

This note describes Sentinel<sup>®</sup> atomizing nozzles – how they work, their capabilities, where to position them, and their connections to liquid and air supply lines.

### Principle of Operation and Performance

The Sentinel nozzle uses low pressure air to create a highly turbulent zone that shears liquid into tiny droplets and ejects a fast moving plume of fog. The proprietary design delivers efficient atomization without high pressures or small orifices. As a result, Sentinel nozzles are well suited for indoor or outdoor use, including dusty or dirty locations.

Droplet size is determined primarily by the liquid feed rate; a low rate increases liquid residence time in the atomizing zone, making smaller droplets. A feed rate of 2-4 gallons per hour will deliver a “dry” fog of small droplets that float widely and evaporate readily. Increasing the feed rate increases droplet size. At the nozzle’s flow limit - about 20-25 gph - the discharge is a heavy wet mist.

The output plume has an exit velocity of about 30-40 ft/sec and a still air penetration of 50-75 feet. Eddy currents at the plume edge cause lateral mixing, spreading the discharge.

### Placement and Number of Nozzles

With a hand-held fogger, nozzle placement is not an issue; the operator just walks along and points the discharge. However, Sentinel nozzles are usually stationary so a little planning will help ensure that the output meets your needs. Say you want to control odors from a dumpster or smelly exhaust stack. For a point source, one nozzle is usually sufficient. Aim it so small droplets can counteract odors at the source, and also travel along with fugitive emissions.

On the other hand, if you’re fogging a disinfectant to sanitize a room, you will want to set the droplet size and nozzle location(s) for complete and fairly uniform coverage. To treat several rooms, or even a single room full of equipment or obstructions, you may need more than one nozzle; tiny fog droplets can diffuse widely, but tend to stick when they hit something. Conduct experiments by fogging water (only) to see the results. Adjust nozzle location and aim, droplet size and application time until you’re satisfied.

Large areas such as landfills require multiple nozzles. A spacing of 150-200 ft. is generally satisfactory.

Lastly, consider how much liquid you must apply. There are trade-offs between concentration (percent active ingredient), run time, nozzle count and droplet size.



701SS nozzle assembly (stainless steel)  
Air: 1-½" NPTF  
Liquid: ¼" compression fitting

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## Nozzle Connections

The Sentinel nozzle has two connections, one for atomizing air and one for liquid. Both air and liquid systems operate at low pressure – typically 2-4 psi for air, and 5-10 psi for liquid.

Liquid lines are ¼" [6 mm] nylon, vinyl, Viton® or stainless steel tubing. Connector options include barb, quick connect, compression or Luer fittings. Liquid can be supplied from a manifold or a home run to the pump.

Air supply piping is usually PVC, but metal pipe is preferred for temperatures greater than 140-150°F. Pipe mounted nozzles are available with NPT or union connections. Hose-mounted nozzles have barb or cam-lock connections to the air supply, and internal tubing for liquid.

## Liquid and Air Supply

A small transfer pump normally delivers liquid to the nozzles. It operates at low pressure, not much more than the static head needed to lift the liquid to the highest point. A valve for each nozzle controls flow and droplet size.

Any type pump can be used, but peristaltic pumps have several advantages – no liquid contact; self-priming; able to deliver the low flows needed for most fogging applications; and, on some models, remote control variable speed drive. A variable speed pump lets the Sentinel system respond to changing conditions. (For more information, see our paper, "Liquid Supply Considerations for Sentinel Systems" at [http://fogmaster.com/pdf/downloads/Sentinel\\_LSC.pdf](http://fogmaster.com/pdf/downloads/Sentinel_LSC.pdf).)

A regenerative blower is generally used for atomizing air. It is economical, quiet and maintenance-free. The number of nozzles determines blower size – a nearby table has general guidelines. Piping layout is important as well. A poorly designed layout or undersized pipe will cause pressure drops and reduced atomization.

A multi-nozzle installation can use one large blower to supply air for all nozzles, but a zone set-up (of 1-4 nozzles per zone) simplifies the piping layout. It also offers redundancy for equipment outage or maintenance downtime.

The liquid supply can be set up in zones, but this is optional. A single pump fitted with bypass pressure relief can serve one or more zones as required.



700CE Nozzle (available with Celcon or HDPE)  
Air: 2" PVC Union (thread or slip)  
Liquid: quick disconnect (QD) or ¾" barb



59012 nozzle (2" heavy duty hose)  
Air: 2" cam lok (male)  
Liquid: QD, barb or compression fitting



59010 nozzle (1-½" standard duty hose)  
Air: 1-½" cuff with clamp  
Liquid: ¼" barb or QD fitting

### Approximate Air Requirements

Blower size (Hp, 60 Hz)	Nozzles Supported (a)
.5-.67	1
.75-1.0	1-2
1.1-2.5	2-4
4.5	5
7	6-8
10	9-12
20	16-20

(a) Depends on blower design, liquid characteristics, flow rate and desired droplet size.