

# ***SALCOR INC.***

P. O. Box 1090, Fallbrook, CA 92088

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## **SPECIFICATIONS FOR THE SALCOR MODEL 3G UV WASTEWATER DISINFECTION UNIT**

### **1.0 DESCRIPTION**

The Salcor 3G disinfection chamber couples directly to the aerobic plant discharge pipe and is permanently installed below grade. The design details of the Salcor 3G unit are shown in sections 2.0 and 4.0.

The ultraviolet light source for disinfection is mounted in a sub-assembly which can be inserted or removed through the top of the riser pipe for periodic servicing. The light source is mounted in the center of an anodized aluminum frame which divides the disinfection chamber in half. The frame seals against the inner surface of the disinfection chamber to prevent flow bypass.

When fully inserted, the disinfection sub-assembly is properly located by two pins mounted near the top of the disinfection chamber. The disinfection subassembly causes the wastewater entering one side of the unit to flow vertically downward, make a 180 degree turn, and then flow vertically upward and out the other side of the unit. This well-defined flow path is designed to give the fluid proper exposure time and no short circuiting.

The ultraviolet light source is surrounded by a clear fused quartz tube to control the lamp surface temperature. A clear Teflon™ film covers the quartz tube to minimize surface fouling. This design feature incorporates the beneficial attributes of both quartz and Teflon™.

When the disinfection chamber is filled with water, the ultraviolet light source can operate continuously, whether or not water is flowing. Continuous operation with a lamp surface temperature range of between 105 and 120 degrees Fahrenheit provides optimum ultraviolet light output and long lamp life.

The Salcor Model 3G unit may be installed in a pump tank, or it may be installed in the ground. In a direct ground installation, access to the unit should be through an irrigation or valve box so that the electrical subassembly junction box is shielded from direct sunlight.

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Properly installed, the Model 3G unit is rated NEMA 6P, and is capable of operating during short term submergence.

The Salcor Model 3G unit is now both UL and cUL certified (US and Canada) under standard 979. As of this date, the Salcor Model 3G unit is the only UV wastewater disinfection unit that is UL and cUL listed.

The electrical subassembly is mounted in a junction box located on top of the 4-inch riser pipe. The box contains fuses, alarm circuitry, UV lamp ballast, power cable connections, voltage surge protection, and electronic noise filters.

The Salcor Model 3G alarm relay circuit triggers an external alarm to warn the user when the UV lamp is not operating properly.

Electronic components in the circuit sense changes in the UV lamp operation which correlate with the germicidal ultraviolet output. *The normally energized relay has contacts that allow actuation of an external alarm indicating low UV output or a lamp outage.*

The alarm relay circuit has been designed to be compatible with a wide variety of alarm systems used on upstream aerobic treatment plants. The relay contacts are rated for alarm power sources that operate at up to 250 Volts AC or DC, and up to 12 Amps.

When the UV lamp is producing ultraviolet germicidal light at a safe level, a green LED indicator light, located on the top of the electrical junction box, glows indicating proper UV lamp operation. The light stops glowing when the light output from the UV lamp falls below a safe level or is not operating.

The Salcor Model 3G UV Disinfection Unit and the UV lamp have a 2 year limited warranty.

## **2.0 DESIGN PARAMETERS**

2.1 Flow Rate. Maximum flow at 3 gpm (4320 gpd) for waste water effluents for suspended solids less than 30 mg/liter and BODs less than 30 mg/liter.

Maximum flow rate of 6 gpm (8640 gpd) for waste water effluents of

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suspended solids less than 10 mg/liter and BODs less than 10 mg/liter.

2.2 Fecal coliform reduction at lamp end-of-life (2 years) greater than 99.9 percent.

2.3 Inlet and outlet pipe is 4 inch schedule 40 ABS.

2.4 Pressure drop is less than 0.5 inches of water at maximum flow rate.

2.5 Power use is 30 Watts.

2.6 Energy use is 0.72 kW-hr/day, assuming continuous operation.

2.7 UV lamp is low pressure mercury, 90 percent of output at 253.7 nanometers. Minimum arc length is 30 inches, and the UV intensity is greater than 190 microwatts/cm<sup>2</sup> at one meter. The lamp life is greater than two years.

2.8 UV dose is greater than 55 mj/cm (55,000 microwatt-seconds/cm<sup>2</sup>).

2.9 UV Lamp Ballast. Ninety Percent efficient, high frequency (50 kilohertz) with thermal link protection. Input Voltage, 120 VAC, 50 or 60 Hz.

Input current, up to 0.5 amps.

## **3.0 THIRD PARTY TESTING**

3.1 University of Rhode Island. George Loomis 1999 - 2005

- FAST Unit effluent
- Annual Service
- Lamp replacement every two years
- Geometric mean fecal coliform count 9.4/100 ml

3.2 Washington State Testing

- Advanced Treatment Unit & UV
- NSF Standard 40 & WA State Fecal Coliform Reduction Protocol
- Duration 26 weeks
- Seventeen tests have been completed.
- 3G UV Effluent Fecal Coliform ranged from 2 – 35 per 100 ml (Geometric Mean)
- Demonstrates that the 3 G UV unit operates reliably without maintenance over 6 months

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## **3.0 THIRD PARTY TESTING (CONTINUED)**

### 3.3 Manufacturers Who Have Tested With the Salcor 3G Unit Using the Washington State Protocol

- Delta Whitewater, Ecopod.
- Orenco, AX 20N.
- Consolidated Treatment, Enviroguard .75.
- Consolidated Treatment, Multiflo.
- Consolidated Treatment, Nyadic.
- Delta Whitewater, DF 60.
- Bio Microbics, Microfast 0.5.
- Quanics, ATS-CSAT-8-AC-C500.
- Hoot Aerobics.
- Jet Inc.
- Enviro Flo.
- Bord na Mona.
- Norweco – Singulair.
- AK Industries, Hydro Action.
- Aero Tech.
- Clearstream.
- Aqua Klear.

