



## ADIATEC<sup>®</sup> EVAPORATIVE COOLING AND HUMIDIFICATION

### High-Pressure System

- *Energy efficient*
- *Provides both direct and indirect evaporative cooling*
- *Multiple zone capabilities in air handlers, ducts, and open spaces*
- *Complete water treatment options available from DriSteem*
- *Simple, reliable operation*

# Advanced, efficient cooling and humidification

## ENERGY EFFICIENT

Evaporative cooling and humidification systems draw heat from air to evaporate unheated water introduced by high-pressure nozzles. This process raises the relative humidity (RH) level and lowers the dry bulb air temperature. Consequently, these systems humidify and cool air very efficiently.

## REDUCES COOLING LOAD

As water is absorbed in air, the evaporative cooling effect reduces the building's cooling load. Twelve pounds of unheated evaporated water (vapor) reduces the cooling load by about one ton, saving about 12,000 Btus.

## LOW MAINTENANCE

High-Pressure Systems are very low maintenance systems.

The High-Pressure System's stainless-steel pump is designed to run for 8000 hours before its first maintenance check, and the stainless-steel dispersion nozzles and manifolds are maintenance free.

High-Pressure System water treatment options available from DriSteem provide ultra-pure water that leaves no white dust. The reverse osmosis (RO) system automatically flushes the membrane for extended membrane life.

## HIGH-PRESSURE SYSTEM



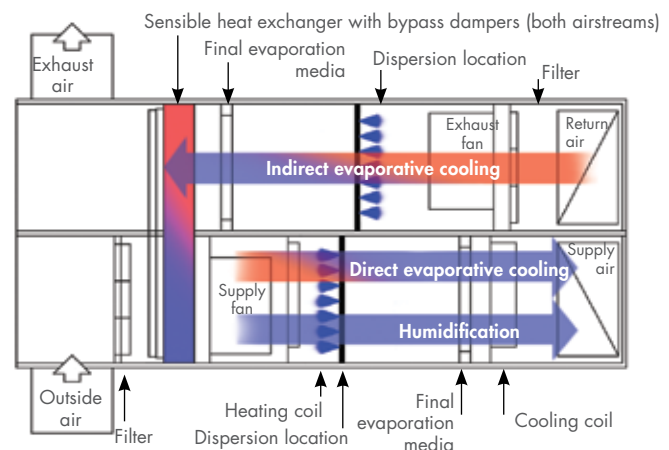
*The DriSteem High-Pressure System delivers evaporative cooling and humidification to multiple zones in air handlers, ducts, and open spaces. The Vapor-logic controller provides comprehensive management of all system variables.*

## DIRECT OR INDIRECT EVAPORATIVE COOLING

*Direct evaporative cooling adds moisture to the supply air while humidifying and cooling the space at the same time.*

*Indirect evaporative cooling occurs in the heat exchanger without adding moisture. Cooling air before it enters the space without adding moisture to the space.*

