

KOMB System
Multi Effect Still + PS Generator

Our KOMB system is a unique design for the simultaneous production of WFI and PS, combining functions of a Multiple Effect Distiller (MED) and of a Pure Steam Generator (PSG) on a single skid, reducing the space requirements and cost.

A single SCADA system controls both the MED and PSG which is capable of providing separate or simultaneous production of Water for Injection and/or Pure Steam.



Water Distillation & Pure Steam Generation Systems

Head Office

5 Polar Drive
Salfords
Surrey
RH1 5HW

+44 (0) 1737 378 000
sales@puretech.uk.com
www.puretech.uk.com

Durham Office

8 Durham Workspace
Abbey Road
Durham
DH1 5JZ

+44 (0) 191 468 2019



**WATER DISTILLATION
& PURE STEAM
GENERATION SYSTEMS**



Multi Effect Distillation

Puretech's Multiple Effect Distillers (MED) are designed and manufactured according to cGMP to produce compendial Water for Injection (WFI). Each unit contains a number of boiling columns (or effects) with the first column producing pure steam, which is condensed and re-distilled in the following columns decreasing the operational costs.

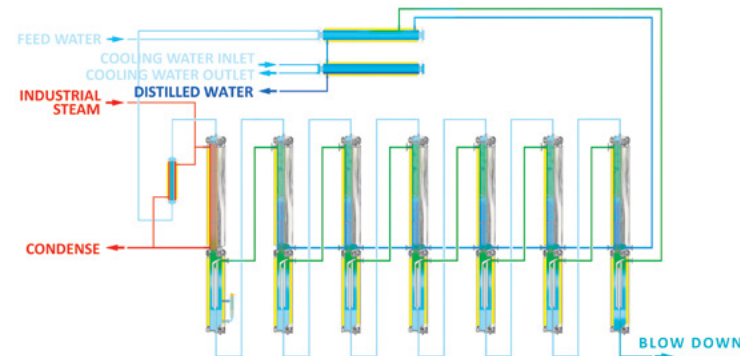
Heating for evaporation and cooling for condensation processes are performed by double tube sheet (DTS) exchangers. Condensation is achieved by means of thin-falling film technology. The process is repeated through each column with the higher number of columns reducing the overall utilities consumption of the system. However, the number of columns does not influence the quality of the product or the capacity of the equipment.

A special labyrinth separator installed at the top of each column which separates the steam generated from any carried over water droplets in the steam itself. The result is a pure, "dry", pyrogen-free steam, condensed to achieve compendial Water for Injection.

The first column of the Still may be used to produce WFI & Pure Steam alternatively or simultaneously. Pressure vessels are designed according to ASME and PED regulation and the equipment features:

- Double tube sheet heat exchangers
- Certified AISI 316L stainless steel mirror-polished and passivated product contact surfaces
- AISI 304 frame, jackets and control board
- PTFE gaskets
- Pneumatic valves with Teflon membranes and AISI 316 L SS polished body
- ASTM C-795 – compliant insulation.

Capacities range from 50 to 15,000 l/hr with three to ten columns.



Vapour Compression Distillation

Puretech's Vapour Compression Distiller (VCD) is manufactured according to the international cGMP (Good Manufacturing Practices) and Pharmacopoeias. A vapour compression still can potentially work with any feed water; furthermore, customised systems with pre-treatment integrated on the same skid with reverse osmosis and the ability to be electrically heated and steam heated are all standard options.

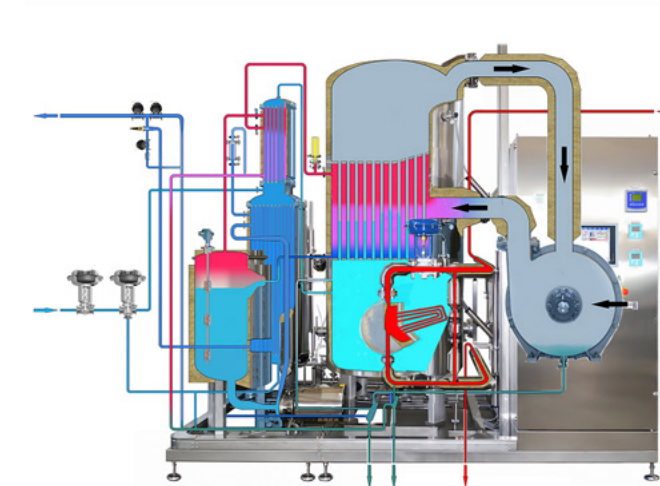
Puretech's "thermoccompression" still can produce both cold distillate or hot distillate with huge savings on energy costs, when compared to MED, with no need for cooling water. Whether electrically heated or plant steam heated capacities range from 20 to 20,000 l/hr with one or more blowers.

The benefits of Vapour Compression Distillation technology are:

- Low energy consumption
- No need of cooling water to condensate the pure steam
- No need for high quality inlet water (in some cases even softened water can feed the VCD)
- No need to pressurise the inlet water
- WFI outflow at high pressure (1–1.5 bar) without an additional pump requirement
- Safe process, with no risk of any cross contamination through plant steam or inlet water
- Highest flexibility in terms of capacities and WFI temperatures
- Reduced Maintenance

As with all of our distillation systems, the VCD is made in certified AISI 316L stainless steel and all internal parts in contact with the feed water, Pure Steam and the Distillate, are mirror-polished. All hydraulic connections are sanitary tri-clamp or flange connections and gaskets are made from PTFE.

A fully automated Siemens®, Rockwell®, SCADA system, ensures easy operation and complete monitoring of critical parameters. Password restricted access and access history can be managed according to 21 CFR PART 11.



Pure Steam Generation

Our Pure Steam Generators produce dry, saturated steam, suitable for sterilisation of pharmaceutical production plants, for direct contact with Active Pharmaceutical Ingredients (API's), for Parenteral and Non-Parenteral dosage form applications. The steam, when condensed, meets USP & EP requirements for Water for Injection. The steam is purified using centrifugal and gravity separation methods.

cGMP, ASME and PED standards are our baseline criteria for our Pure Steam Generators design and construction, materials and instruments are certified.

- The evaporation column is designed to minimize steam speed to avoid the carry-over of water droplets, which are separated from the steam by means of a special labyrinth separator.
- A Double Tube Sheet Heat Exchanger provides heating of pre-treated feed water above the boiling temperature, generating pure steam which expands into the evaporation column. Heating medium in the DTS Heat Exchanger is typically industrial steam at 100 to 120 psig (6 to 8 barg).
- Pure steam pressure is maintained by an electronic control system, modulating the supply steam control valve and monitoring the evaporator feed water.

The system must be fed with Purified Water and heated using industrial steam, however heating can also be achieved using superheated water or with direct electrical power supply.

Capacities range from 20 to 8,000 kg/h.

Puretech's Kettle Pure Steam Generators, provided with a horizontal evaporation chamber with kettle end, are also available for sites with space restrictions and cases that require a high capacity of steam.

