



# Fermentation cellar design

– Brewery Systems

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# The brewery cold block

– From wort cooling to packaging



Stable quality



Food safety  
and hygiene



Sustainability

# Custom turnkey solutions for the cold block

– From wort cooling to packaging



## Optimizing process design for new or existing facilities

- Biological contamination
- Oxygen pick up
- Product losses
- Yeast management
- Fermentation efficiency
- Product stabilization
- Cleaning-in-Place (CIP) efficiency
- Water and energy consumption
- Waste stream management
- Other areas

# What we'll talk about today

– Agenda



- Fermentation tanks layout and installation options
- Pipe bridges and piping layout
- State of the art valve cluster design
  - Product routing
  - CIP and gas routing
  - CIP
- Features of sustainable design



# Tank layout



# Tank layout

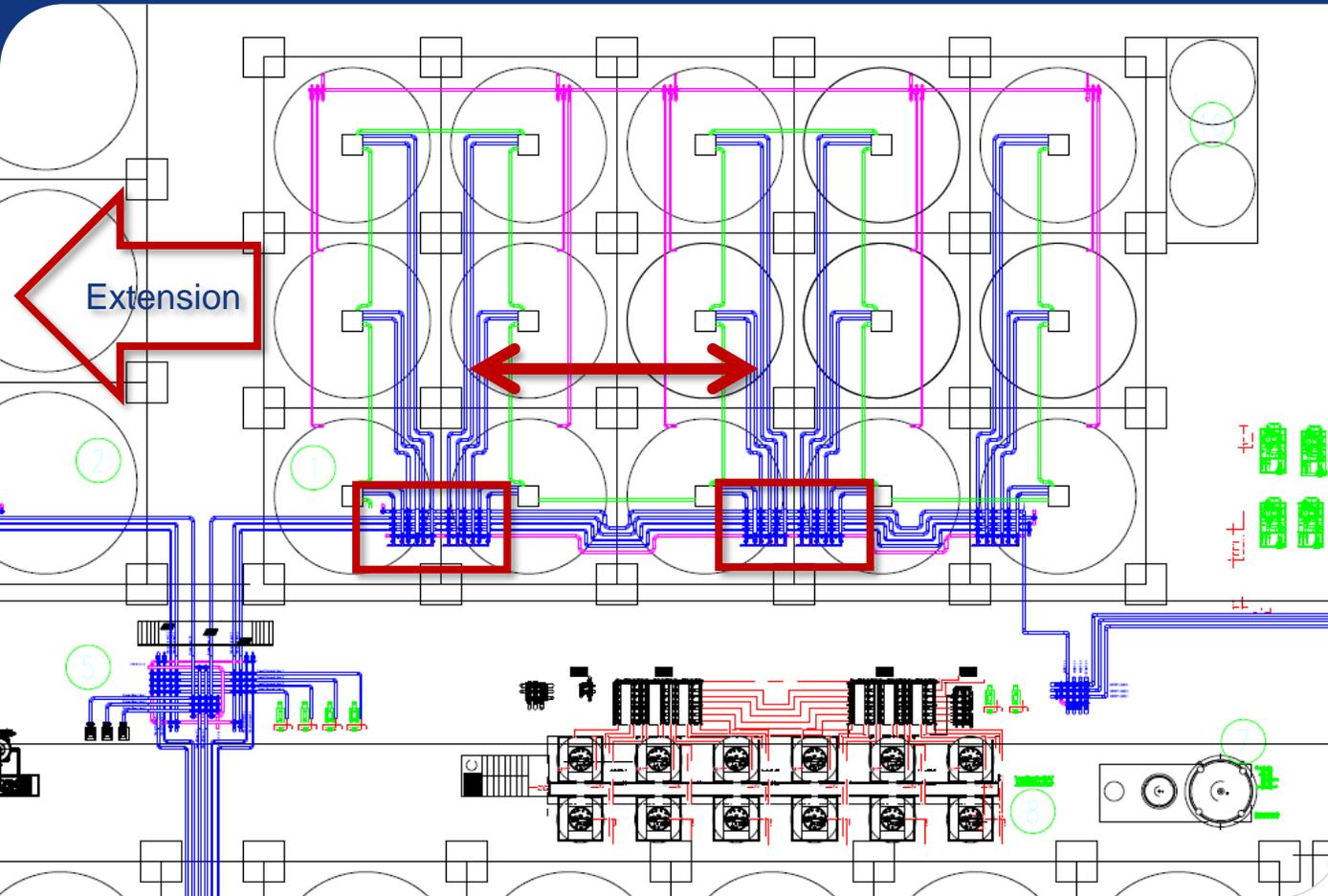
– Plan now for the future



- Future brewery development and expansion
- Maintenance and site logistics
- Installation plan optimization
- Length of piping = operation efficiency and waste management

# Tip 1 – optimize space usage

– What to consider when choosing an optimal tank layout



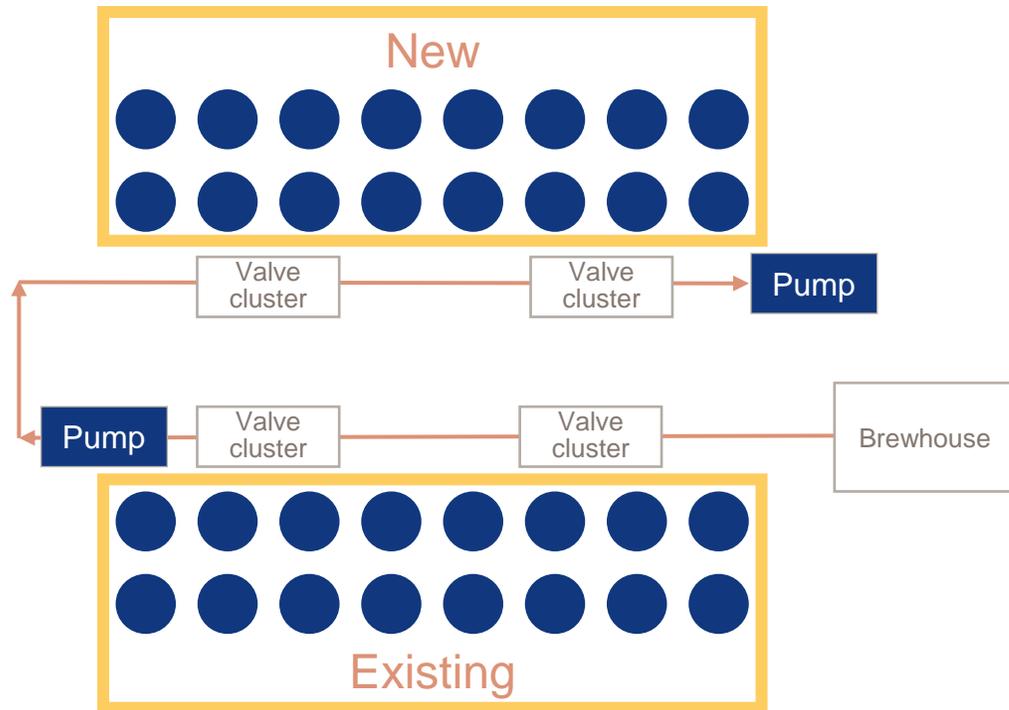
- Position equipment for easier installation and service
- Plan for possible pipe routes, filling and emptying distances
- Consider future extension capabilities

