

Alfa Laval non-alcoholic beer technology

- For a new generation of beer-based products

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Great moments for 0.0 beer

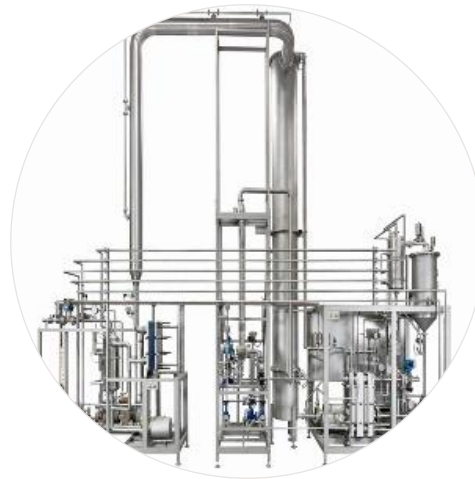
– Taking the world by storm



Non-alcoholic beer: Zero alcohol beer sells big



More mature market
with huge consumer
demand for 0.0 beer



Great taste from
Alfa Laval Dealc
technology



Global brewery
know-how and
support

Non-alcoholic beer: Zero alcohol beer sells big

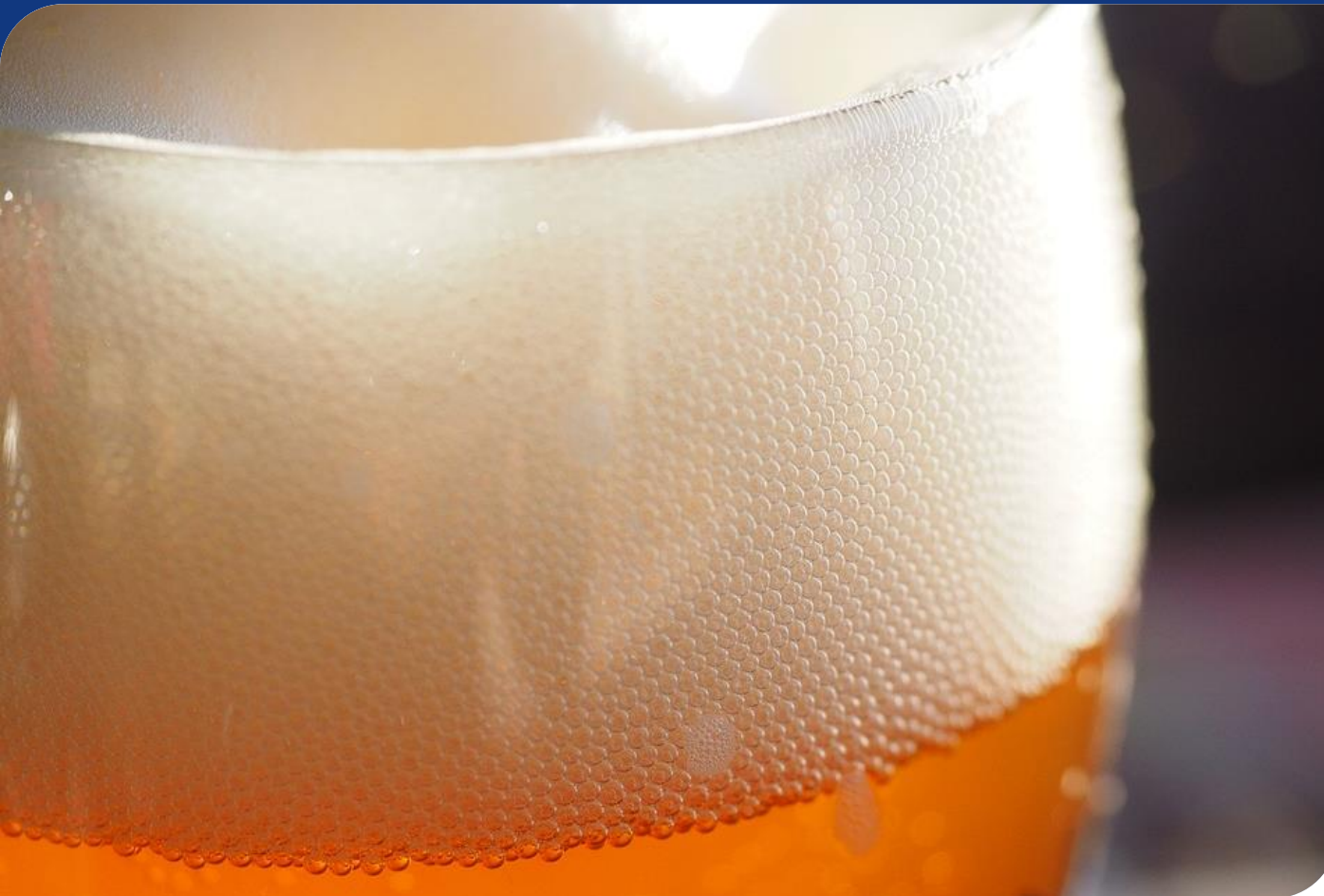
– What are the latest market trends and demand drivers for 0.0 beer



