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Water recycling & re-use

Benefits & pitfalls

Water Management Best Practice Webinar

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Agenda

- Benefits
- Opportunities for recycling
- Pitfalls
- Examples

Benefits

- Saves water and effluent costs
- Allows expansion if water or effluent is restricted
- Comply with regulations
- Green issues, corporate responsibility
- **REDUCTION is BEST**

Main opportunities for recycling

- Bottle rinsers
- Bottle washers
- Tunnel pasteurisers
- Vacuum pumps
- Water treatment plants
- CIP sets

- Rainwater

Bottle rinsers

- Typically use about 3 m^3/hr
- Relatively clean, cold water
- Can be recycled to vacuum pumps, cooling towers, boilers or water treatment plants
- Requires collection and pumping

Bottle washers

- About 10 m^3/hr can often be returned from final rinse to pre rinse. About 3 to 5 m^3/hr of this water is surplus
- Surplus water is warm and contains caustic
- Can be collected and used for floor hose down
- Supply to crate washer?

Tunnel pasteurisers

- When balanced has 2 - 3 m^3/hr overflow
- During start up or shut down can use up to 70 m^3/hr
- Water is clean but warm or hot
- Can be reused as pasteuriser water after cooling

Vacuum pumps

- Typically use 3 - 5 m^3/hr
- Contaminated warm water
- Can be recycled to vacuum pumps
- Requires collection and cooling

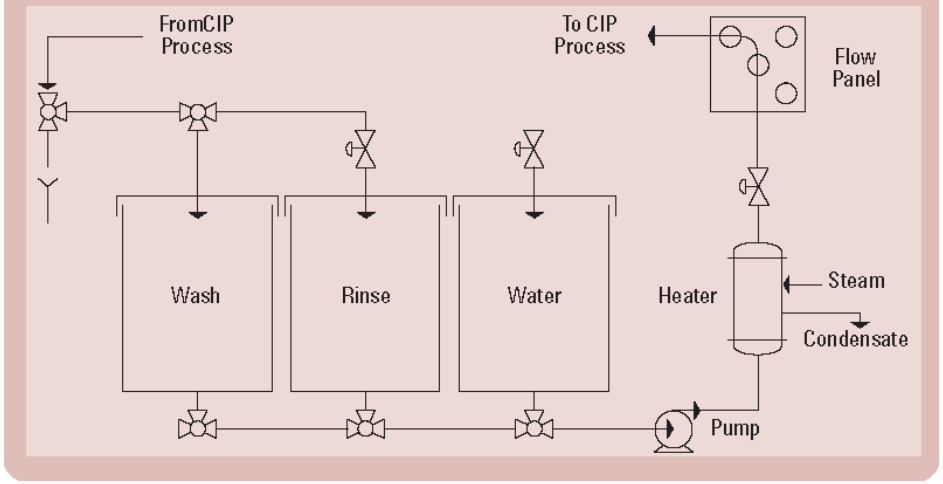
Water treatment plants

- Typically waste 5% of site water usage
- Optimise first
  - Backwash filters when necessary
  - Check backwash times, max 15 minutes at correct flow rate
  - Ion Exchange Plant - regenerate only when required
  - Check backwash and rinse times
  - Maximise reverse osmosis recovery with alternative anti-scalents or acid
- Water is generally contaminated with suspended solids
- Recycle to front of the plant via treatment to reduce turbidity to less than 2 NTU

CIP sets

- Use three tank systems
- Recover chemicals and final rinse water
- Use conductivity to terminate final rinse
- Use spray balls for cleaning vessels or better still dynamic spray devices which use very small amounts of water
- Carry out CIP cleaning only when necessary

Figure 2: Simplified drawing of a CIP reuse system



Rainwater collection

- Viable even in drought areas
- UK rainfall about 50 mm/month
- 3,000 m^2 roof will yield 150 m^3 per month

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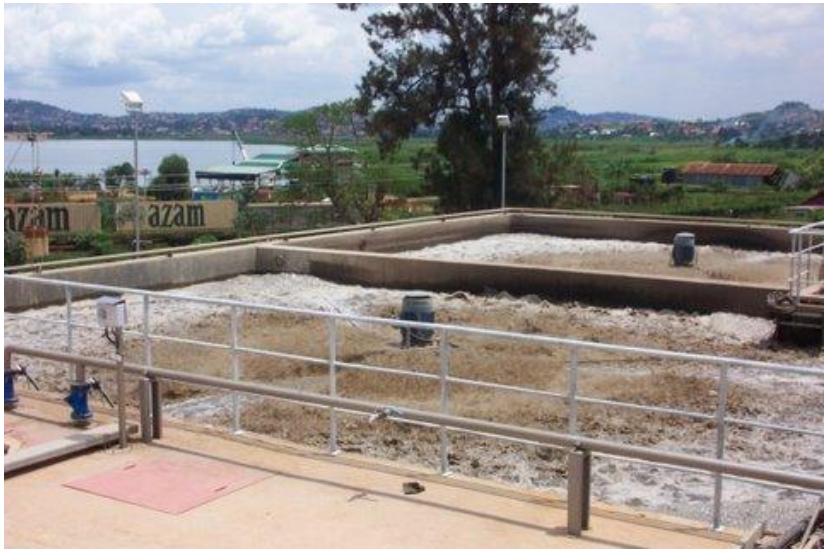
Pitfalls

- **Quantity and quality**
  - Blowdown and cleaning losses
  - Microbiology e.g. RO reject
  - Trace contaminants e.g. Rainwater air pollution
- **Heat**
  - Vacuum pump; pasteuriser
  - Cooling can be expensive
- **Cleaning**
  - Production downtime during cleaning of milk condensate recovery
- **Cost**
  - Both Capex and Opex

Example 1

West African brewer

- Water to product ratio was between 30:1 and 40:1
- Should be 15:1 to 20:1 for this region and type of production
- Process modifications were made to the bottle washers, pasteurisers and CIP operations
- Water balance identified a significant difference between the measured and estimated water consumption on the plant



- Further investigations led to the discovery of several underground water mains failures accounting for a significant quantity of the water overuse

Example 2

Rainwater harvesting at beverage plants

- Two projects where rainwater harvesting was being used
- Issues with variable water quality
- Occasional presence of antimony
- Source identified in both cases as atmospheric pollution from nearby industry
- Expensive to treat

- Normally only an option for use as washing, grey water, WC use

Summary

- Many options for water recycling and reuse
- Reduce before recycling
- Be aware that quality can be an issue

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