# Tip 2 – tank grouping

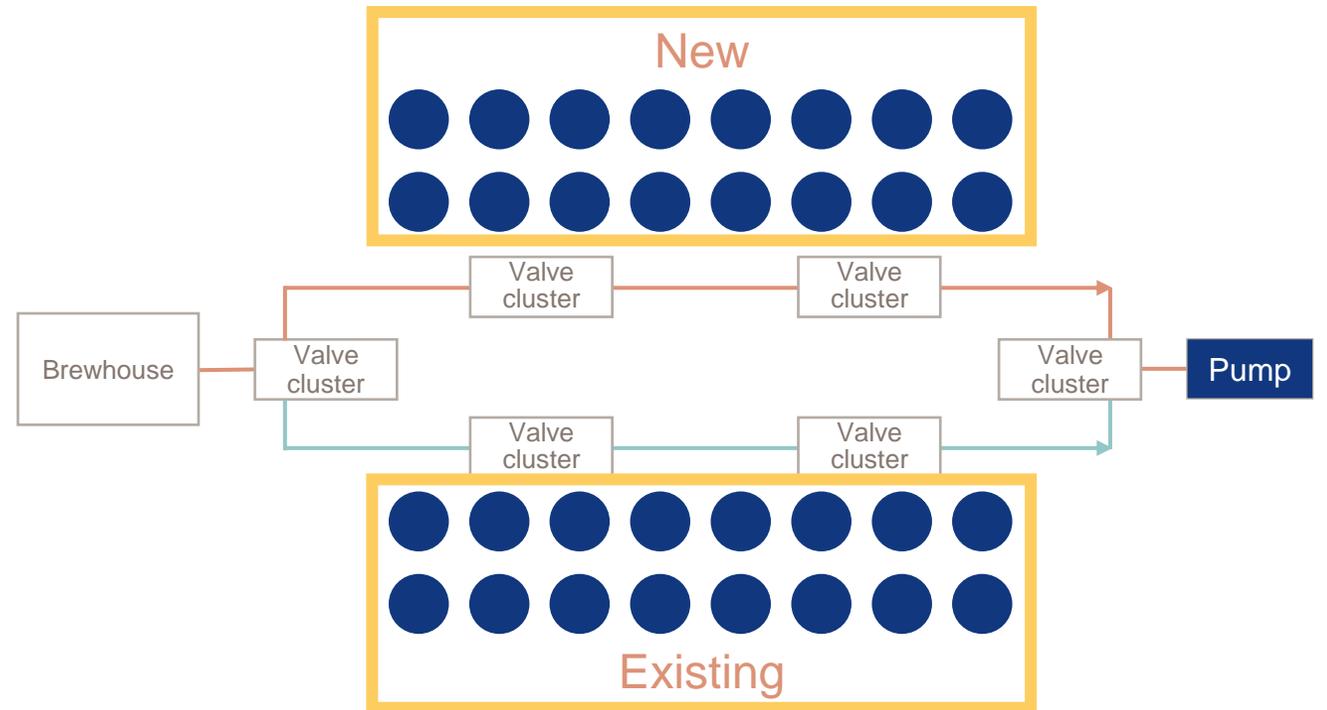
– Tank layout



## Option 1

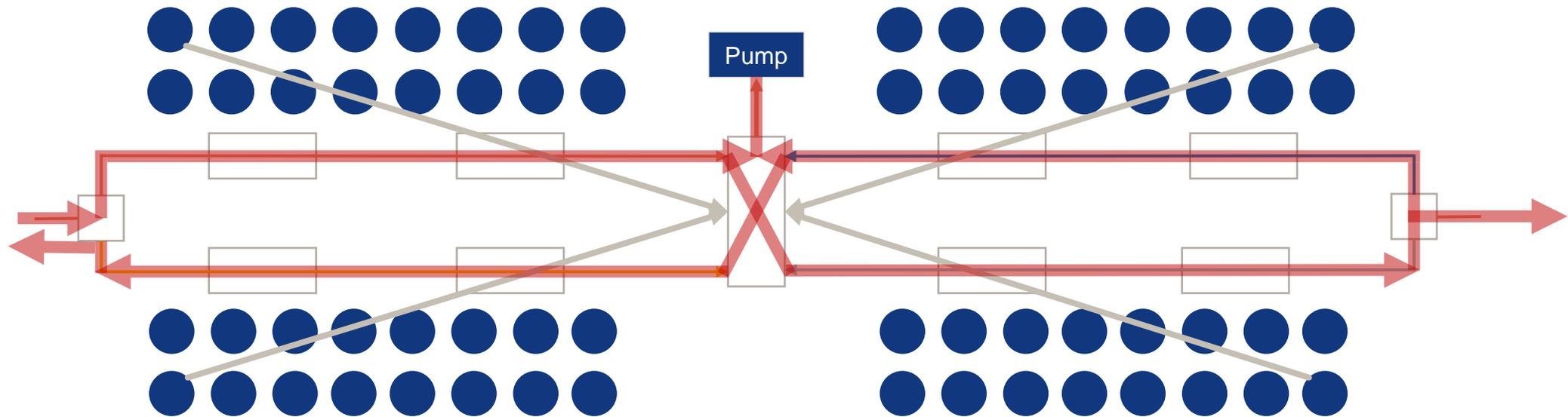


## Option 2



# Tip 3 – process and CIP flexibility

– Tank layout

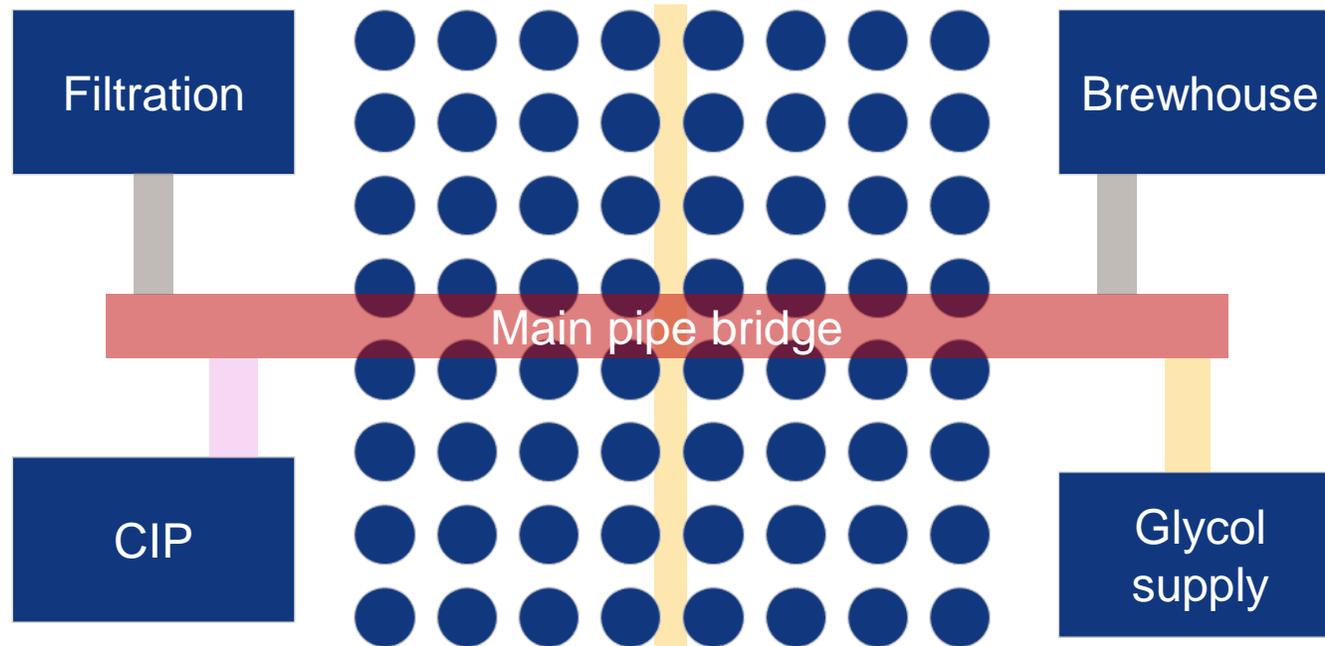


# Pipe bridges and piping layout



# Pipe bridges and piping layout

- Example

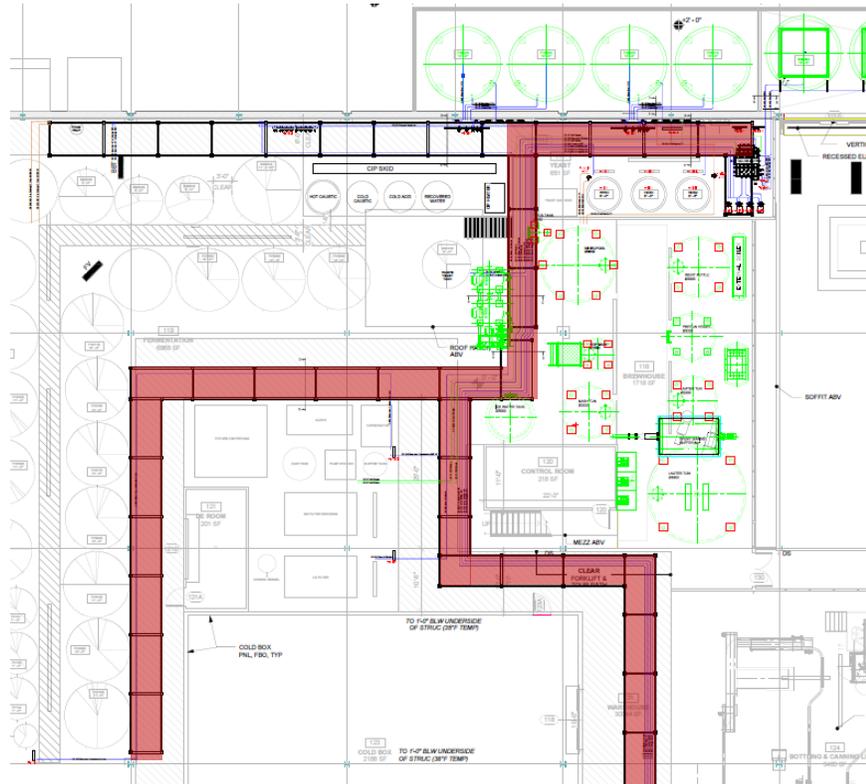


Leave adequate space for future:

- Pipes
- Walkways
- Maintenance
- Electrical hardware

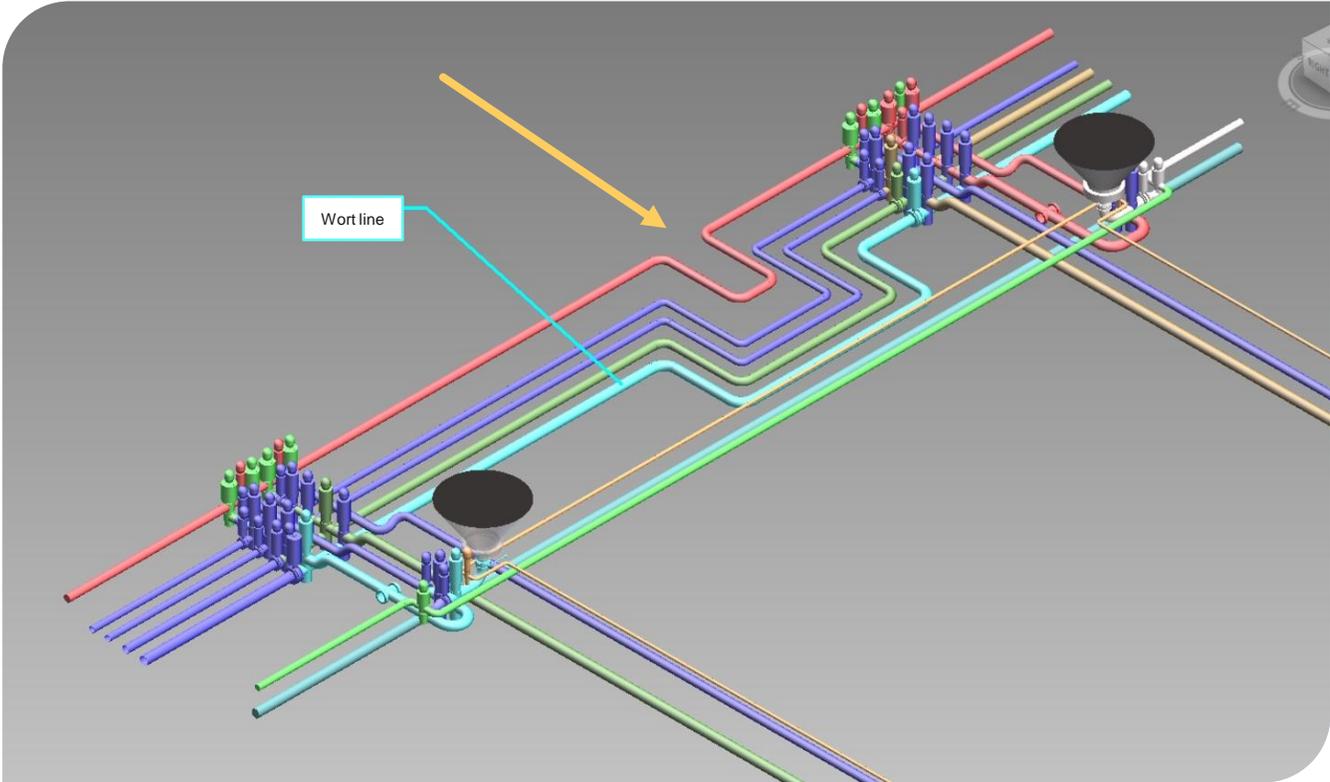
# Pipe bridges and piping layout

– Important for all breweries



# Piping layout

- Expansion loops



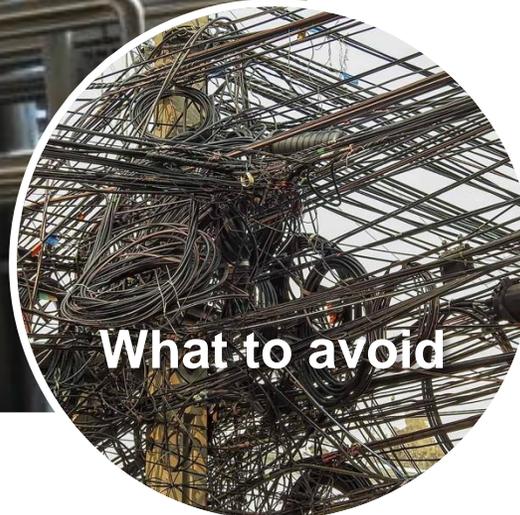
# Pipe bridges and piping layout

– Craft brewery example



Well-designed pipe bridges and piping layout means cellar design that is:

