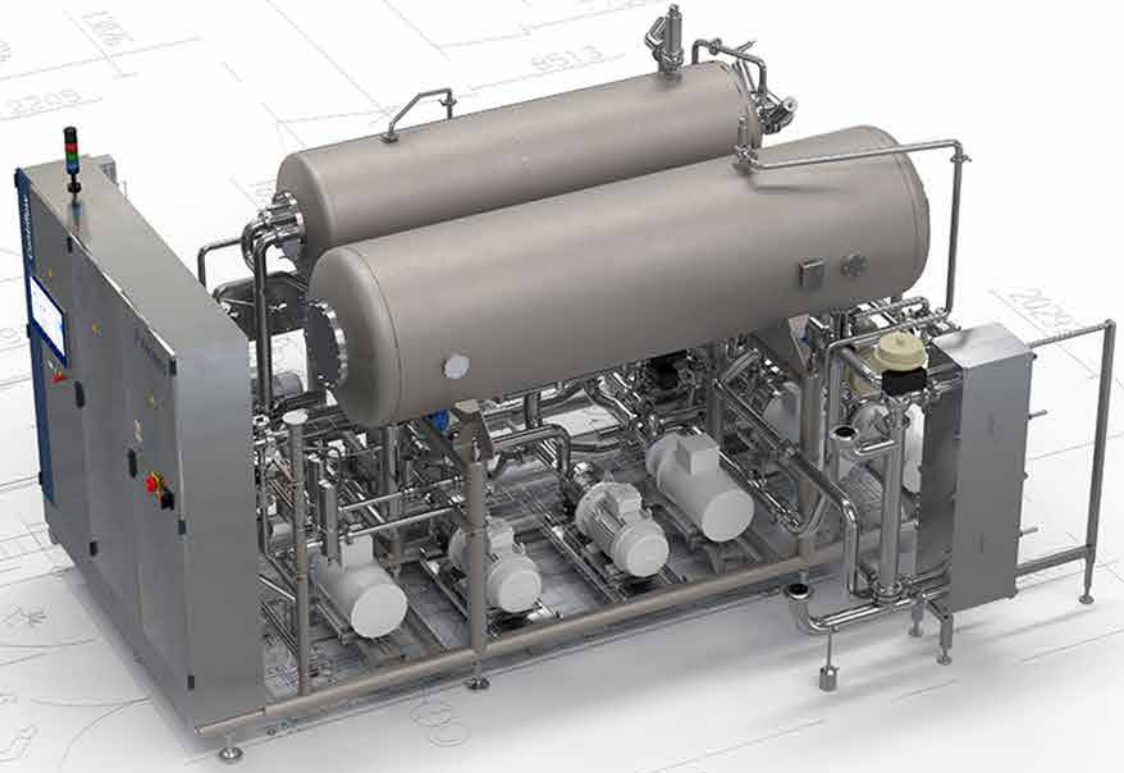
# Contiflow

Mixing systems



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# Best-precision mixing and carbonation

Non-alcoholic refreshment drinks are on the road to success. As a result, more and more flavour combinations are appearing on the market and arousing consumer curiosity. A flexible line technology which provides a maximum leeway for the beverage manufacturers is required.

## At a glance

- Mixers and carbonators for the production of different beverage types
- Comprising three modules: deaeration, dosing and carbonation
- Up to six different sizes with variable outputs (33 to 100 percent) of 15, 30, 45, 60, 75 and 90 $m^3/h$ are available.
- Highly accurate dosing of syrup and $CO_2$ for a lower syrup consumption of up to 0.2 percent
- Optional: Integration in the Modulfill VFS-M through elimination of the interface between the filler and the mixer