## **4.0 MULTIPLE UNITS AND DRAWINGS**

Salcor Model 3G units may be connected in series, parallel, or in a series-parallel array as shown in figures 6 through 10. Commercially available ABS drain pipe and fittings may be used to provide a larger flow capacity. Arrays of 3G UV units have been installed to disinfect flow rates of up to 100,000 gal. /day. This approach has saved up to 75 percent in capital cost over an open channel UV wastewater disinfection system, and has provided increased system reliability.

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## Salcor 3G UV Disinfection Unit

NOTE! Not all dimensions to scale

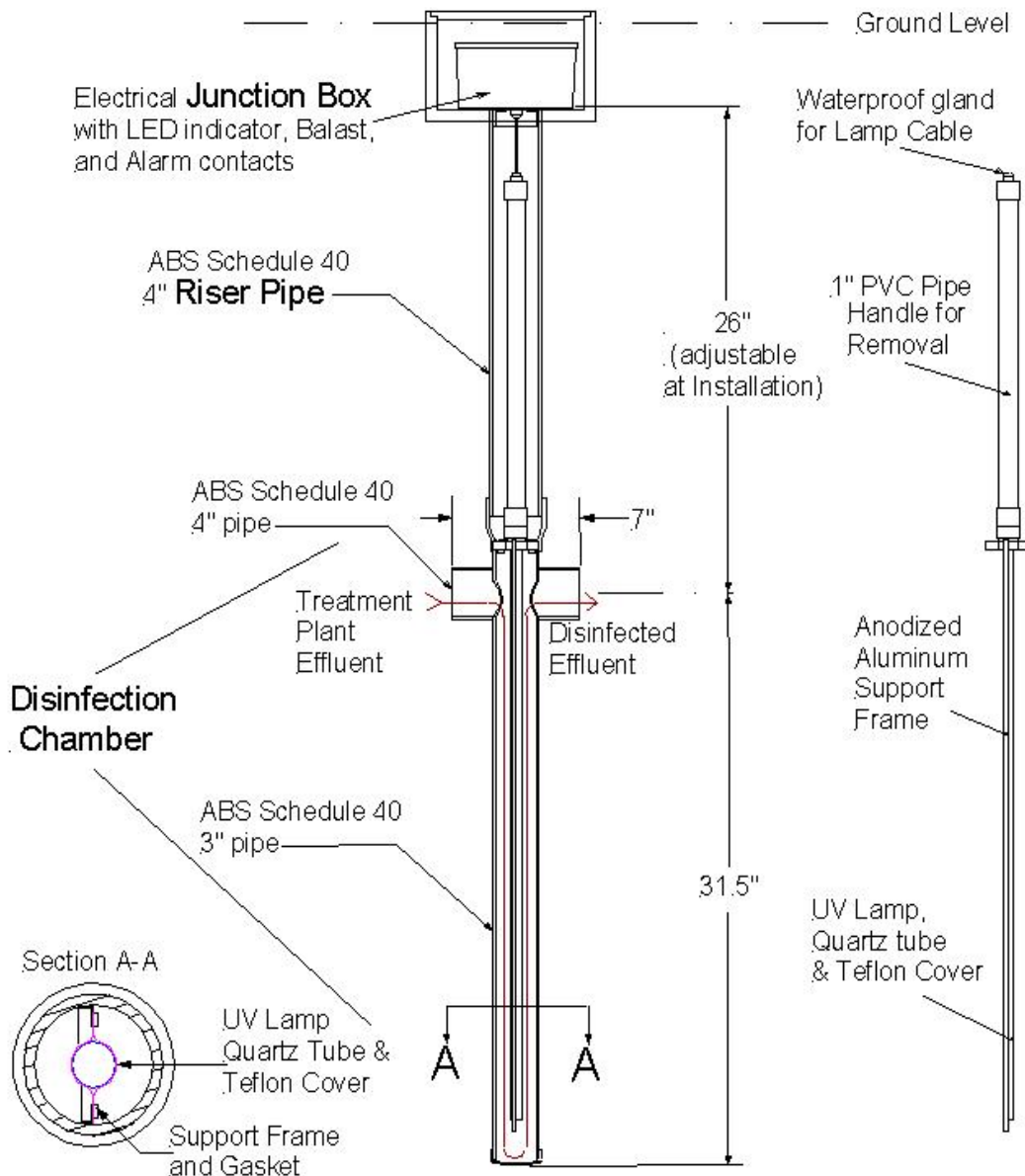


Figure 1

# SALCOR UV DISINFECTION UNIT

JUNCTION BOX: CONNECTION FOR  
120VAC LINE AND EXTERNAL ALARM

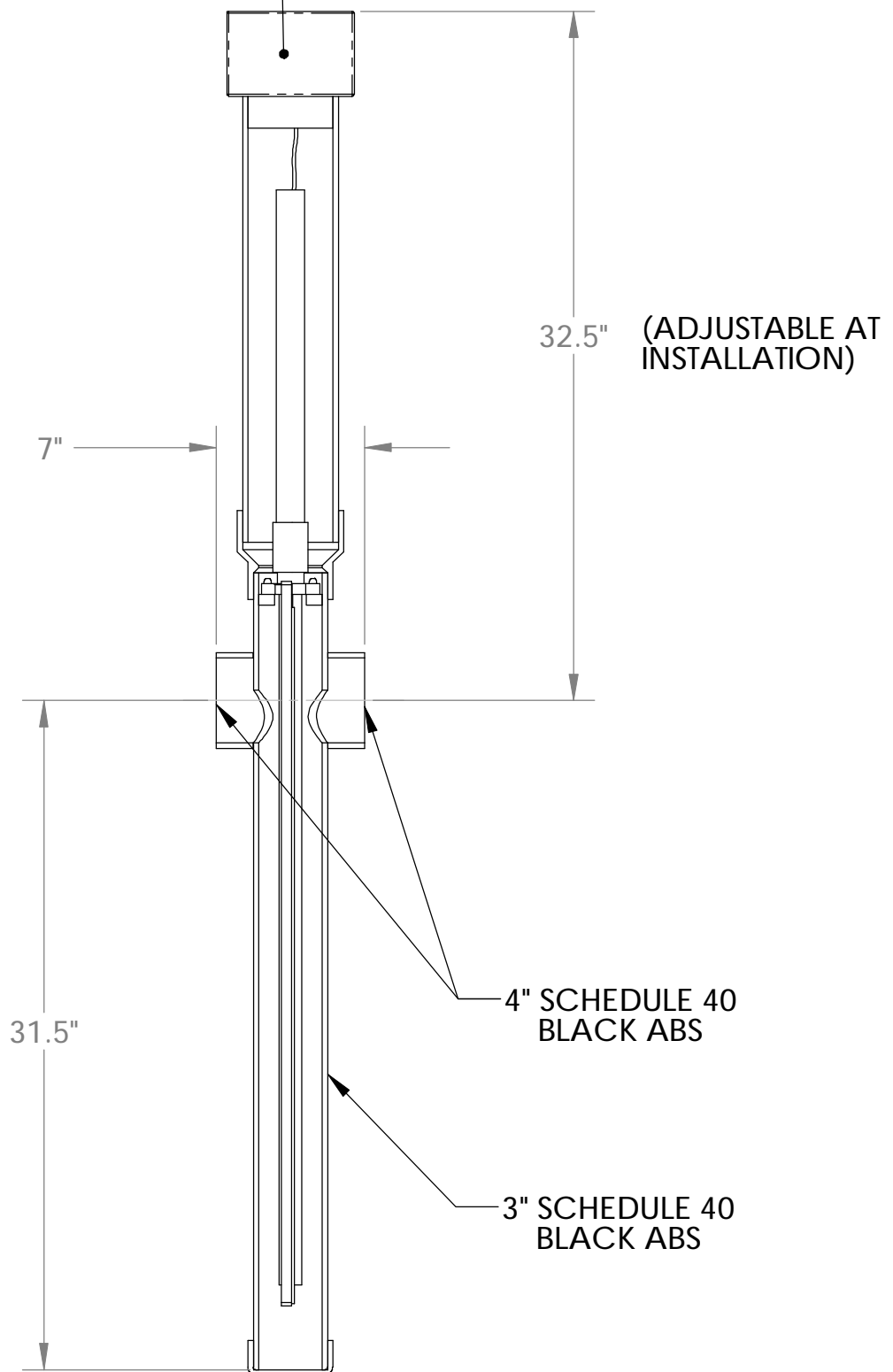


Figure 2

NOTE: NOT ALL DIMENSIONS TO SCALE

January, 2011

Page 6 of 15

