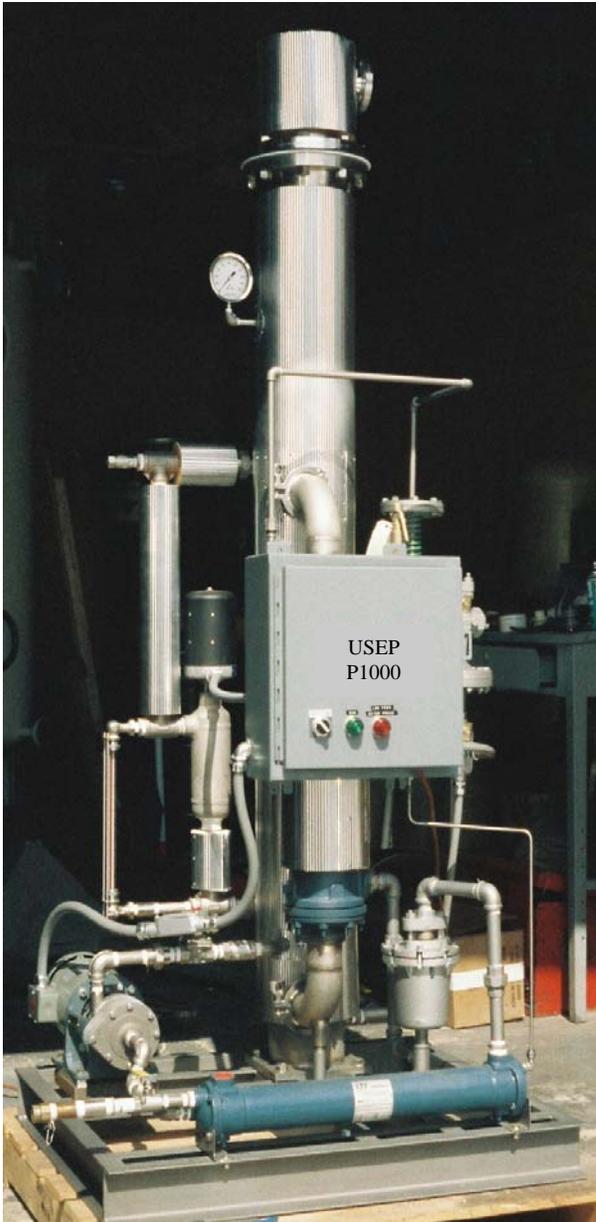


Pyrogen-Free Steam for Guaranteed Sterilization US Engineered Products-Pure Steam Generators.

US Engineered Products



Pure Steam Generator

US Engineered Products automatic Pure Steam Generator are designed for pharmaceutical, cosmetics manufactures, research institutions, hospitals and other organizations requiring pure, pyrogen-free steam for sterilization. Ideal for in-line sterilization of liquid storage tanks and distribution equipment, the compact, steam-powered systems can also be used effectively to power sterilizers and autoclaves, or to provide steam at the point-of-use.

A US Engineered Products Pure Steam Generator can produce a significant cost savings for applications in which the presence of boiler treatment additives is not permitted. Chemical treatment can be freely used in the main boiler feeding the Pure Steam Generator without any fear of contaminating the integrity of the final sterilization process. The resulting increase in boiler efficiency can, in many cases, pay for the equipment cost in less than one year.

