



PURE STEAM GENERATORS

STILMAS' PSG-DTS ULTRA-PURE PYROGEN-FREE PURE STEAM GENERATORS PRODUCE PURE STEAM WHICH MEETS THE LATEST REQUIREMENTS OF THE INTERNATIONAL PHARMACOPEIAS INCLUDING USP, EP AND JP.

Standard models capacity:

- ⊕ From 50 to 6.000 kg/h output



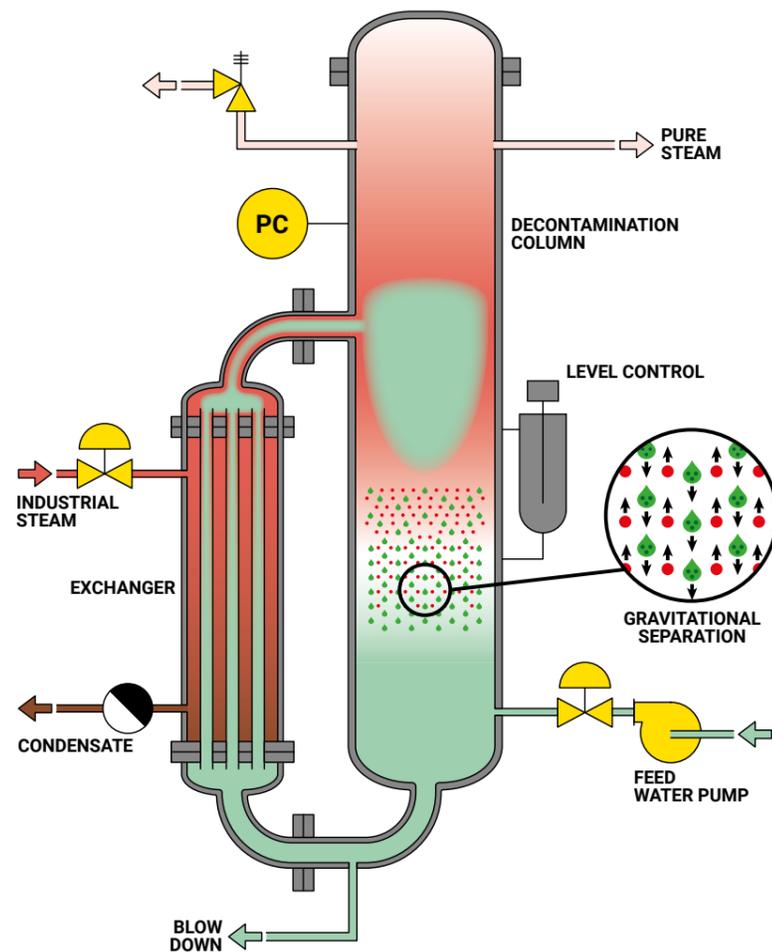
MAIN FEATURES OF STILMAS PSG - DTS

- ⊕ Immediate start up: pure steam is immediately available thanks to the "accumulating boiler" technology design. The unit is able to pass from stand-by to full capacity in a few seconds
- ⊕ High Flexibility: the production capacity can be varied automatically from 0 to 100% according to the demand
- ⊕ Unique purification system: gravitational purification principle for better guarantee of steam purity
- ⊕ High Quality Steam: the quality of produced steam is constant in terms of pyrogen contents, superheat value and dryness fraction, independently from pressure and production flow rate
- ⊕ Simple and clean mechanical construction: baffle and demister free decontamination chamber, granting the best inspectability, minimized corrosion risk, for the longest expected life of the equipment
- ⊕ Extremely limited maintenance. No moving parts, expansion joints or mechanical seals
- ⊕ Compact construction and low height. Little extra head room needed for dismantling and inspection
- ⊕ Software is developed according to the latest GAMP
- ⊕ Supervision system CFR 21 - Part 11 Compliant

OPERATING PRINCIPLE

Stilmas' PSG - DTS Pure Steam Generators design is based on the thermosyphon technology. The system is composed by two parallel bodies: the heat exchanger and the evaporator/decontamination column. Feed water is fed to the decontamination column (main body) while industrial steam is fed to the heat exchanger shell side. Industrial steam heats the feed water to evaporation temperature, creating a strong circulation inside the two bodies.

The steam develops in the evaporator where its low velocity and the height of the decontamination column eliminate any possible impure water droplets entrainment. A pressure transducer, installed in the evaporator, controls the industrial steam input to the heat exchanger, thus granting constant pressure of the produced pure steam. The feed water flow is controlled by a level transmitter installed in the evaporator.



NON-CONDENSABLE GASES (NCG) REDUCTION

Stilmas has developed two alternative solutions to comply the NCG requirements of EN 285.

The first solution consists of a buffer tank into which the preheated feed water is sprayed separating the liquid from gas which is then stripped out. This solution can retrofit any clean steam generator to allow the accomplishment of NCG content.

The second solution, Stilmas Gasbuster® is embedded into the PSG. The degassing process occurs when the preheated feed water enters into the decontamination column and is sprayed separating the liquid from gas which is then stripped out by a small stream of clean steam.

With both solutions Stilmas' PSG is able to grant NCG content much lower than what is required by the international rules.



ENDOTOXIN REDUCTION

A unique and careful design of the decontamination chamber allows Stilmas to grant the highest performances in terms of endotoxin content reduction.

The gravitational separation system has proven to be an extremely simple and simultaneously effective process for the separation of the contaminants from the pure steam.

Challenging the system with increased endotoxin levels in the feed water has proven the capability of Stilmas PSG-DTS to reduce endotoxin level by log 6 (1.000.000 times).

CONSTRUCTION CHARACTERISTICS

The plant is completely made in AISI 316L stainless steel. Standard finishing of the active surface is smooth & flush with passivation; mechanical or electrochemical polishing can be made on request.

The heat exchanger is shell-and-tube type with double tube sheet execution; the pipes are expanded into the plates, avoiding any welding for a totally hygienic execution, and a better resistance against dilatation stress.

The design and construction of the decontamination chamber, which is a totally empty column, ensure the best inspect ability. The absence in this area of welds dramatically reduce the risk of corrosion, for a very long expected life of the equipment.

The general construction design, coupled with the described decontamination process, ensure a very compact layout and require an extremely limited space for maintenance.

MORE...

WFI PRODUCTION FEATURE

The Pure Steam Generator function can be extended to WFI generator by equipping it with a Pure Steam Condenser (PSC).

The electric variant delivers the same qualitative performance of the DTS version using electrical energy instead of industrial steam as heating source. CS production capacity vary between 60 and 500 kg/h.



DOCUMENTATION AND AUTOMATION

THE DOCUMENTATION PACKAGE SUPPLIED BY STILMAS FOR ITS PLANTS IS CONCEIVED AND ORGANIZED TO:

- ⌚ Provide documented evidence of the Project Life-cycle, from the design phase up to the final Site Acceptance Test runs
- ⌚ Collect all the necessary information as needed to consistently feed and support the Validation Activity

STILMAS' AUTOMATION MAIN FEATURES

- ⌚ All PLC controllers have the possibility to be connected with a factory supervisory system via the most common communication systems
- ⌚ Software is developed according to the latest GAMP
- ⌚ Supervision SCADA system CFR 21 - Part 11 Compliant

