

Purpose guides us



We pioneer solutions to the world's water and climate challenges and improve quality of life for people

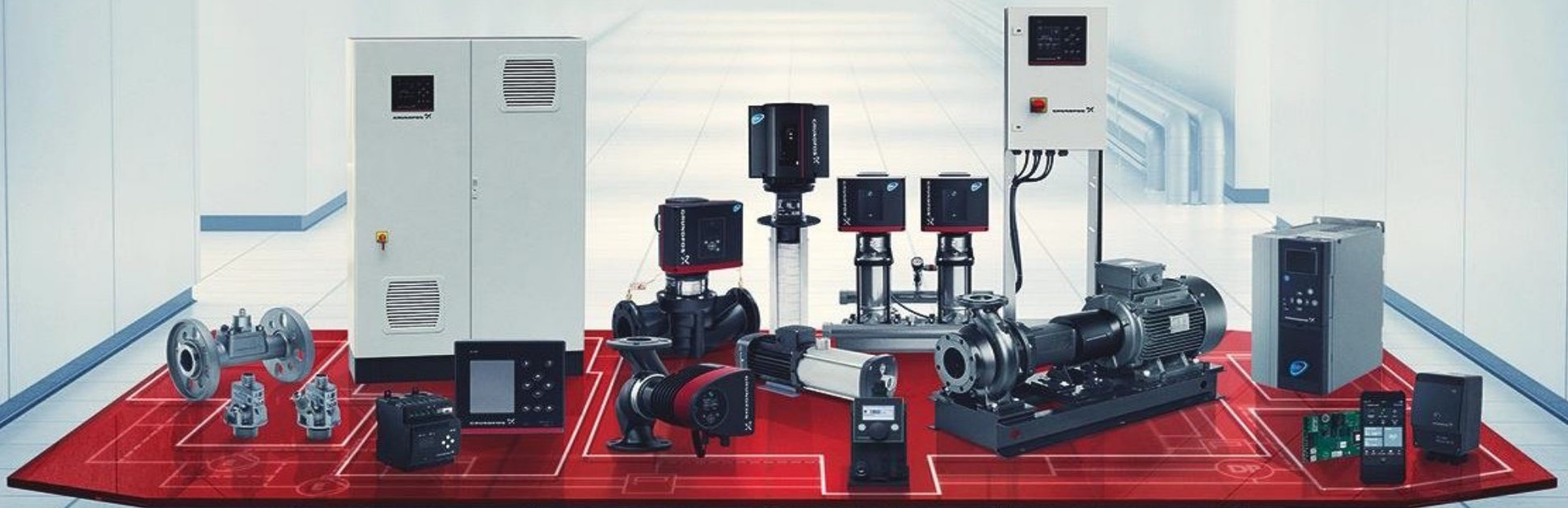
Grundfos becomes world's first water solutions company with approved net-zero Science-Based Targets



Grundfos commits to reduce absolute Scope 1 and Scope 2 GHG emissions 50% and reduce absolute Scope 3 GHG emissions 25% by 2030 from a 2020 baseline year.

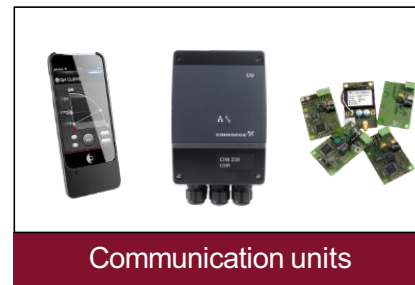


Innovation is the Core .