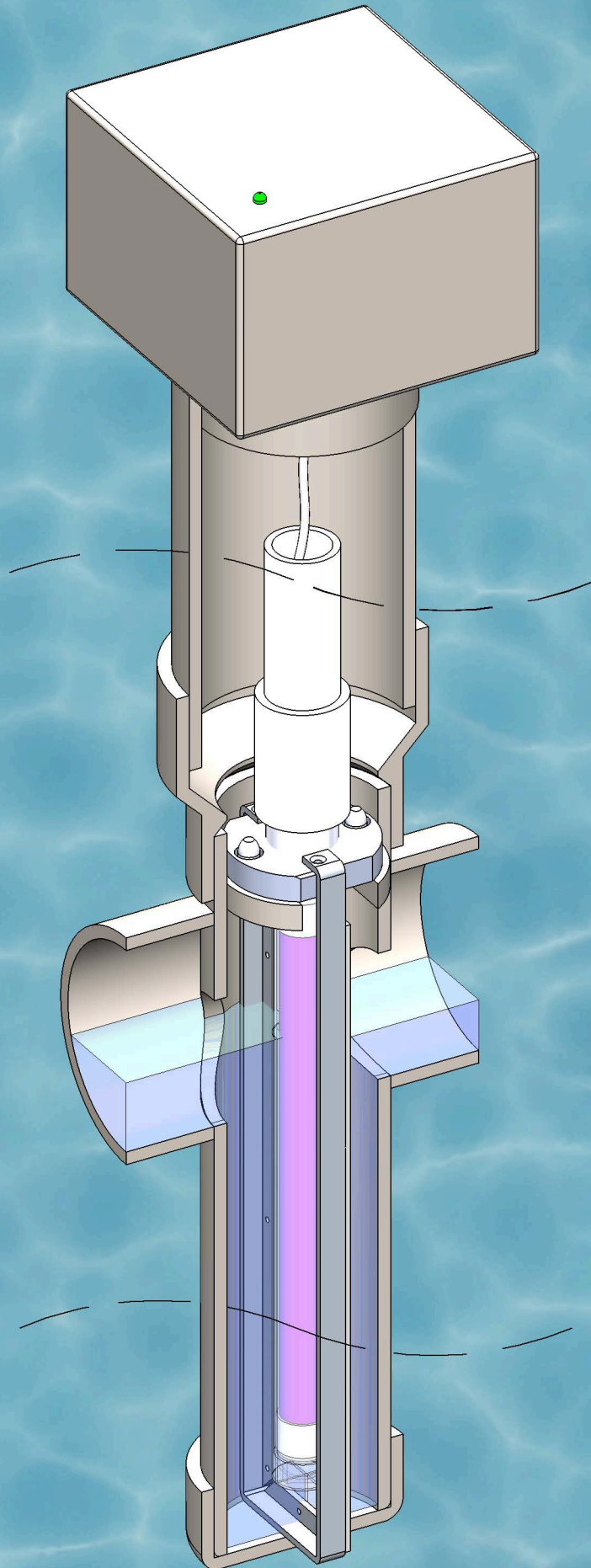


Figure 3

# In Ground Installation

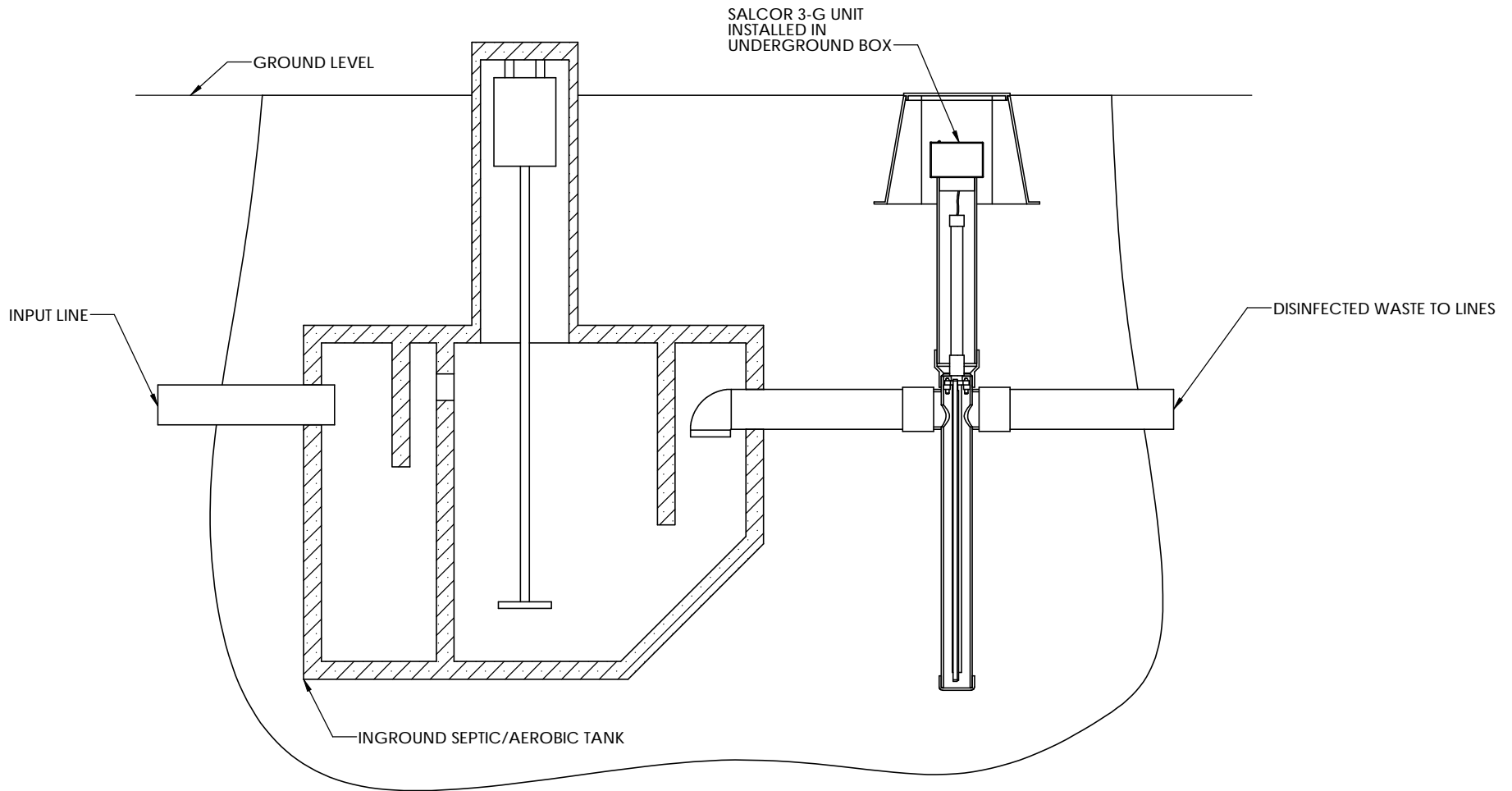


Figure 4



# In Tank Installation

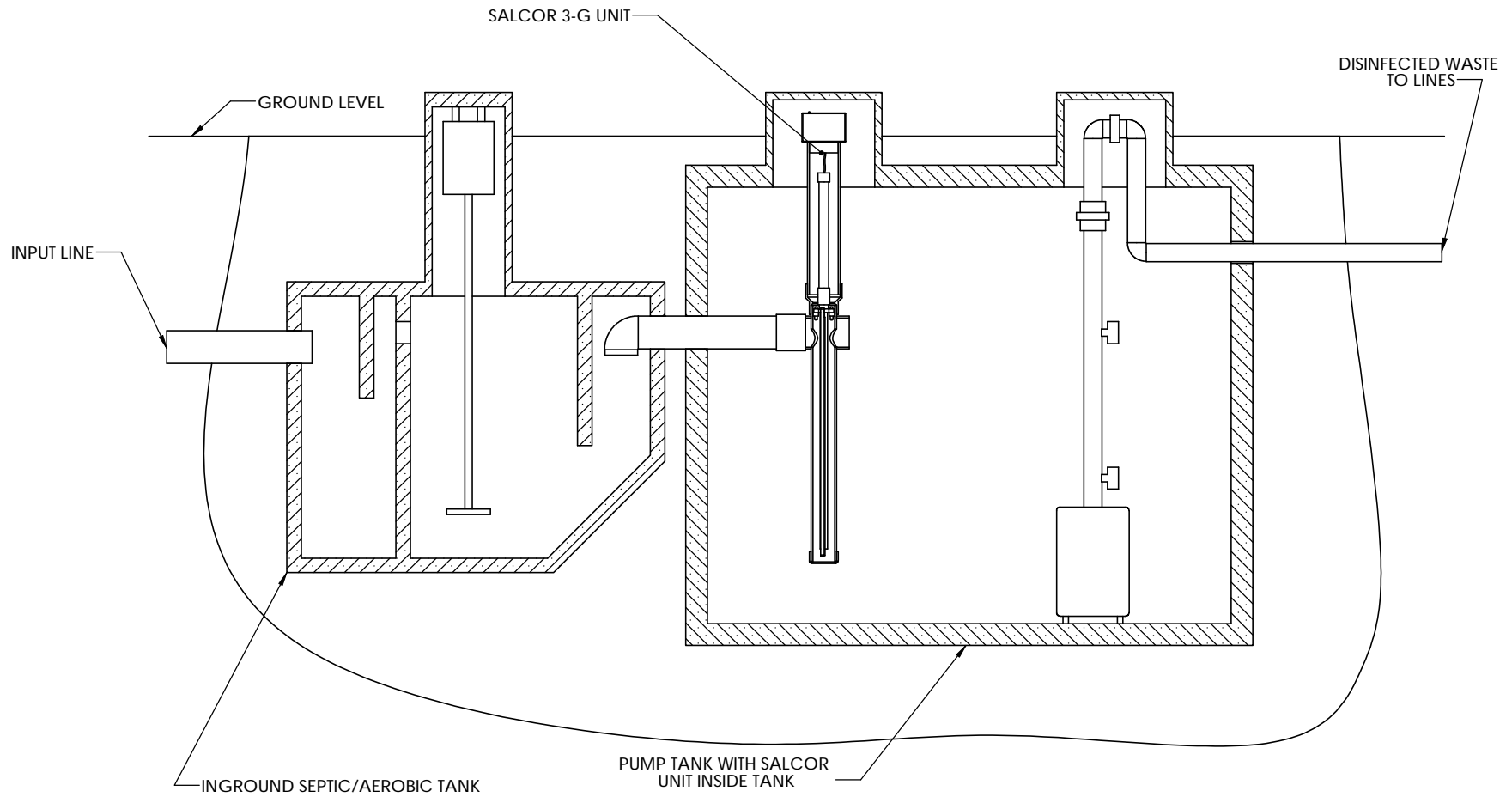


Figure 5

## 2 Units in Series

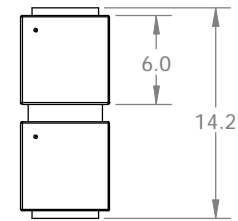
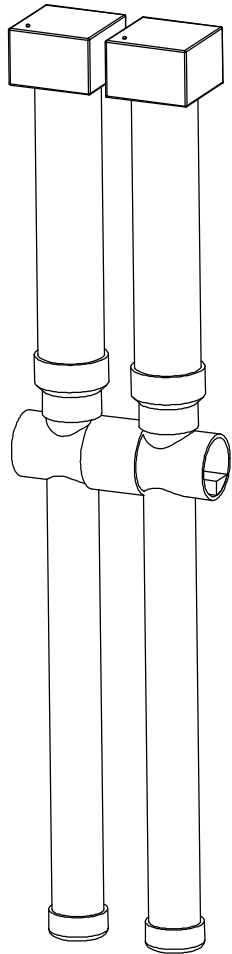