More mature market
with huge consumer
demand for 0.0 beer

High demand for 0.0 beer products

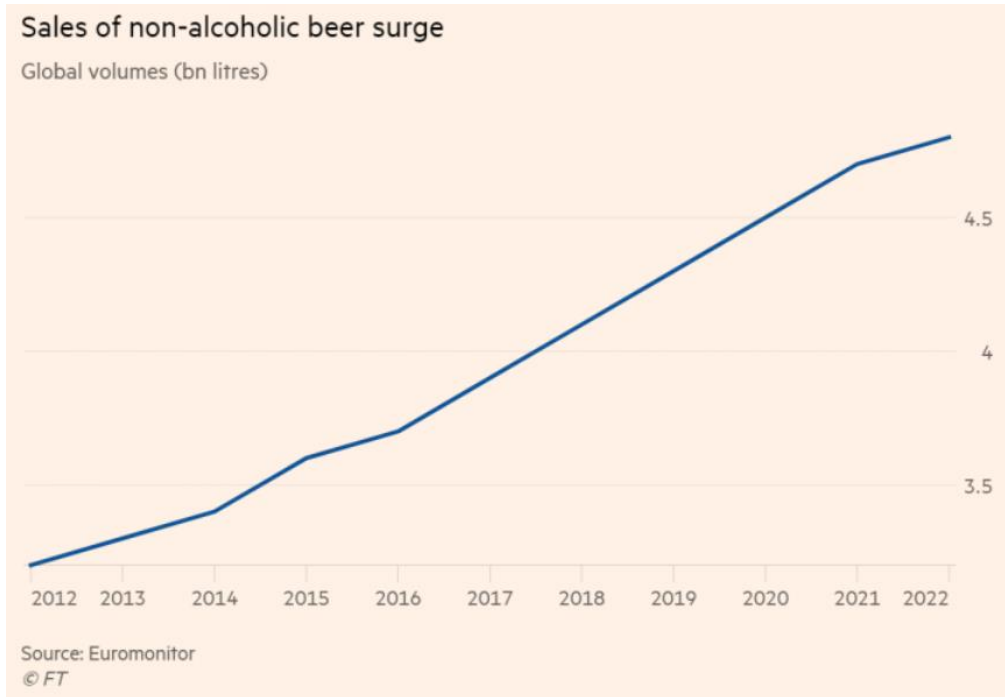
– For people who don't drink beer and for those who do



- A **great alternative** for consumers who don't drink beer or alcohol making it a growing niche for breweries
- A **beer-based drink alternative** for current beer consumers with clear benefits (responsible drinking, healthier lifestyles, lower calories, great taste)
- 0.0 beer a **clear driver for profitable growth**; top brewery groups have made major investments in marketing it

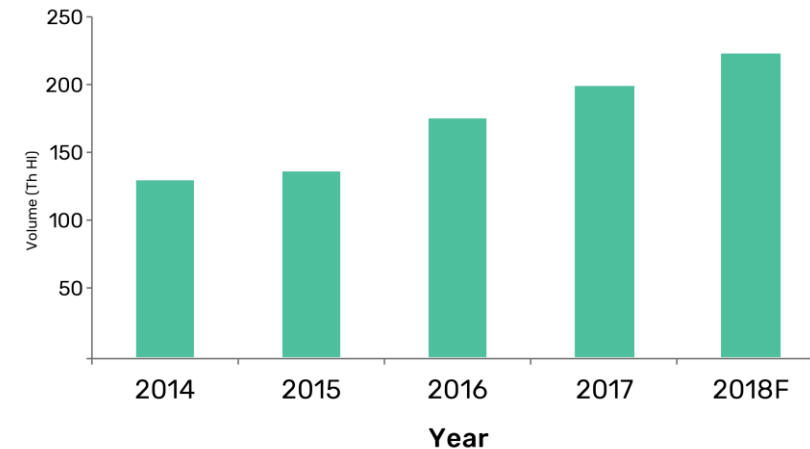
Accelerated growth for non-alcoholic beer globally

– 18% sales increase in past five years and forecast to climb another 12% by 2022



Euromonitor: Sales volumes of low and non-alcoholic beer up nearly 18% in the past five years in western Europe, and are forecast to climb another 12% by yearend 2022.

Non-alcoholic (0-0.5 ABV) beer volume in the UK, 2014-2018  GlobalData.



Source: GlobalData, Consumer Intelligence Center

People choose 0.0 beer over alcoholic beer



Alcoholic beer is left on the shelf

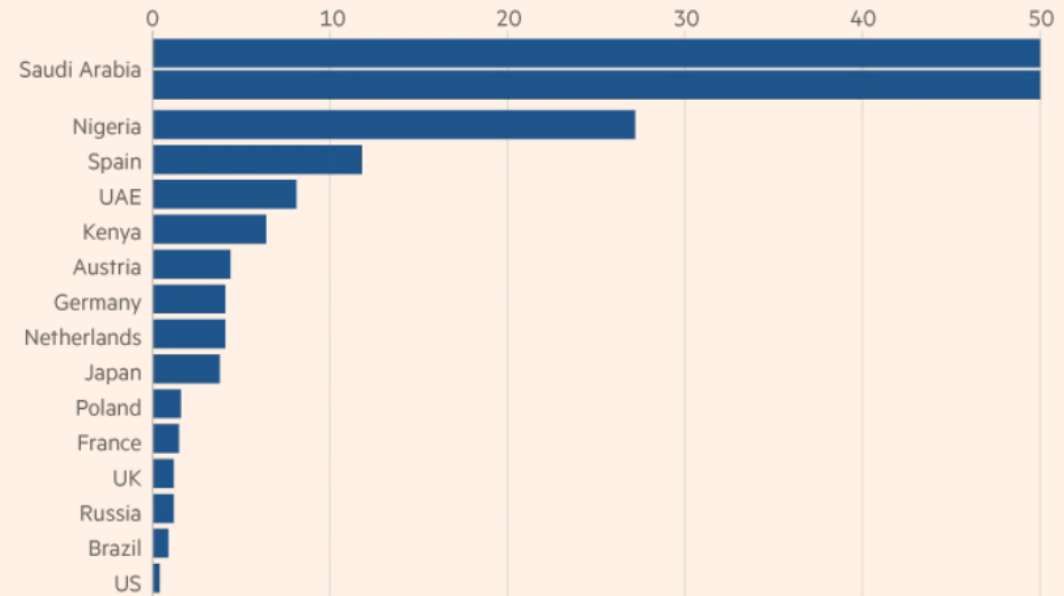
Sales growth 2012 to 2017 (%)



Source: Euromonitor
© FT

Leading non-alcoholic beer markets

% share of total, 2017



Source: Euromonitor
© FT

What's so good about 0.0 beer?