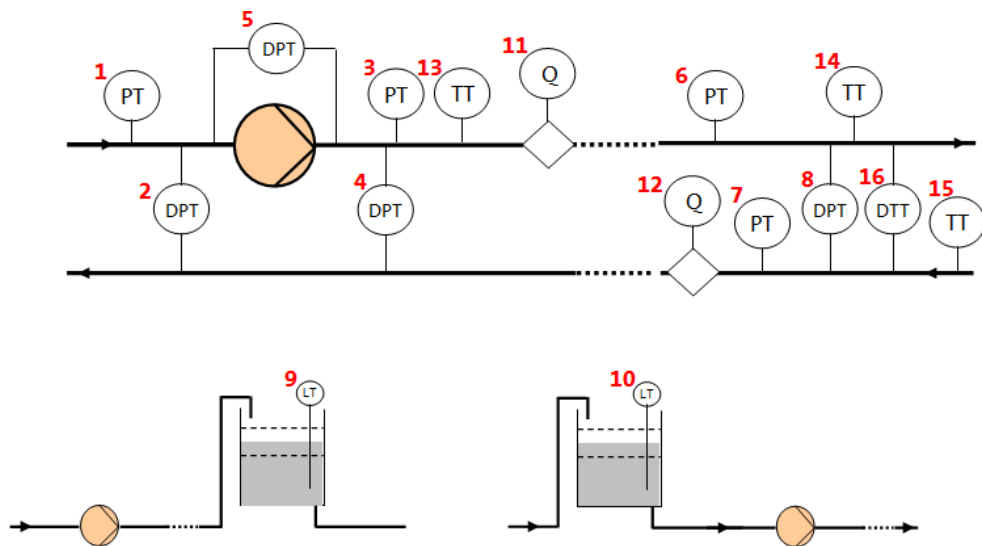




DIFFERENT GROUPS FOR DIFFERENT APPLICATION AREAS



Measured parameter



Measured parameter

1. Pump inlet pressure
2. Pump inlet differential pressure
3. Pump outlet pressure
4. Pump outlet differential pressure
5. Pump differential pressure
6. Remote pressure 1
7. Remote pressure 2
8. Remote differential pressure
9. Feed tank level
10. Storage tank level
11. Pump flow
12. Remote flow
13. Liquid temperature
14. Temperature 1
15. Temperature 2
16. Remote diff. temperature
17. Ambient temperature
- Other parameter

Grundfos iSOLUTIONS brings the benefits of intelligent solutions to advanced pump systems today



GRUNDFOS iSOLUTIONS



PUMP



CLOUD



SERVICES

BENEFITS

- ✓ **Autonomously optimise system performance:**
Reacting to system performance data, adjusting to demands
- ✓ **Complete system overview and control:**
Integrated user interface, for the pumps and components, remote control from your device
- ✓ **Improved reliability:**
Reduced downtime and maintenance costs
- ✓ **High energy efficiency:**
Exceeding all standards and legislation
- ✓ **Customer specific digital offerings:**
Tailored to your needs out of the box

Grundfos motors achieve highest energy efficiency rating worldwide

IE5

IS THE FUTURE, AND WE HAVE IT

NOW



TPE



CME



CRE



NKE

& MORE...

