

# Water Conservation at Avtec Finishing

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**UNIVERSITY OF MINNESOTA**

**Driven to Discover<sup>SM</sup>**



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# Company Background



- **Overview**

- New Hope, MN
- 116 Employees
- 100,000 Sq. Feet

- **History**

- Founded in 1971
- Part of Lindgren Group
- Several industries served

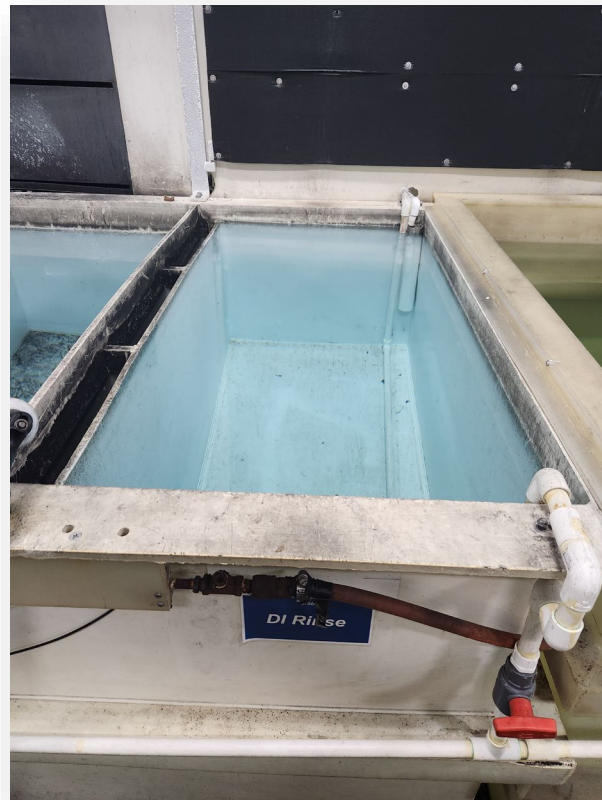


# Incentives to Change

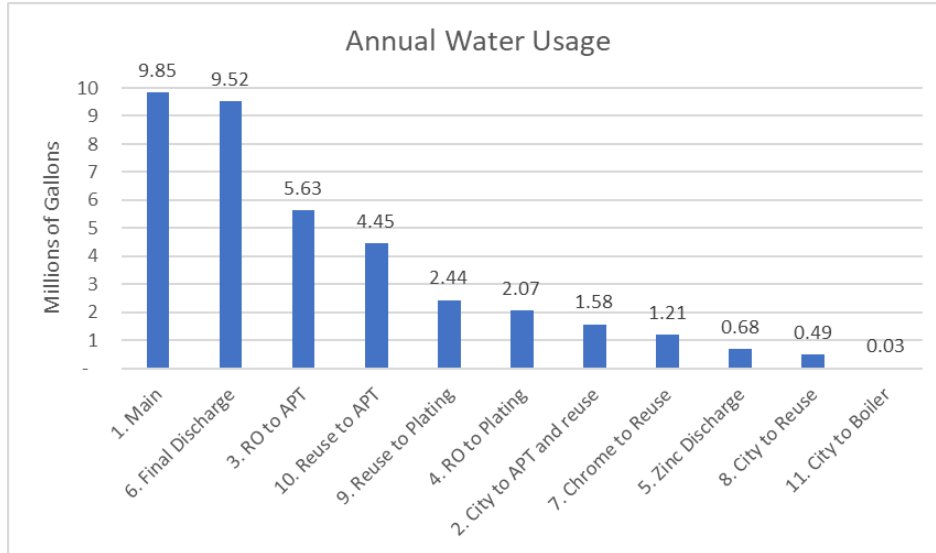
