

Pure Steam Generator

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Pure Steam Generators are designed and constructed to produce endotoxin-free pure steam in accordance with the latest International Pharmacopeia and the latest cGMP FDA and EN standard. The range of PSG available is capable of supplying any pharmaceutical autoclave, humidification system, sterilizing tank, vessel and process line.

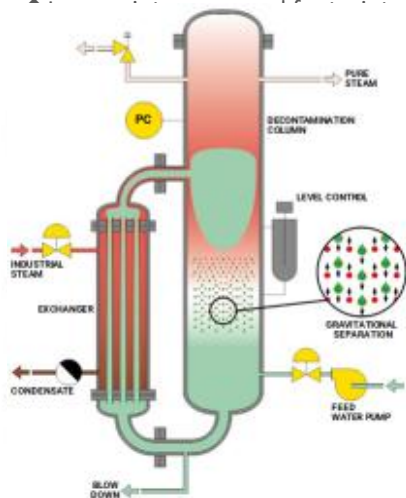
Standard steam heated model range from 50 – 3,000 kg/hr production.

Electrically heated model is available up to 200 kg/hr production.

PSG Main Features

Many features make the Biocell PSG system the best pure steam generator available. Some examples are:

- ◆ Accumulating boiler thermal wheel concept designed
- ◆ specifically for rapidly fluctuating steam header demand
- ◆ Fully modulating 0-100% output
- ◆ Exceptional response time, virtually no pressure drop on pulsing
- ◆ High purity due to reliable gravitational separation
- ◆ Physical quality in excess of EN285 limit
- ◆ Steam quality independent of utility
- ◆ Lowest blow down and steam utility demand



The system is composed of two parallel bodies, the heat exchanger and the evaporator-decontamination column. Feed water is fed into the main body of the decontamination column while industrial steam is fed into the heat exchanger shell.

The industrial steam heats the feed water to evaporation temperature creating a strong circulation through both bodies. Low velocity of steam and the height of the decontamination column eliminate any possibility of impure water droplet entrapment.

Construction Characteristics

The plant is made completely of AISI 316L stainless steel. The supporting frame is AISI 304 as standard, epoxy-coated steel option.

The standard finishing of the active surface is pickled and passivated; and mechanically polished where required.

The heat exchanger is a DTS type, totally separate from the main column; the pipes are expanded into the plates avoiding any welding for a totally hygienic solution and better resistance against dilation stress.

The design and construction of the decontamination chamber, which is a totally empty column, ensures inspectability. The absence of complex welded structure in this area reduces the risk of corrosion.



Clean Steam Generators



Operating Principles



Biocell

Pharmaceutical Water System

- ◆ Pre-treatment
- ◆ PW–Purified Water System
- ◆ WFI–Multi-Effect Still
- ◆ WFI–Electrically Heated Multi-Effect Still
- ◆ PS–Pure Steam Generator
- ◆ PS–Electrically Heated Pure Steam Generator
- ◆ PS & WFI Combination
- ◆ PS/WFI–Storage & Distribution Systems
- ◆ HPW–EDI Skid
- ◆ Cold WFI –Integrated Membrane System For WFI
- ◆ CIP& SIP
- ◆ Mixing Vessel
- ◆ Double Tube Sheet (DTS) Shell & Tube Heat Exchanger

Purified & Highly Purified System

- ◆ Pre-Treatment System
- ◆ Reverse Osmosis Plant (RO)
- ◆ Nanofiltration Plant (NF)
- ◆ Ultra Filtration Plant (UF)
- ◆ Electro Dionization (EDI)
- ◆ Electrodialyzer (ED)
- ◆ Ion Exchanger (IX)
- ◆ Mixed Bed Plant (MB)

Laboratory Ultrapure Water Machine & Sewage Treatment Machine

- ◆ Plus-E2 UP Water Machine
- ◆ Plus-E3 UP Water Machine
- ◆ Fast-X3 UP Water Machine
- ◆ Integrated Sewage Treatment Equipment

Qirui Water Treatment

Complete Turn-Key Project

Pure Steam Generators

Services

Biocell, like our suppliers are solely dedicated to the regulated pharmaceutical sector. This enables us to fully understand not only the quality of performance required, but the documented evidence of all activities.

Project Management

A dedicated Project Manager follows each sale through to OQ handover. Liaison with customers, suppliers and field operations team to ensure effective project delivery.

Project Sitework

From our highly trained team offering:

- ◆ Installation Assistance
- ◆ Start-up & Commissioning
- ◆ SAT, IQ/OQ
- ◆ Calibration
- ◆ Thermal Mapping
- ◆ Cycle & Process Development

After-Sales

Full life-time support for equipment including:

- ◆ Full Training Packages
- ◆ Technical & Process Support
- ◆ Spare Parts Supply
- ◆ Preventative Maintenance
- ◆ Calibration
- ◆ Routine Validation
- ◆ Upgrade and Revamping



EN285 (HTM2010) Options

For installation where compliance with international standards (EN285, HTM2010) is required Biocell have developed a number of alternative solutions:

Internal Gasbuster

Pre-heated feed water is fed directly to the decontamination column through a specially designed device. A stream of pure steam is used to strip the NCG's from the incoming feedwater.

External Break Tank/ Degasser

This system is an external tank where feed water is circulated, heated and sprayed into the break tank. This removes NCG's which are then vented off.

Steam quality test points can be included in the pure steam outlet for full EN285 (HTM2010) testing.

LD(S) Combi

The innovative Biocell LD(S)Combi combines into one system a Biocell pure steam generator with its output flexibility and instantaneous response, with the columns of a Biocell multi-effect still. This achieves uninterrupted WFI supply and simultaneously, pure steam for a typical fluctuating demand load. By applying the optimum technology for each service need the Biocell Combi pure steam generator/multiple effect still is the most flexible unit available. For smaller or intermittent amounts of WFI to be created a Biocell DTS pure steam condenser can also be used for the simultaneous creation of WFI.



Electrically Heated PSG

For capacities up to 200kg/hr, PSG can be purely electrically heated. The design of a large evaporation chamber is ideal for such applications.



Falling Film Heat Exchange

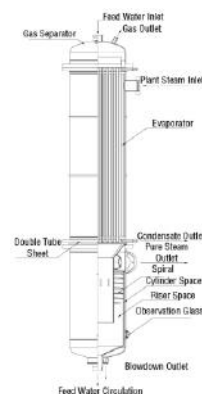


Separator Column



The core of falling film evaporation is its column – a compact design falling-film evaporator and a separator that removes impurities at high centrifugal velocities at the spiral. The impurities are removed as blowdown is directed away from the pure steam outlet. Falling film evaporation three-stage separation technology ensures high quality steam free of endotoxin, pyrogen and droplet. Three-stage separation provides:

- > Separation by falling film evaporation
- > Gravity separation by 180-degree flow turn
- > Centrifugal separation



A full lifetime support.

Biocell