

## Recycling Rinses into DI Water at PCB Facilities

For maximum yields and longer chemical bath life in manufacturing today's sophisticated printed circuit boards, a high volume of quality rinse water is required. In general, facilities purchase potable water, purify a portion of it, use it once only through the production process, perform chemical treatment to remove regulated metals, and then discharge to the sewer, incurring costs at every step. Such an inefficient process cannot continue in the current competitive business environment as the cost of incoming water and sewer disposal increases and water quality decreases. In its place, an ion exchange rinse water recycling system producing high quality deionized water while improving efficiency can pay for itself within 2 years or less.

For PCB's incorporating intricate technologies such as buried vias, tight lines and spaces, and high inner-layer counts, rinsing with high quality water is critical to avoiding defects which drive yields down and unit costs up. Also, DI water is required for many processes including alternative oxide, electroless nickel/immersion gold and immersion silver which are chloride-sensitive. Often, to meet these requirements, DI bottle exchange service costing approximately \$.04 per gallon of water produced is utilized. By comparison, an on-site regenerable ion exchange recycling system has an operating cost of approximately \$0.004 per gallon.

In the news almost every day are stories about water shortages or increasing costs. As surface water becomes scarce, use of groundwater with its higher level of dissolved solids is increasing. Facing population growth, industrial water users are under pressure to reduce consumption. Attempting to extend the serviceable life of POTW's, municipalities are increasing sewer fees and limiting discharge volumes. The good news is that in response to these situations, water agencies are establishing programs to subsidize and promote industrial water conservation.

Wastewater treatment is generally the last area where management wants to expend valuable and limited capital. But with an inefficient treatment system typical of many PCB manufacturing facilities, money is being poured down the drain with every gallon of water discharged. A traditional chemical precipitation treatment system does not benefit quality, lower operating cost, or increase profits. But a rinse water recycling system which can process 60% of total rinse waters does all three. Its operating cost to process wastewater and generate DI water is about 75% less than chemical treatment which costs on average \$15 per 1,000 gallons and 90% less than DI service exchange.

Decision-makers need to reconsider the back-end of their operation and invest in a recycling system which will position their company for continued growth in the face of dwindling water sources and increasing costs.

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