ELJEN GSF WORKS

Bacteria Working Together
HOW THE ELJEN GSF WORKS
HOW THE ELJEN GSF WORKS

Two Separate Performance Areas:
Primary & Secondary Treatment

• Septic effluent is filtered through the Bio-Matt™ fabric

• Open air channels within the module support aerobic bacterial growth

• The B43 has 84 square feet of geotextile fabric per module which is 7 square feet of bio-fabric for every 1 square foot of soil interface area
HOW THE ELJEN GSF WORKS

Two Separate Performance Areas:
Primary & Secondary Treatment

Course content prepared by Eljen Corporation.
Secondary treatment begins at the sand layer directly beneath and to the sides of all modules. Creates unsaturated conditions on to the native soils.

Secondary zone ensures the preservation of the Long-Term Acceptance Rate of the native soils surrounding the system.
GSF Benefits
GSF BENEFITS

Sites that require pre-treatment

High Ground Water

Shallow Bedrock

Poor Soils

Soils that are Rapidly Permeable
GSF BENEFITS

PASSIVE TREATMENT

MAXIMIZE INTERNAL SURFACE AREA

PACKAGE PLANT STRENGTH

EASY MAINTENANCE

MULTIPLE APPLICATIONS
GSF BENEFITS

- No Startup Period
- Great for intermittent use
- Hard to get to spots
  - Vacation Homes
  - Summer Camps
MASSACHUSETTS GSF APPROVAL
General Use Approval

- 40% Reduction of Basal Area
  - Trenches
  - Beds
  - Mounds
- 50% Reduction in conjunction with an ATU (no double dip)
- System does NOT require a 5’ overdig
- Minimum 400 sf of system area
MASSACHUSETTS GSF APPROVAL

- Use a minimum of 5 B43’s per bedroom
- Use a minimum of 6 A42’s per bedroom

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Percolation Rate</th>
<th>Application Rate GPD/ft²</th>
<th>Minimum Trench Bottom Area Required (ft²)</th>
<th>Minimum Number of Modules Required</th>
<th>Modules Per Each Additional Bedroom</th>
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<tr>
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<td>1 - 5</td>
<td>0.74</td>
<td>216 288 360</td>
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<td>0.15</td>
<td>768 1032 1284</td>
<td>18 24 30</td>
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</tbody>
</table>

Remedial Use 60 - 90 MPI Systems

| Class III & IV | 60      | 0.15 | 768 | 1032 | 1284 | 64 | 86 | 107 | 21 |

Pressure Dosed Systems

| Class III      | 40      | 0.29 | 408 | 540 | 672   | 34 | 45 | 56  | 11 |
| Class III & IV | 50      | 0.25 | 468 | 624 | 768   | 39 | 52 | 64  | 13 |
| Class III & IV | 60      | 0.2  | 576 | 768 | 960   | 48 | 64 | 80  | 16 |
Use of an impermeable barrier in accordance with DEP rules can reduce this distance to 5 ft. before beginning 3:1 side slope.
Remedial Use Approval

• Same as General Use Approval, plus:

  • A deed notification is required when installing an Alt. SAS Treatment with Disposal-Patented Sand Filters System

  • Approved up to percolation rates of 90 mpi

  • For percs of 60 to 90 minutes per inch, use an application rate of 0.15 gpf/sf
• The local approving authority may allow the following reductions without granting a waiver under 310 CMR 15.400 or obtaining MA DEP approval.
SYSTEM DESIGN OPTIONS
TRENCH OPTIONS

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BED OPTIONS
BED SYSTEMS
BED SYSTEMS

Course content prepared by Eijen Corporation.
MOUND OPTIONS

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DOSING METHODS
DOSING METHODS

- Gravity
- Pump up to Gravity
- Pressure Dosed
Dose A42 Modules less than 3 gallons / module / dose

• Maximum daily dose of 25 gpd/module
Dose B43 Modules less than 4 gallons / module / dose

• Maximum daily dose of 30 gpd/module
DOSING METHODS

Pump to gravity
DOSING METHODS

- Pressure Distribution
### PIPE IN PIPE METHOD

**FINISHED GRADE**

- **LATERAL ENDS AT LAST ORIFICE WHERE VARIABLE LENGTH CLEANOUT BEGINS**
- **4" PERFORATED PIPE**
- **4" END CAP**
- **6 - 8" DIAMETER LAWN SPRINKLER**
- **THREAD CLOCK CLEANOUT PLUG**
- **LONG SWEEP 90 OR TWO 45 DEGREE BENDS SAME DIAMETER AS LATERAL**