- Natural ingredients barley-malt-wheat
- Less than half the calories of conventional beer
- Full and rewarding social life
- Work and 0.0 beer integration
- Reduced short- and long-term healthcare costs

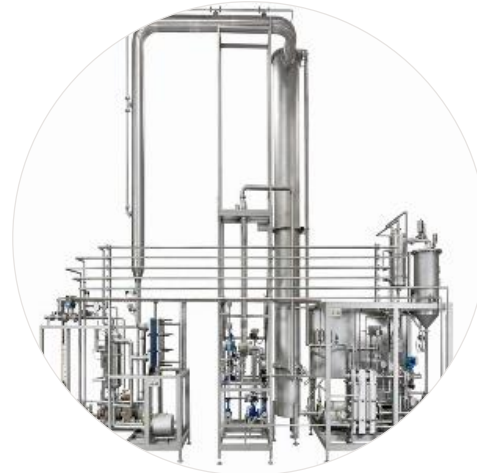


Great 0.0 beer



Non-alcoholic beer: Zero alcohol beer sells big

– How to achieve successful taste from unique dealcoholization technology?



Great taste from
Alfa Laval Dealc
technology

Great 0.0 beer taste from Alfa Laval Dealc



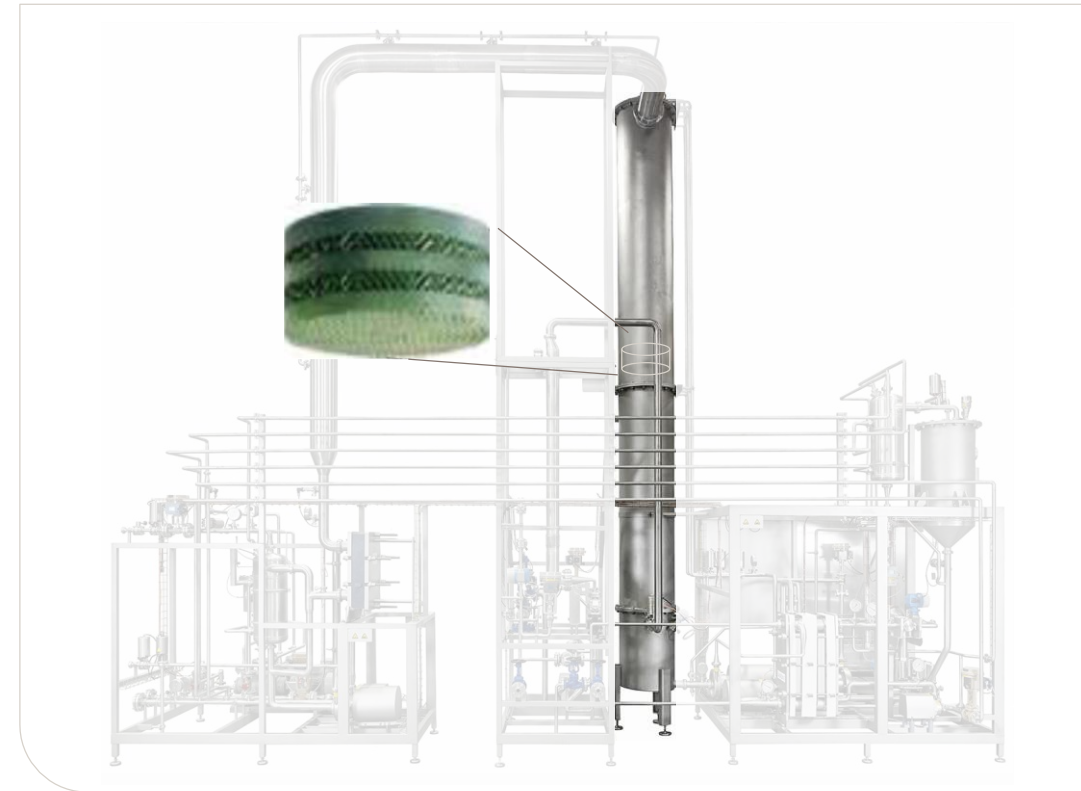
- No-distillation, no-dilution stripping column
- Continuous single-pass, low temperature vacuum processing with low residence time
- Possibility to recover and dose aroma before or after removing the alcohol

Why stripping is best



– A gentle, single-pass process with less than a minute of residence time

- Effectively removes ethanol from a liquid stream using a counter-current flow gas stream
- Always occurs in equilibrium at 80–110 mbar between 41–45°C under vacuum conditions
- Column provides huge contact area between the liquid and gas phases
- Column packing is very versatile for custom design and variable density and efficiency
- No boiling, just highly effective separation



