ION EXCHANGE
Refreshing the Planet

INDION High Purity Water Generation & Distribution

Complete integrated solution, specially designed for the pharma industry by the leading total water management company

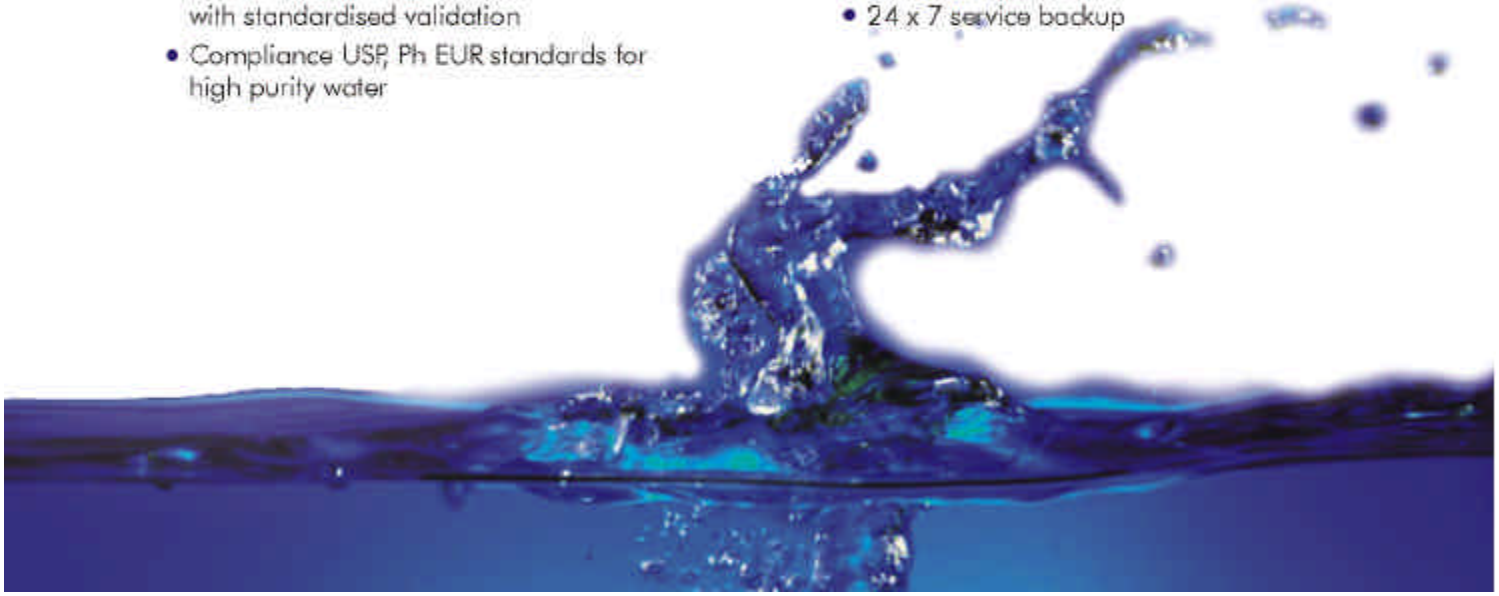
INDION RO-EDI Systems

INDION Duo Rapide Demineralisers

Purified water, highly purified water, pyrogen-free water and water for injection are critical to the pharma industry's processes. Technological expertise and R&D capabilities combined with our close association with the industry enables us to deliver customised, speciality systems to meet stringent requirements for high purity water generation and distribution.

INDION High Purity Water Systems offer:

- Complete water generation and distribution
- Hot water sanitisation for INDION RO-EDI
- Fast track delivery - complete packaged system with standardised validation
- Compliance USP, Ph EUR standards for high purity water
- Pre-validated to industry accepted standards
- Compliance to cGMP, GAMP & ISPE design standards
- 24 x 7 service backup



Specifically for Pharmaceutical Industry

Identify Customer Needs

Designed in consultation with pharmaceutical engineers and end users.

Develop User Requirement Specification (URS)

The URS describes clearly and accurately what the industry requires from the system.

Functional Design Specification (FDS)

The FDS describes the functions the system will perform and the facilities required to meet the specification.

Design Qualification (DQ)

The DQ provides documented evidence that the key aspects of the design adhere to the URS.