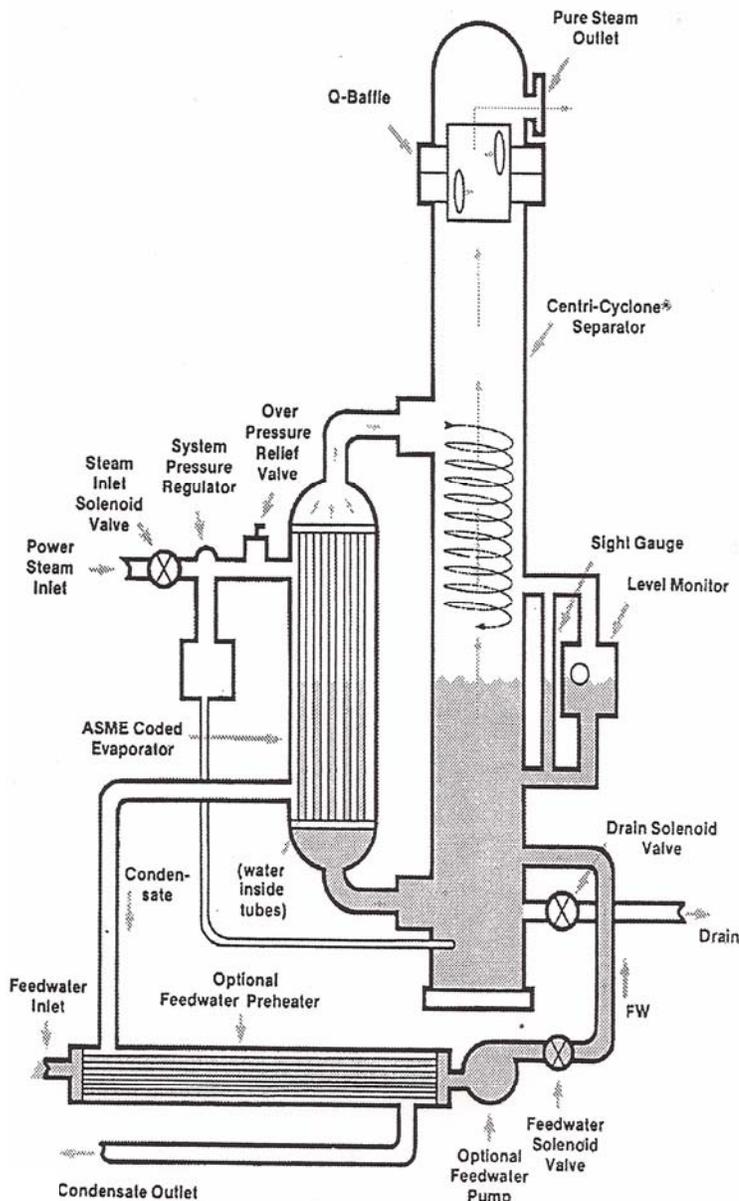
Available in six models with output capacities ranging from 100 to 6,000 lbs/hr. (46 to 2,718 kg/hr.), each Pure Steam Generator incorporates a proprietary Baffle for complete removal of entrained impurities, including all pyrogen contamination. All surfaces in contact with pure steam and feed water are fabricated of Type 316 stainless steel. Shipped completely assembled on welded steel frame, the US Engineered Products Pure Steam Generator is fully warranted against defects in materials or workmanship for a period of one year.

Products and Services for the Water Treatment Industry

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Specifications

Model P1000-100 to 500 lbs/hr (46 to 277 kg/hr)
Model P1001-200 to 800 lbs/hr (91 to 364 kg/hr)
Model P1002-300 to 1000 lbs/hr (136 to 435 kg/hr)
Model P1003-400 to 1200 lbs/hr (181 to 544 kg/hr)
Model P1004-800 to 2400 lbs/hr (362 to 1087 kg/hr)
Model P1005-2000 to 6000 lbs/hr (906 to 2718 kg/hr)



General

The U.S. Engineered Products Pure Steam Generator consists of an efficient tube-in-shell evaporator (boiler), a Centri-Cyclone centrifugal separator, a Baffle for complete removal of pyrogenic impurities, automatic drain, water level and inlet steam controls. Accessories include a Feed Water Preheater to reduce operating cost and a feed water pump. The unit-plus accessories if included-is completely self contained on a welded steel frame.