*A High-Pressure System is shown here.*

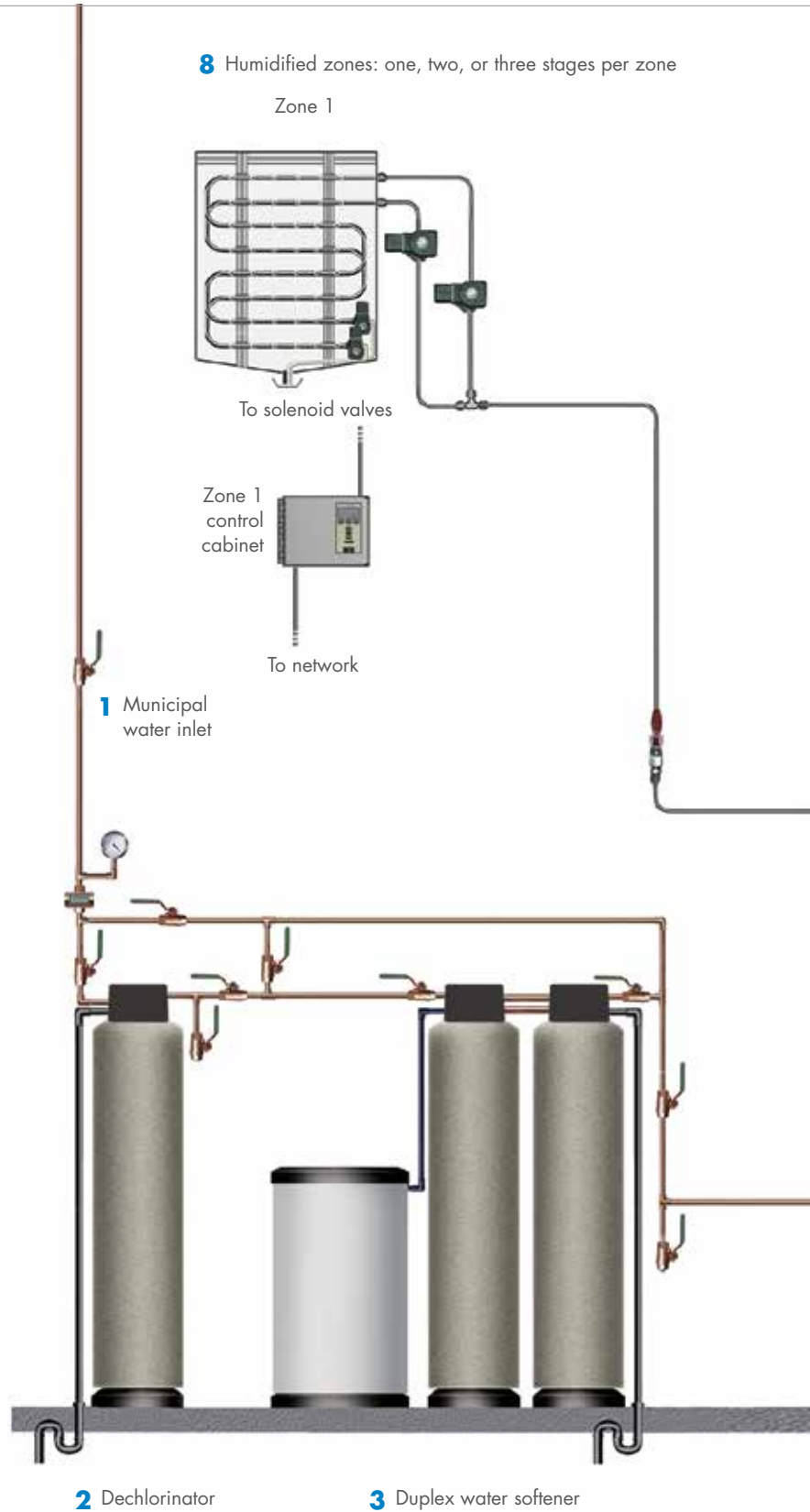


Feature	High-Pressure System
Application versatility	Suitable for any application; commonly used in agriculture, painting, industrial manufacturing, printing facilities, and applications using air-side economizers
Advanced technology	Precision-machined atomizing nozzles fragment water droplets into ultra-fine particles (90% are ten microns or less)
	Water delivered to nozzles at up to 1200 psi (8.27 MPa) requires no pressurized air
	Integral check valve in nozzle ensures no dripping when system shuts off
Cooling effect saves energy	Every pound of atomized water absorbed in air removes approximately 1000 Btu of heat from the air (every kg absorbed removes approximately 2300 kJ of heat)
	Significant energy savings when cooling and humidifying simultaneously
	Utility rebates can offset initial costs
Low maintenance	Stainless-steel pump is cooled by purified supply water; 8000 hours before maintenance check and service
	Stainless-steel nozzles and manifolds require little maintenance (replacement as needed)
	Thorough water filtration protects stainless-steel components from corrosion and undue wear
	Final evaporation media as close as three feet (0.9 m) downstream from heating coil prevents downstream wetting
Comprehensive system control with Vapor-logic	Accurate, responsive RH control; PID control tunes system for maximum performance
	Set up, view, and adjust system functions with intuitive keypad/display or Web interface
	Integrates into any building automation system via an optional BACnet, LonTalk, or Modbus communication protocols
User controlled	Not available
Multiple zone control capability	Individual zone monitoring and modulated staging valves provide tight control in all zones with optimized absorption and minimal water waste
	One system cools and humidifies multiple zones with separate demands
Fan-assisted dispersion	Fan assisted fans have a hub style design for localized access and more efficient evaporation as it moves air more effectively. The fan-assisted dispersion unit pulls the air from above where it tends to be warmer.
Versatile	Cools and humidifies in air handlers, ducts, and open spaces
	Nozzle staging and pulsed modulation allow high turndown of system output. Additionally, a mechanical relief valve allows for internal recirculation; providing further turndown.
	Capacities up to 5500 lbs/hr (2495 kg/h), multiple systems can be combined for larger capacities
	Flexibility to accommodate the most challenging applications; extensive network of DriSteem representatives available to assist with system layout and design
Complete water treatment solution	Water treatment options available from DriSteem include RO hyperfiltration, particulate filtering, dechlorination, and duplex water softening
	Automatic back-flush technology ensures long RO membrane life
	Ultra-pure water can eliminate white dust fallout and bacteria/virus proliferation, that can occur when using potable water