Figure 6

# 2 Units in Parallel

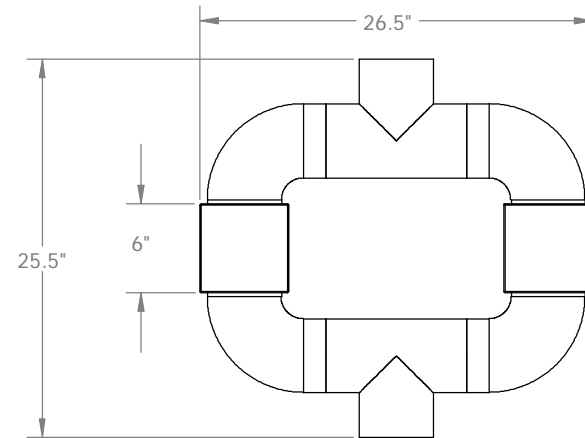
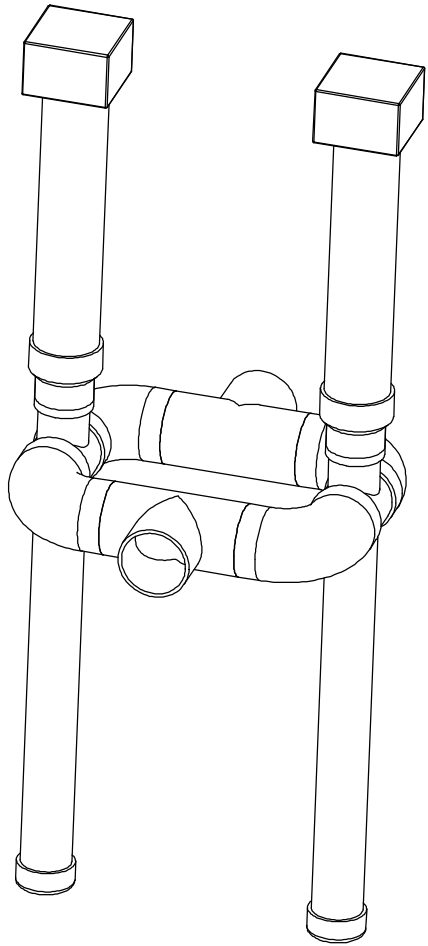


Figure 7

# 3 Units in Parallel

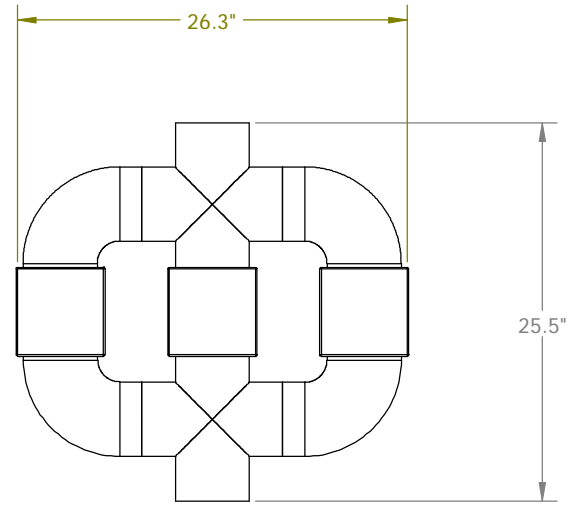
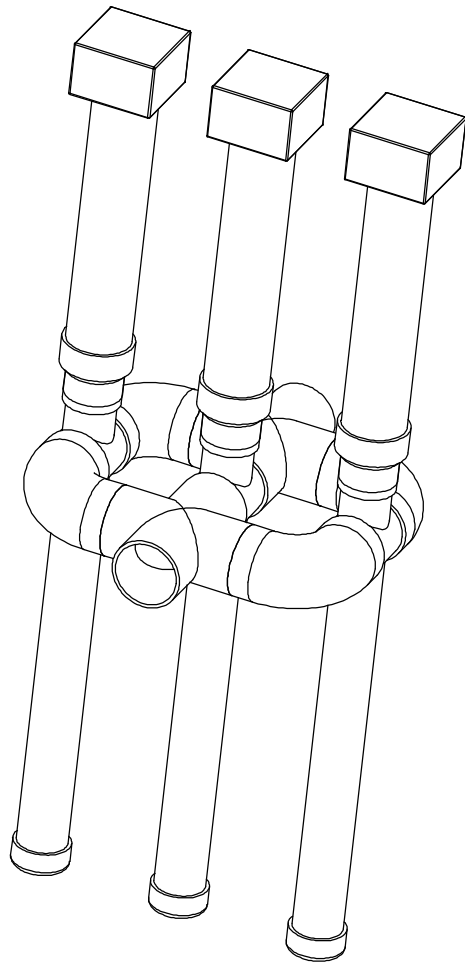