- Safe
- Efficient
- Expandable



# Tank installation options

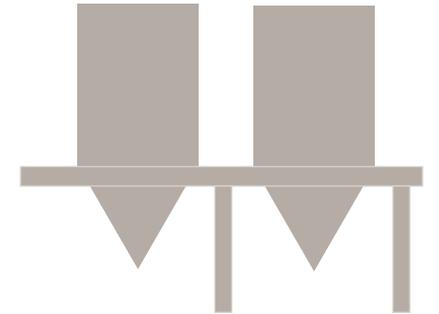
# Tank installation options

– Investments and complexity



## Slab-mounted tanks

- Smaller building to maintain, less OPEX
- More space for equipment and piping underneath the tanks
- Higher CAPEX



## Leg-mounted tanks

- Larger building to maintain
- Higher OPEX
- Less space for equipment and piping underneath the tanks



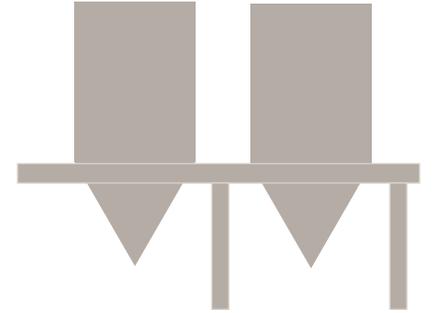
# Tank installation options

– Installation and safety



## Slab-mounted tanks

- Physical separation between installation crews
- Improved installation time
- Better control of site safety



## Leg-mounted tanks

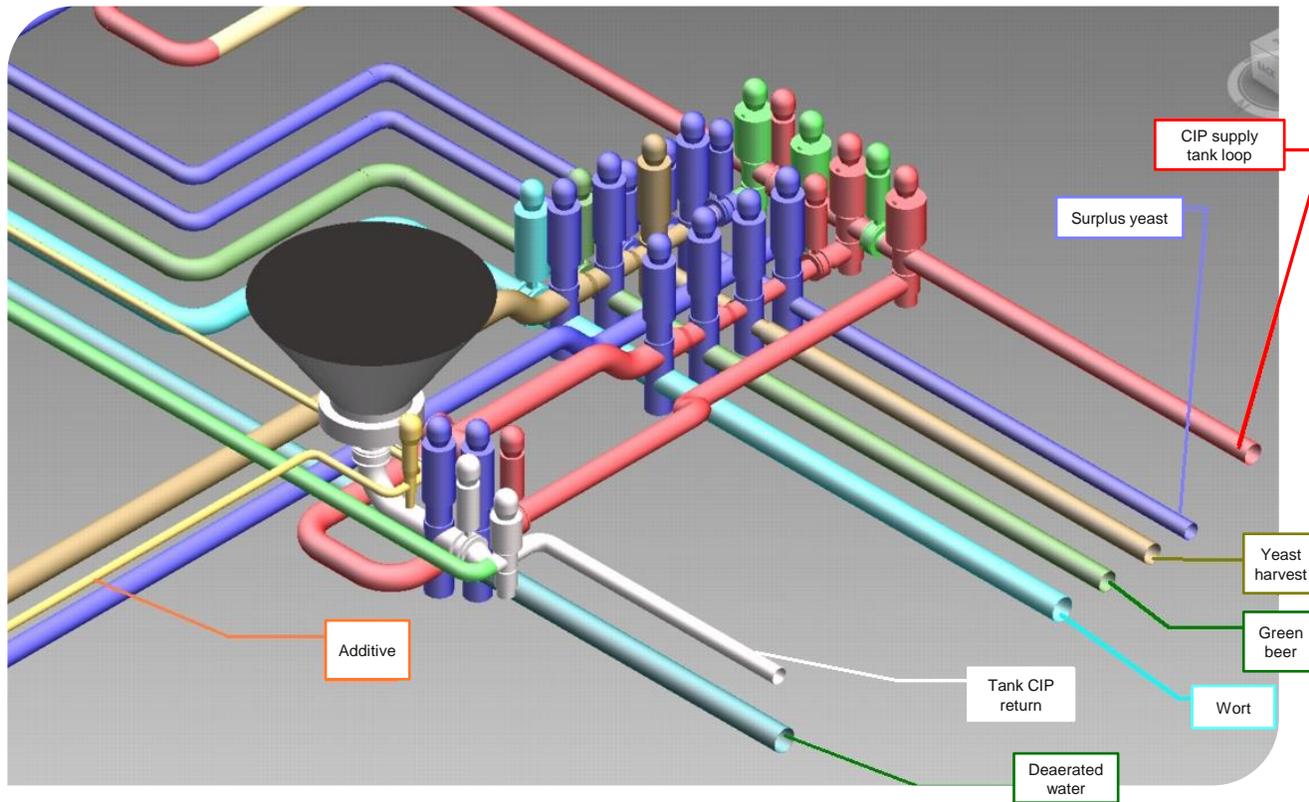
- Complex safety management if tanks are built on site
- Increased installation time



# Valve clusters for process routing

# Product valve cluster design

– Loop design

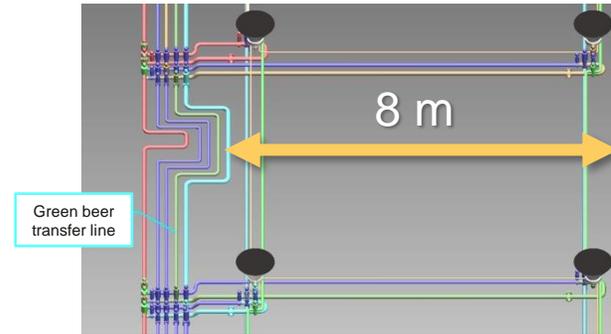
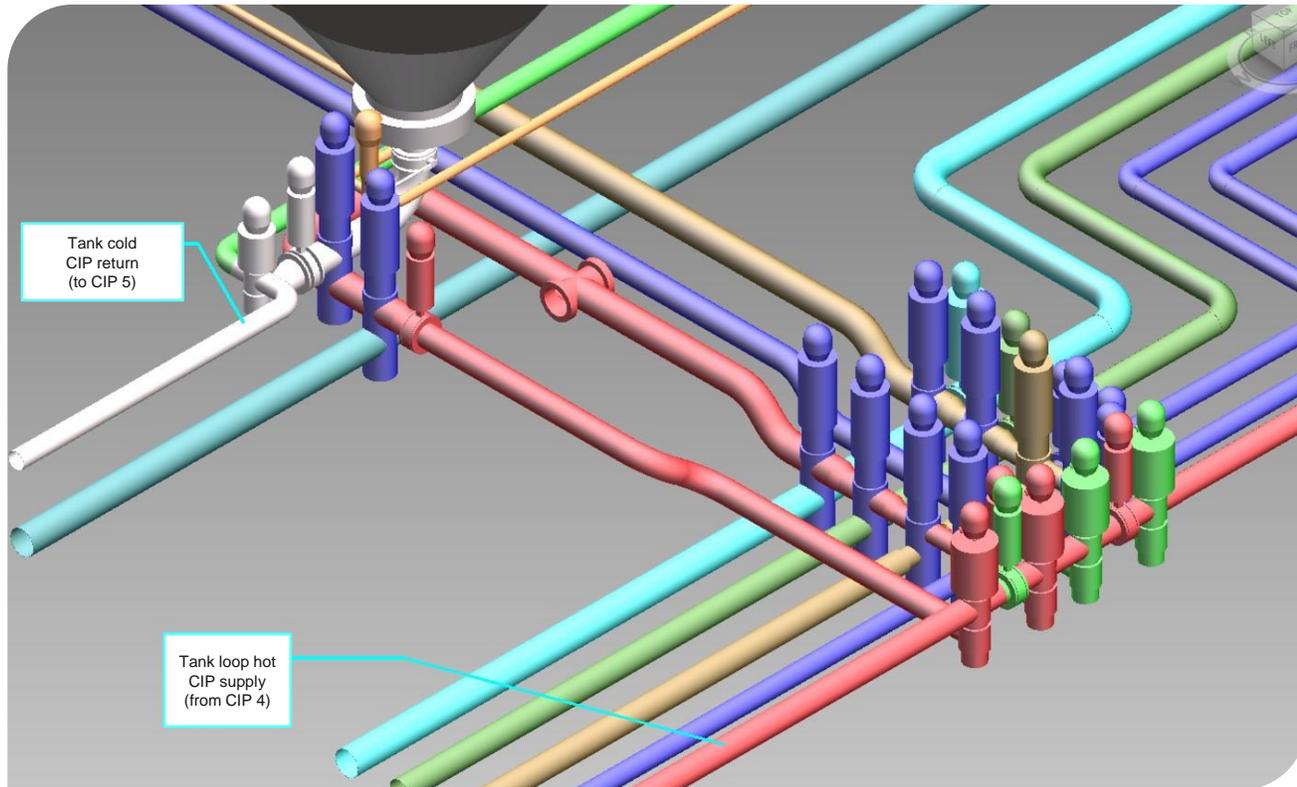


## Advantages when the tank outlet pipe is separated from the tank

- Reduced extract losses due to more efficient product push outs and recovery
- Best cleanability and CIP efficiency
- Increased product quality – no product is left in the pipe during fermentation

