# PURIFIED WATER GENERATORS

## STILMAS' PURIFIED WATER GENERATION PLANTS ARE THE RESULT OF MANY YEARS OF EXPERIENCE AND CONSTANT TECHNICAL DEVELOPMENT, AVAILABLE IN DIFFERENT CONFIGURATIONS TO MEET SPECIFIC CUSTOMER PRODUCTION NEEDS.

**Standard models capacity:**

- From 300 up to 30.000 l/h

They represent the safest and most reliable water purification method to produce purified and highly purified water for pharmaceutical, cosmetic and food industries which meets the latest requirements of the International Pharmacopeias including USP, EP and JP.

Stilmas pure water plants ensure the absolute control of microbiological growth, reducing the minimum need of system sanitization.

# PURIFIED WATER PRODUCTION PLANT BY DOUBLE STAGE REVERSE OSMOSIS

## STILMAS MODEL PHARMA-RO

Granting the best quality in terms of bacterial purity, Stilmas' double stage Reverse Osmosis plants constitutes the most reliable solution for purified water and HIGHLY purified water production.

The installed set of membranes is able to separate 99% of all dissolved salts of raw water also retaining bacteria, pyrogens and organic substances.

## OPERATING PRINCIPLE

Softened feed water is pre-filtered into a break tank. A pressurization system after a final filtration feeds the first stage of membranes, the number of which will determine the processing capacity.

The osmosed water produced through a further pump system enters the second stage of membranes; the purified water produced is sent to the PW storage tank while the concentrate is recovered for consumption optimization.

The plant configuration of Stilmas' exclusive design, ensures the best performance and operation flexibility by permitting periodical flushing during stand-by condition for bacterial contamination control.

## MORE...

**SANITIZATION FEATURE**
Stilmas pure water production plants PHARMARO and PHARMADION can be chemically sanitized (standard version) or sanitized by hot water (option). The chemical sanitization is performed by recirculation of suitable chemical solution. The plants can be provided with heat exchanger, membranes and CEDI modules suitable for hot water circulation for hot sanitization.

Moreover, Stilmas sanitization process is fully automated and easily remotely controlled.

**DOCUMENTATION AND VALIDATION**
The Documentation Package supplied by Stilmas for its Plants is conceived and organized so 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

With regards to the Validation Activity, Stilmas is able to provide a fully comprehensive Validation Service Package, including Validation Protocol Preparation, Site Tests execution, Instruments calibration and Validation Reports organization. The Validation Activity is performed by a dedicated Validation Team.

# PURE WATER PRODUCTION REVERSE OSMOSIS AND ELECTRO-DEIONIZATION

## STILMAS MODEL PHARMADION

Granting extremely low conductivity, Stilmas' Reverse Osmosis + Electro Deionization (RO+CEDI) plants constitute a reliable and widely adopted alternative to the traditional double stage Reverse Osmosis for purified water production.

## OPERATING PRINCIPLE

Softened feed water is pre-filtered into a break tank. A pressurization system after a final filtration feeds the first stage of membranes, the number of which will determine the processing capacity. The osmosed water produced enters the CEDI Package.

CEDI operating principle consists in the generation of an electrical field into the water stream, which is separating positive and negative ions, being then captured by ion exchange resins enclosed into the system.

CEDI technology also grant continuous regeneration of the resins, without the need of periodic regeneration by an external concentrate flow. The purified water produced is sent to the PW storage tank while the concentrate is recovered for consumption optimization.

The plant configuration of Stilmas' exclusive design, ensures the best performance and operation flexibility by permitting periodical flushing during stand-by condition for bacterial contamination control.

## MORE...

- Software is developed according to the latest GAMP
- Supervision system CFR 21 - Part 11 Compliant

**ENERGY PACK:**
A unique package developed for energy consumption control is available on request with the following features and capabilities:

- Istantaneous equipment consumption
- Actual performance vs ideal performance
- Record and store results
- Real time cost of 1 $m^3$ water
- Could be applied as retrofit solution
- SW/HW changes "plug and play"

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# PRE-TREATMENT PLANTS

## FEED WATER PRE-TREATMENT SYSTEMS STILMAS CAN SUPPLY:

- Oxidation processes for elimination of heavy metals
- Sand and multimedia filters
- Activated carbon filters simple or steam sterilizable
- Zeolyte filters
- Organic scavengers
- Softeners
- Chemical dosing system
- Microfiltration systems
- UV lamp

## QUALITY OF FEED WATER

Pre-Treatments are fundamental for the proper use of the membranes and the CEDI modules.

Pre-Treatment is necessary for:

- Removing particles which could damage the membranes
- Reducing the possibility of scale precipitation
- Elimination of free chlorine

Stilmas is able to furnish the pre-treatment suited to every requirement. Raw water analysis are necessary for the sizing of the pre-treatment systems.