Grundfos E-products used in Industry



CME range



NBE/NKE range



Dosing range



MTSE range



TPE range



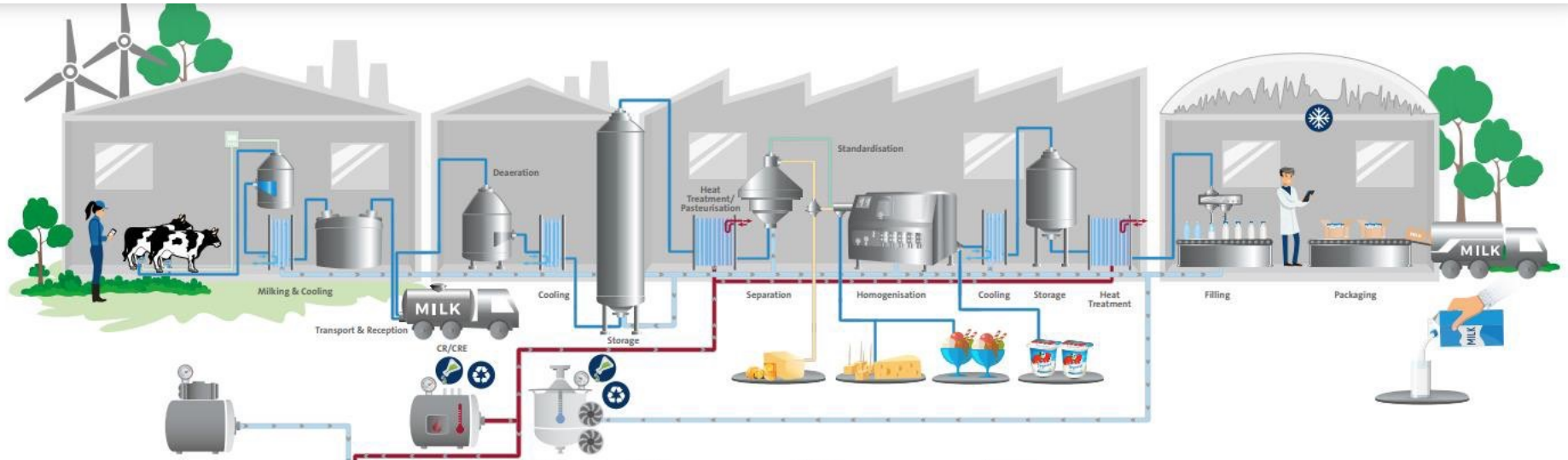
CRE range



MTRE range



FOOD & BEVERAGE



Water Intake & Feed



Cleaning Processes



Boiler Systems



Cooling Systems



Water Treatment



Wastewater Treatment



Water Reuse



Control System



Water Intake & Feed | Grundfos Products



SP

- Ground water or surface water pumping (consider max. borehole extraction capacity!)



NB (E) / NK (E)

- Water transport (e.g. into break tank):
 - City water
 - Surface water (consider NPSH!)



*NKG single and double shaft seal solution (tandem), AISI 316



CR (E) / CRN (E)

- Pressure boosting (e.g. after break tank)
- Feed in membrane processes for dairy product itself
- Flushing out whey in cheese making



Special range: CRN with flange connection according to DIN 11853-2, stainless steel AISI 316 (1.4401) and low surface roughness (option: electropolished $\leq 0.8 \mu\text{m}$) suitable for the beverage industry (but not a sanitary pump).



Booster Systems

- Pressure boosting (e.g. after break tank)



I am in **Booster's** for Pressure Boosting in Utility & Process and Professional Water Supply



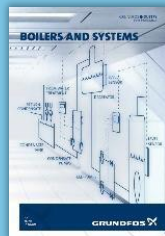


Situation: Often, steam boilers are operated with fixed-speed pumps, a bypass pipe and a modulating feed valve.

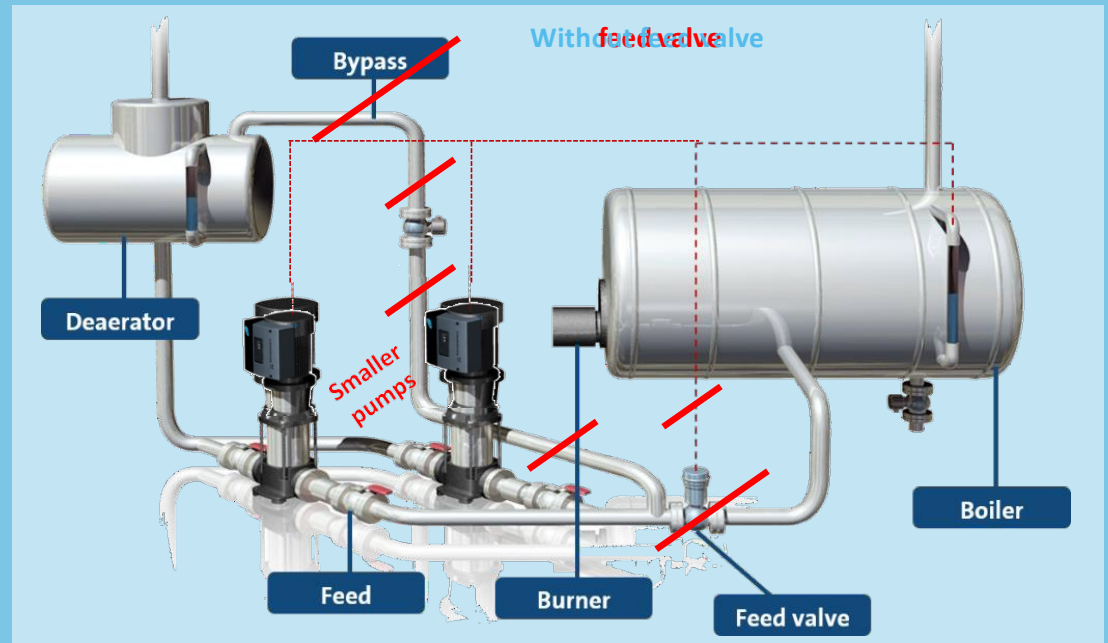
Improved solution: The water level in the boiler is controlled directly by means of variable speed pumps without the use of a modulating feed valve. The pumps are controlled via level sensor positioned on the boiler. This way the water intake is controlled according to steam consumption.