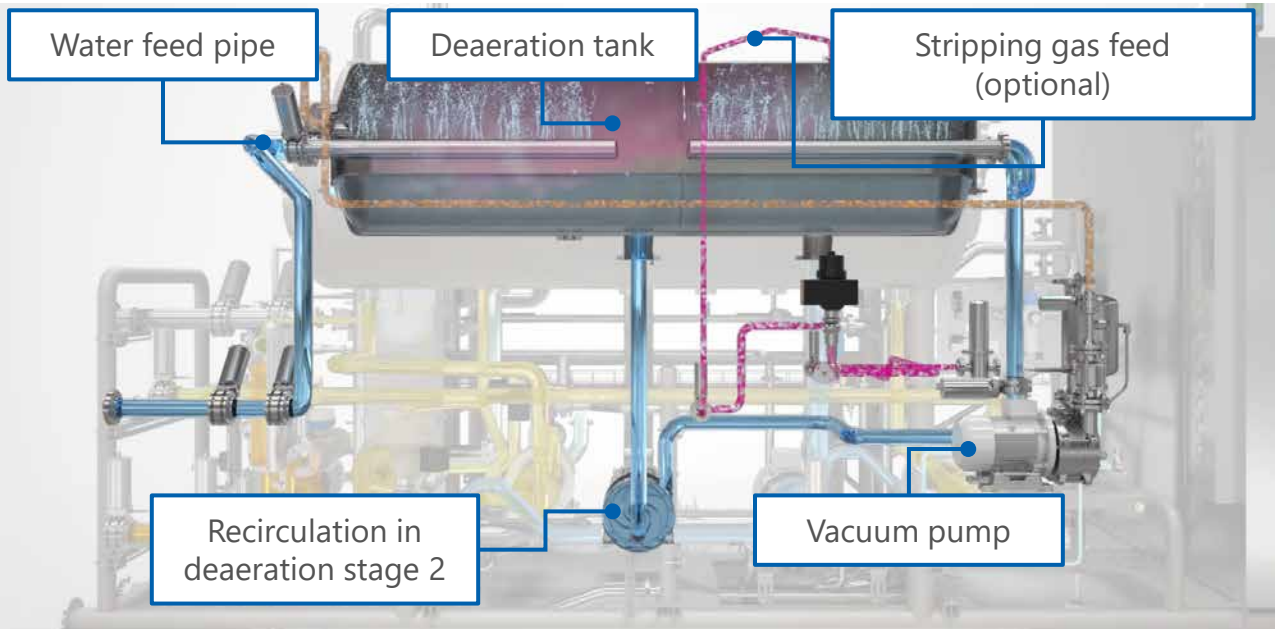
# The modules in detail

## Deaeration

- Water feed to the horizontal deaeration tank via two sets of nozzles of different sizes
- Deaeration using a single-stage or double-stage vacuum process and optional support with stripping gas

## Benefits to you

- The stripping gas ($CO_2$) provides: accelerated removal of the gasses from the water which ensures efficient deaeration
- Reduction of the sealing water consumption to a minimum thanks to a water saving function in the vacuum pump.




**Overview of the types of deaeration**

- Single-stage = residual oxygen content: ≦ 1.5 ppm*
- Two-stage = residual oxygen content: ≦ 0.8 ppm*
- Two-stage + stripping gas = residual oxygen content: ≦ 0.5 ppm*