Why distillation is not best

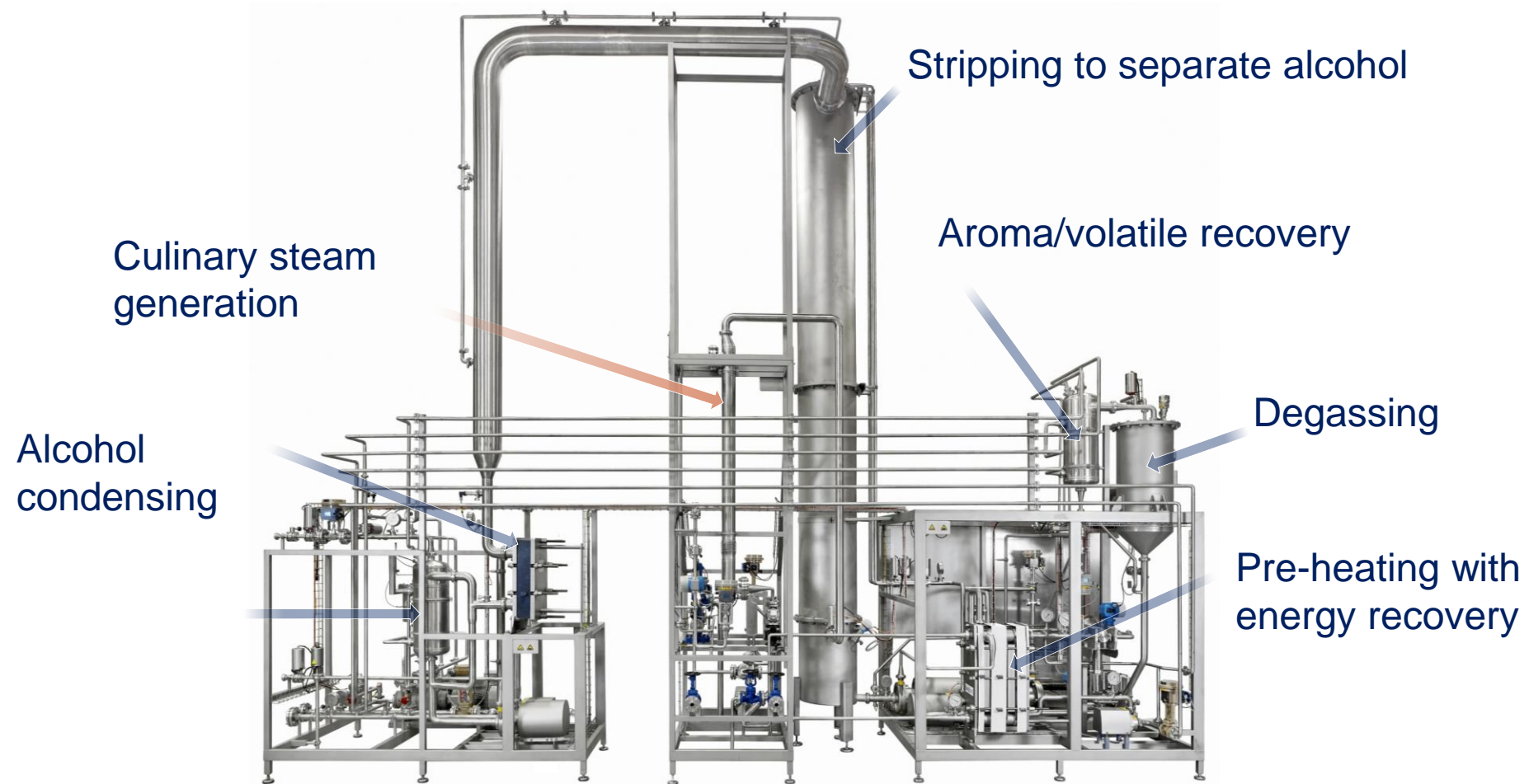
– Beer must be boiled for ethanol extraction



- A physical process where components in a mixed stream are divided by different boiling point
- Separates and concentrates certain components of a liquid mixture that have lower boiling points
- If temperatures exceed the boiling points, alcohol evaporates much more quickly than water does
- Cooling the resulting vapours then produces a high percentage of alcohol
- Longer residence time (at boiling temperature) required for efficient distillation and phase separation



Key dealcoholization processes



Great-tasting 0.0 beer from a single pass

– Gentle vacuum-based stripping



- **From 5 to 100 hl/h standard capacities in Alfa Laval Dealc**
ABV reduction from 13% to $<0.05\%$
- **Efficient dealcoholization for all beers**
Lager/ale/wheat/IPAs/non-filtrated beers
- **Optimized for great no-burn beer taste**
Dealcoholized beer profile close to the reference beer



Great-tasting 0.0 beer from a single pass

– Effective performance



- **Single pass, low thermal impact**
Operating temperature < 45°C, 1 minute in column...
- **Full system cleanability**
CIP/SIP of internal surfaces



Great-tasting 0.0 beer from a single pass

– Efficient operation



- **Low steady-state running costs, low maintenance**
Less than €4/hl in utilities
(2.8 to 3.8 €/hl depending on flow)
- **Short start-up time**
Start-up to standby in less than 10 minutes



Dealcoholization

– Three applications in one unit



- Production of non-alcoholic (NAB<0.05% ABV) and low-alcoholic (LAB< 0.5% ABV) beers
- Partial removal of alcohol from full-strength, high-gravity beer
- Separation of neutral, decolourized food-grade alcohol for use in other applications

A world leader in stripping column technology

– Alfa Laval Aldox



Aldox: Efficient stripping technology

- Proprietary know-how
- Stainless steel structured modular packing
- Stable performance

Brewery industry-leading reliability

- More than 1000 stripping systems in use worldwide
- Lowest total cost of ownership

Big capacity range and flexibility

- Capacities from 5 to 1600 hl/h DAW stripping
- Multiple applications in food & beverage industry

Non-alcoholic beer: Zero alcohol beer sells big

– Why consider your provider's brewery know-how, technical support and extended solutions?