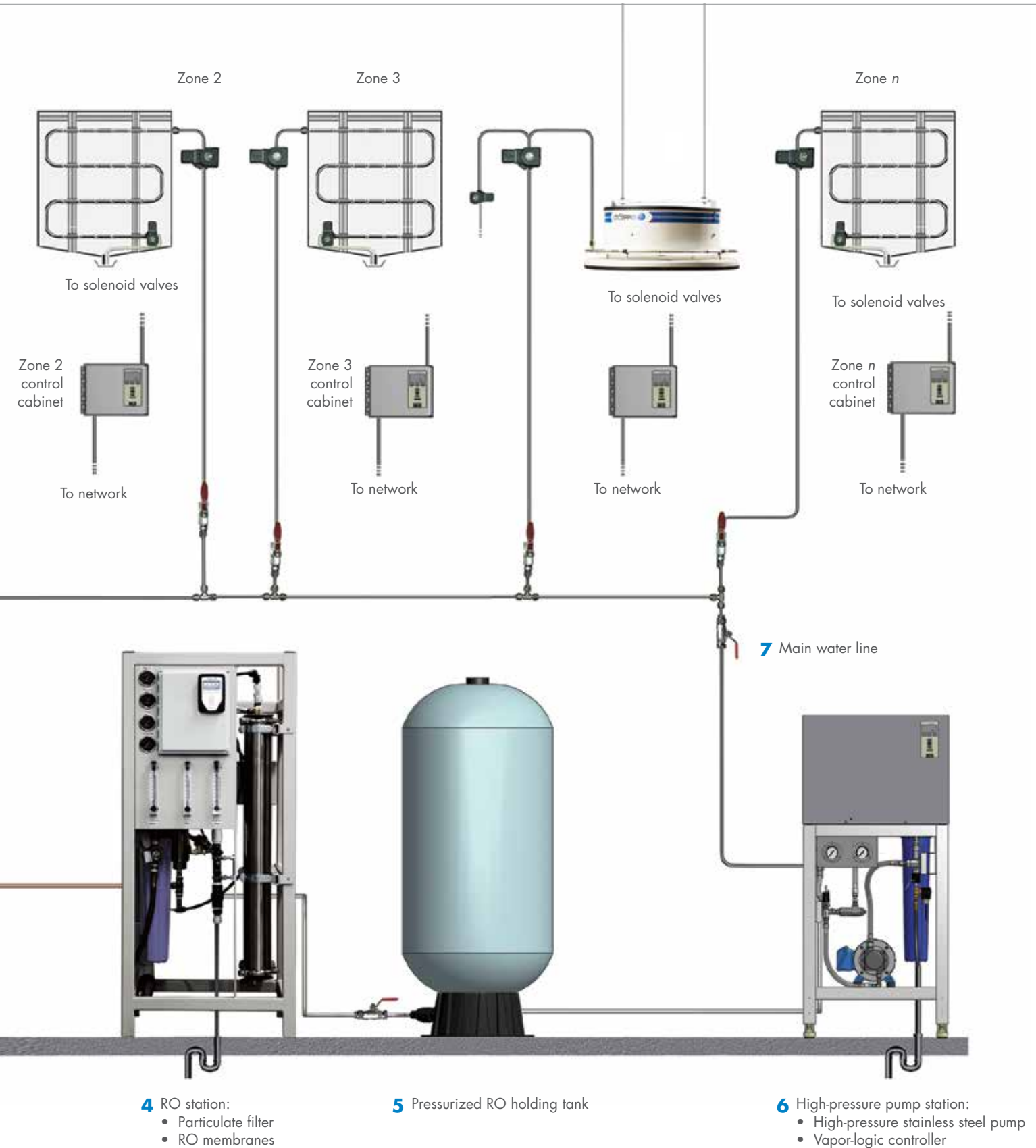
# High-Pressure System sequence of operation

