

	Energy Recovery, Inc 1908 Doolittle Drive San Leandro CA 94577 USA Tel: +1 510 483 7370 Fax: +1 510 483 7371	<b>PERFORMANCE CURVES  DEFINITIONS, PRESSURE  EXCHANGER</b>	REV	BY	CKD	REVISION	DATE
			000	RLS	JPM	Issued for Distribution	4/1/04
			001	RLS	RBC	Revised Test Conditions	4/30/04
			002	RLS	RBC	Revised Test Conditions	3/10/05
			003	RLS	RBC	Revised Test Conditions	5/18/05
			004	RLS	RBC	revised mixing definition	6/29/05
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**Efficiency:** Energy transfer efficiency in the Pressure Exchanger unit (PX) as calculated with the following equation:

$$Efficiency = \frac{\sum (Pressure \times Flow)_{OUT}}{\sum (Pressure \times Flow)_{IN}} \times 100 \%$$

**High Pressure Flow Differential Pressure (HP DP):** The pressure at the high-pressure inlet port of the PX minus the pressure at the high-pressure outlet port of the PX.

**Low Pressure Flow Differential Pressure (LP DP):** The pressure at the low-pressure inlet port of the PX minus the pressure at the low-pressure outlet port of the PX.

**Lubrication Flow:** The flow rate of high-pressure brine required to lubricate the PX's hydrodynamic bearing measured as a difference in flow rates according to any of the following equivalent methods:

- Low-pressure feedwater to the main high-pressure pump minus the membrane permeate
- High-pressure brine to the PX unit minus the high-pressure feedwater from the PX unit
- Low-pressure brine from the PX unit minus the low-pressure feedwater to the PX unit

**Minimum Discharge Pressure (MDP):** The minimum allowable pressure at the low-pressure outlet port of the PX.

**Mixing:** The ratio of the difference between the salinity of the feed to the membranes and the salinity of the feedwater supply divided by the salinity of the feedwater at 40% recovery in a standard PX-booster pump system according to the following equation:

$$Mixing = \frac{membrane\ feed\ salinity - feedwater\ salinity}{feedwater\ salinity} \times 100 \%$$

**Sound:** Audible noise in dBA measured at a distance of 1 meter from the PX at a frequency of 160 to 280 Hz.

**Test Conditions:** Pressure Exchanger performance data collected in ERI's wet test facility in San Leandro, California. Mixing data collected at a confidential ERI customer site.

- Water: 70 ppm TDS, 77 degF / 25 degC (tap water)
- Differential Pressure, Noise: data collected at 1,000 psig / 69 barg high-pressure inlet, 30 psig / 2 barg low-pressure inlet with Pressure Exchanger in horizontal orientation
- Mixing: data collected at 1,200 psig / 83 bar high-pressure inlet, 44 psig / 3 barg low-pressure inlet at balanced flow (i.e.: LPin flow = HPout flow)
- Minimum Discharge Pressure: data collected at 200 psig / 14 bar high-pressure inlet, 30 psig / 2 barg low-pressure inlet
- Lubrication: data collected at minimum, middle and maximum rated flow rate at 1000 psig / 69 barg