



GENESYSTM

Premium Purified Water Systems



The ultimate in pure water generation

Puretech's premium Pure Water generation system, the Genesys, offers world-leading thermally sanitised pure water delivery. From softened water to point of use, the Genesys offers a true single source, multi-technology validated unit, for producing purified water. Genesys systems are designed and constructed to produce purified water in full compliance with cGMP guidelines as per FDA and EMEA, EP, JP and USP requirements for pharmaceutical, laboratory and medical applications.



Purified water applications

Purified water is used as an excipient in the preparation of non-sterile products and as a starting material in the preparation of water for injection and pure steam. It is also used for rinsing purposes and in the preparation of cleaning solutions.

Purified water is used in the preparation of medicinal products where bacterial endotoxins need to be controlled, except where water for injection is required.



A choice of quality

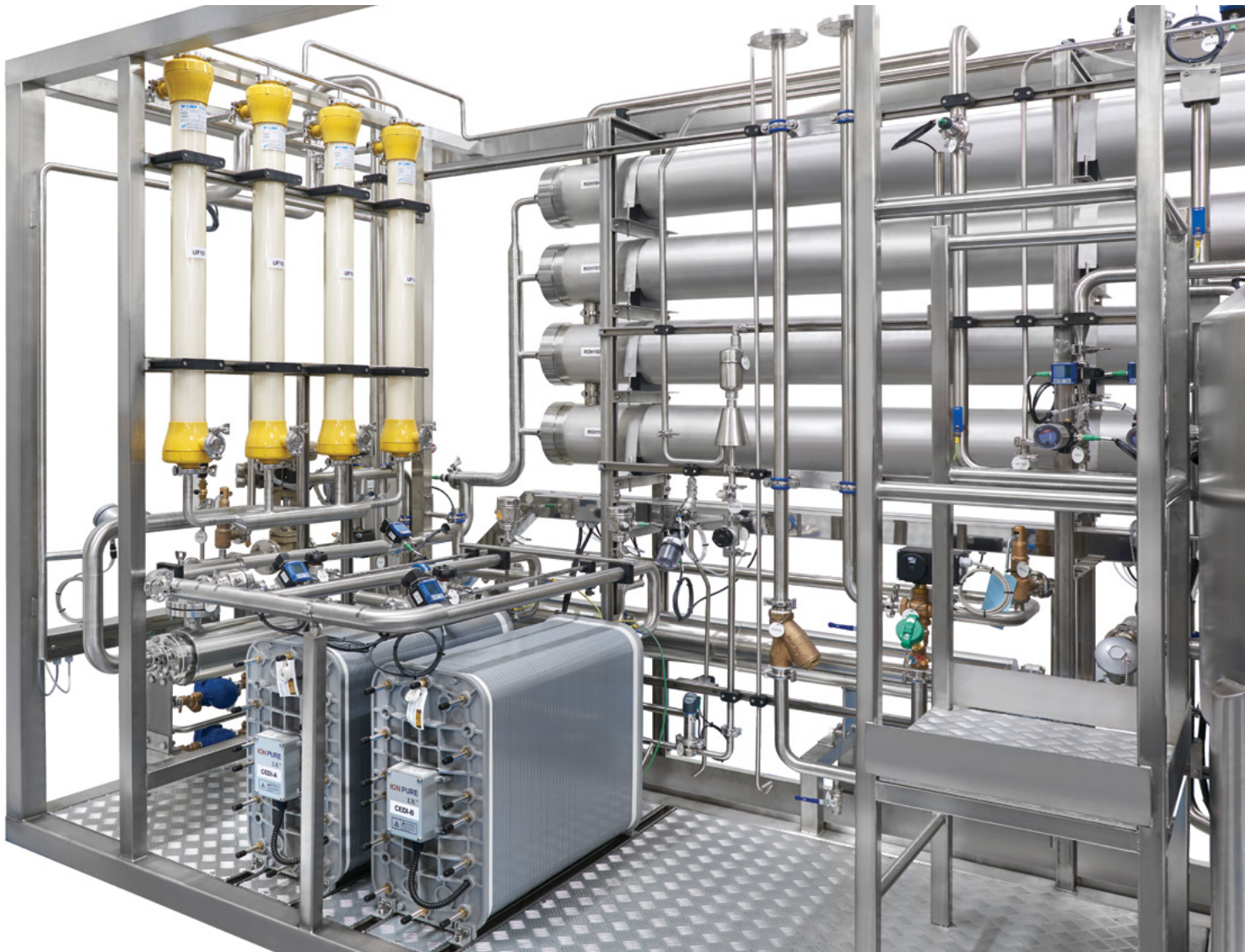
Engineering and manufacturing practices follow ISO 9001 procedures, ASME BPE criteria, GAMP guidelines, etc. Design and construction meets the most stringent Regulations and Codes from Europe, USA and others concerning Safety and Pressure Vessels.