## A COMPLETE SYSTEM THAT INCLUDES WATER TREATMENT

- 1 Water enters system from municipal water supply
- 2 Dechlorinator (wall-mounted on smaller models)
- 3 Duplex water softener with brine tank
- 4 RO station with particulate filter and RO membranes
- 5 Pressurized RO holding tank
- 6 High-pressure pump station:  
All-stainless-steel axial-piston high-pressure pump delivers purified, high-pressure water to atomizing nozzles  
Vapor-logic controller optimizes absorption in multiple humidification zones
- 7 Main water line feeds network of high-pressure, stainless-steel piping
- 8 Humidified zones: purified, ultra-fine water droplets exit nozzles and disperse in AHUs, ducts, and/or open spaces



# High-Pressure System sequence of operation



# High-Pressure System dimensions

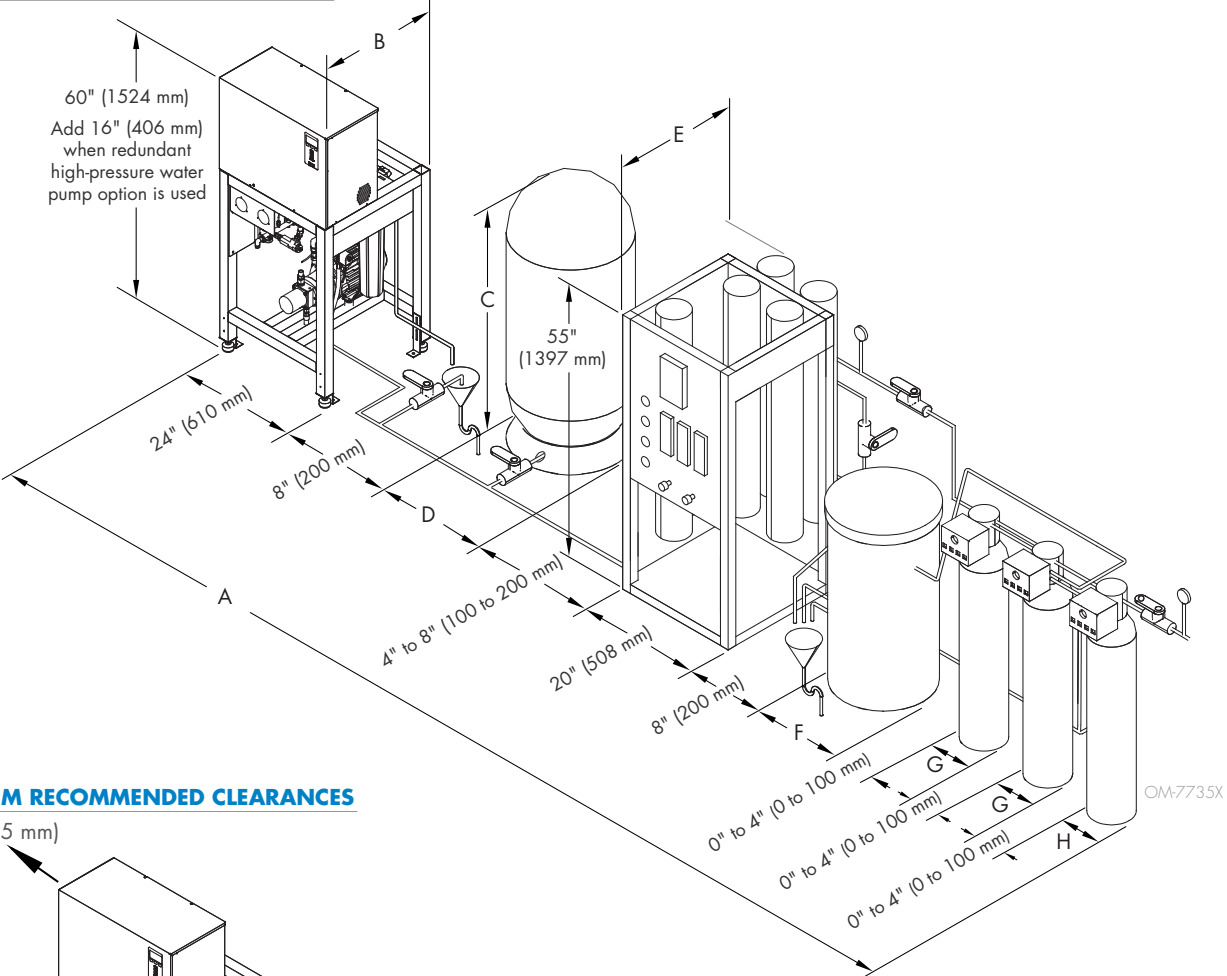
**Table 6-1:**  
DriSteem High-Pressure System dimensions<sup>1</sup>

