



# VAPOR COMPRESSION DISTILLERS

THE VAPOR COMPRESSION DISTILLERS BY STILMAS, THERMOPHARMA BD SERIES, PRODUCE DISTILLED WATER FOR INJECTABLE USE WHICH MEETS THE LATEST REQUIREMENTS OF THE INTERNATIONAL PHARMACOPEIAS INCLUDING USP, EP AND JP. THEY ARE ALSO APPLIED IN MANY OTHER INDUSTRIES SUCH AS: FOOD & BEVERAGE, DESALINIZATION, CHEMICAL AND FINE CHEMICAL.

**Standard models capacity:**

⊕ From 100 to 24.000 l/h



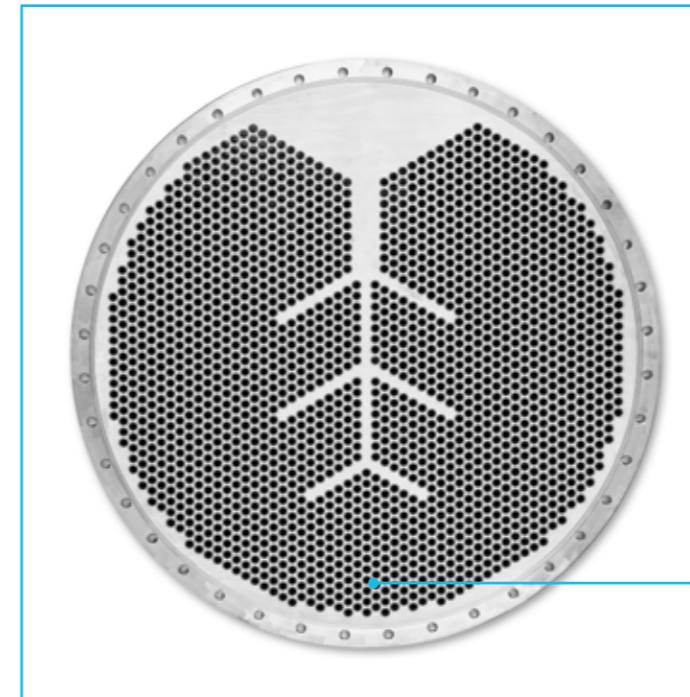
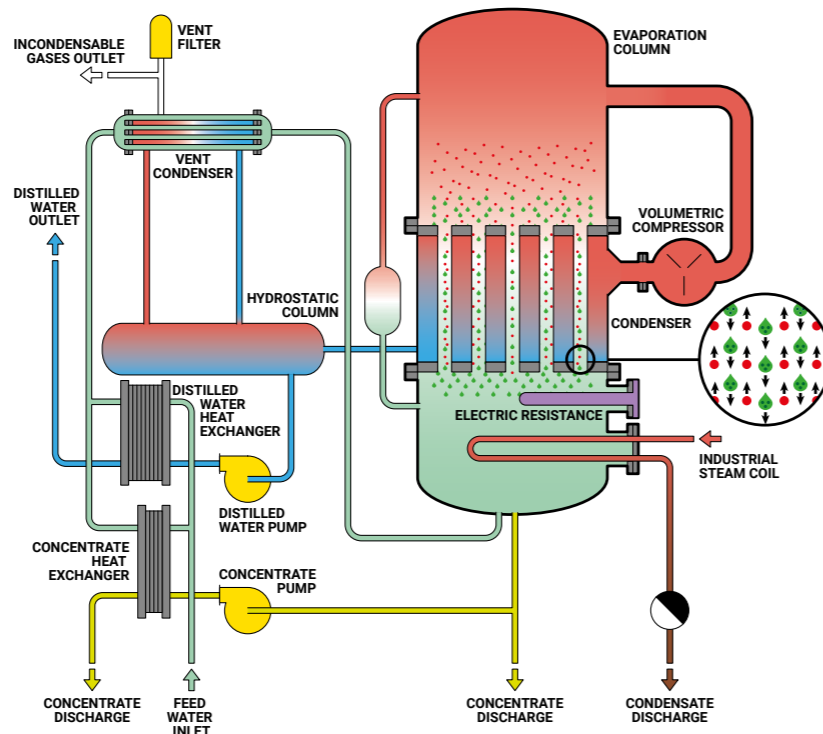
## MAIN FEATURES OF STILMAS THERMOPHARMA