Benefits: The system operates smoothly and is ideal for all types of steam boilers, both small and large, and will minimise the risk of over-boiling and carry over.

- No need for expensive modulating feed valve
- Reduced maintenance costs
- Smaller pumps and reduced power consumption
- Steady steam quality



Boilers & Systems Manual:



Things to consider when using an E-motor

- The regulation range could be small
- The start-up speed
- How to start/stop the pumps?
- The regulator signal could be inverted



Cooling Systems

- Refrigeration is one of the largest electrical power consumers in a dairy used for cooling of storage rooms and liquids.
- Directly after arrival at the dairy, the milk is often cooled to a low temperature (5 °C or lower), to temporarily prevent growth of microorganisms. Following pasteurisation, the milk is also cooled again to about 4 °C.
- The process and finished product storage need to be cooled permanently. Thus, even when the dairy is pausing or slowing down production, at least parts of the cooling systems will remain turned on (24/7 operation). Therefore, it is important to energy optimize the cooling systems and be able to flexibly adjust the output capacity.
- **Cooling medium:** Cold water, ice water, brine solution or an alcohol solution, such as glycol. Glycol systems are used when low temperatures are required that cannot be achieved with water as cooling medium. A typical solution contains 30 % of glycol and 70 % of water. Ammonia (NH₃) is a common **refrigerant**.



Background Knowledge

As a natural refrigerant, Ammonia has environmental benefits versus the synthetic refrigerants (e.g. R-134a).

There are higher cooling demands in summer months due to higher ambient temperatures and higher consumption. → E-pumps

Cooling water quality


Cooling water quality depends on the type of heat exchanger or engine to be cooled. Very generally, it should have the following quality:

Suspended solids	None
Conductivity	50 – 600 µS/cm
Hardness	max. 8 ° dH
pH	7.8
CO2 aggressive	None
Iron	<0.3 mg/L
Manganese	<0.05 mg/L
Sulphate	<250 mg/L
Chloride	<250 mg/L
COD	<40 mg/L
Bacteria	<1,000 CFU/ml

Cooling Systems | Grundfos Products


CR (E)

- Cooling liquid circulation
- Cooling tower




TP (E)

- Cooling liquid circulation
- Cooling tower



CM (E)

- Cooling liquid circulation
- Cooling tower



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MAGNA

- Cooling liquid circulation



NB (E) / NK (E)

- Cooling liquid circulation
- Cooling tower



Booster Systems

- Cooling tower



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Oxiperm Pro

- Cooling tower WT



Dosing Pumps & DID

SMART Digital, DME, DMX, DMH

- Cooling tower WT





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Cooling liquid circulation: This refers to the *secondary side* of the cooling system. Common cooling liquids are: ice water, glycol, brine, alcohol-water. Usually stainless steel is used.