Model	Dimension															
	A <sup>2</sup>		B		C		D		E		F		G		H	
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
250	150	3810	24 <sup>3</sup>	610 <sup>3</sup>	55	1397	24	610	24	610	18	457	12	305	4 <sup>4</sup>	102 <sup>4</sup>
500	160	4064	24 <sup>3</sup>	610 <sup>3</sup>	55	1397	24	610	24	610	24	610	14	356	4 <sup>4</sup>	102 <sup>4</sup>
1000	176	4470	24 <sup>3</sup>	610 <sup>3</sup>	55	610	24	610	32	813	24	610	16	406	16	406
1750	176	4470	24 <sup>3</sup>	610 <sup>3</sup>	55	610	24	610	32	813	24	610	16	406	16	406
2500	197	5004	30	762	80	2032	24	610	32	813	30	762	21	533	21	533
3500	221	5613	30	762	72	1829	30	762	40	1016	39	991	24	610	24	610
5500	239	6071	30	762	90	2286	30	762	46	1168	39	991	30	762	30	762

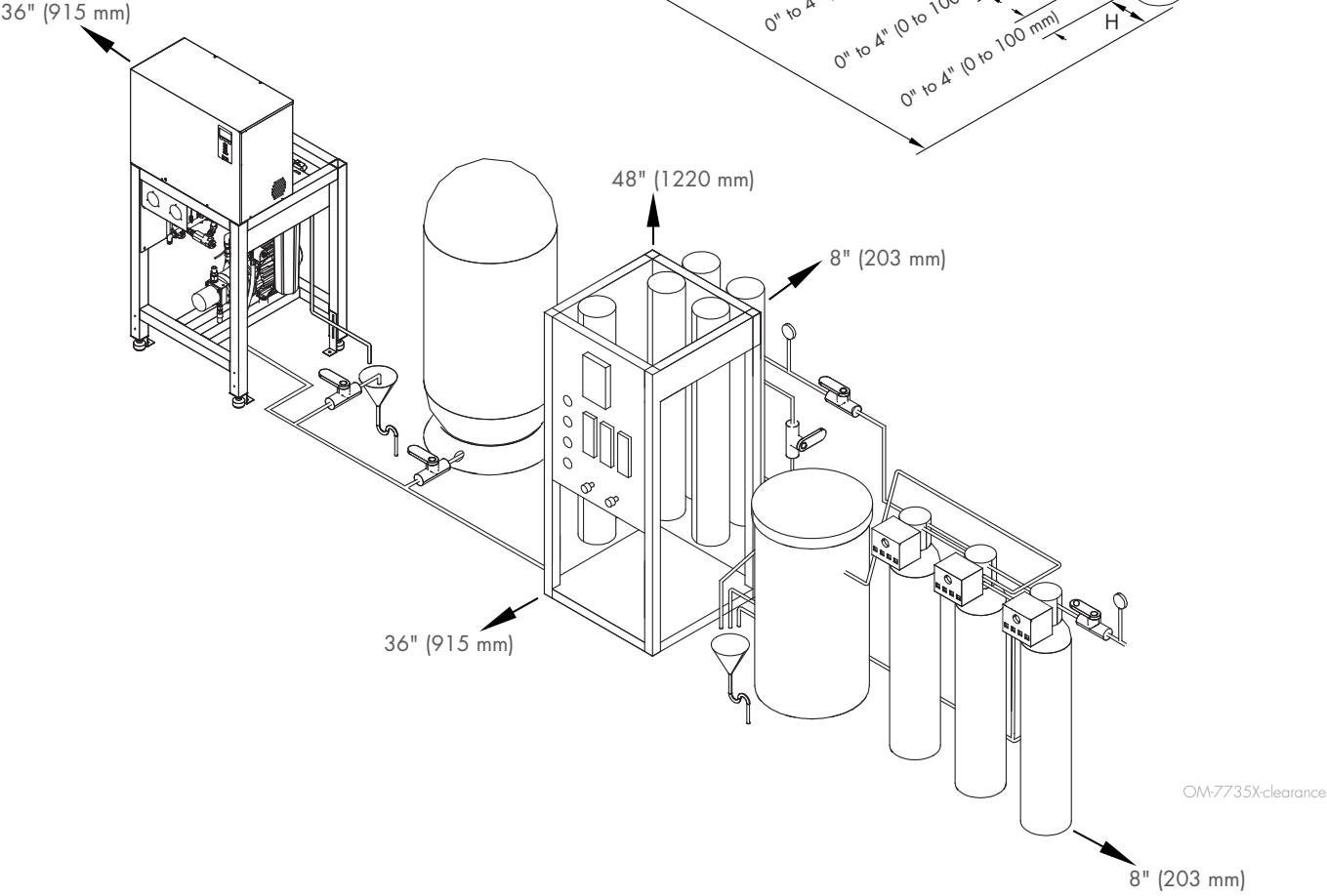
**Notes:**

1. Water treatment component sizing is based on city-treated water, 20-grain hardness, and 50 °F (10 °C) or higher. City-treated water or well water with different hardness or temperature may require different components/dimensions. Call DriSteem with your water characteristics for component sizing.
2. Dimension given is maximum dimension when all components are located sequentially. Component locations are flexible; components may be placed in front of each other if floor space allows.
3. Add 6" (152 mm) when redundant high-pressure water pump option is used.
4. Wall-mounted dechlorinator (optional).

## HIGH-PRESSURE SYSTEM DIMENSIONS



## MINIMUM RECOMMENDED CLEARANCES



# High-Pressure System specifications

**Table 8-1:**  
High-Pressure System pump station specifications

Model	250	500	1000	1750	2500	3500	5500
System capacity, lbs/hr (kg/h)	250 (113)	500 (227)	1000 (454)	1750 (794)	2500 (1134)	3500 (1588)	5500 (2495)
