GE Power & Water
Water & Process Technologies

Fact Sheet

IPER* Ultra Efficient Pump

SWRO Integrated Pump and Energy Recovery
1,000 m^3/d (264k gpd) permeate

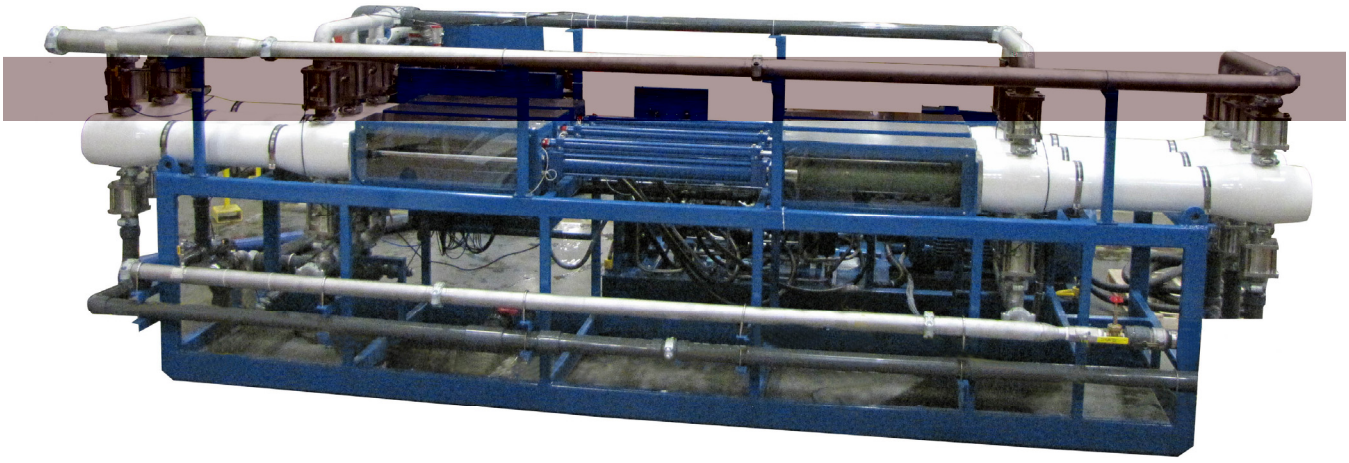

Figure 1: IPER Ultra Efficient Pump

IPER Benefits

- IPER is one of the most energy efficient pumps in the world (Figure 1). Applied to desalination reverse osmosis systems, it can reduce energy costs by 50%.[1]
- Pre-engineered pumping system combines flow controls, high pressure pumping and energy recovery into one skid
- No additional controls, drives, pressure regulators, or flow balancing required
- Modular design
- Low inlet pressure requirement

[1]Compared to desalination plants operating with no energy recovery. Efficiency claims based on competitors published motor and pump efficiencies.

Features

- Robust FRP water cylinders
- Dual-acting pistons transfer maximum energy
- One button start up and shut down controls
- Ultra efficient hydraulic power source
- Skid mounted master control enclosure
- Proven, reliable hydraulic power source that is scalable and adaptable
- Extremely low cycle rate compared to positive displacement pumps

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FSppIPER_EN May-14

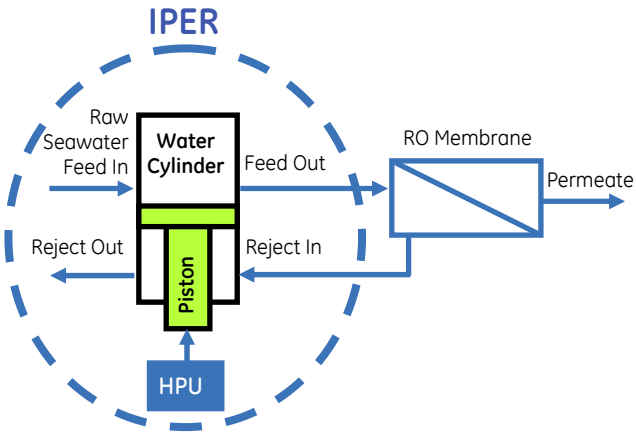

Figure 2: IPER operational flow diagram

Why is IPER so Efficient?

- Leverages highly efficient and reliable Hydraulic Power Unit (HPU) technology (Fig 2)
- Uses the hydraulic energy from the high pressure SWRO reject, combined with energy from the HPU, to deliver constant flow and pressure to membranes
- Employs piston as a barrier so there is no appreciable mixing between raw seawater feed and SWRO reject
- Eliminates secondary boost pump required by other energy recovery devices

Operating Parameters

Maximum SWRO Permeate	264k gpd 183.5 gpm (1,000 m^3/d)
Fixed Recovery	35% to 45%
Maximum Pressure	1160 psi (80 bar)
Temperature	40 to 95°F (4 to 35°C)
Minimum Inlet Pressure	15 psi (1.0 bar)

Materials of Construction

High pressure piping	SS Duplex 2205
Low pressure piping	Sch. 80, PVC
High pressure valves	Super Duplex 2507
Frame	Epoxy painted carbon steel
Water cylinders	FRP
Enclosures	NEMA 4

IPER Skid

Water Displacement Skid	
Height	74" (188 cm)
Width	55" (140 cm)
Depth	256" (651 cm)
Weight Estimate for Shipping	3,500 lb (1585 kg)
Hydraulic Skid	
Height	48" (122 cm)
Width	68" (173 cm)
Depth	48" (122 cm)
Weight Estimate for Shipping	6,500 lb (2,950 kg)

Installation and Utility Requirements

Inlet	4.0" Victaulic
High Pressure Outlet	4.0" Victaulic
Concentrate Inlet	3.0" Victaulic
Concentrate Outlet	3.0" Victaulic
Inlet Water Pressure	15 psi (1.0 bar), minimum
Air Pressure	100 psi (6.9 bar), oil free
Power	380/460 VAC, 3-phase, 50/60Hz
Control Circuit	120/220 VAC, 1-phase, 50/60Hz