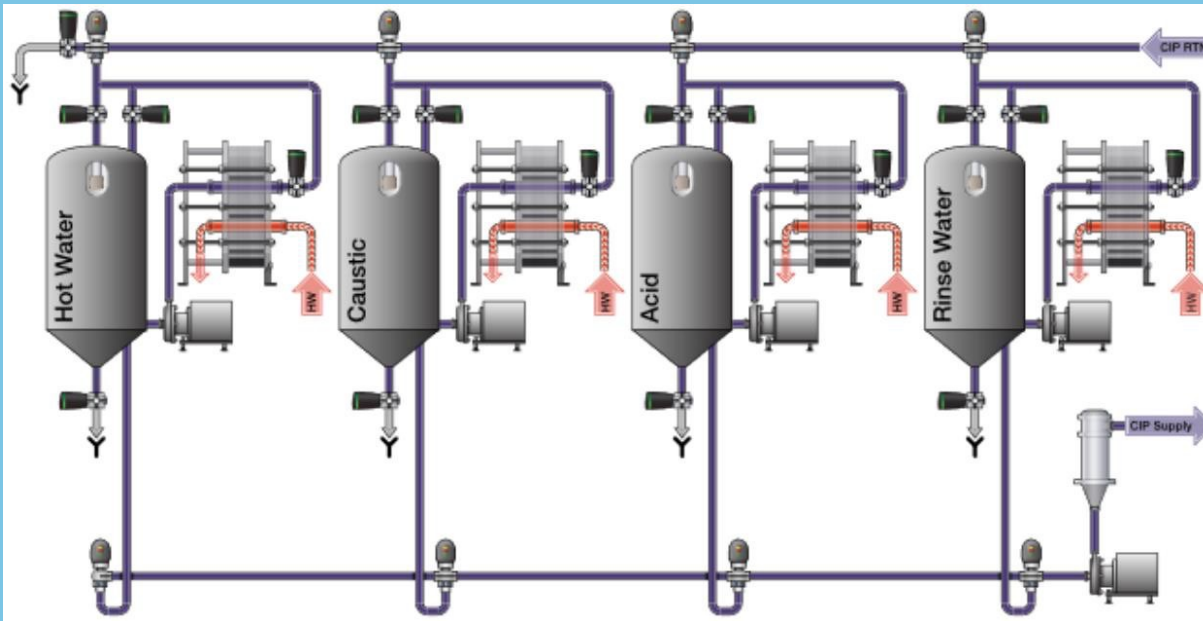
Refrigeration/chiller: This refers to the *primary side* of the cooling system. It is not within our standard product range! Common refrigerants are: Ammonia (NH₃) and carbon dioxide (CO₂).

Cooling tower: Only in larger dairies.

Cleaning Processes | Cleaning-in-Place

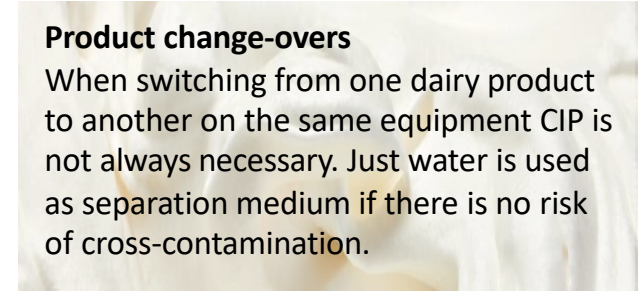


Typical setup for a Cleaning-in-Place (CIP) system



Product change-overs

When switching from one dairy product to another on the same equipment CIP is not always necessary. Just water is used as separation medium if there is no risk of cross-contamination.



Cleaning Processes | Grundfos Products



For CIP processes in dairies sanitary pumps are predominantly used as they are considered an integral part of the production process. Also possible for parts of the cleaning process: NB/NK (SS) or CRN – electropolished, for CIP return water also cast iron is allowed.

Dosing Pumps & Skids

SMART Digital, DME, DMX, DMH

- Dosing of caustic/alkali, acid and sanitizer



Caution

Recommended dosing head materials for dosing pumps: PVDF (up to 85 °C) or Stainless Steel (up to 120 °C). Reason: CIP of dosing heads is often done at high temperatures.

PP and PVC must not be used as dosing head material in CIP due to their limitations in higher short-term temperatures.



Oxiperm Pro

Chlorine dioxide is a widely accepted disinfection method in the beverage industry. Local regulations apply!



CRN (E)

- Tank wash down
- Circulation of pre-washing water
- CIP return water



FAB

Special range: CRN with flange connection according to DIN 11853-2, stainless steel AISI 316 (1.4401) and low surface roughness (option: electropolished $\leq 0.8 \mu\text{m}$) suitable for the beverage industry (but not a sanitary pump).



