

System Components

Evaporator. The natural circulation design of the PyroPure double-tubesheet evaporator ensures maximum surface wetting, eliminating the hot, dry areas that lead to the stress-cracking associated with other designs. The tube bundle creates a large heat transfer surface which vaporizes feedwater almost instantly to allow the unit to respond to large loads. Mueller PyroPure pure steam generators have a fully drainable external evaporator, eliminating the need for the excess headroom required for evaporator removal with other designs. All surfaces that come into contact with pure vapor or distillate are made of type 316L stainless steel, including seamless tubes and sanitary clamp-type connections.

Blowdown Cooler Assembly. The blowdown cooler assembly serves three functions toward making the PyroPure pure steam generator as reliable and efficient as possible: preheating feedwater, cooling blowdown, and preventing the buildup of microbial impurities. By transferring heat from blowdown to incoming feedwater, the blowdown cooler serves to preheat the feedwater while at the same time cooling wastewater and preventing it from flashing into steam as it exits the high-pressure separator. Blowdown temperatures are consistently less than 140°F (60°C) when fed with ambient temperature feedwater.

Steam Separator. As the mixture of water and vapor leaves the evaporator at high velocity and enters the steam separator through a tangential port, a natural vortex is formed. The centrifugal force of the vortex separates water droplets and contaminants out of the spiraling vapor. Pure vapor rises up through the steam separator and out of the pure steam outlet at the top of the generator. Because the separator has no baffles or demister, there are no auxiliary surfaces for condensation to accumulate and stagnate. Consequently, concerns over the potential for bacterial growth are eliminated.

Controls. The standard control system is an Allen Bradley PLC with an Allen Bradley operator interface mounted in a NEMA rated panel. Ethernet communication is provided on the standard control system to facilitate communications with adjacent equipment or data archiving systems. Mueller can also provide other Allen Bradley control components, as well as control systems from Siemens, Mitsubishi, and Delta V. Control and electrical panels are supplied with a UL 508a label.

Options

Feedwater Pump System. The feedwater pump system enhances feedwater pressure and should be installed if feedwater supply pressure does not exceed the desired pure steam operating pressure by 15-30 psig (1-2 bar). When furnished, the feedwater pump system will be installed on the pure steam generator framework.

Pure Steam Condensate Sampling System. Regular product testing is essential for regulatory compliance. The sampling system will simplify your sampling methods and enable you to draw samples for testing. The sample valve is located near the control box for easy access.

Pure Steam Analyzer. This option works in conjunction with the pure steam condensate sampling system to measure and record the resistivity (conductivity) and temperature of the condensed pure steam. If the resistivity falls below the user-selected setpoint, the analyzer will signal an alarm on the operator interface.

Stainless Steel Sheathing and Frame. Sheathing made entirely of Type 304 stainless steel enhances the general appearance of your unit and adds shine to any facility. The sturdy Type 304 stainless steel frame enhances the generator's overall appearance and improves its resistance to corrosion. Standard equipment includes a painted carbon steel frame and embossed aluminum insulation sheathing.

Feedwater Analyzer. The feedwater analyzer option continuously measures and records the resistivity (conductivity) of the feedwater. If the resistivity falls below the user-selected setpoint, the analyzer will signal the operator interface.

Degasser. To ensure compliance with regulations limiting the non-condensable gas content in pure steam the degasser may be desired. The degasser uses steam from the steam separator to heat the feedwater. As the feed-water is heated the non-condensable gases are expelled and vented from the equipment.

WFI Production. A pure steam condenser may be included with the pure steam generator to produce up to 150 gallons per hour (568 LPH) of WFI. The condenser may be provided integral to the pure steam generator skid or as a separate skid.