Hardware & Software Design Specifications (HDS/SDS)

The HDS & SDS describe the hardware and software components and their arrangements including the PLC.

Installation & Operation Qualification (IQ/OQ)

The IQ and OQ provide documented evidence that the system is installed and performs as intended.

INDION High Purity System

The result is a fully pre-validated system that is compliant with pharmaceutical standards.

Hot Water Sanitisation

- Automatic microbial control
- Specification compliance assured
- No chemicals required

Packaged System

- Fast track project delivery
- Minimum site disruption
- Footprint optimisation

Standard Pre-validated System

- Reduced cost of compliance
- Complete FAT pre-delivery
- Provisional IQ at our factory

Designed for Pharmaceuticals

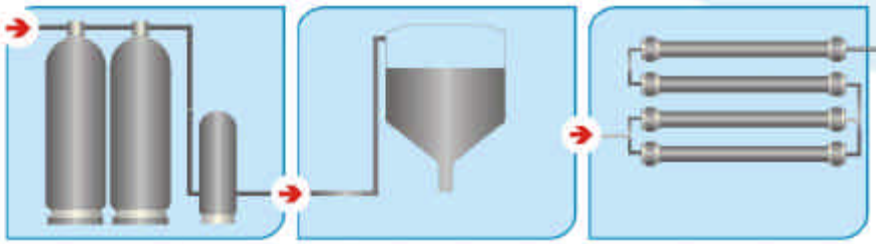
- cGMP and GAMP compliance
- FDA compliance
- SS 316L construction
- Sanitary fittings
- Flexible automation and control
- Designed for accessibility

Applications

- Large and small volume parenterals
- Serum/media
- Genetically engineered drugs
- Ophthalmic solutions
- Antibiotics
- Cosmetics
- Veterinary products
- OTC and ethical products
- Fermenter make-up
- Medical devices
- Neutraceuticals
- Diagnostics
- Electronics
- Semi-conductors

Complete, Wide Range & Integrated High Purity Package

INDION RO-EDI Systems



Pre-treatment

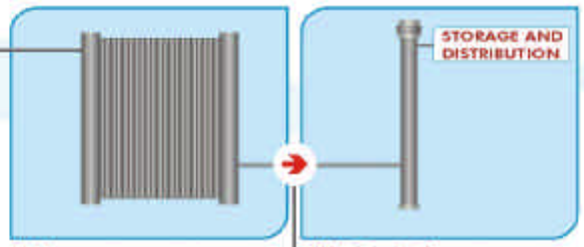
- Autoserial softeners for maximum removal of total hardness
- Fine filtration down to 5 µ
- Optional UV
- Alternate pre-treatment such as ultra filtration available

Multipurpose tank

- Storage for soft water
- Recycle tank for RO-EDI reject
- Hot water generation during sanitisation
- Cleaning tank for RO-EDI

Reverse Osmosis

- Hot water sanitisable RO membranes
- 99% removal of TDS
- 95% removal of bacteria & organics
- Sanitary design
- HP pump with VFD (variable frequency drive)

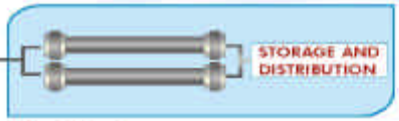


EDI

- Polishing unit downstream of RO
- Consistent conductivity <0.5 µs-cm
- Auto dumping, in case inlet conductivity exceeds
- No chemicals for regeneration
- Hot water sanitisation

UV Disinfection

- Provides final security against microbial contamination



Ultra Filtration

- Provides physical barrier and removes endotoxins & bacteria
- Produces highly purified water

INDION Duo Rapide Demineralisers

Pre-treatment

- Ultra filtration uses advanced membrane technology & removes suspended solids from raw feed water

Duo Rapide Demineralisation

- Uses state-of-the-art ion exchange technology
- Conductivity < 1 µs-cm, with low running costs

TOC Removal

- Reverse osmosis/ Ultra filtration-UV steriliser

Features

- Instantaneous flow rates upto 70.5 gpm
- Automatic PLC control with continuous display readout of system status
- Short cycle (4 hours), rapid regeneration (30 min)
- High chemical efficiency, smaller footprint and higher flow rates than conventional plants
- Near neutral effluent reduces disposal costs