System voltage/phase, Amp draw	240/1, 5.2 480/3, 1.6 600/3, 1.3	240/1, 7.3 480/3, 2.2 600/3, 1.8	240/1, 13.8 480/3, 4.0 600/3, 3.2	480/3, 6.6 600/3, 5.3	480/3, 6.6 600/3, 5.3	480/3, 9.2 600/3, 7.3	480/3, 12.6 600/3, 10.1
Fuse size (see Note 1)	240/1, 25 480/3, 16 600/3, 6	240/1, 35 480/3, 10 600/3, 6	240/1, 50 480/3, 15 600/3, 10	480/3, 30 600/3, 15	480/3, 30 600/3, 15	480/3, 35 600/3, 20	480/3, 40 600/3, 20
Dimensions (W/D/H), inches (mm)	24/24/60 (610/610/1524)	24/24/60 (610/610/1524)	24/24/60 (610/610/1524)	24/24/60 (610/610/1524)	24/30/60 (610/762/1524)	24/30/60 (610/762/1524)	24/30/60 (610/762/1524)
Dimensions (W/D/H) with redundant high-pressure pump option, inches (mm)	24/30/76 (610/762/1930)	24/30/76 (610/762/1930)	24/30/76 (610/762/1930)	24/30/76 (610/762/1930)	24/30/76 (610/762/1930)	24/30/76 (610/762/1930)	24/30/76 (610/762/1930)
Weight, lbs (kg)	275 (125)	300 (136)	325 (147)	325 (147)	350 (159)	400 (181)	450 (204)
Weight with redundant high-pressure pump option, lbs (kg)	375 (170)	400 (181)	475 (216)	475 (216)	500 (227)	625 (284)	700 (318)
Supply water connection diameter, inches (see Note 2)	3/4	3/4	3/4	3/4	3/4	3/4	3/4
High-pressure water connection diameter, inches (see Note 2)	1/2	1/2	1/2	1/2	1/2	1/2	1/2
5-micron prefilter diameter x height, inches (mm)	2.5 x 40 (64 x 1016)	2.5 x 40 (64 x 1016)	2.5 x 40 (64 x 1016)	2.5 x 40 (64 x 1016)	2.5 x 40 (64 x 1016)	2.5 x 40 (64 x 1016)	2.5 x 40 (64 x 1016)
High-pressure pump flow rate, gpm (L/m)	0.5 (1.89)	1.0 (3.78)	2.0 (7.57)	3.5 (13.2)	5 (18.9)	7 (26.5)	11 (41.6)
High-pressure pump motor power, hp (kW)	1 (0.75)	1.5 (1.1)	3 (2.2)	5 (3.7)	5 (3.7)	7.5 (5.5)	10 (7.5)
High-pressure pump motor rpm	1000–1500	1000–2550	1000–2250	1000–2550	1000–2250	1000–2550	700–2450