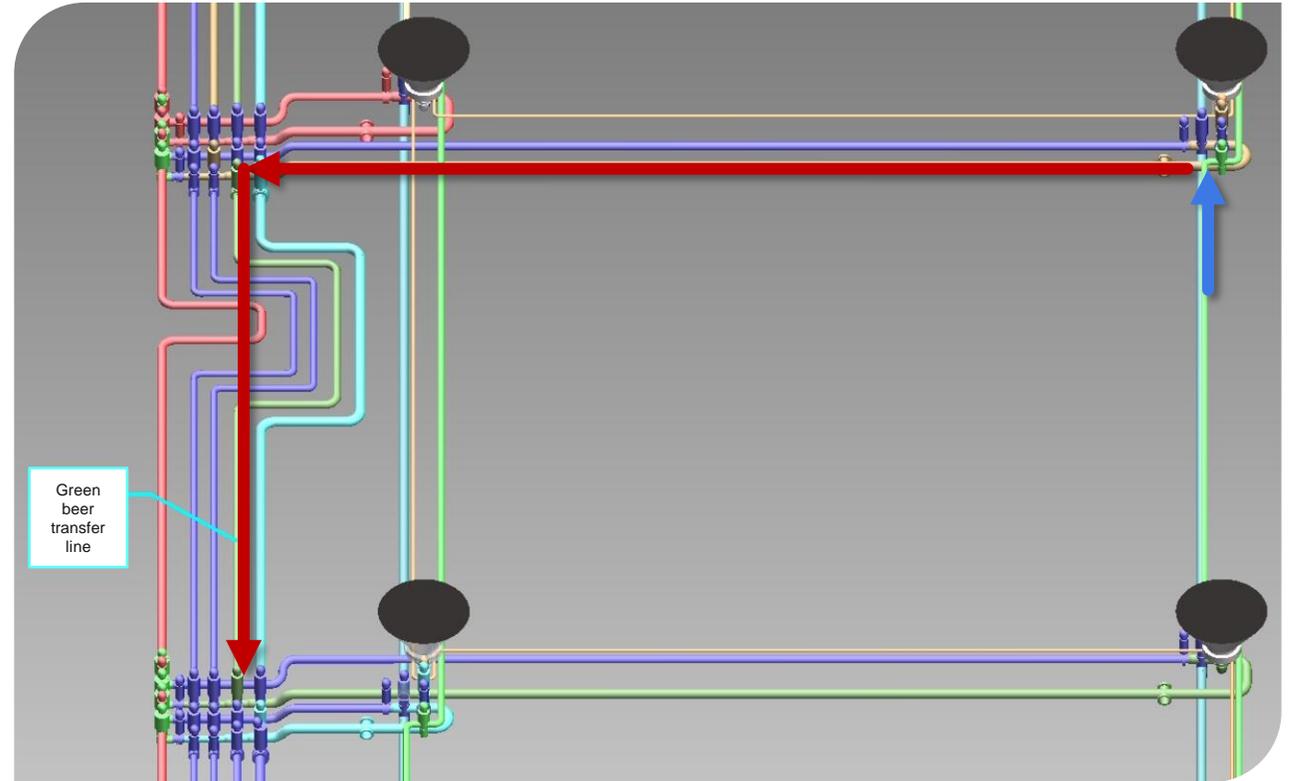
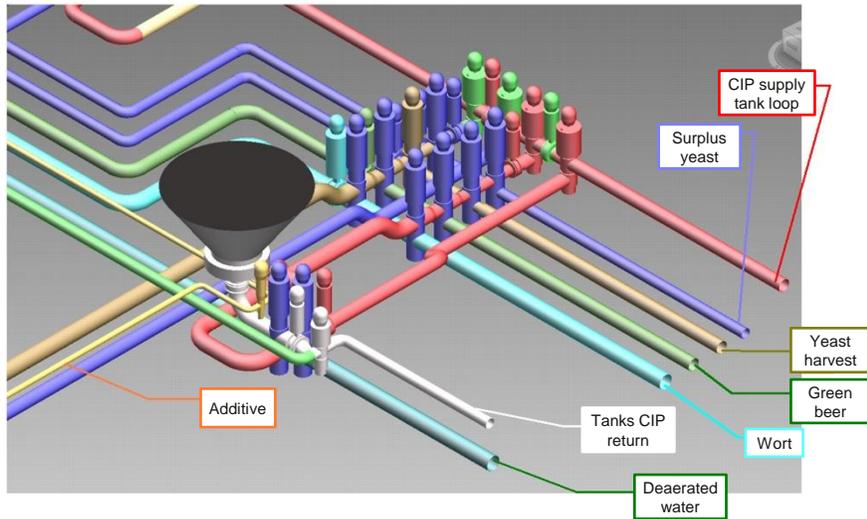
# Product valve cluster design

– Loop design for full process flexibility and hygiene



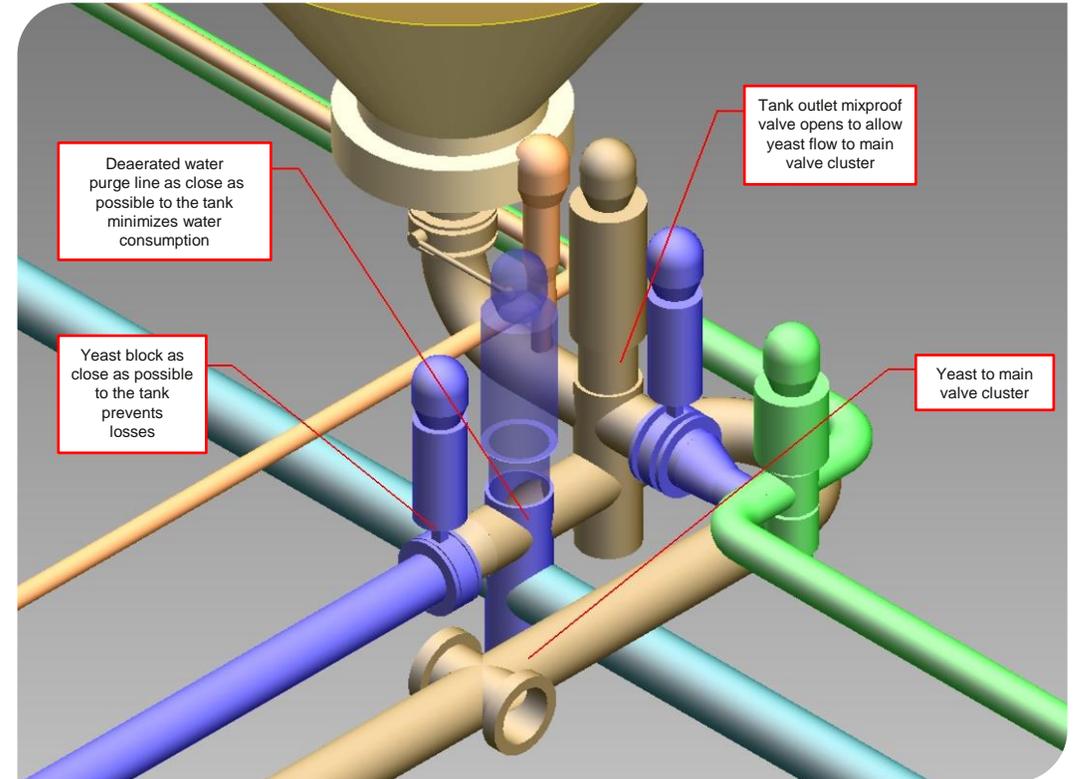
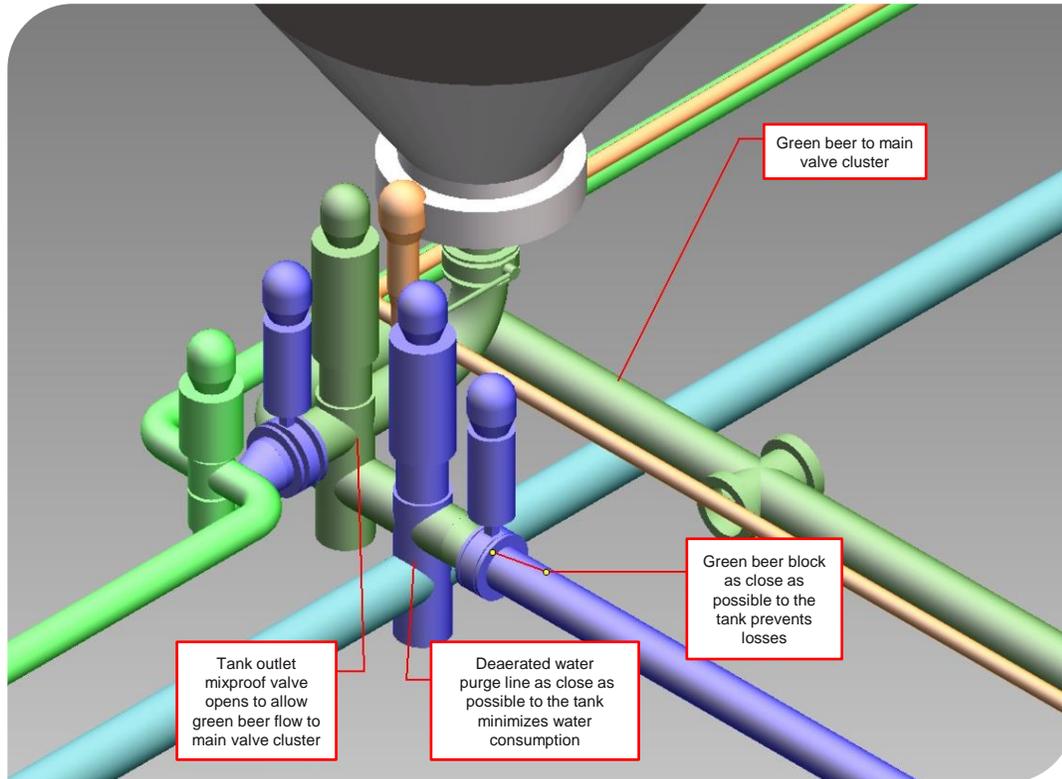
# Product valve cluster design

– Push out and prime lines for reduced product loss



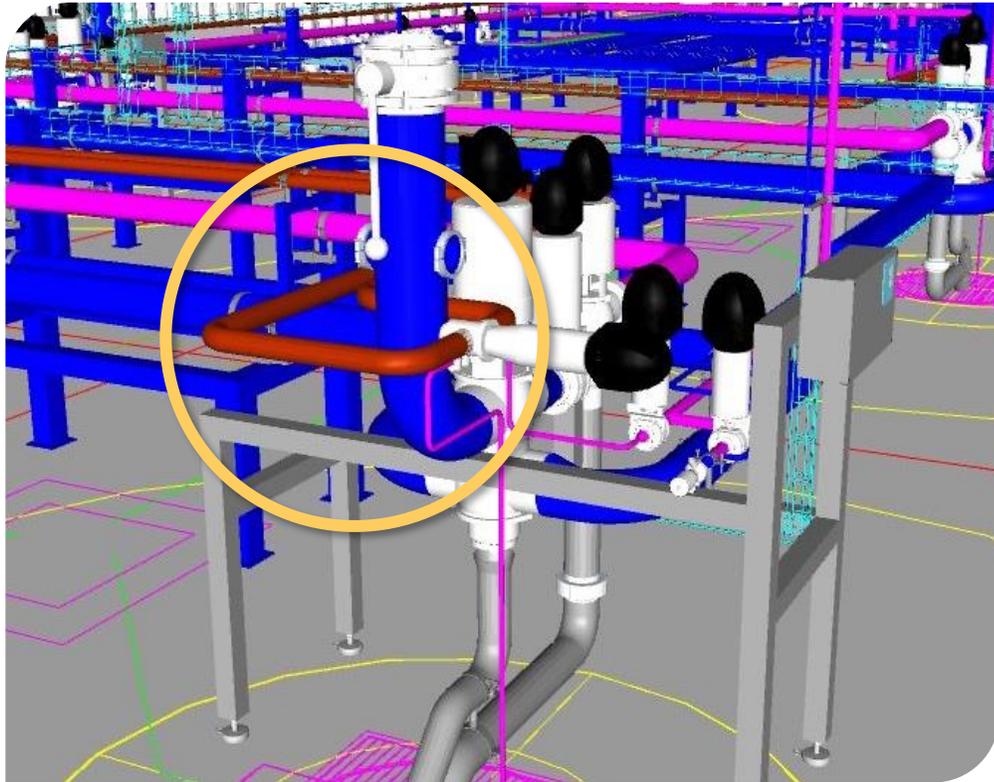
# Product valve cluster design and tank outlet