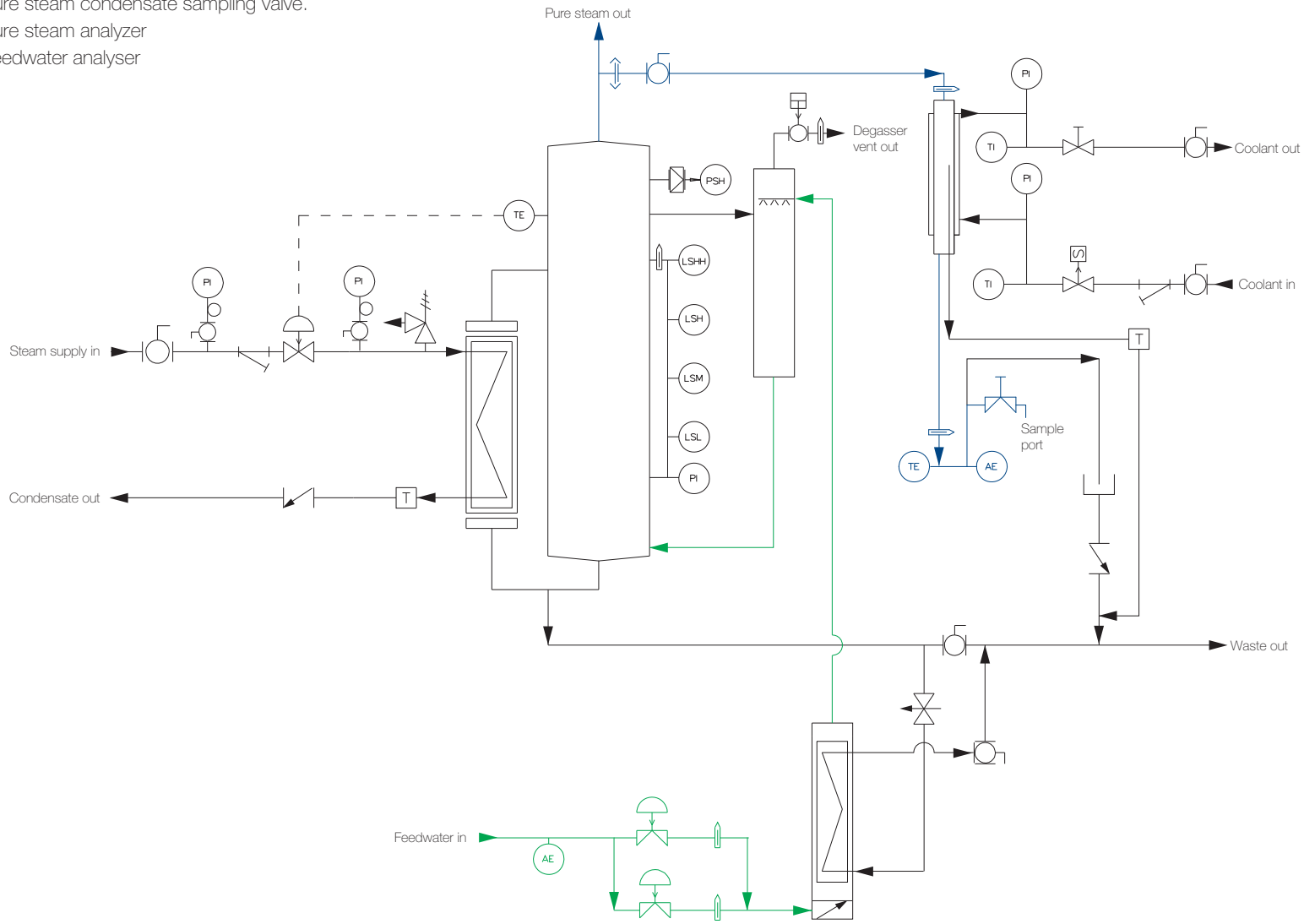
PyroPure Pure Steam Generators

The Mueller PyroPure P7000 Series Advantage

Schematic of Operation

Optional equipment indicated:

- Degasser
- Pure steam condensate sampling valve.
- Pure steam analyzer
- Feedwater analyser