**Notes:**

1. Wiring and branch circuit protection (Type RK1, J, or T fusing) to be provided by installer in accordance with National Electrical Code (NEC) requirements.
2. High-pressure compression fittings.
3. Unit ships with 36" x 1/2" high-pressure flexible hose and a 1/2" union for easy connection to dispersion piping.
4. 25 psi (170 kPa) supply water pressure at 125% of maximum flow rate, 60 psi (415 kPa) maximum



# High-Pressure System evaporation efficiency

## USING THE EVAPORATION EFFICIENCY CHART

Using 55% leaving air RH and 15 grains of moisture per pound of dry air, the chart identifies:

- Required entering air temperature = 68 °F (20 °C)
- Evaporation efficiency = 70%

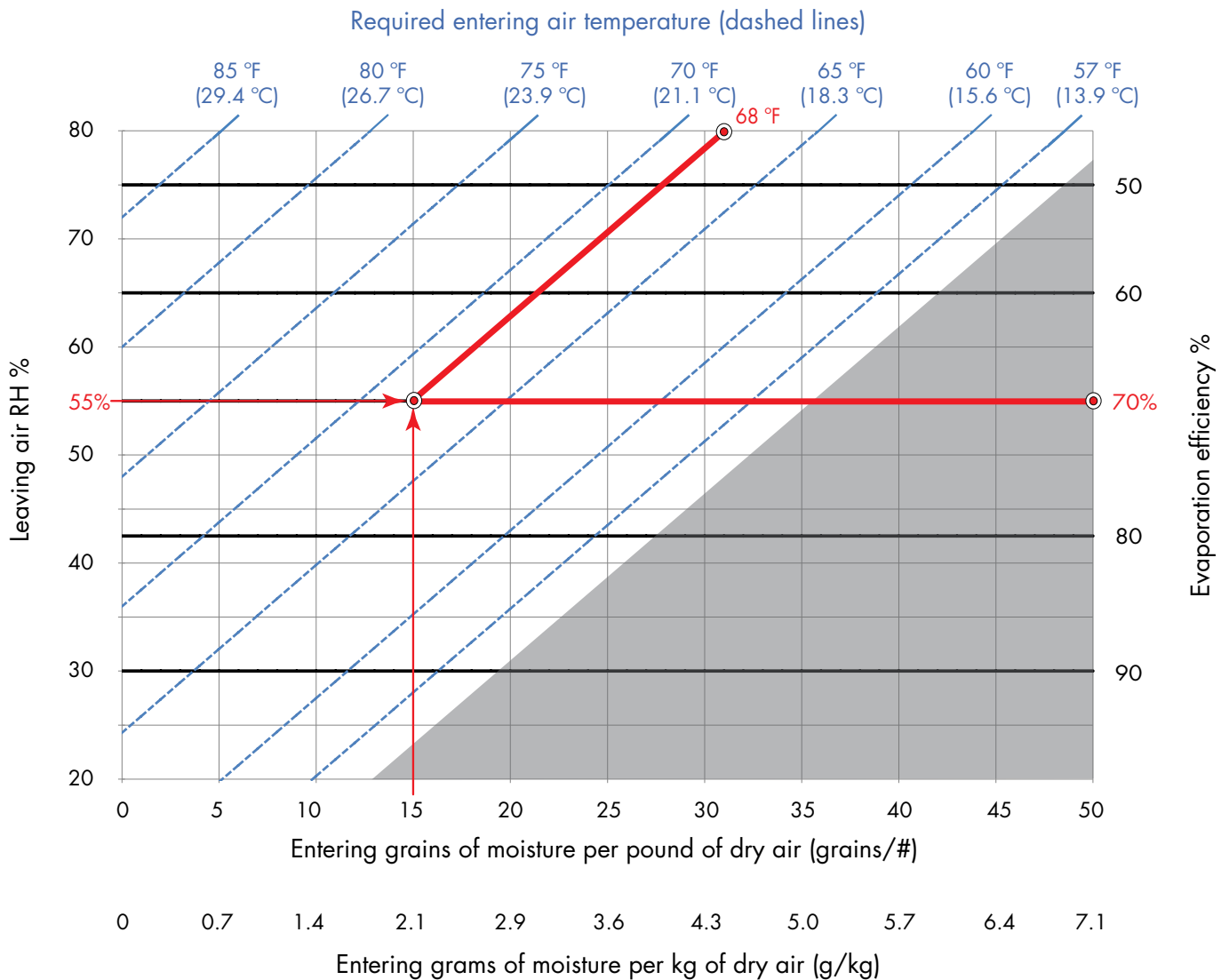
*To accurately size a High-Pressure System, first define all the values, as shown in this section. This will ensure a system that maximizes efficiency and delivers consistent output.*