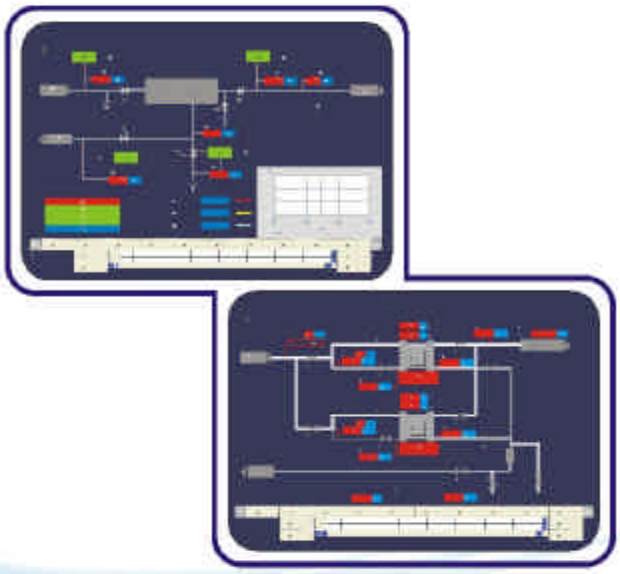
INDION Duo Rapide Demineralisers

STANDARD PRE-VALIDATED SYSTEM

INDION RO-EDI Systems

INDION Storage & Distribution Systems

INDION Distribution Systems



SCADA

A reliable and validated purified water generation plant is still half the job done.
The next big challenge after generating purified water is to distribute it at various user points across the factory at desired time, capacities, temperature and, most importantly, at desired quality. INDION Storage & Distribution Systems are designed considering cGMP norm, ISPE guidelines with respect to material of construction, orbital welding techniques, dead lag consideration (<2d), advanced instrumentation and controls. All the controls are monitored by advanced SCADA systems which are 21 CFR Part 11 compliant.

Features

- High quality SS 316L electropolished storage tank with spray ball; vent filters of 0.2 μ and necessary fittings
- Pharma grade UV sterilisers with intensity monitor & hour meter in SS 316L construction
- Boroscopy facility for welds made
- Zero dead lag valves with EPDM or PTFE gaskets
- Critical instrumentation like level indicators Compound pressure gauges, conductivity monitors, flow transmitters of reputed makes
- Combined SCADA system for water generation & distribution which are 21 CFR compliant
- Hot water sanitisation at > 80°C
- Imported PVDF/SS 316L tubes with original certificates with mill finish <0.8 R_a, after EP <0.5 R_a
- All pumps, UV steriliser & fittings in sanitary construction
- Orbitally welded with printout facility
- Built around ISPE and cGMP guidelines

The components used in the distribution system are carefully selected depending on whether it is a chilled water loop, ambient loop or hot loop. Normally chilled or ambient loops would be for purified water while hot loops would be for WFI, unless high temperature is required at user purified water.

Technical Specifications

INDION RO-EDI Systems

Model		400	1000	1500	2000	3000	4000	6000
Product flow	gpm	1.76	4.4	6.6	8.8	13.2	17.6	26.42
Feed flow	gpm	2.34	5.86	8.8	11.73	17.6	23.47	35.22
Concentrate flow	gpm	0.58	1.46	2.2	2.93	4.4	5.87	8.8
Average Recovery	%			75				

Nominal flows are based on operation at 25°C, 500 mg/l TDS, 20 mg/l CO_2, and SDI<3
Product flows at a maximum outlet pressure of 1 bar
RO-EDI systems can be made upto 52.90 gpm

Treated water quality

Purified Water	Outlet of EDI	<0.5 µs-cm, <250 ppb TOC, < 50 cfu/ml
Highly Purified Water	Outlet of UF	<0.5 µs-cm, <250 ppb TOC, <10 cfu/100ml, <0.25 E.U./ml

Treated water quality is dependent on feed water quality & flow rate

INDION Duo Rapide Demineralisers

Model	1+	2+	3+	4+	5+	6+
Max. flow (gpm)	9.9	16.59	23.1	33.02	52.9	70.5
Conductivity(µs-cm)	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1
pH	5-7	5-7	5-7	5-7	5-7	5-7

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