Trends | Production Changes relevant to the Pumping Business

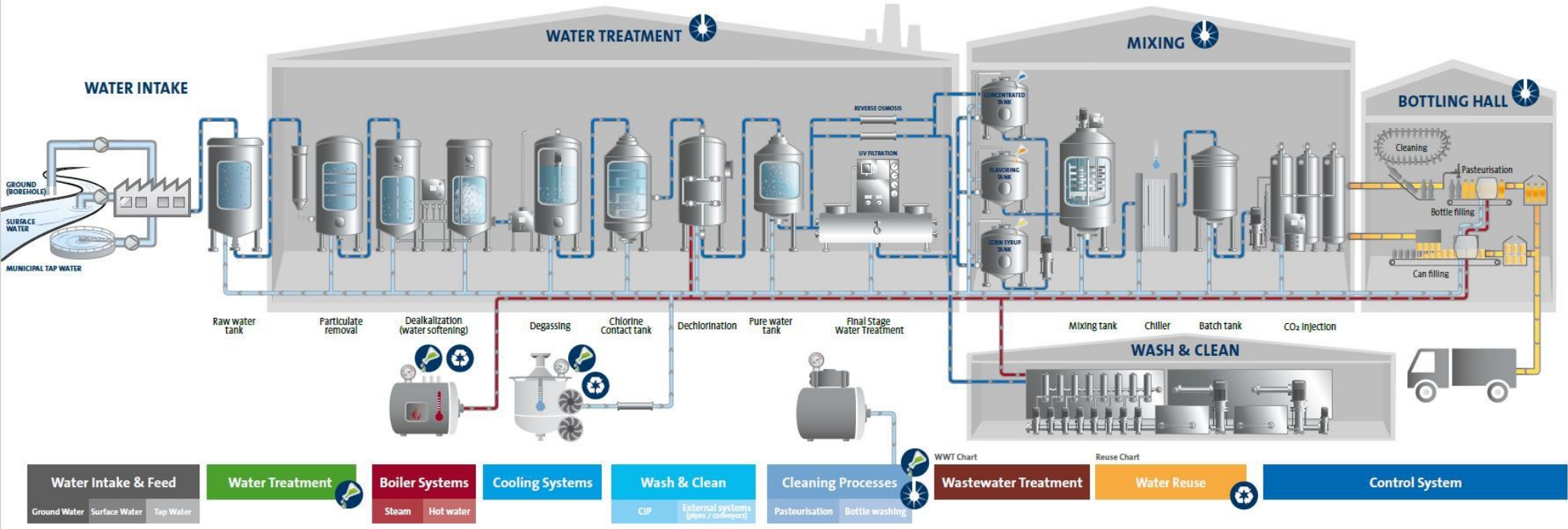
- **Overall Equipment Effectiveness (OEE):** It is becoming one of the most important measures looking at
 - availability
 - performance
 - quality

The top line figures in the MES (Manufacturing Execution System) are important to see the trends in a plant but to be useful they need to be broken down into actionable information.

- **Total Cost of Ownership (TCO) orientation:**
 - **Water savings**, e.g. by **water reuse** → also less heating and cooling is needed: opportunity to resize boilers, pumps, etc.
 - **Energy savings/recuperation:** mainly in the cooling and heating systems
 - **Chemical savings:** e.g. by reusing detergents (caustic or acid) in cleaning processes
 - **Membrane separation:** big topic for concentration of milk



Solutions for all secondary processes in soft drinks



Water Intake & Feed	Water Treatment	Boiler Systems	Cooling Systems	Wash & Clean	Cleaning Processes	Wastewater Treatment	Water Reuse	Control System
Ground Water Surface Water Tap Water		Steam Hot water		CIP External systems (pipes / containers)	Pasteurisation Bottle washing			

Solutions for all secondary processes in breweries and soft drinks



Water Treatment | Water Treatment Technologies



The most common technologies for the treatment of ground and surface water in textile processing factories are:

- Sand filtration
- Nano filtration (NF)
- Reverse osmosis (RO)
- Ion exchange
- Disinfection (UV or chlorination)



UV system



Chlorination system
(Vaccuperm)



Sand filter



Nano filtration system



Reverse osmosis system



Ion exchange system

Installation Reference : CRNE 20-8 for permeate water RO plant at Murugampalayam CETP, Tirupur

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systems and
solutions

Selection
and **design**
tools

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Thank you for your time

