

# Purified Water Systems



Stilmas' pure water generation plants are the result of many years of experience and constant technical development. They represent the simplest, safest and most reliable water purification method for the production of both purified and highly purified water for the Pharmaceutical, cosmetic and food industries (where high bacteriological and chemical quality is required). Stilmas' standard plants can cover a range of production from 300 to over 30,000 liters per hour. All plants are in strict compliance with the relevant Pharmacopoeias.

## Produced Water Quality

Stilmas pure water plants grants the production of Purified water and Highly purified water in compliance with the latest editions of the International Pharmacopoeias.

A unique care in manufacturing procedures as well as in process design, the plants ensure the absolute control of microbiological growth, reducing the minimum need of system sanitization. Whether there is a preference is for dual stage RO or RO & EDI, chemical or hot water sanitisation, preferred instrumentation or a particularly high feed water characteristic, the best systems will always be designed according to these known requirements.

As well as the chosen process technology, a key characteristic of Stilmas plants is that they are properly dimensioned to minimise non-productive time. By designing the system for proper regeneration and full use of each resin bed the systems can maximise their true production time whilst minimising replacement costs.

## Operating principle

Feed water is pre-filtered into a break tank. Circulation pump and high pressure pump after final filtration feeds the first stage membranes, the number of which will determine the processing capacity.

The osmosed water exists from the membranes to a second brake tank, the concentrate being rejected. If a second stage is fitted, this comprises a further pumps system, filtration and second set of membranes.

The concentrate is recovered to the first break tank. Tank, pumps and filter of each stage are also used for washing and sanitizing the membranes.



## Construction

Stilmas pure water production plants are designed and manufactured according to GMP requirements. Plants are fully in AISI 316L stainless steel with active surfaces mechanically polished and piping system realized by orbital welding.

All the components, instrumentation included are selected in base to sanitary criteria. Different sanitization methods are available according to the plant configuration.

## Contact

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## Produced Water Quality

### Pharma – RO

- Double stage reverse osmosis plants constitute the most reliable solution for the production of purified water and the only solution for the production of highly purified water
- Special plants execution is possible for the production of Highly Purified Water and low endotoxin Purified Water, without any need of ultrafiltration section or additional treatment
- The double stage RO configuration, with a second break tank between the first and second rack of membranes, is the most updated design by Stilmas and allows to use the second stage RO as a microbial polisher for the PW/HPW (Purified Water/High Purified Water) distribution loop

### Pharmadion – RO+EDI

- Granting an extremely low conductivity, Stilmas Reverse Osmosis + Electro Deionization (RO+EDI) plants constitute a reliable alternative to the traditional double stage Reverse Osmosis for the production purified water
- CDI technology also grants a continuous regeneration of the resins. This way we avoid the contact of the CDI modules with external and potentially contaminated stream of water
- Stilmas pure water production plants PHARMARO and PHARMADION can be sanitized chemically (standard version) or by heating (on request)

### Ultrafiltration

- In some special cases it is suggested to install an Ultrafiltration unit in the pre-treatment section of the PW plant. The typical molecular cut-off of such kind of Ultrafiltration is 100 – 150 k Dalton
- This unit can be used as a removal step for bacterial content reduction, as well as a silica reduction
- In case of special requirement for Purified Water quality, e.g. Highly Purified Water, or Purified Water with low endotoxin content. In this case, especially if a PW generation system based on RO+EDI is installed, a final treatment of the produced PW is necessary to reduce the content of endotoxin

### Pre-treatment systems

- Remove particles that could damage the membranes
- Reduce the possibility of scale precipitation
- Eliminate free chlorine

Water Quality	Equipment
PW as per USP and EP	RO II
PW as per USP and EP	RO + EDI
HPW as per EP “low endotoxin”	RO II “special”
HPW as per EP “low endotoxin”	RO / EDI /RO (or RO / EDI /UF)
HPW as per EP “low endotoxin”	Thermocompressor (cold)