Global brewery
know-how and
support

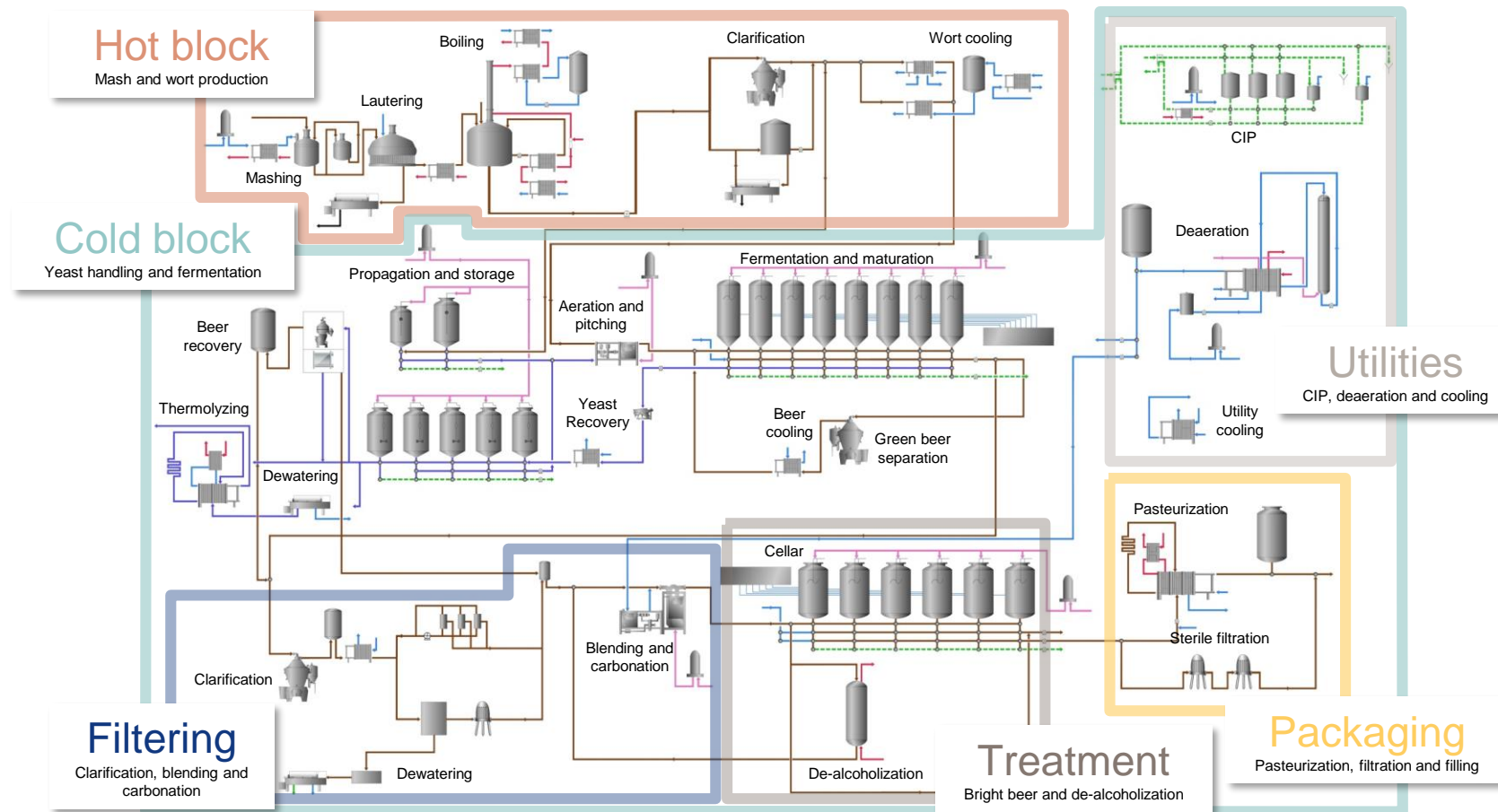
Global brewery know-how for great 0.0 beer



- 0.0 process starts in brewhouse and how beer is fermented
- Beer pre-treatment and post-treatment support is required
- Dealcoholization is a complete solution, not just a component

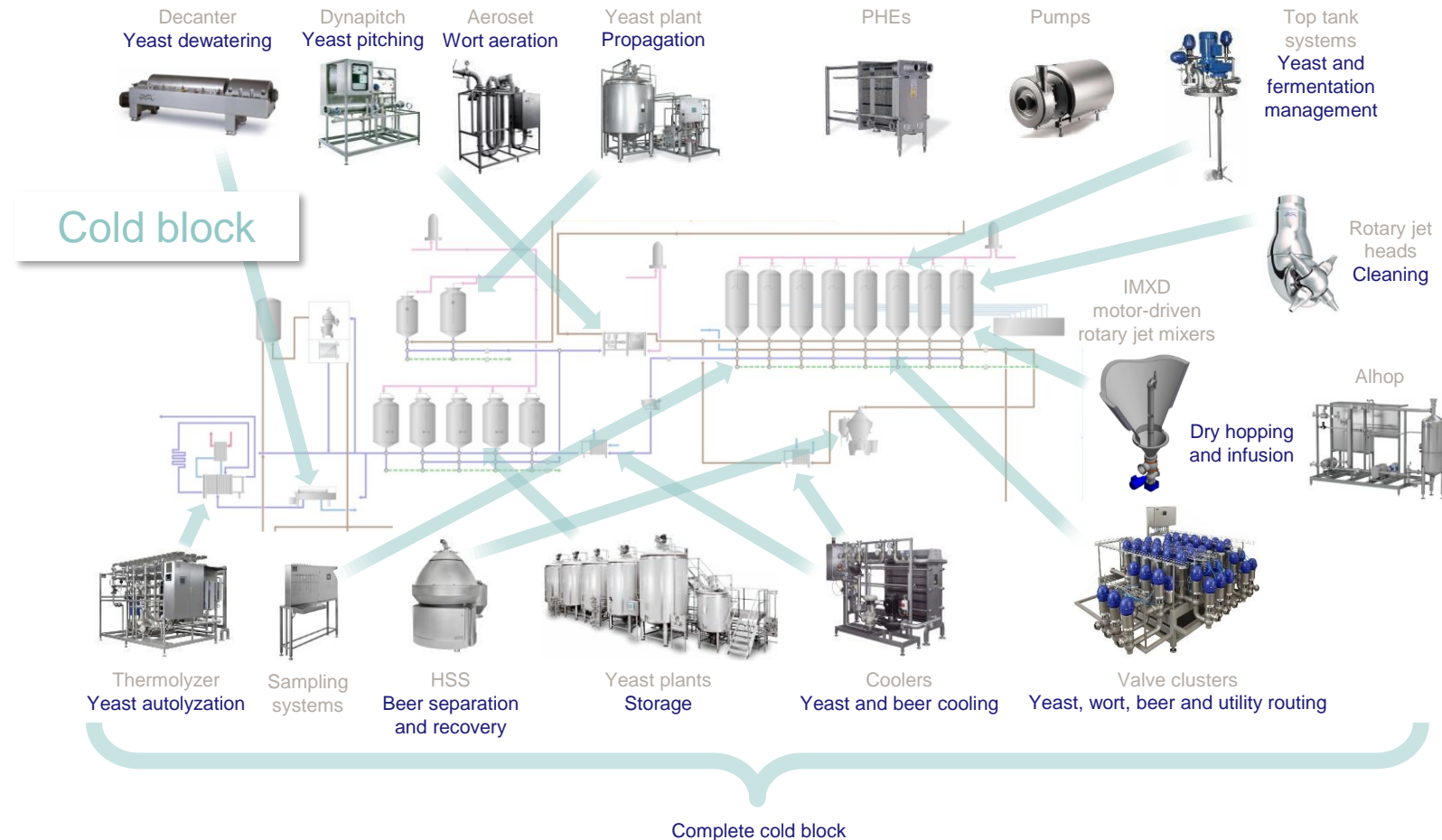
The brewing process...