Figure 8

# 4 Units in Parallel & Series

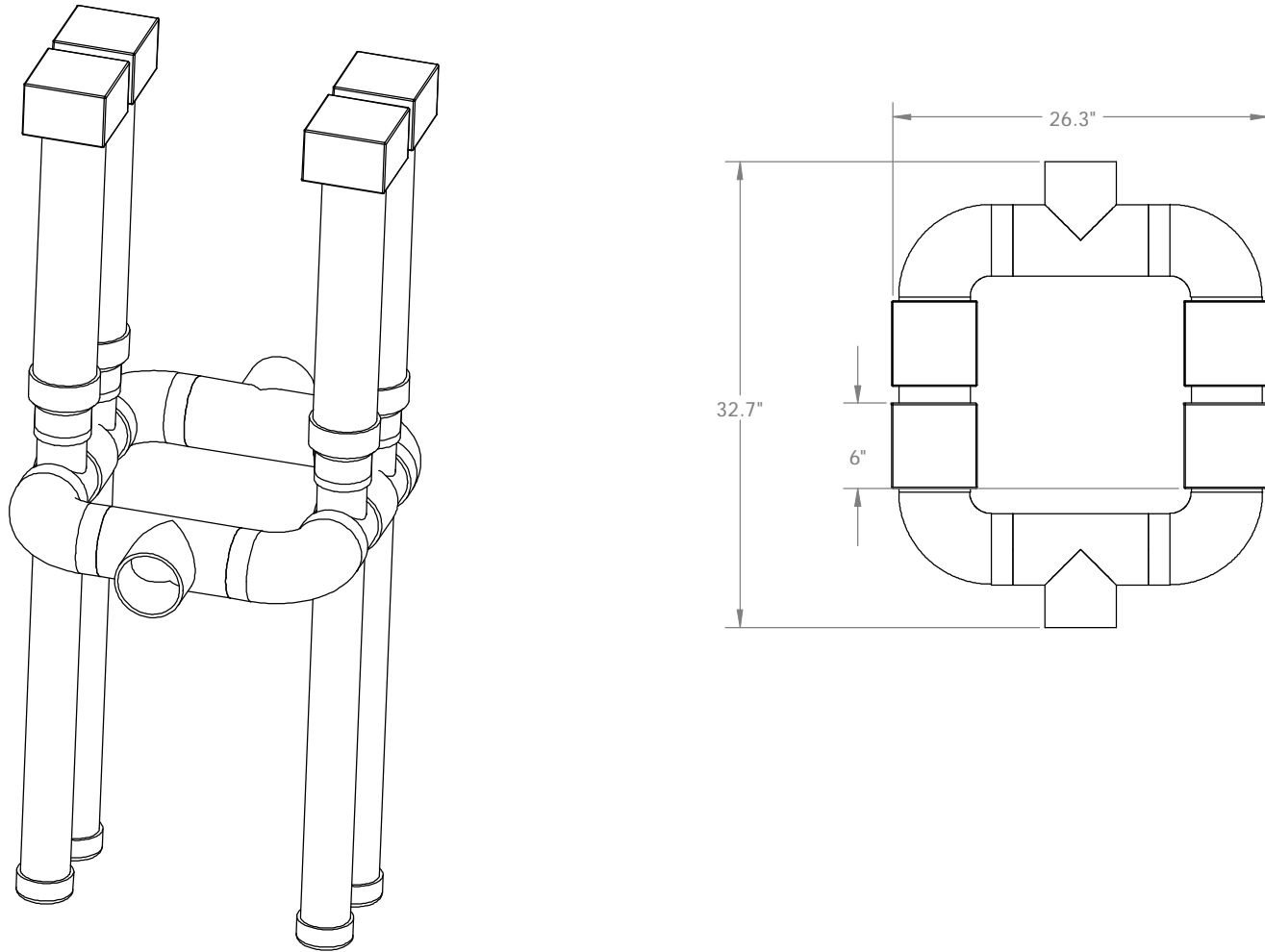


Figure 9

# 6 Units in Parallel & Series

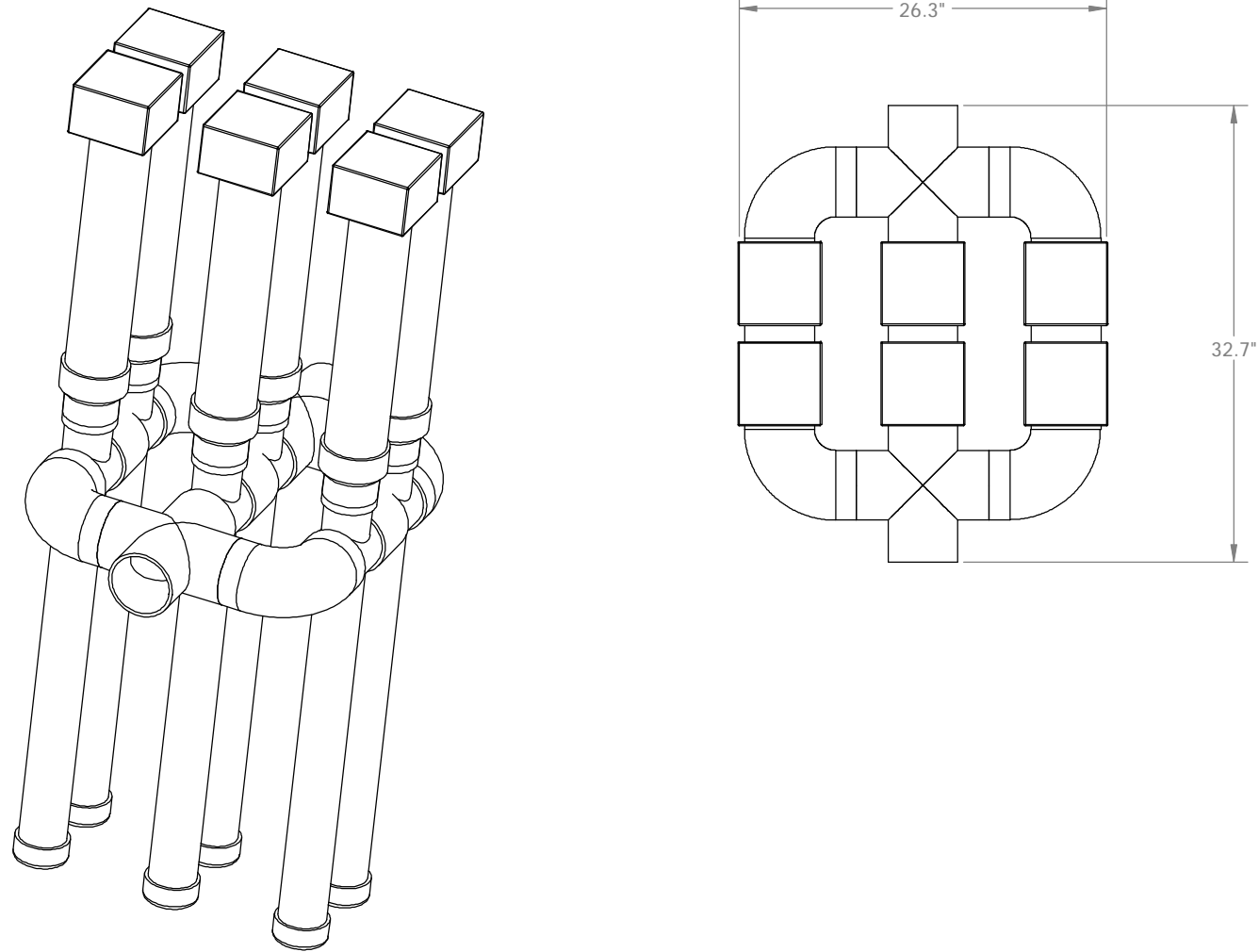