- **DISTRIBUTION LATERAL**
- **LATERAL CLEANOUT**
DOSING METHODS

Pressure Distribution with orifice shields/splash guards
SYSTEM SAND
# SYSTEM SAND

- Medium to Coarse Washed Concrete Sand

## ASTM C33 SAND SPECIFICATION

<table>
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<th>Sieve Size</th>
<th>Sieve Square Opening Size</th>
<th>Specification Percent Passing (Wet Sieve)</th>
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<tr>
<td>3/8 inch</td>
<td>9.52 mm</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>4.76 mm</td>
<td>95 - 100</td>
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<td>No. 8</td>
<td>2.38 mm</td>
<td>80 - 100</td>
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<tr>
<td>No. 16</td>
<td>1.19 mm</td>
<td>50 - 85</td>
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<tr>
<td>No. 30</td>
<td>590 μm</td>
<td>25 - 60</td>
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<tr>
<td>No. 50</td>
<td>297 μm</td>
<td>5 - 30</td>
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<tr>
<td>No. 100</td>
<td>149 μm</td>
<td>0 - 10</td>
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<tr>
<td>No. 200</td>
<td>75 μm</td>
<td>0 - 5</td>
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</table>
ADDITIONAL SYSTEM DESIGN INFORMATION

Up sizing of the septic tanks and absorption fields should occur when any of the following conditions exist:

- Garbage Disposals
- Oversized Tubs
- High Occupancy
Venting is required when there is more than 18” of cover from the top of the unit to finished grade.

Ventilation piping should be pitched so that water cannot accumulate water or condensation.
SYSTEM VENTING

• How does air move in and out of an Eljen System?
Venting with Pressure
• Common Vent
SYSTEM VENTING

- Vented Cap
- Non-Perforated 4" Diameter Pipe
- Specified Sand
- Edge of Last Module
SYSTEM VENTING

MOUNDED BACKFILL OVER MODULES

CLEAN BACKFILL

GSF MODULES

COVER FABRIC NOT SHOWN OVER DISTRIBUTION PIPE AND MODULES

SHRUB

FINISHED GRADE

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GSF INSTALLATION

EXCAVATION AND SCARIFICATION OF NATIVE SOILS
GSF INSTALLATION

SPECIFIED SAND STABILIZED AND LEVELED
GSF INSTALLATION

MODULE PLACEMENT
GSF INSTALLATION

DISTRIBUTION PIPE PLACEMENT
GSF INSTALLATION

SECURE THE DISTRIBUTION PIPE
GSF INSTALLATION

COVER MODULES WITH GEOTEXTILE
GSF INSTALLATION

• CUT THE FABRIC AROUND THE PIPES
GSF INSTALLATION

ADD SAND TO SECURE COVER FABRIC
GSF INSTALLATION

- COVER AND SEED
What you don’t want to see...

Oh you don’t smell that?

Because I keep smelling poop!
The GSF is **NOT** for use under vehicular traffic!

“Merry Christmas! Shitter's full!”

-Cousin Eddie
Tenting
Forget Something?
Improper install

• Sand goes under the unit first!
• Fabric goes over the top of the pipe and unit and drapes down the sides.
C’Mon Man!
C’Mon Man!
C’Mon Man!
Short on Fabric?
**What to Look for...**

<table>
<thead>
<tr>
<th>What to Look for</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Cover over</td>
<td>Proper cover over the units</td>
</tr>
<tr>
<td>Grade</td>
<td>Grade area to minimize storm water intrusion or inflow.</td>
</tr>
<tr>
<td>Blade</td>
<td>Back blade to final grade, keep tires off the system with minimum cover.</td>
</tr>
</tbody>
</table>

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Maintenance

eljen® Geotextile Sand Filter

eljen CORPORATION
MAINTENANCE

Routine Pumping of the Septic Tank

Septic Tank Effluent Filters should be Cleaned

Pressure Distribution Systems should have the LPP lines blown out Annually
Contact Information

Eljen Technical Department

Phone: (800)444-1359

Monday-Friday: 7:00am-3:30pm (EST)

info@eljen.com

Eric Daniels

Senior Technical Lead

Cell: (774)275-4569 –24/7

edaniels@eljen.com
<table>
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<tr>
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</tr>
<tr>
<td><a href="mailto:info@eljen.com">info@eljen.com</a></td>
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<tr>
<td><strong>Lee Shamblin</strong></td>
</tr>
<tr>
<td>Technical Specialist</td>
</tr>
<tr>
<td>Cell: (860)308-4023</td>
</tr>
<tr>
<td><a href="mailto:lshamblin@eljen.com">lshamblin@eljen.com</a></td>
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THANK YOU!