– Tank outlet operation

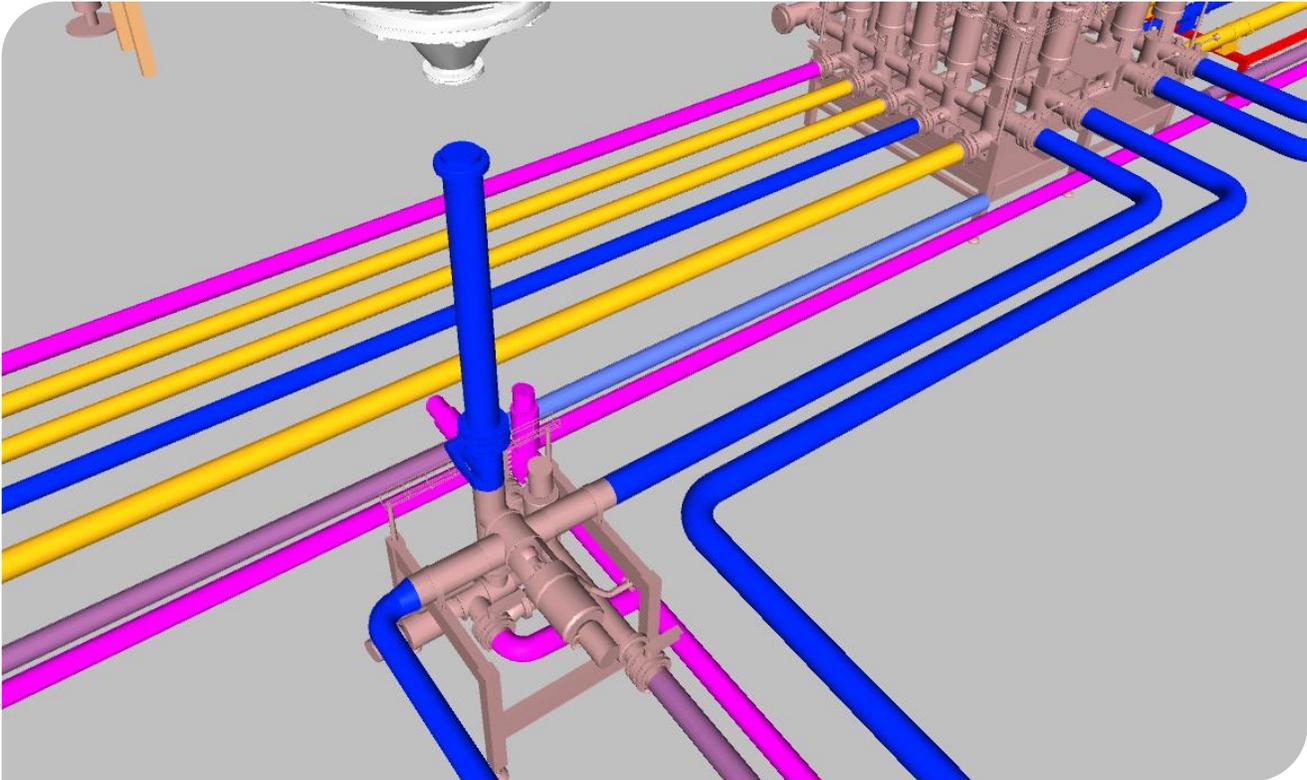
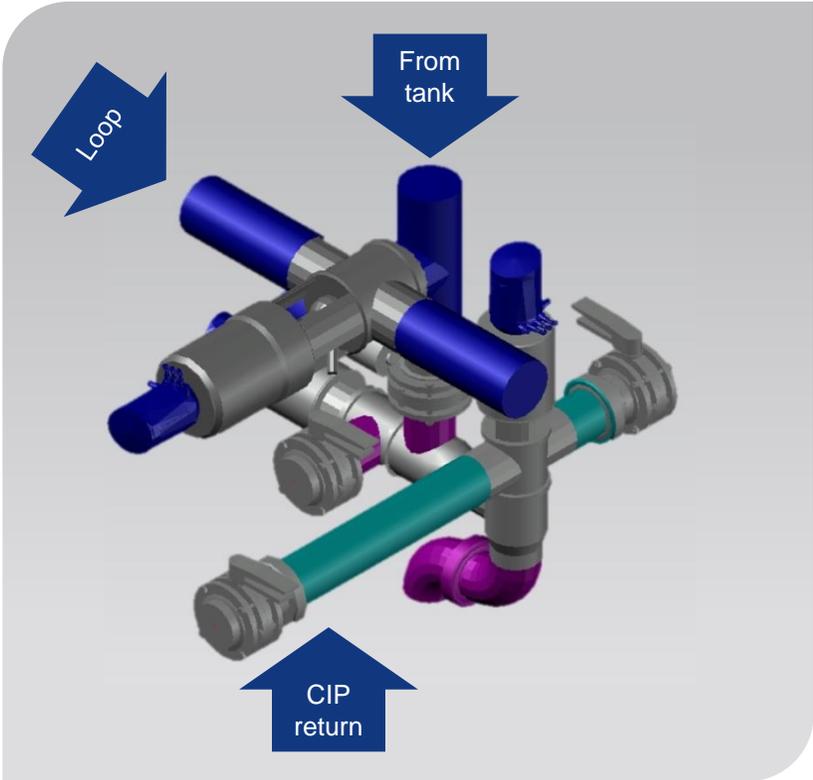


# Product valve cluster design and tank outlet

– Sampling and drains

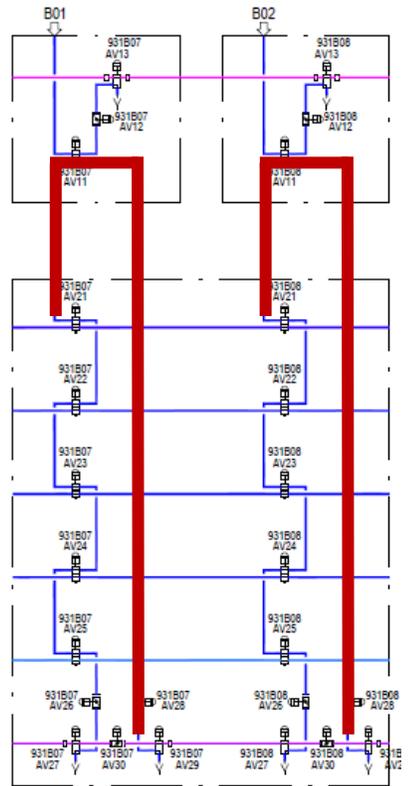


# Valve cluster design and new tank outlet

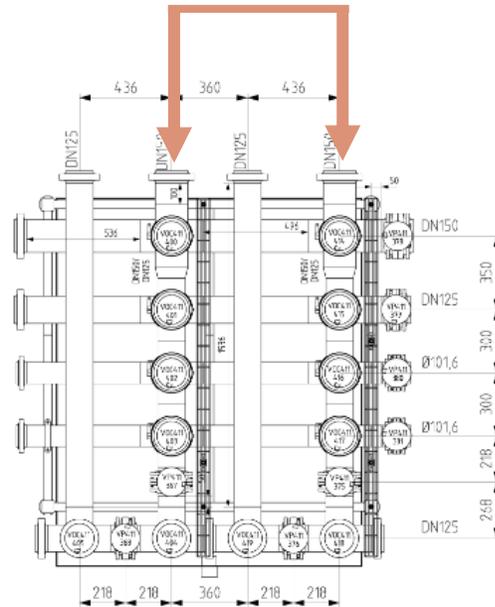


# Valve cluster design and combined loop

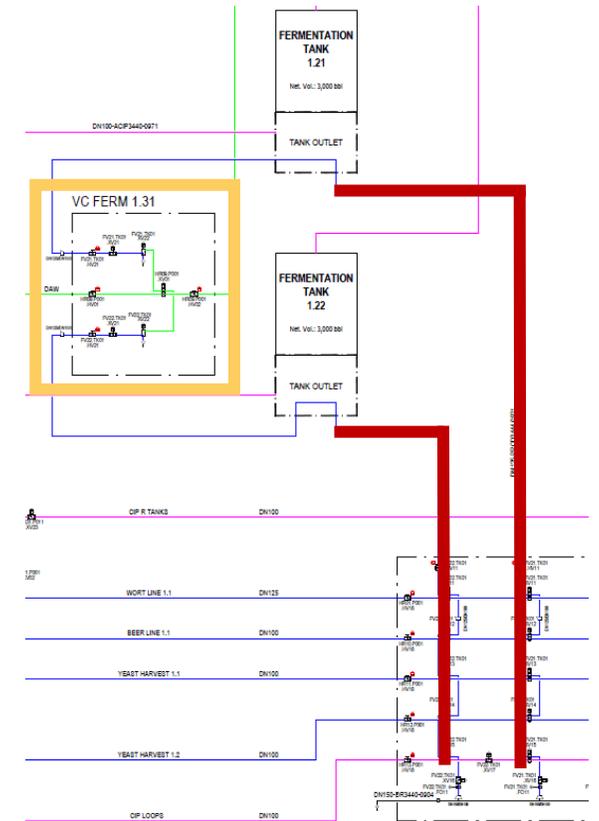
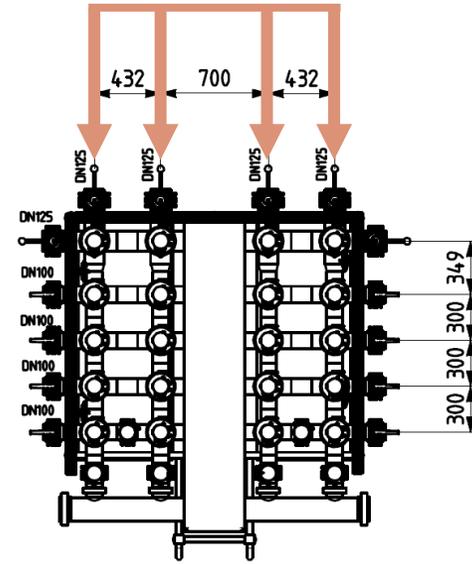
– Easy cleanability, reduced water consumption and minimized product loss