## Company Focus to Reduce Water Usage

### Over-Rinsing

- Loss of Processing Chemicals
- Product Quality Control



# Current Situation

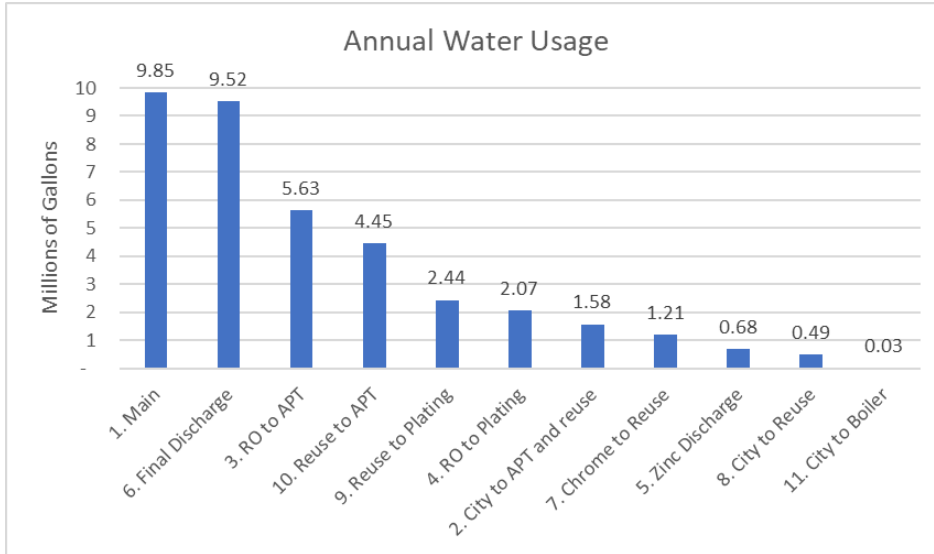


- **9,850,000 Gal/yr annual water usage**

- **Water Sources**

- City
- Deionized (DI)
- Soft
- Reuse

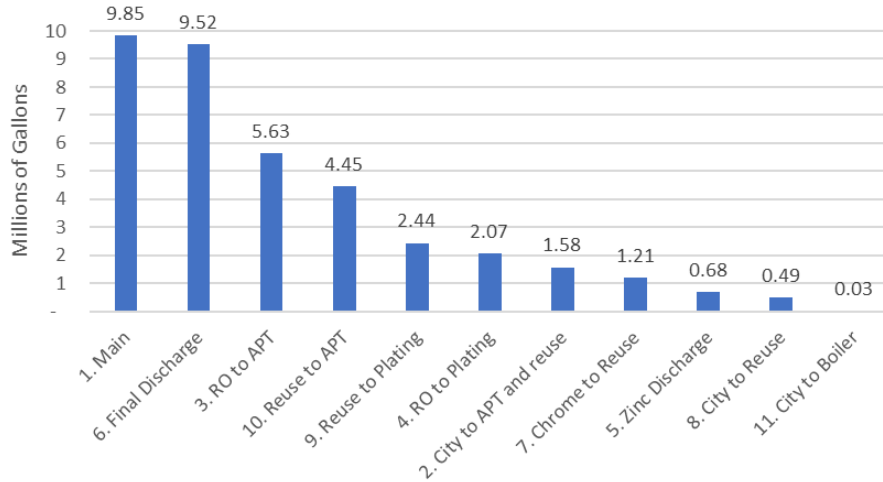
# Mapping Water Use



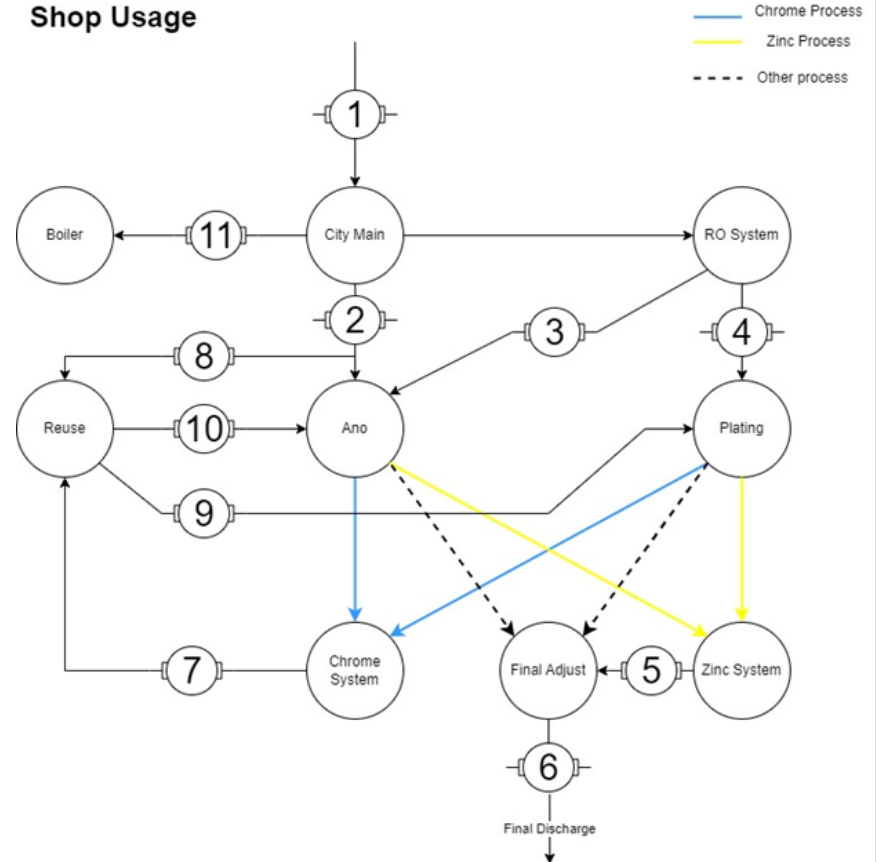
- Identify input/output locations
- Which lines use most water
- Chemical composition of tanks
- Identify locations of interest that are not metered

