

Operating Cost for WDI Deionized Water System

The primary operating costs consist of labor, regeneration chemistries & wastewater, filter change-outs, electricity, waste treatment, and periodic resin & carbon replacement. The below costs apply to a WDI Elite 1252FF, with assumptions for input costs based upon known operating parameters, assuming 24-hour operation 26 days per month at 10-gpm flow for a total of 14,400 gallons of DI water per day or 374,400 gallons per month.

Electricity

- Assuming system is operating on 460V 3Ph power, and estimating electricity cost is \$0.10 per KWH, the cost per month to operate the feed and repressurization pump is **\$35 per month**.

Bag Filters

- Assuming change out once every 2 weeks of one 20-inch 5 micron bag filter, the cost at \$5 each would be **\$10 per month**.

Resin Replacement

- It's conservatively assumed resin change-out is required every 5 years. With a total of 5 cubic feet of cation resin costing \$100 per ft³, and anion resin \$250 per ft³, each change out will cost \$1,750 in materials, one day labor @ \$150, disposal (assuming 2.5 drums of waste) costing \$150 each, for a total replacement cost of \$2,275 or **\$38 per month**.

Regeneration chemistry

- This is based upon a cost of \$0.24 per lb for 50% NaOH and \$0.24 for 32% HCl, and assuming 2 regenerations per day of both the cation and anion vessels, which is a maximum frequency of regenerations we recommend for a KDI system. Each cation regeneration consumes 3.5 gallons of HCl, costing \$2.40 per gallon, \$8.40 per regeneration, or \$16.80 per day. Each anion regeneration consumes 1.8 gallons of NaOH at \$3.05 costing \$5.49 per regeneration or \$10.98 per day. Their combined cost is **\$722 per month**.

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Feed Water

- It is assumed feed water costs \$4 per 1,000-gallons so assuming 10-gpm or 14,400 gallons per day, the monthly expense for feed water would be **\$58 per month**.

Waste Water

- Each cation regeneration produces 85 gallons of wastewater and each anion regeneration produces 95 gallons of wastewater. Assuming two regenerations per day of each, a total of 9,360 gallons per month of wastewater would be generated, costing \$58 per month for lost DI water and \$70 for wastewater treatment costs (assuming a treatment cost of \$7.50 per 1,000 gallons), for a cost of **\$128 per month**

Total Operating Cost for WDI Elite 122FF

- As detailed above, the total operating cost is estimated at \$991 per month.
- Assuming 24 hour per day x 26 days per month, 374,400 gallons of rinsewaters would be processed each month, with 9,700 gallons lost to backwashing and regeneration for a total volume of DI water produced of 364,700.
- $\$991/364,700 = \0.00278 or **\$2.78 per 1,000 gallons of DI water produced**

Cost for Service Deionizer (SDI) Exchange Vessels

- While costs vary depending upon service provider, it's our experience that the typical cost for a 13" x 54" 3-ft³ SDI vessel consists of \$40 to \$60 (average \$50) per vessel each month for rental and \$40 to \$60 (average \$50) per vessel exchange. Assuming city water feed to 1 cation & 1 anion SDI Vessels with 1 of each in stand-by (4 x \$50 = \$200), and based upon a SDI vessel (with 3 ft³ resin per vessel) change-out 20% less frequent than regeneration of the WDI (with 2.5 ft³ resin per vessel), the 2 each cation & anion regenerations per day would equal 83 (4 x 26 x 0.8) change-outs per month. Based on the above, the monthly expense for SDI vessels to produce the same 364,700 gallons per month would be \$4,408 - (83 x \$500 for exchange) + \$200 for rental + \$58 for feed water – or **\$12.08 per 1,000 gallons of DI water produced**
- At a DI Water Production rate of 14,400 gallons per day, **the savings with a WDI Elite 1252FF compared to SDI for 10-gpm of DI water production would be \$133.92 per day** (14.4 x \$9.30)