Two tanks connected



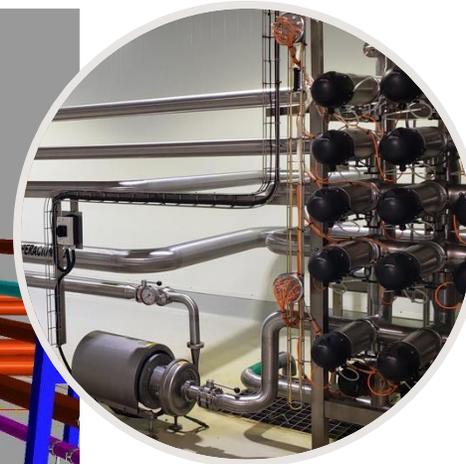
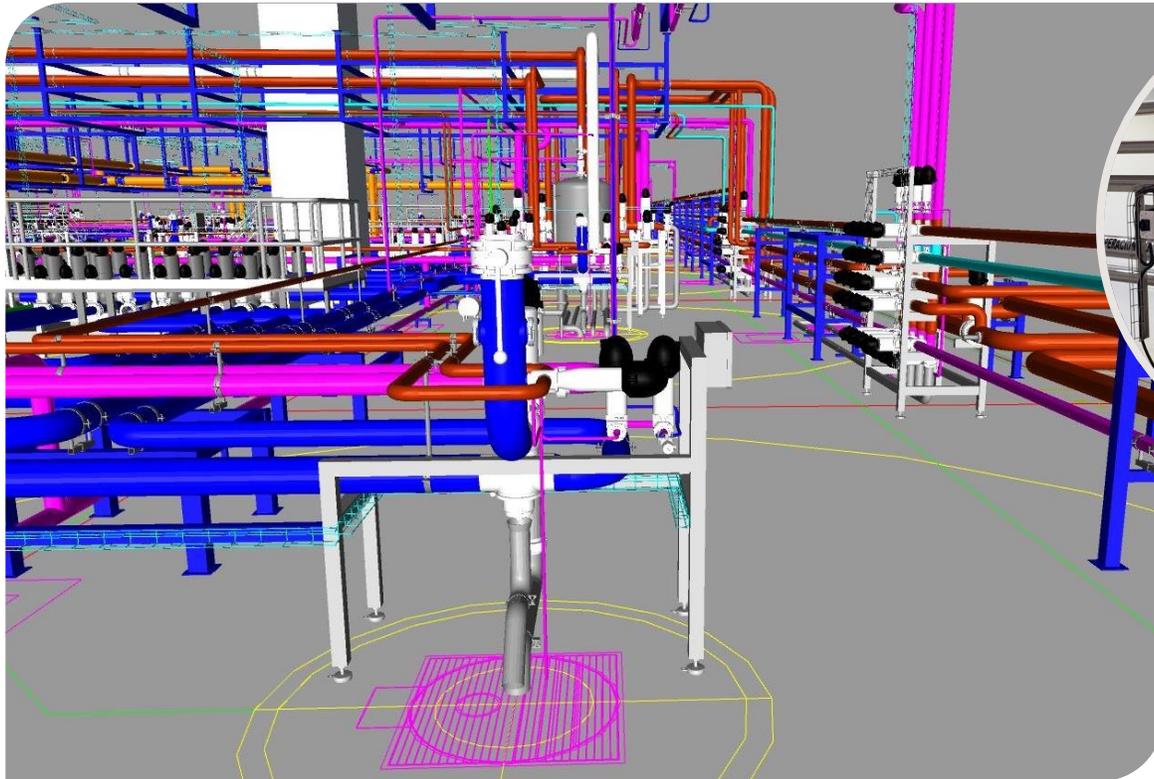
Four tanks connected



# Valve clusters for CIP and gas routing

# CIP and gas valve cluster design

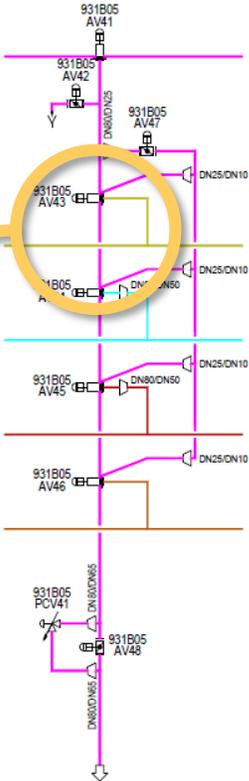
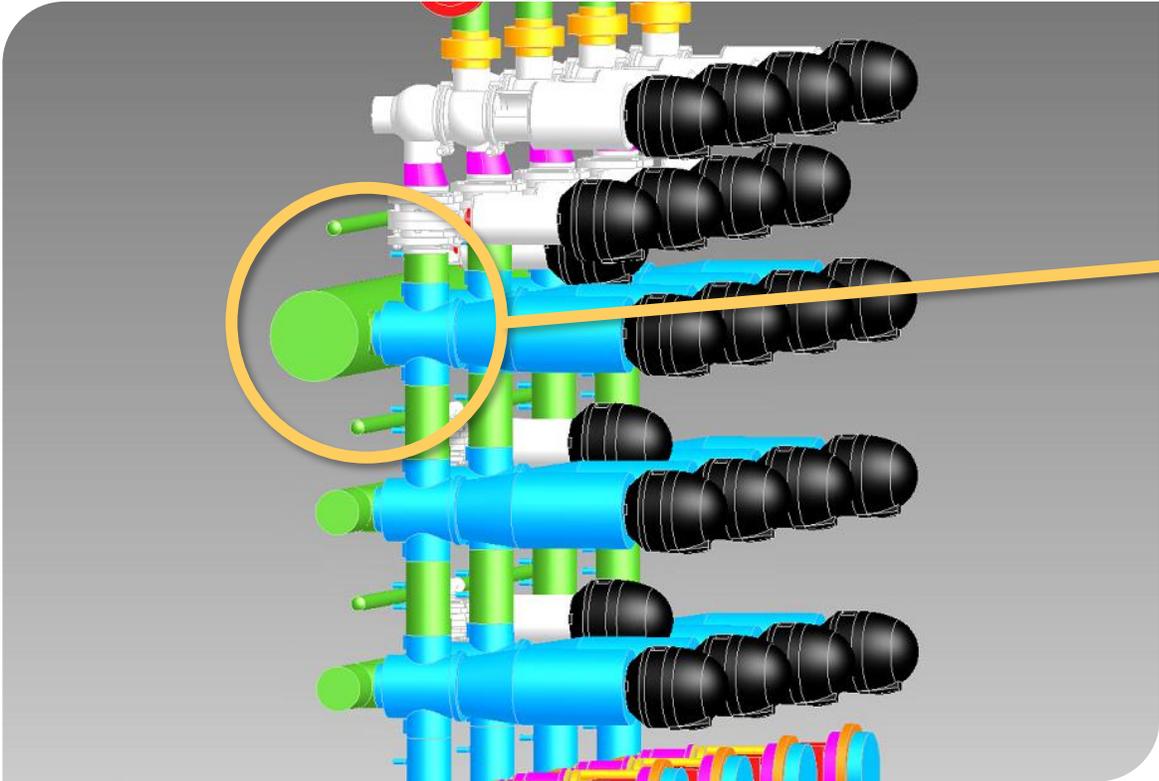
– Vertical



- More lightweight piping
- More compact installation
- Easier installation due to pipes from above
- Easier access for valve maintenance

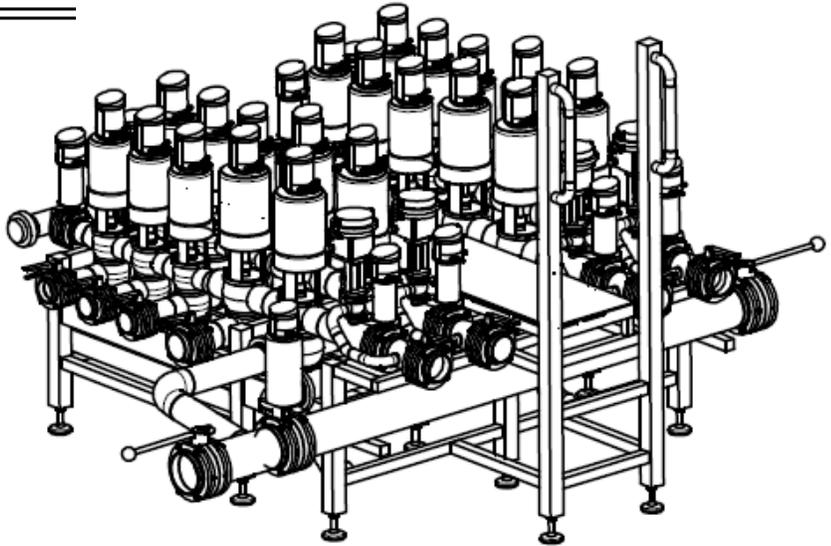
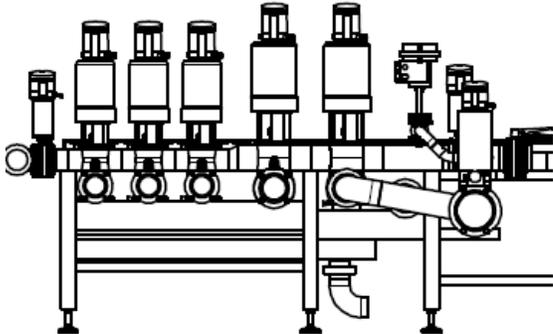
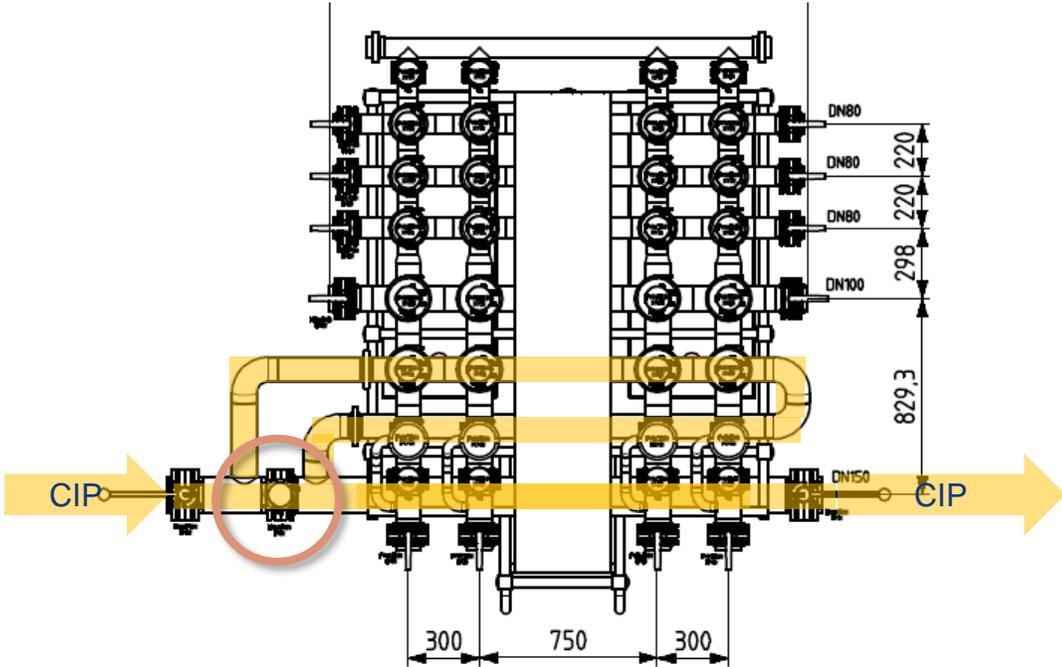
# CIP and gas valve cluster design