# Mapping Water Use

Annual Water Usage



Shop Usage



# Mapping Water Use

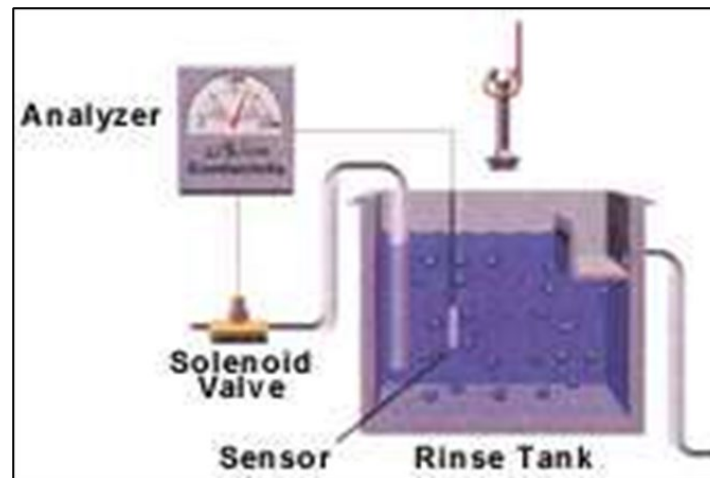
## Flow Restrictors

- Range from 0.25 to 2.5 GPM
- Variable pressure
- Always active
- Allow roughly 9,500,000 Gal/yr



# Conductivity Control Rinse Tanks

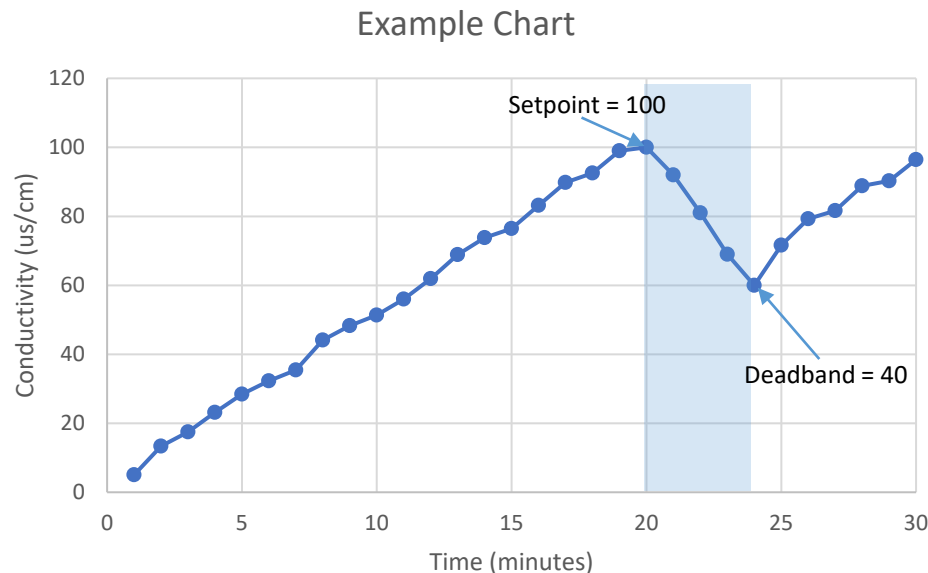
- **“Conductivity”**
  - A measurement of dissolved solids in water
  - Lower conductivity = cleaner water
- **Add fresh water, flush dirty water above certain conductivity**