Automatic Controls

Flow of feed water and steam power to the system is automatically controlled by a float-type Level monitor. The Level Monitor activates the feed water solenoid valve (and feed water pump, included) to maintain a constant water level in the Evaporator and Centri-Cyclone. Should the feed water supply be interrupted, the Level Monitor automatically closes the inlet steam solenoid valve until a safe water level in the Evaporator is re-established.

The pure steam outlet pressure is adjustable between 10 and 50 psi (0.7 and 3.6 kg/cm²). The desired operating pressure is maintained at a constant level by the Inlet Pressure Regulator.

The automatic drain cycle is activated manually by turning the system "OFF". Pressure switches are included to prevent the drain solenoid valve from opening until pressure within the system is reduced to a safe level. The drain remains open for 30 minutes before automatically closing.

Automatic controls are housed on an integral control panel with power ON/OFF switch, and indicator lights for RUN and Drain modes.

Evaporator

Fabricated of Type 316 stainless steel, the system evaporator is a tube-in-shell design for maximum efficiency and economy. In operation, power steam (115 psig maximum) surrounds a network of straight tubes in which the feed water is evaporated. Because of the extremely large surface area of the bundle, high velocity vapor is produced only seconds after power steam is introduced to the Evaporator.

ASME Coded and stamped for 125psi (8.7 kg/cm²) steam pressure the system Evaporator includes an adjustable inlet steam pressure regulator, and automatic inlet steam solenoid valve, an overpressure relief valve, and a steam trap.

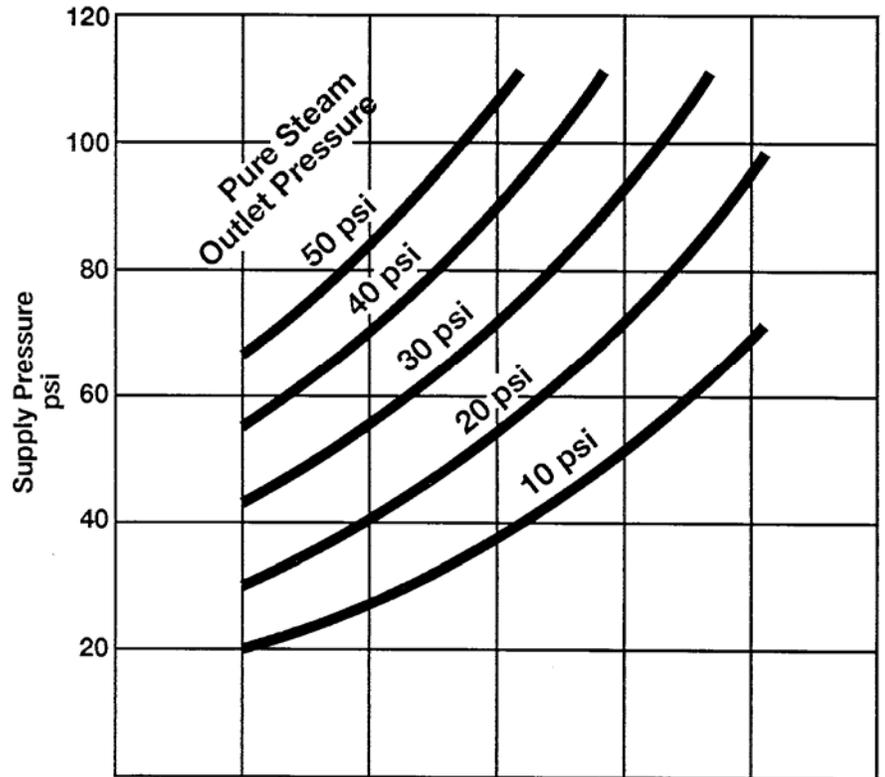
The system Evaporator is also available in a double-tube sheet design on special order.

US Engineered Products

How to Size a USEP Pure Steam Generator.

Sizing of a Pure Steam Generator is a function of the inlet steam supply pressure, the required outlet pressure and the required capacity in pounds per hour of pure steam. The chart (to the right) illustrates these relationships for each of the six available models.