- Vertical



# CIP and gas valve cluster design

- Horizontal



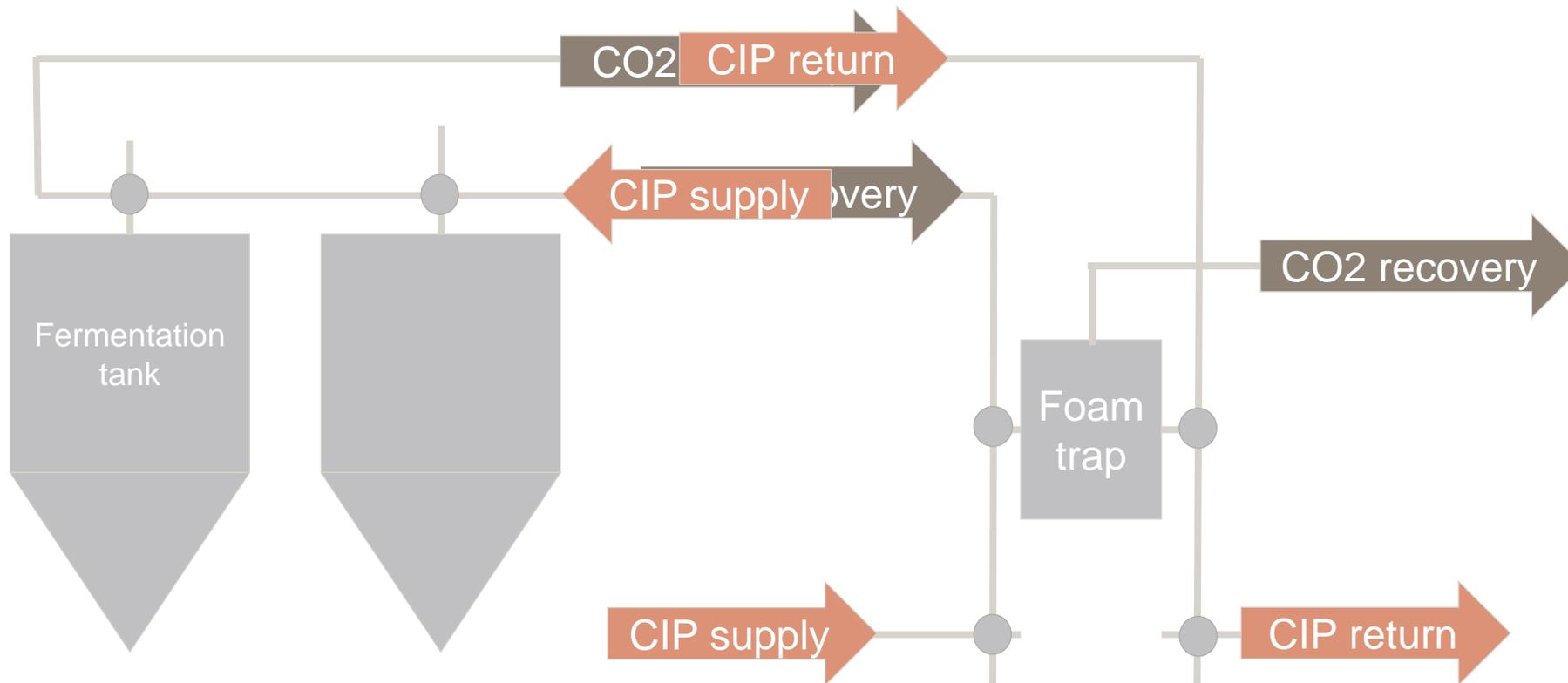
# Valve cluster design and maintenance

– Horizontal



- No splashing around the cluster
- Convenient maintenance platforms

# CO2 recovery line and exhaust line cleaning

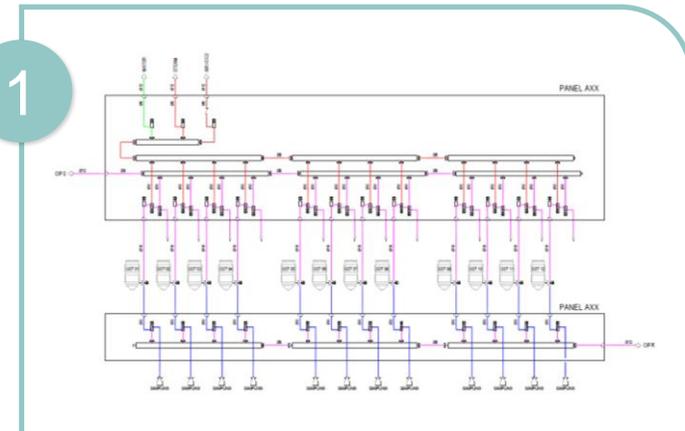


- No pressure build-up in CO2 recovery lines
- Full cleanability by hot CIP
- Applied to all gas lines

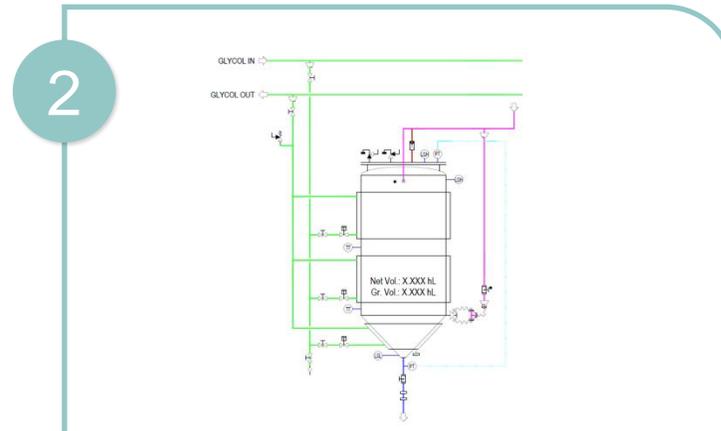
# Sampling options

# Sampling options for automatic cellars

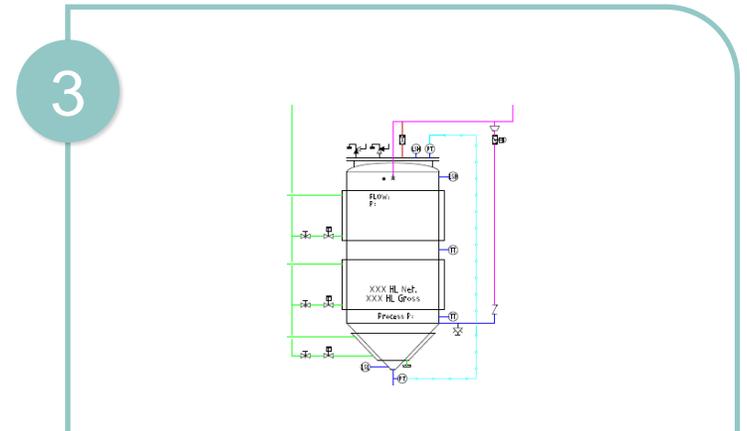
Alfa Laval offers three alternatives for sampling from the fermentation tanks along with cleaning-in-place



Complete automatic centralized sampling, including CIP and sterilization requires no operator intervention

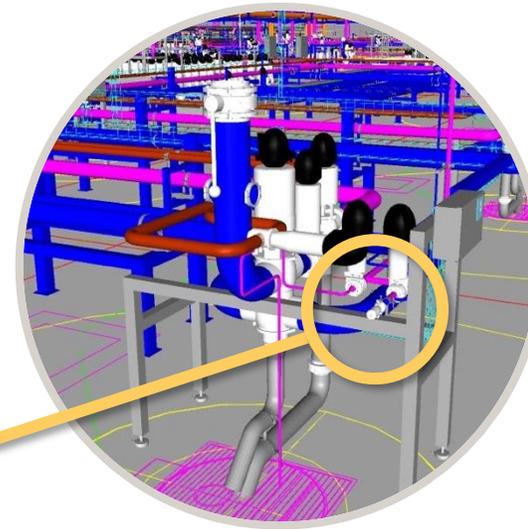
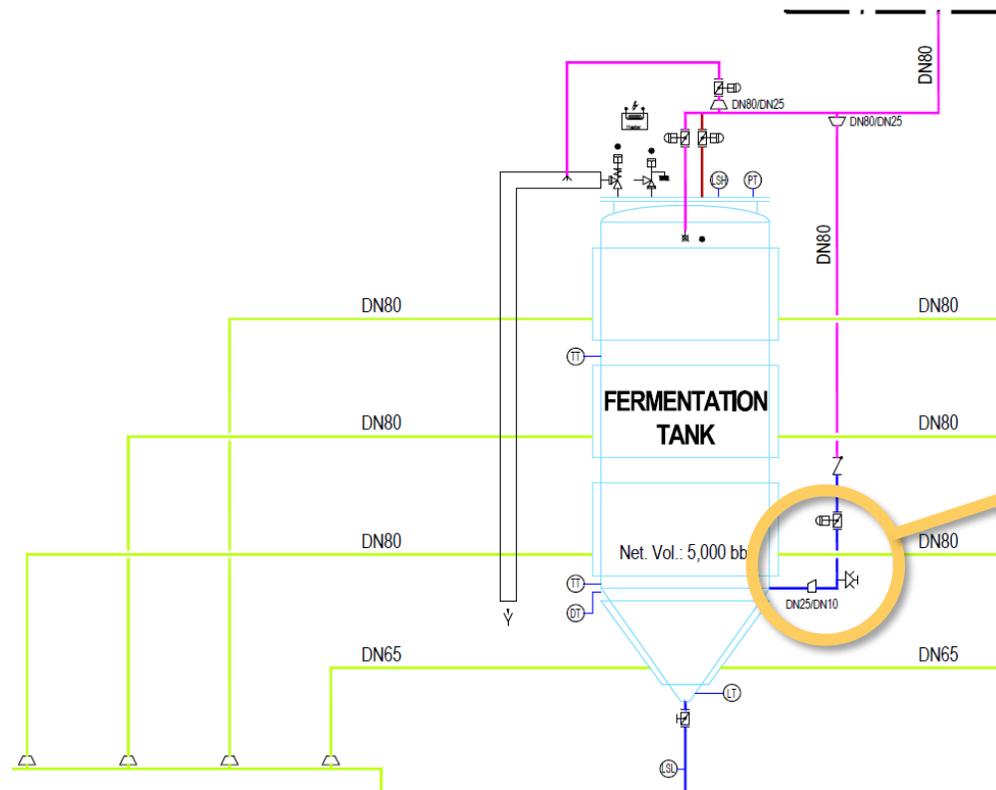


Sampling with manual connection for cleaning requires operator to connect sampling valve to the CIP pipe



Sampling at each tank with automatic CIP does not require operator to connect sampling valve for CIP