* At 15 °C and an initial oxygen content of 10 ppm

# The modules in detail

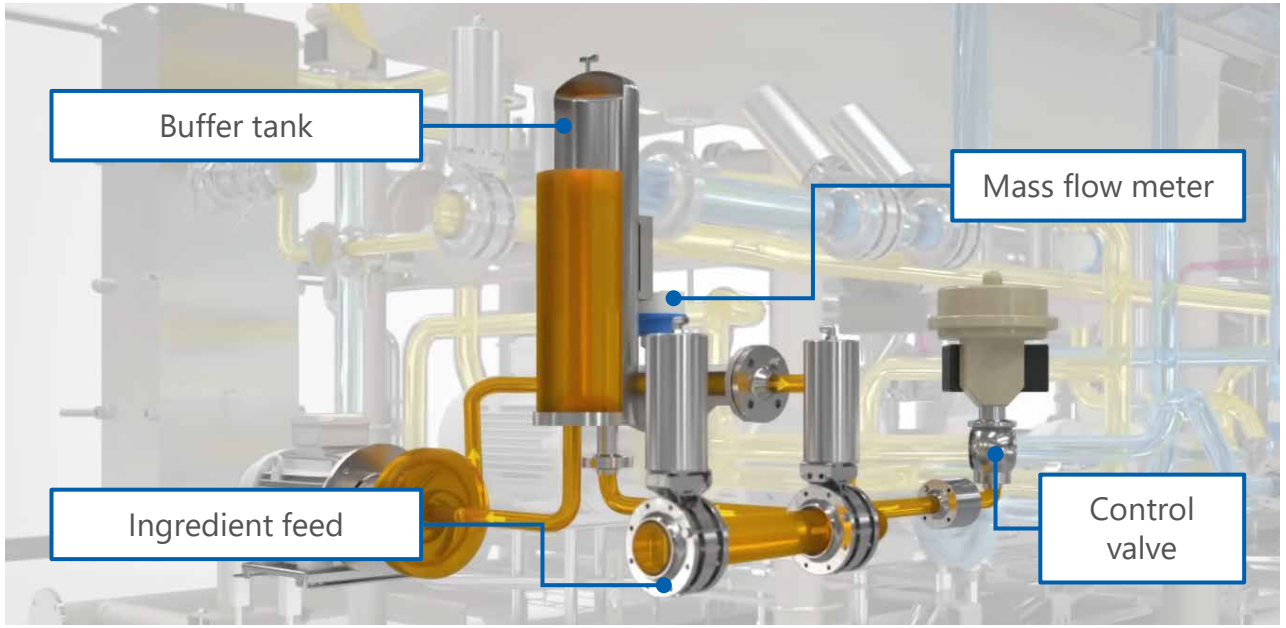
## Dosing

- Buffer tank for removing the gas bubbles from the ingredient
- Efficient register controller: precision control of the syrup dosing process, thus achieving potentially high raw material savings
- Recording of the ingredient volume flow rate with a mass flow meter
- Dosing of up to eight liquid ingredients possible

## Benefits to you

- Precision control of syrup dosing: for a high potential raw material savings
- Top product quality due to multi-stage product homogenisation

* Described as sigma 1, based on a target brix content of 10 °Bx




**Mixing water and ingredient in the correct mixing ratio**

Brix accuracy:

- In all circumstances: ≦ 0.03 °Bx*
- If the production conditions remain consistent: ≦ 0.01 °Bx*