Specifications

Model Nos.	P7060	P7140	P7145	P7310	P7315	P7500	P7505	P7990	P7995
Capacity (lb./hr.)¹	600 (270 kg/hr)	1,200 (544)	1,400 (640)	2,300 (1,043)	3,100 (1,400)	4,100 (1,860)	5,000 (2,270)	7,500 (3,400)	10,600 (4,810)
FW Inlet^{2,5}	1" TC Sanitary	1" TC Sanitary	1" TC Sanitary	1" TC Sanitary	1" TC Sanitary	1" TC Sanitary	1" TC Sanitary	1.5" TC Sanitary	1.5" TC Sanitary
Plant Steam Inlet (150psig max.)³	1" Flange	1.5" Flange	1.5" Flange	2" Flange	2" Flange	3" Flange	3" Flange	4" Flange	4" Flange
Pure Steam Outlet	1.5" TC Sanitary	2" TC Sanitary	2" TC Sanitary	3" TC Sanitary	3" TC Sanitary	4" TC Sanitary	4" TC Sanitary	6" TC Sanitary	6" TC Sanitary
Condensate Outlet⁴	.75" FNPT	1" FNPT	1" FNPT	1.25" FNPT	1.25" FNPT	1.5" NPT	1.5" NPT	2" Flange	2" Flange
Drain	1" TC	1" TC	1" TC	1" TC	1" TC	1" TC	1" TC	1" TC	1" TC
Instrument Air	.25" FNPT	.25" FNPT	.25" FNPT	.25" FNPT	.25" FNPT	.25" FNPT	.25" FNPT	.25" FNPT	.25" FNPT
FW Pressure/ Quantity Req'd.⁵	150 psig/Maximum of 1 ppm silica or total hardness. No chlorine, chlorides, or amines.								
Elec. Srv. (Std.)⁶	Without Pump: 115 VAC, 1 phase, 50/60 Hz.; With Pump: 460 VAC, 3 phase, 60 Hz. (Other voltages available upon request.)								
Height⁷	94" (240 cm)	107" (270 cm)	107" (270 cm)	115" (290 cm)	115" (290 cm)	126" (320 cm)	126" (320 cm)	143" (363 cm)	167" (423 cm)
Width⁷	47.5" (120.5 cm)	48" (122 cm)	48" (122 cm)	50" (127 cm)	50" (127 cm)	50" (127 cm)	50" (127 cm)	60.5" (154 cm)	60.5" (154 cm)
Depth⁷	46" (117 cm)	46.5" (118 cm)	46.5" (118 cm)	54.5" (138 cm)	54.5" (138 cm)	61.5" (156 cm)	61.5" (156 cm)	63" (160 cm)	63" (160 cm)
Operating/ Shipping Wt.	1,500 lbs (680 kg)	2,150 lbs (980 kg)	2,350 lbs (1,070 kg)	2,700 lbs (1,230 kg)	2,800 lbs (1,270 kg)	5,100 lbs (2,313 kg)	5,700 lbs (2,580 kg)	8190 lbs (3710 kg)	9200 lbs (3870 kg)

¹ Capacity is based on a steam supply pressure of 120 psig, a clean steam header pressure of 50 psig, and a feedwater temperature of 70°F.

² Feedwater flow rate must be 5 to 10 percent greater than the pure steam volume produced to allow for blowdown (e.g., 100 lb/hr [12 gph] pure steam requires 110 lb/hr [13.8 gph] feedwater).

³ If feedwater temperature is at least 160°F (71°C) then plant steam must be 20 percent greater than pure steam capacity (e.g., 100 lb/hr pure steam requires 120 lb/hr plant steam). If feedwater temperature is approximately 70°F, then plant steam must be 30 percent greater than pure steam capacity.

⁴ Generator performance curves assume no back pressure on the condensate outlet. Any back pressure must be subtracted from the inlet supply steam pressure to figure the net effective inlet steam pressure and actual unit performance.

⁵ If a feedwater pump is used, feedwater must be supplied at a minimum pressure of 10 psig and connection size may be larger than indicated.

⁶ Other electrical services must be specified at time of order.

⁷ Dimensions and weights do not include options. All specifications subject to change without notice.

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Pressure and Temperature Charts — Capacity Curves

1. Select the chart(s) with pure steam capacities closest to the one you need.
2. Locate your supply steam pressure on the vertical axis.
3. Follow that line across to the point where it intersects with the curve representing your required pure steam pressure.
4. Drop down from this point to the horizontal axis to determine the model's pure steam capacity.
5. Select the model which most closely fits your capacity needs given your pressure requirements.