To ensure the equipment meets your requirements, we work in partnership with you, a dedicated team follows your order as a unique project. We develop specific Quality Plans (DQ, IQ and OQ) and undertake factory acceptance testing (FAT) to give assurance of performance and quality.

Key features

- Purified water to USP, EP and JP
- Automatic hot water sanitisation
- Flexible outputs from 100 to 20,000 l/hr
- Designed for simple upgrading of production rate
- Provides constant monitoring of RO status and gives warning of requirement for cleaning
- Constructed from 316L stainless steel, orbitally welded, internal surface finish 0.5 Ra. Designed to ASME BPE
- Choice of sophisticated control systems with inbuilt data logging and paperless chart recorder
- GAMP and 21 CFR part 11 compliant
- Validation to regulatory and client standards
- Minimises waste water
- Flexible system integration with proven technologies
- 304 stainless steel control panels as standard
- Pressure and flow sensors and transmitters accross the system allow for easy monitoring.

Design & construction features



Trusted technology, safely implemented

The Genesys Purified Water System is designed to generate purified water in accordance with the International pharmacopoeial specifications for purified water. The system has been designed to allow automatic hot water sanitisation of the complete unit including the pipework feeding the purified water into the storage vessel.

Sensors and transmitters are used throughout the system allowing for comprehensive monitoring, data storage and trending.

Key components

Softened water tank

This 316L stainless vessel is used as a reservoir for sanitisation and can be used for the automatic CIP cycles.

Reverse osmosis

RO technology involves using a variable speed pressure pump to force a portion of the feed water through semi-permeable membranes. The permeate flow is kept constant, independent of variables such as the feed water temperature.

Continuous electro deionisation

The water passing through the CEDI is deionised to purified water using an electric current. The concentrate water exiting the CEDI unit is reused and mixed with the RO feed water.

Ultraviolet irradiation/ultrafiltration

The pure water exiting the CEDI passes to a UV unit or a 6,000 NMWL ultrafilter to give added security in achieving the purified water specifications.