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# The modules in detail

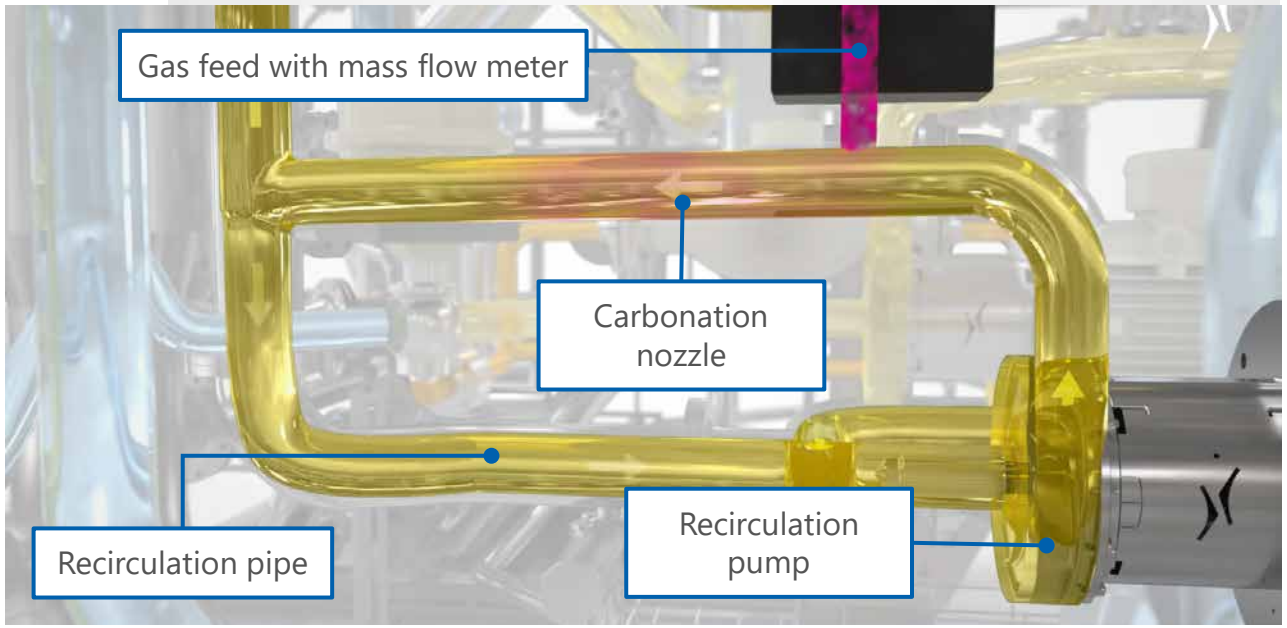
## Carbonation

- The carbonation nozzle ...
  - Always operates at a consistent volume flow rate
  - Guarantees efficient and consistent carbonation (independent from the machine output; between 100 and 33 percent)
- Dosing of up to two gaseous ingredients possible

## Benefits to you

The incorporated $CO_2$ must be dissolved completely before the filling procedure can be faultless. This is guaranteed through the combination of high-pressure carbonation (> 8 bar) in the Contiflow and gentle product transfer to the filler.

* Described as sigma 1




**Krones procedure for high-pressure carbonation: > 8 bar**

$CO_2$ dosing accuracy:

- In all circumstances: ≦ 0.08 g/l*
- If the production conditions remain consistent: ≦ 0.04 g/l*



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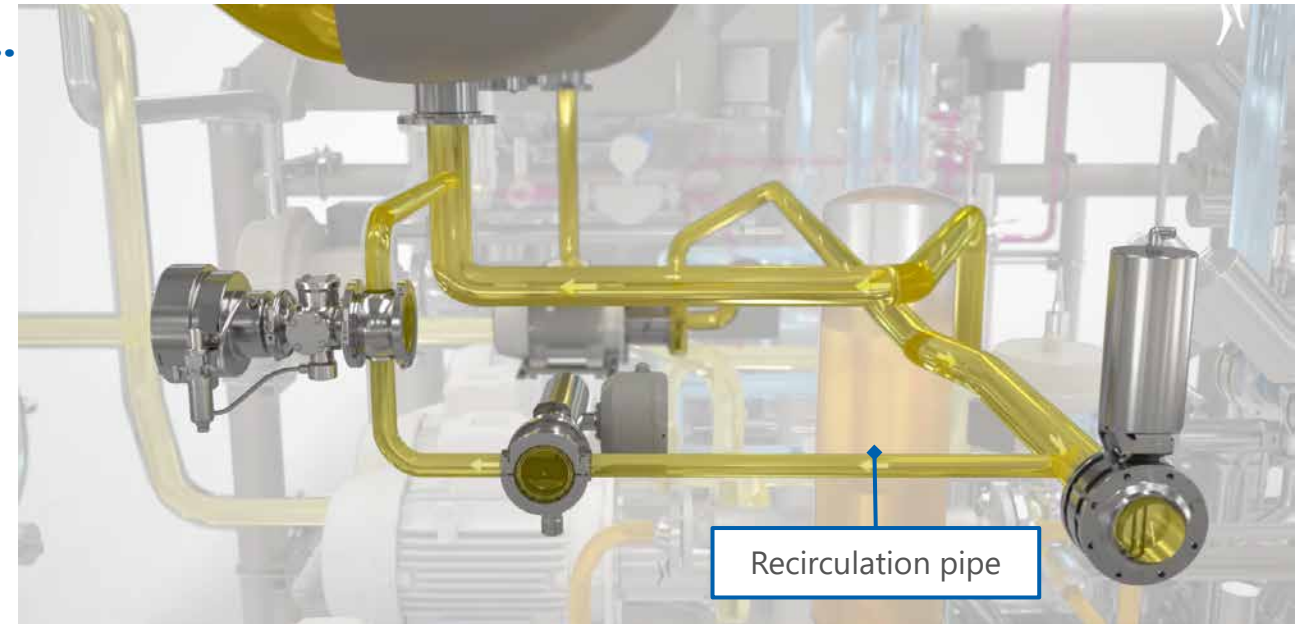
# The modules in detail
## Integrated product tank

### The product tank integrated in the Contiflow ...

- decouples the deaeration, mixing and carbonation processes from the filler,
- balances out production fluctuations,
- ensures that the filler is evenly and consistently supplied with product – and this at a continuous production output.