– Comprehensive solutions from Alfa Laval



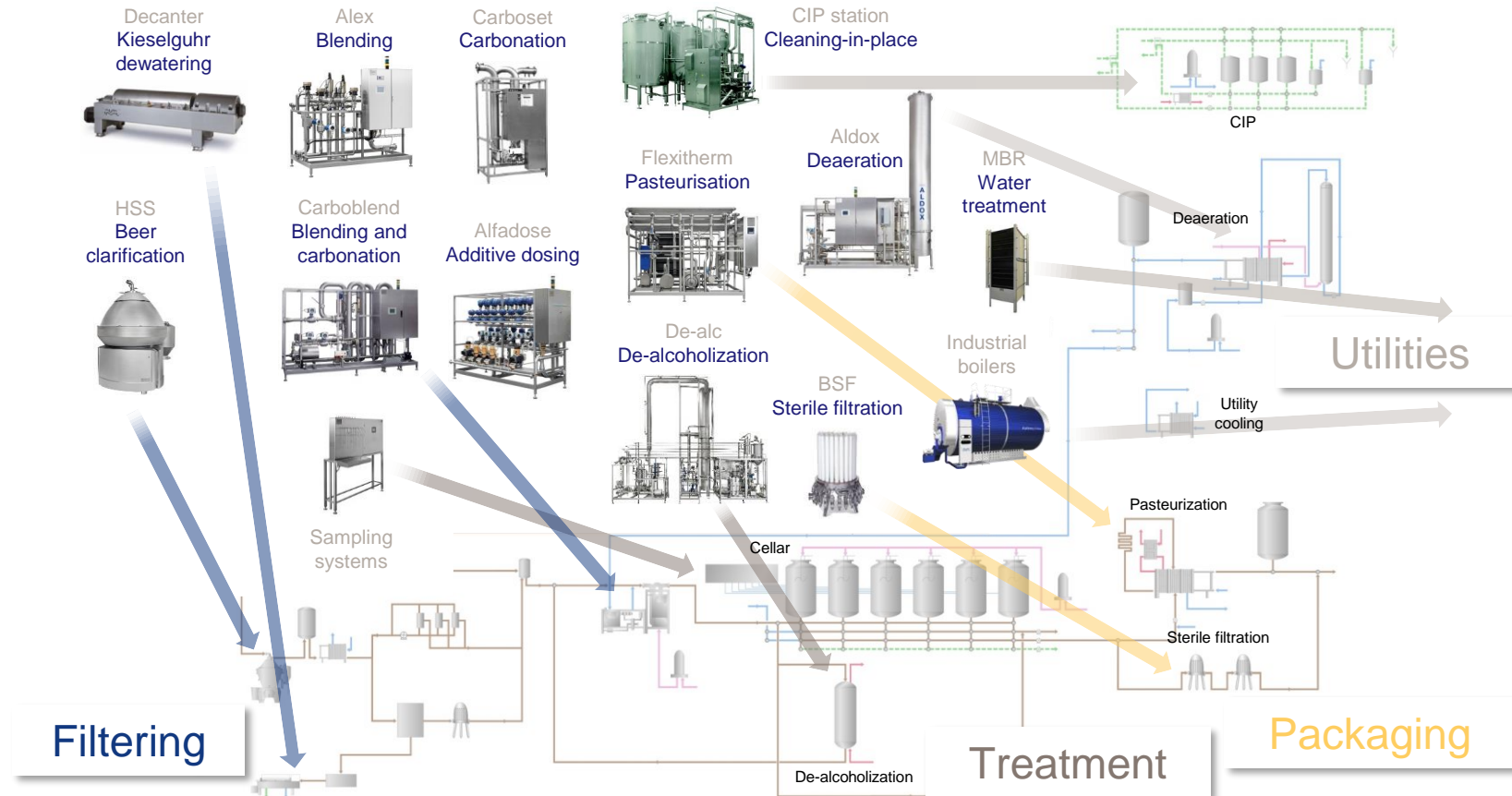
Alfa Laval's brewery offering...

– Cold block processes



Alfa Laval's brewery offering...