- ⊕ Possibility to produce cold distilled water at 25°C or hot distilled water at 85°C. No cooling water required
- ⊕ High energetic performances due to compressors design and heat recovery system
- ⊕ Highly efficient non condensable gases removal due to the hydrostatic column system installed downstream the still
- ⊕ Distilled water pressurization system embedded
- ⊕ Fast response: in hot stand-by conditions the distillate is produced in 10 minutes
- ⊕ Atmospheric pressure operation: no need of pressure vessel certification
- ⊕ The design and construction of the decontamination chamber, which is a totally empty dome, ensure the best inspectability and the reduction of corrosion risk
- ⊕ High flexibility: the production capacity can be adjusted in the range of 50-100%
- ⊕ State of the art construction characteristics are in compliance with pharma latest guidelines (ASME BPE, ISPE GUIDELINES and more)
- ⊕ Software is developed according to the latest GAMP
- ⊕ Supervision system CFR 21 - Part 11 Compliant

## FEED WATER QUALITY

**Stilmas Thermocompressors Series BD can be fed with deionized water or even softened water.**

This possibility is of extreme interest in running cost reduction (due to softened water lower production cost compared to deionized water), as well as extremely simplifying the configuration of the pre-treatment section: a simple softener can provide the suitable feed water to the still.



IN SHELL AND TUBE HEAT EXCHANGER, INCLUDING THE MAIN EVAPORATOR, THE PIPES ARE EXPANDED INTO THE PLATES, AVOIDING ANY WELDING FOR A TOTALLY HYGIENIC EXECUTION, AND A BETTER RESISTANCE AGAINST DILATATION STRESS. PIPE LAYOUT HAS BEEN DEVELOPED TO OPTIMIZE THE STEAM DISTRIBUTION IN ORDER TO MAXIMIZE THE HEAT EXCHANGE.

## MAIN COMPONENTS DESIGN

**Thermopharma distillers include:**

- ⊕ A set of preheaters to heat feed water. Such configuration guarantees very high energetic performances, simultaneously allowing the production of hot or cold distillate
- ⊕ Vertical evaporator / condenser, shell and tube type, granting a very high efficiency in heat transfer
- ⊕ Evaporation column: design is characterized by large diameter which allows for gravitational separation of the water droplets from the steam without any device such as demister
- ⊕ Hydrostatic column of careful design for the separation of the non-condensable gases from the generated distillate. The column is installed downstream the still, ensuring high NCG removal and, consequently, very low WFI conductivity

## OPERATING PRINCIPLE

**The feed-water, entering in the equipment, is brought to the evaporation with the following steps:**

- ⊕ Pre-heating by hot WFI into the WFI heat exchanger
- ⊕ Pre-heating by hot blowdown into the concentrate heat exchanger
- ⊕ Pre-heating by plant steam into the pre-heater
- ⊕ Pre-heating clean steam and gases into the vent condenser
- ⊕ Heating by plant steam into the coil installed in the main column

The feed water, kept at a constant level into the column, evaporates into clean steam which flows up into the dome and from where it is sucked by the centrifugal blower and compressed in the shell of the central condenser where its condensation take place.

The condensate enters in the WFI hydrostatic vessel where the non-condensable gases are removed from the liquid phase. The WFI is then sucked by the pump and delivered, through the recovery heat exchanger to the diverting valves which, depending from the conductivity, feed the storage tank or dump to the drain.

## COMPRESSORS TECHNOLOGY

### THERMOPHARMA STILL SERIES B

**Sanitary Design**

**Equipped with side channel blower.**

- ⊕ Material of construction:
  - ⊕ Aluminum for body and rotor, nickel electroless plating (FDA approved)
  - ⊕ AISI 316L for the shaft
- ⊕ External bearings
- ⊕ Mechanical seals FDA approved
- ⊕ Low/Medium rotational speed, implying low noise and a simple mechanical execution

The compressors are characterized by an extremely limited and easy maintenance which can be done by Customer's technicians.





# 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

