

Modular Ultrapure Water Plant

Flexible, Pre-Engineered, Proven Designs

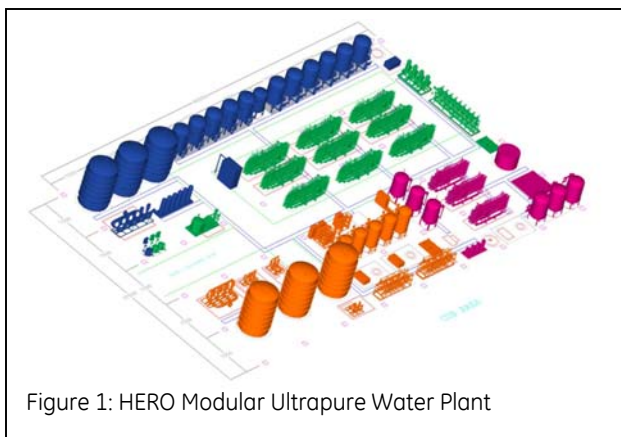


Figure 1: HERO Modular Ultrapure Water Plant

For many years, has partnered with our customers requiring ultrapure water and treatment of other difficult to treat streams and provided solutions based on the patented High Efficiency Reverse Osmosis (HERO™) process. The HERO operates at a very high water conversion factor (typically an overall recovery of 90% to 98%) while producing a much higher quality effluent water when compared to traditional water treatment technologies. The HERO process can operate reliably at a flux rate of 30 GFD or more, handle higher levels of silica in the feed, reject silica and boron more efficiently, and eliminate biofouling – parameters that are difficult to achieve using a traditional RO.

Now, has taken the benefits of the HERO process and added more value with our pre-engineered design packages. Depending on the application, one, some, or all of these design modules (See Figure 2) can be utilized to treat a variety of feed sources.

Pre-Engineered HERO Packages

Model	Flow Rate m ³ /hr (gpm)
Mini-Mod	50 to 100 m ³ /hr (220-440 gpm)
S-Mod	100 to 150 m ³ /hr (440-661 gpm)
M-Mod	150 to 250 m ³ /hr (661-1101 gpm)
L-Mod	250 to 400 m ³ /hr (1101-1761 gpm)

Design Standards

- CSA/UL
- ASME
- ASTM
- NEMA

Design Details

Power Requirements.....	380 V, 50 Hz, 3-phase
Piping (Modules 1 &2).....	304L SS
Piping (Module 3).....	304L & 316L SS
Piping (Modules 4 &5).....	PP & PVDF
Piping (Module 6).....	PVC
Max. Skid Size.....	1190L x 228W x 260H cm (469L x 90W x 102H in)

Optional Packages

- Single-Pass RO for HERO Module
- Upgrade to EDI from Primary Mixed Beds
- 410 V, 50 Hz, 3-phase power
- Operating and maintenance service contracts

Figure 2: UPW Design Modules

MOD-1 – Pretreatment

Unit operations selected based on feed water characteristics such as hardness and alkalinity. In general, this module can consist of blend water tank and pumps, prefiltration, heat exchanger, softener, and weak or strong acid cation columns.

MOD-2 – HERO System

Either a single-pass or a two-pass RO system operating at 90%+ overall recovery. The RO system is preceded by cartridge filtration and a degasification step. Optional CIP System for RO cleaning.

MOD-3 – Primary UPW

A storage tank with a nitrogen blanket is provided for RO permeate collection. From the storage tank, product is transferred through TOC UV units to either electrodeionization (EDI) stacks or primary mixed beds. Finally, gas-transfer membranes are used to remove CO2 and further enhance product water quality.

MOD-6 – Rinse Reclaim / Recycle

Last rinse water from the cold and hot UPW manufacturing operations are diverted to this module for treatment and reuse. The heart of this process is a patented reverse osmosis step, with overall recovery greater than 90%.

MOD-4 – Polishing Loop / Cold UPW

Product water from Module 3 (above) is collected in a blanketed storage tank. A TOC reducing UV and cooling heat exchanger serve as a precursor to polishing mixed beds and a final cold ultrafiltration (UF) step.

MOD-5 – Hot UPW

A side stream of polished (pre-UF) water from Module 4 is diverted as feed to this module. Product Water is brought to temperature before going through a hot UF step. The UF permeate then goes to the plant for consumption

MOD-7 – Support Equipment

Miscellaneous system support operations include necessary regeneration storage tanks and transfer pumps.