– Filtering, treatment, utilities and packaging processes



... and competence know-how

– Unmatched brewery expertise



Separation



HSS
Beer separation
and recovery,
wort/beer clarification



Decanter
Dewatering



Lowal
Dealcoholizer

Thermal



PHEs

Modules and filtration



Coolers
Yeast and beer
cooling



Dynapitch
Yeast pitching



Aeroset
Wort aeration



Carboset
Carbonation



Yeast plant
Propagation



CIP station
Cleaning-in-
place



Aldox
Deaeration



Carboblend
Blending and
carbonation



Alex
Blending



Alhop
Dry hopping



Flexitherm and
Thermolyzer
Pasteurization and
yeast autolysis



Alfadose
Additive
dosing



BSF
Sterile filtration



De-alc
Dealcoholization



Scandi Brew
components



Rotary jet heads/mixers
Cleaning fermentation,
dry hopping and
infusions



Top tank systems
Yeast and
fermentation
management



Valves



Sampling
systems



Fermentation



Pumps

Flow



Valve clusters
Yeast, wort, beer and utility routing



Yeast systems
Propagation and storage

Projects



Process blocks

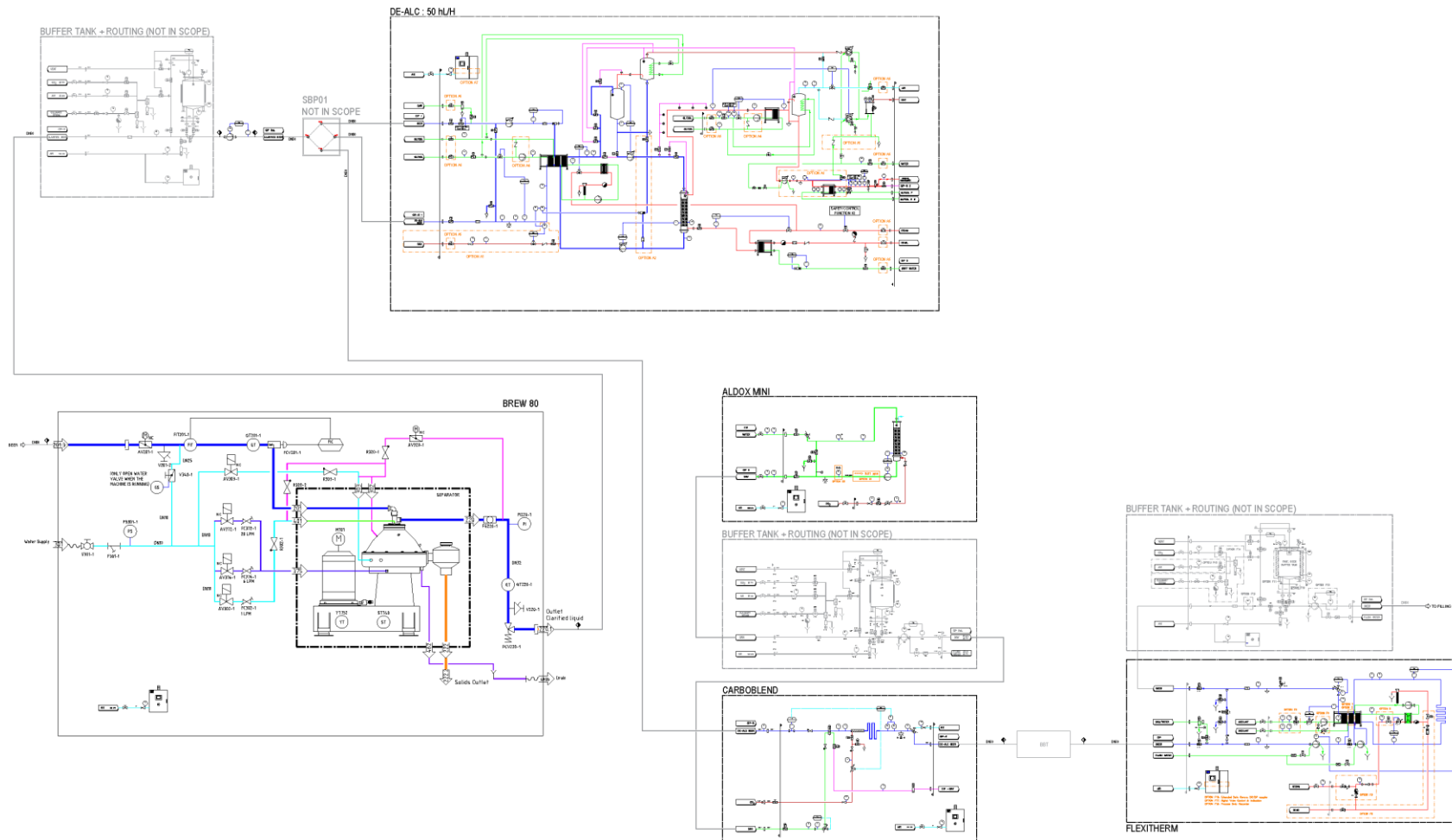
Alfa Laval Dealcoholization Module

for non-alcoholic and low-alcohol beer

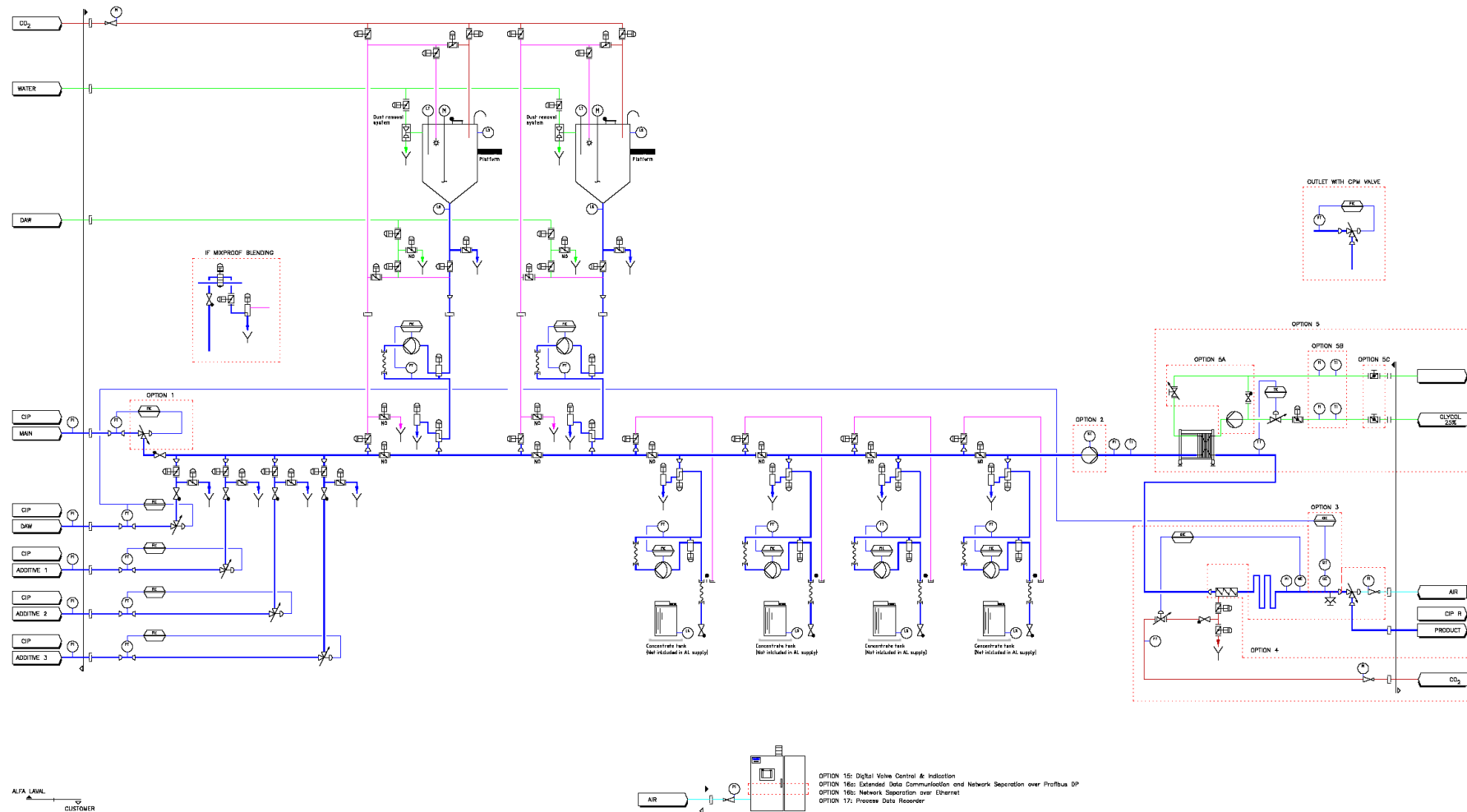


Low- and no-alcohol beer integration projects

– Include Alfa Laval centrifuges, buffers, Carboblend, aroma dosing, cooling modules...



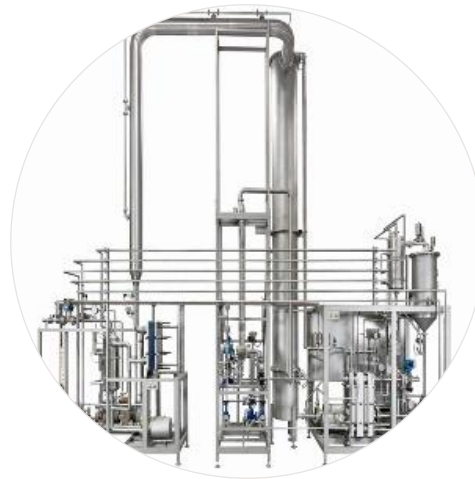