Adapted from <https://www.pfonline.com/articles/reducing-rinse-water-use>

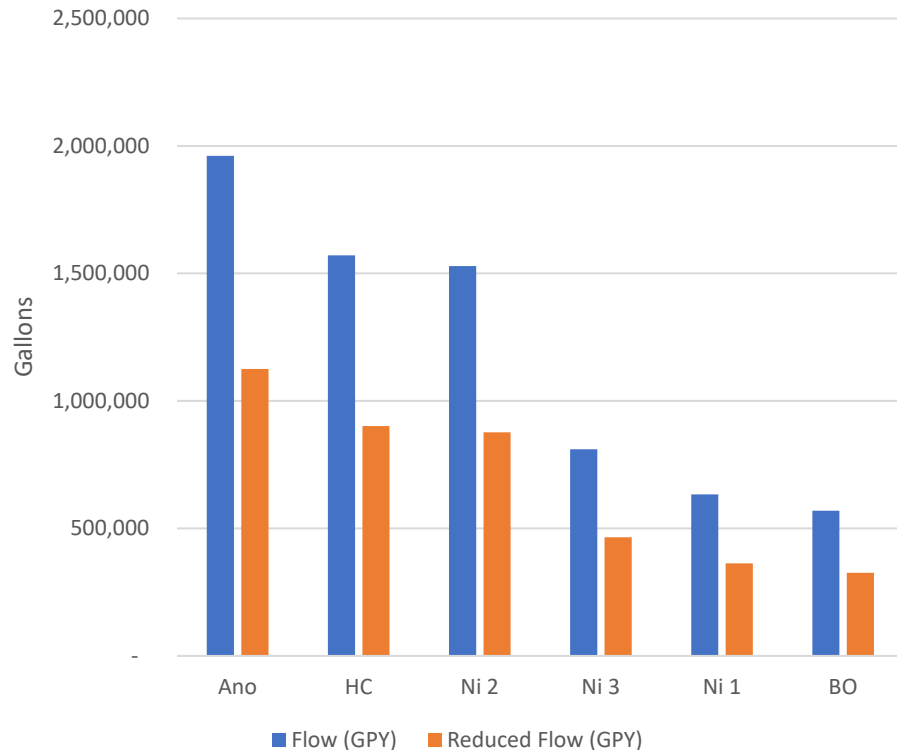
# Conductivity Control Rinse Tanks

- Add water in highlighted region
- Stop when conductivity falls below deadband
- “Deadband”
  - Region of values where valve will remain open



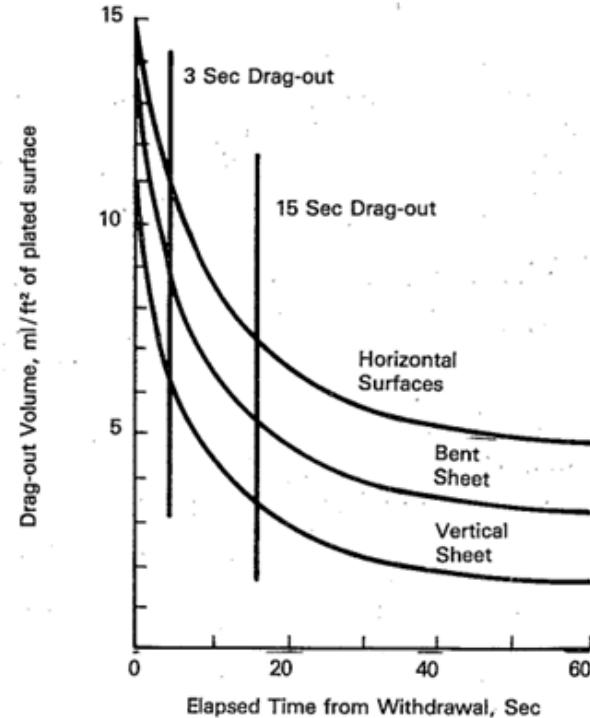
# Conductivity Control Rinse Tanks

- Top 6 of 13 lines use 77% of total water
  - 40 tanks suitable for conductivity controls
- Merit Partnership Case Study – 42% reduction in rinse water