# Sampling options



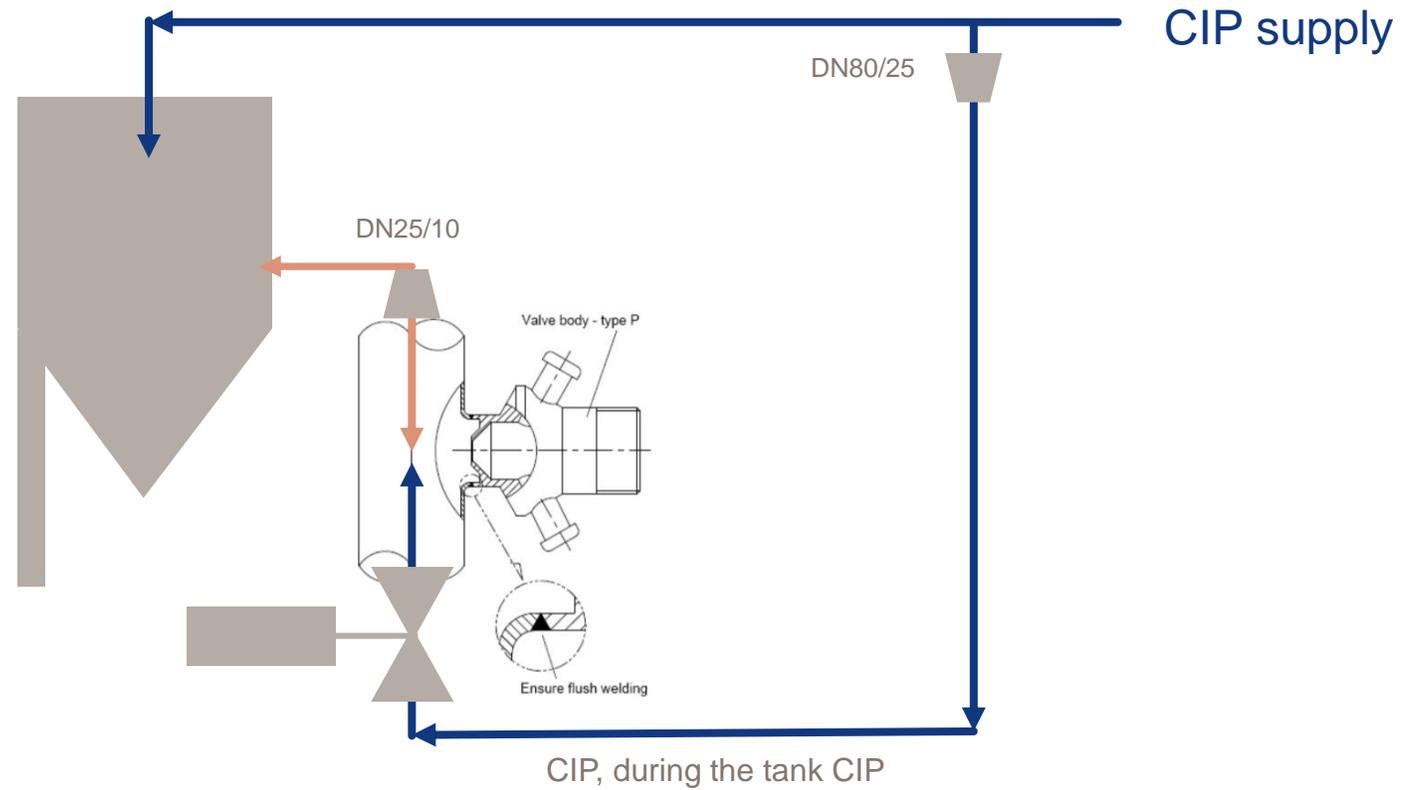
- Sampling at floor level
- No manual operation required for cleaning
- Effective CIP cleaning during the tank CIP

# Sampling from fermenters

- Detailed view

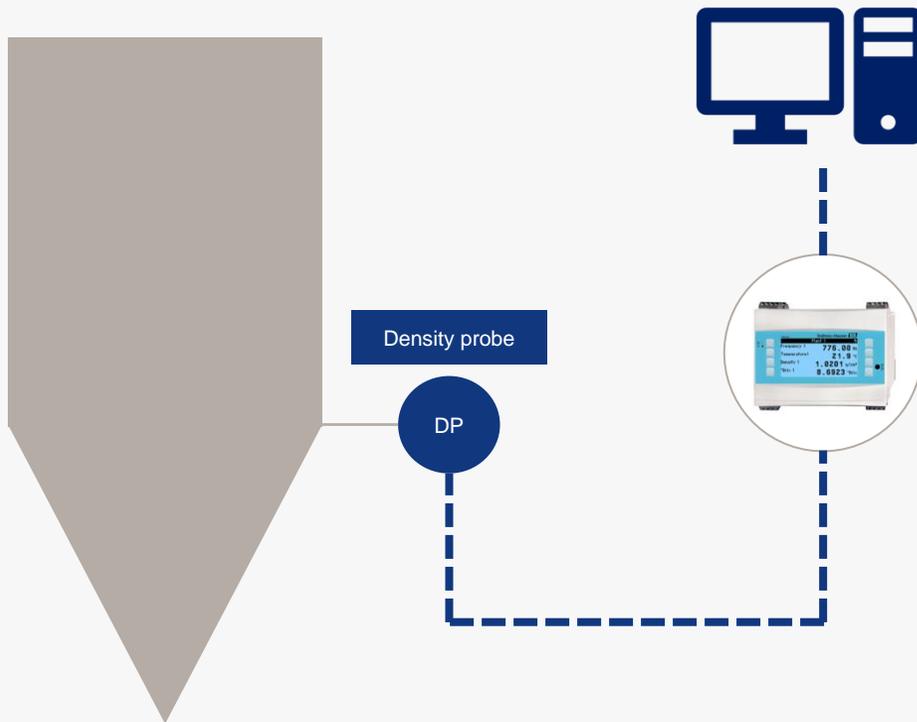


Sampling from the cone or shell on the big tanks



# Density control in fermentation tanks

# Density control

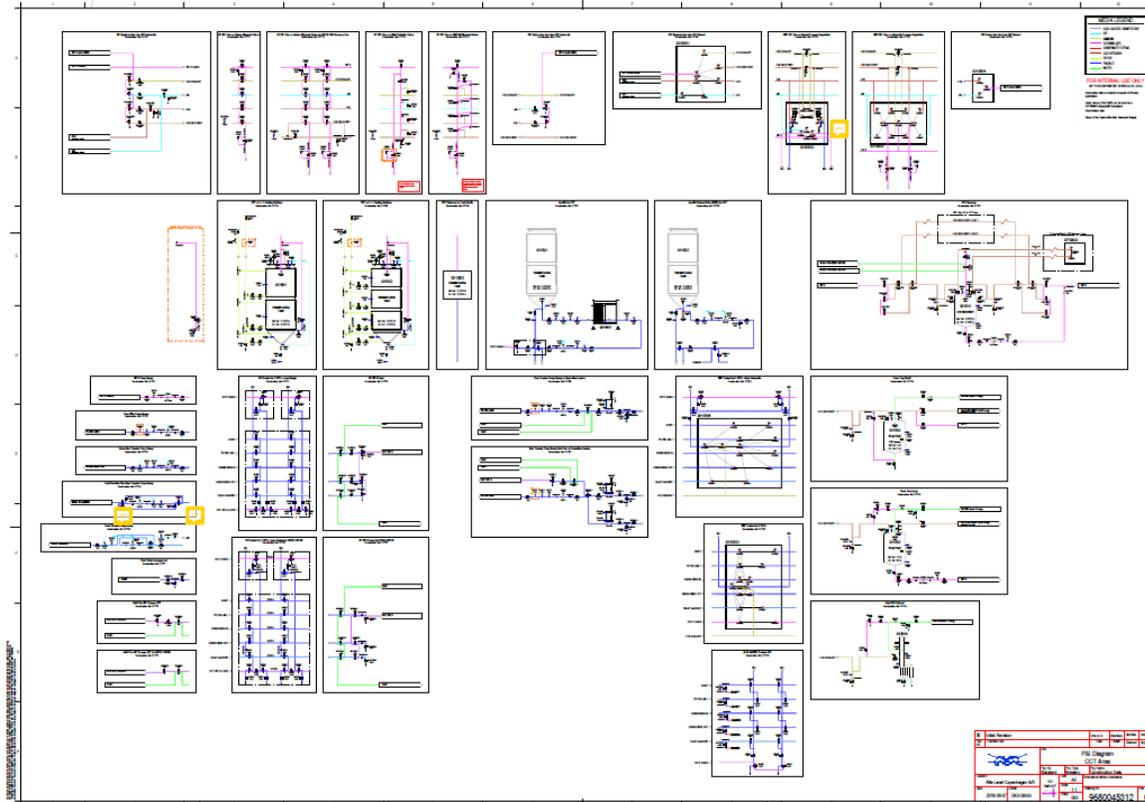


- Based on high-quality vibration sensor
- Affordable technology
- Easy to integrate
- High precision

# Fermentation cellar construction sets

# Fermentation cellar construction sets

– Pre-engineered piping and instrumentation diagrams



## Optimal solutions for specific projects

- Many design options
- Range of automation
- Verified hygienic designs

## Why pre-engineered construction sets?

- Highest hygienic standards
- Production flexibility
- Product quality
- Operational safety

# Fermentation cellar design

– Summary



## Efficient, sustainable, easily expandable and maintenance-friendly

- Take a holistic approach to tank layout – today and tomorrow
- Choose the right installation option: slab-mounted or leg-mounted installation?
- Plan the pipe bridges and piping layout to make installation easy and create more space in the cellar
- Design valve clusters for optimal operation and minimize use of water and energy
- Automatic density control for better cellar performance



# Cold blocks around the world

- Alfa Laval installations



Complete process block

## Engineered solutions

Tank top systems



Aldox

>3,200  
since 2011



Flexitherm

>900  
since 1990



Iso-Mix Fermentation

>500  
since 1990



HSS

>500  
since 2010



>390  
since 2012

Carboblend, Carboset and Alex



>300  
since 1990

BSF



>120  
since 1990

IMXD Dry hopping



>50  
since 2017

Decanter Intelligent Whirlpool Systems



>25  
since 2012

# Any further questions

Please feel free to contact:

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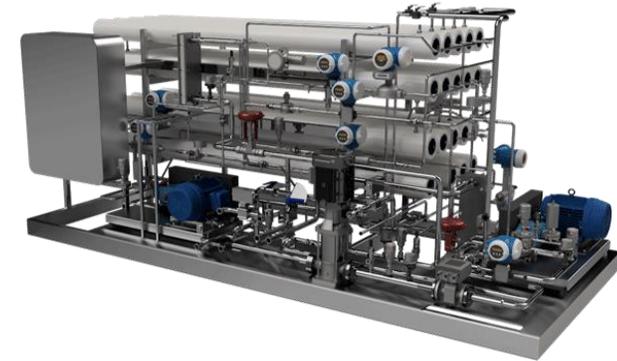


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# Q&A

# Webinars for brewers

– Upcoming events



## Beer concentration with Revos™ – the future of beer production and distribution

Webinar 17 June, 2021



[Click here to visit the webinar web page](#)

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