From these values, required system capacity can be calculated:

$$\frac{\text{Load}}{\text{Evaporation efficiency}} = \text{Required system capacity}$$

$$\frac{385 \text{ lbs/hr}}{0.7} = 550 \text{ lbs/hr} \quad \text{or} \quad \frac{174.6 \text{ kg/h}}{0.7} = 249.4 \text{ kg/h}$$

## EVAPORATION EFFICIENCY CHART\*



\* Evaporation efficiency shown here is based on 4-ft evaporation distance, 55 °F leaving air temperature, and 500 fpm air velocity.

# Fan-assisted dispersion

DriSteem's high-pressure fan-assisted dispersion Model FA is a component of a high-pressure atomization system. The fan is designed to throw small water droplets and increase air movement. The Model FA-2 is designed for low ceiling heights. Models FA-3 and FA-4 are designed to pull air from above the fan (typically the hottest air), which promotes better absorption, and throws moisture horizontally. The Model FA can be used for cooling and/or humidification applications.

Pulls air from above the system rather than below, using the warmest air and minimizing the chance for condensation forming from fog return.

Utilizes flexible tubing to increase installation speed.

The hub style system allows for easier access to service all nozzles on the unit.

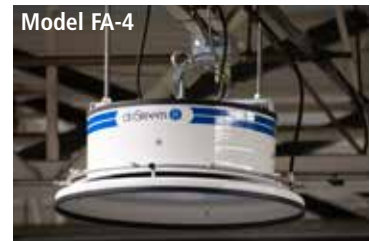
Promotes better air movement.

The stainless steel design provides quality and longevity of the dispersion system.

Fan powered dispersion allows for installation in lower ceiling applications.

## APPLICATION VERSATILITY

- Greenhouses
- Germination chambers
- Printing
- Paper products
- Wood working
- Warehouses
- Electronics
- Textiles
- Clean rooms
- Cigar manufacturing
- Plastic fabrication





**DriSteem Corporation**

A subsidiary of Research Products Corporation  
DriSteem U.S. operations are ISO 9001: 2015  
certified

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For more than 45 years, DriSteem has been leading the industry with  
creative and reliable humidification solutions. Our focus on quality is  
evident in the construction of DriSteem Evaporative Cooling Systems.  
DriSteem leads the industry with a Two-year Limited Warranty and  
optional extended warranty.

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