Figure 10

# 8 Units in Parallel & Series

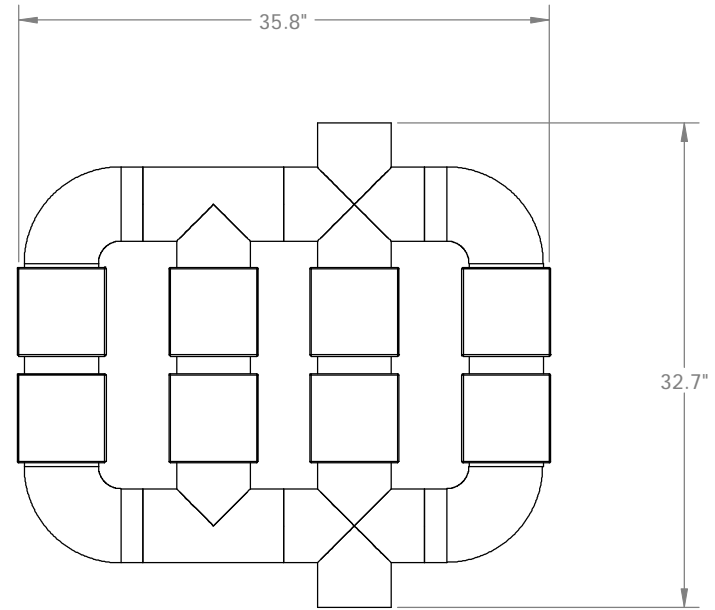
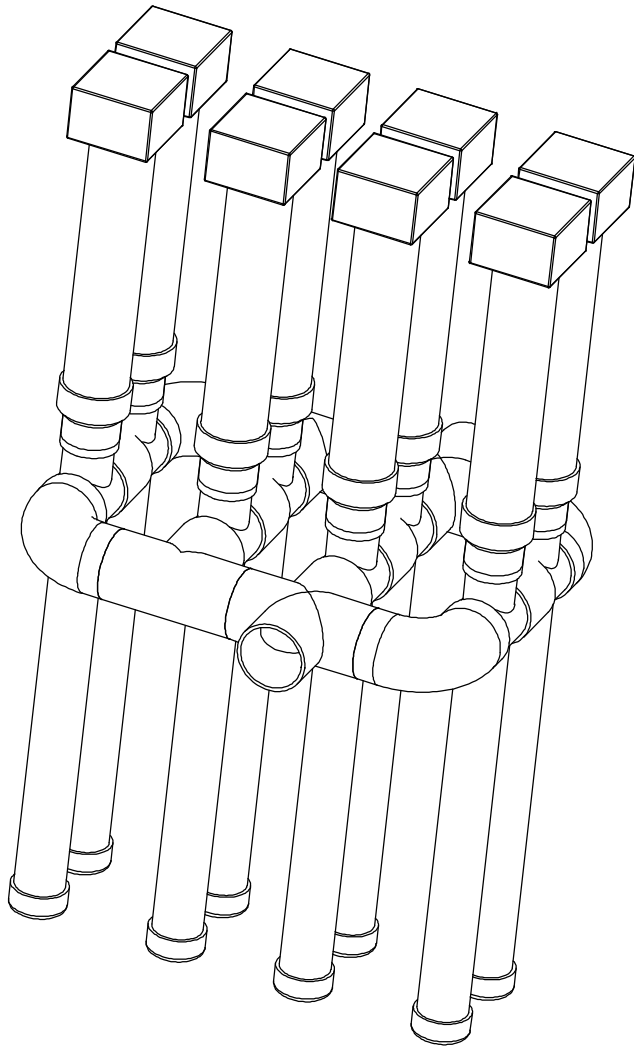


Figure 11