AlfaDose after Dealc for inline dosing



0.0 beer: Bring it on!



Huge demand for
0.0 beer



Great taste from
Alfa Laval De-alc
Module



Global brewery
know-how and
support

One final clear benefit...

– Responsibility and life saver




Alfa Laval Brewery on social media

– #alfalavalbrewery



Alfa Laval - Beer Production
168 followers
5d

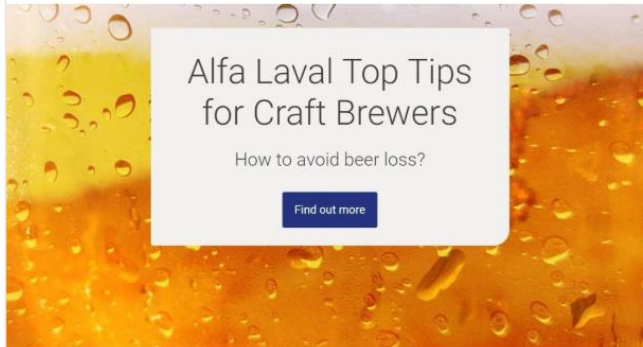
What can you benefit as a small craft brewer if you add a centrifuge to your beer production process? Our experts find at least five reasons for that. Read this article and find out: <http://fal.cn/ACOT> ...see more



Five reasons to get a centrifuge for your brewery
alfalaval.com

Alfa Laval - Beer Production
168 followers
2mo

High beer loss, long sedimentation time and the need to grow production capacity are some of the challenges experienced by #craftbrewers, we have a solution to deal with these pain points. ...see more



Alfa Laval Top Tips
for Craft Brewers


How to avoid beer loss?

Find out more

How to avoid beer loss?
alfalaval.com

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We recently hosted a webinar on dry hopping in beer production. If you have missed the event, here is a chance to view the recording to hear what our experts have shared with brewing enthusiasts from around the world. ...see more



Dry hopping webinar - recording
alfalaval.com