# Tank Covers/Drain Boards

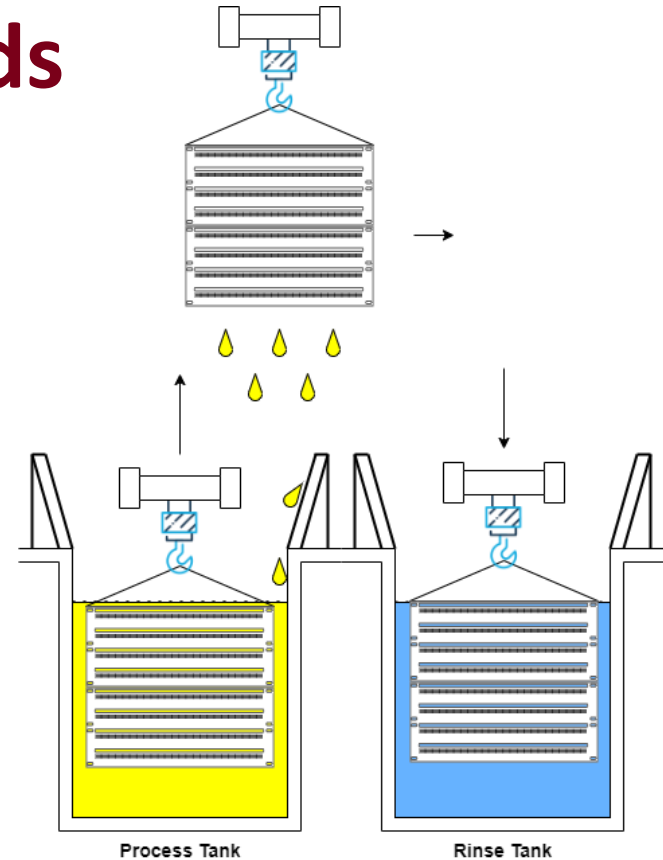
- “Dragout”
  - Liquid adhering to parts after removal from tank
  - Lose up to 0.5 gal per rack
- **+5 seconds of drain time = 30% reduction in:**
  - water use
  - chemical loss
  - wastewater generated



# Tank Covers/Drain Boards

## Open door Benefits

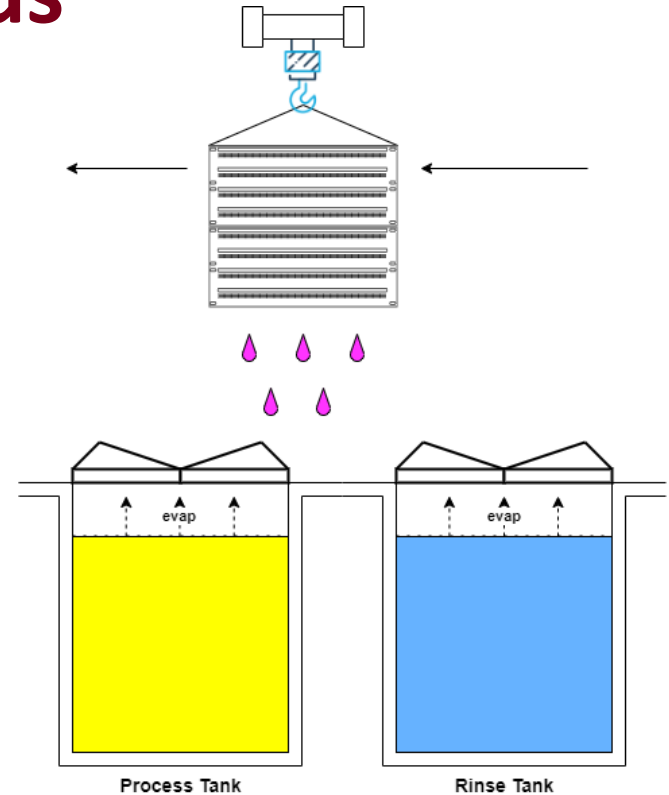
- Return chemical runoff to tank
- Increase drain-time
  - Hoist speed and tank dimensions to determine geometry
  - Goal: +5s of drain time



# Tank Covers/Drain Boards

## Closed Door Benefits

- Prevent cross-contamination
- Reduce loss due to evaporation
  - Roughly 330,000 GPY lost



# Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Conductivity Controlled Rinse	3,340,000 gal water	\$59,000	\$45,200	1.3 years	Recommended
Tank Covers/Drain Boards	1,040,000 gal water	\$6,700	\$15,500	5 months	Recommended

# Personal Benefits

- Made meaningful connections
- Experience in a new field
- Unexpected application of my interests