Softened water tank



Reverse osmosis



Continuous electro deionisation



Ultrafiltration



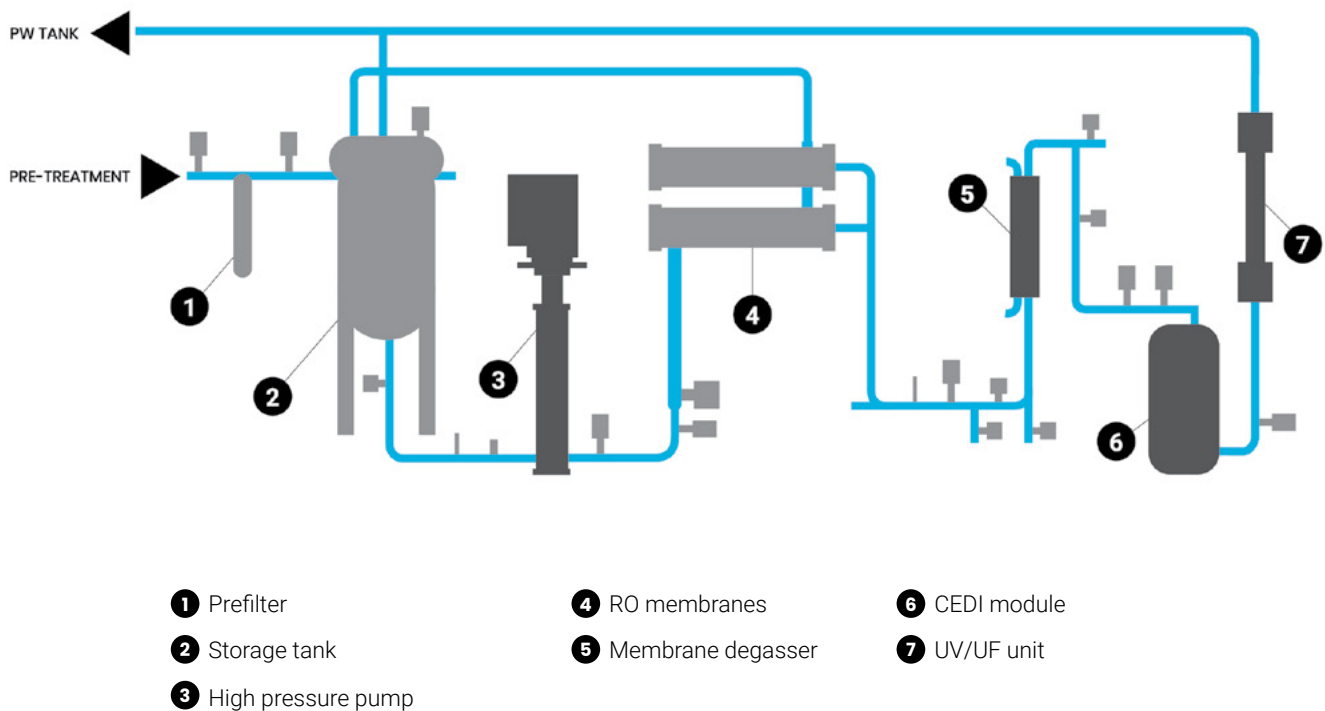
The Genesys control system

- Utilises the latest technology with touch screen HMI to allow ease of operation and monitoring.
- Offers control and monitoring from a single interface with data logging facilities and links to user systems e.g., BMS, DCS or SCADA.
- Provides the flexibility to operate complete turnkey packages allowing customers to reduce costs and simplify operation using a single access interface for pre-treatment, purification, storage and distribution.
- Ensures safe operation, protecting the system and the operator, giving you confidence and peace of mind.

Operating principle

The pre-treated (softened) water is passed through a filter housing (typically 5 µm) and analysed for free chlorine prior to entering the RO feed tank. The filtered water then enters the stainless storage tank, if the tank is full the softened water is returned to the raw water tank to ensure constant movement to minimise the risk of bacterial proliferation.

The softened water is then pumped at high pressure using a stainless steel multi-stage centrifugal pump, through the RO membranes. The RO permeate is then fed through a membrane degasser to remove dissolved carbon dioxide, followed by a CEDI unit in order to remove ionic contaminants. The purified water is then passed through a UV irradiator unit before being fed to the storage vessel.



Sustainability

Recovery RO

We can increase the permeate production rate from the standard 75% up to +90% by adding an additional RO membrane on the concentrate outlet of the first stage RO membrane. This will recover up to 50% of the concentrate water for re-use, providing a saving on waste water costs and softened feed water.

Cooling heat exchanger

By adding a cooling heat exchanger, we can reduce the amount of water wasted when the purified water storage tank is full. On standard systems, the waste water is typically around 10% when the storage tank is full. By controlling the temperature of the re-circulating water, we can reduce the waste water to 0%

Technical data

Model ⁽¹⁾	Outlet Flowrate	System*	Width (mm)	Depth (mm)	Height (mm)
Genesys 1A	300 l/hr	75%-90%	2,400 ⁽²⁾	1,600	2,200
Genesys 2A	500 l/hr	75%-90%	2,400 ⁽²⁾	1,600	2,200
Genesys 3A	800 l/hr	75%-90%	2,400 ⁽²⁾	1,600	2,200
Genesys 4A	1,100 l/hr	75%-90%	2,400 ⁽²⁾	1,600	2,200
Genesys 5B	1,600 l/hr	75%-90%	2,900	1,600	2,200
Genesys 6B	3,000 l/hr	75%-90%	2,900	1,600	2,200
Genesys 7B	5,000 l/hr	75%-90%	2,900	1,600	2,200
Genesys 8B	6,000 l/hr	75%-90%	2,900	1,600	2,200
Genesys 9C	7,500 l/hr	75%-90%	4,500	1,650	2,200
Genesys 12C	10,000 l/hr	75%-90%	4,500	1,650	2,200

(1) Actual flowrate dependent on feedwater temperature and site feed water quality. Each system is designed on client exact requirements

(2) Units can be delivered in larger frame to allow future flowrate increase

* Dependent on incoming water quality and recovery RO option being specified

Other capacities are available upon request.

Material specifications

- **Softened water tank** 316L stainless steel vessel
- **Reverse osmosis** 316L stainless steel
- **CEDI LX** FDA approved materials
- **Pipework** 316L stainless steel, orbitally welded, internal surface finish <0.5 µm Ra
- **Frame** 304 stainless steel
- **Control cabinet** 304 stainless steel

Services: Electrical 380/415V; three-phase; 50Hz

Feed water requirements

- **General** potable water free from organics, colloids and suspended matter: SDI<3
- **Total hardness** <5 ppm as CaCO₃
- **Free chlorine** <0.05 ppm
- **Iron** <0.1 ppm as Fe
- **Temperature** 5–30°C
- **Pressure** 2–6 bar

Compressed air Oil free, instrument grade >6 bar

Typical product water quality			
Attribute	Genesys	US Pharmacopoeia	European Pharmacopoeia
Conductivity (µS/cm)	< 0.1	< 1.3 @ 25 C (Stage 1)	PW=<4.3
TOC (ppb)	< 100	<500	<500
Bacteria (TVC CFU/100ml)	<10	<100 ⁽³⁾	<100
Endotoxins (EU/ml)	< 0.05 (UF option)	N/A	PW=< 0.25 EU/ml

PW = Purified water; (3) FDA recommended action limit

Every Genesys is manufactured to suit client's individual site requirements. Puretech works with clients to ensure every system matches their needs.



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