To size a system, start with the inlet steam supply pressure which is available, and then follow the graph to the desired outlet pressure of pure steam. The system(s) which meet the required output capacity can then be determined at the bottom of the graph. For example, assuming an available supply pressure of 75psi, a required outlet pressure, of 35psi and required capacity of 600 lbs/hr, either models P1002 or P1003 can be selected. The later model would be the best choice if the required capacity is projected to expand in the future.



Model	100	200	300	400	500
P1000	100	200	300	400	500
P1001	200	350	500	650	800
P1002	300	500	750	900	1000
P1003	400	600	800	1000	1800
P1004	800	1200	1600	2000	2400
P1005	2000	3000	4000	5000	6000

Centri-Cyclone Separator

The unique Centri-Cyclone column causes a continuous and uniform directional change of vapor for a fast and effective separation. High velocity water vapor from the Evaporator enters the Centri-Cyclone at tangent and is directed downward in a tight spiral. Entrained droplets are centrifuged out of the vapor and are collected at the base of the unit.

The resulting pure, dry vapor then rises through the upper Baffle for complete removal of any entrained impurities.

The Centri-Cyclone column is fabricated of type 316 stainless steel and includes a Level Control Monitor automatic drain, Baffle, and 0 to 60 psi pressure gauge.

Baffle

Located at the top of the Centri-Cyclone column, the patented Baffle enables production of absolutely pyrogen-free sterilizing steam. The stainless steel Baffle directs ascending vapor through thirteen 180° directional changes. This tortuous path strips vapor of even microscopic entrainment and all pyrogen contamination.

System Accessories

Feed water Pump

P1015-1½ hp for models P1000, P1001, P1002, P1003 and P1004

P1016-2 hp for model P1005

A Feed Water Pump should be included if inlet feed water pressure is not at least 15 psi (1.0 kg/cm²) above the outlet pure steam operating pressure. Fabricated of Type 316 stainless steel, the pump is of mechanical seal design and includes a motor starter, overload protection, all interconnecting piping and all wiring for automatic operation.

Feed Water Preheater

P1010-for all models

Fabricated of Type 316 stainless steel, the tube-in-shell heat exchanger should be used if feed water temperature is below 160°F (72°C). The Feed Water Preheater utilizes power steam condensate from the evaporator to preheat make-up water to the system. On special order, the Feed Water Preheater is available in a double tube sheet design.

	Model P1000	Model P1001	Model P1002	Model P1003	Model P1004	Model P1005
Feedwater Quality'	500,000 ohm-cm (at 25°C) minimum, produced by a, deionizer, reverse osmosis system or still.					
Feedwater Inlet	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT
Pure Steam Outlet (Flange)	1"	1½"	1½"	2"	2"	3"
Power Steam Inlet	¾" NPT	1" NPT	1¼" NPT	1½" NPT	1½" NPT	2½" (Flange)
Maximum Inlet Steam Pressure	115 psi	115 psi	115 psi	115 psi	115 psi	115 psi
Condensate Outlet	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT
Drain	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT	¾" NPT
Power With Feedwater Pump	240/480 VAC, 60 Hz, three phase					
Without Feedwater Pump	120 VAC, 60 Hz, single phase					
Dimensions						
Height – in (cm)	67½ (172.4)	80½ (204.5)	80½ (204.5)	92½ (235)	100¼ (256.6)	133¾ (339.6)
Width – in (cm)	37 (94)	38 (96.5)	38 (96.5)	38 (96.5)	48 (121.9)	48 (121.9)
Depth – in (cm)	31 (78.7)	34 (86.4)	34 (86.4)	34 (86.4)	35½ (90.2)	38½ (97.8)
Est. Shipping Weight lbs (kg)	900 (408)	1000 (454)	1060 (481)	1100 (499)	1290 (585)	2500 (1134)

¹US Engineered Products offers a complete range of packaged deionization, reverse osmosis or distillation systems which can be perfectly sized for any Pure Steam Generator model.