### In detail

- Adjustment of the production output in the Contiflow: between 100 and 33 percent of the nominal output
- For a consistent product quality: multi-stage product homogenization during production
  - **Recirculation carbonation:** about 25 percent of the product circulates through a short bypass pipe within the $CO_2$ dosing pipe (loop).
  - **During the inflow into the carbonation tank:** approximately 6 percent of the entire product volume permanently recirculates at the carbonation tank discharge.




**Process monitoring in the recirculation line:**
Brix, $CO_2$ and alcohol values of the finished mixed drink are measured inline.

Anton Paar maselli measurements



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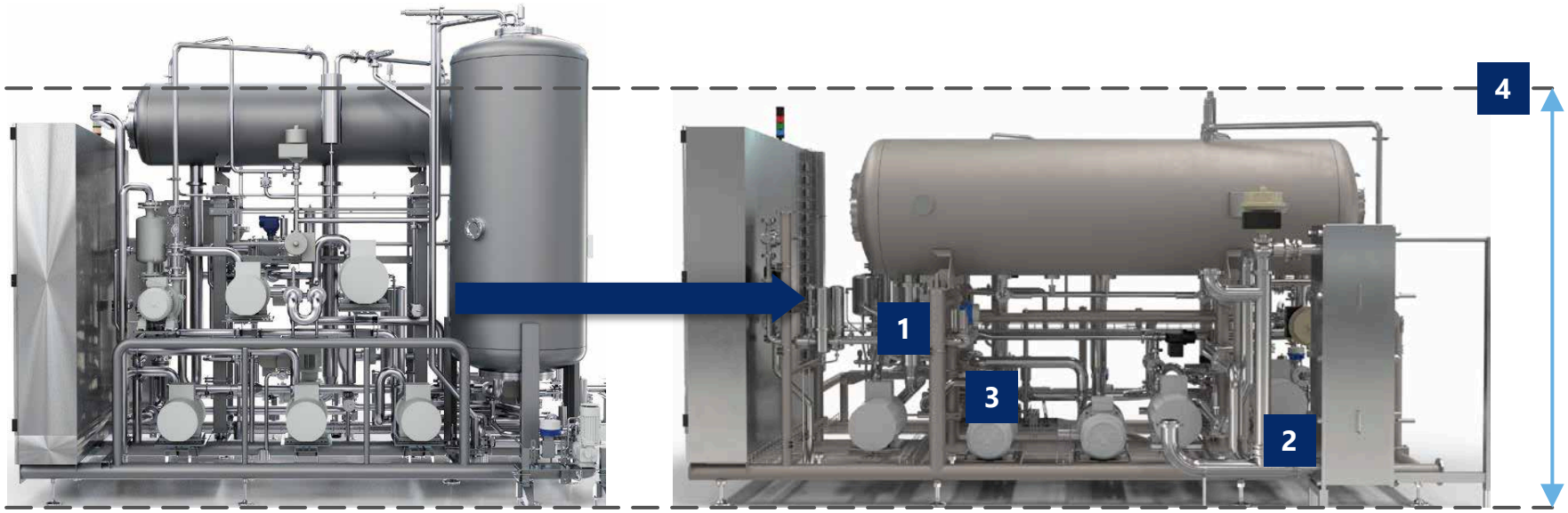
# If required: available in the new machine design

Following the sale of more than 1,500* systems all over the world, Krones has now optimised the Contiflow. The new design stands out because of its numerous benefits:




1. An open and easily accessible mixing station design thanks to the stainless steel circular tube frame
2. A drainage pan is mounted on the base frame to combine all of the waste water and drain it off from a central position
3. Easy-to-maintain design: e.g. pumps are mounted on a moveable slide so that the mechanical seals can be replaced quickly; all pumps are installed close to the ground
4. Reduced construction height: container dispatch possible

* As of: 2022



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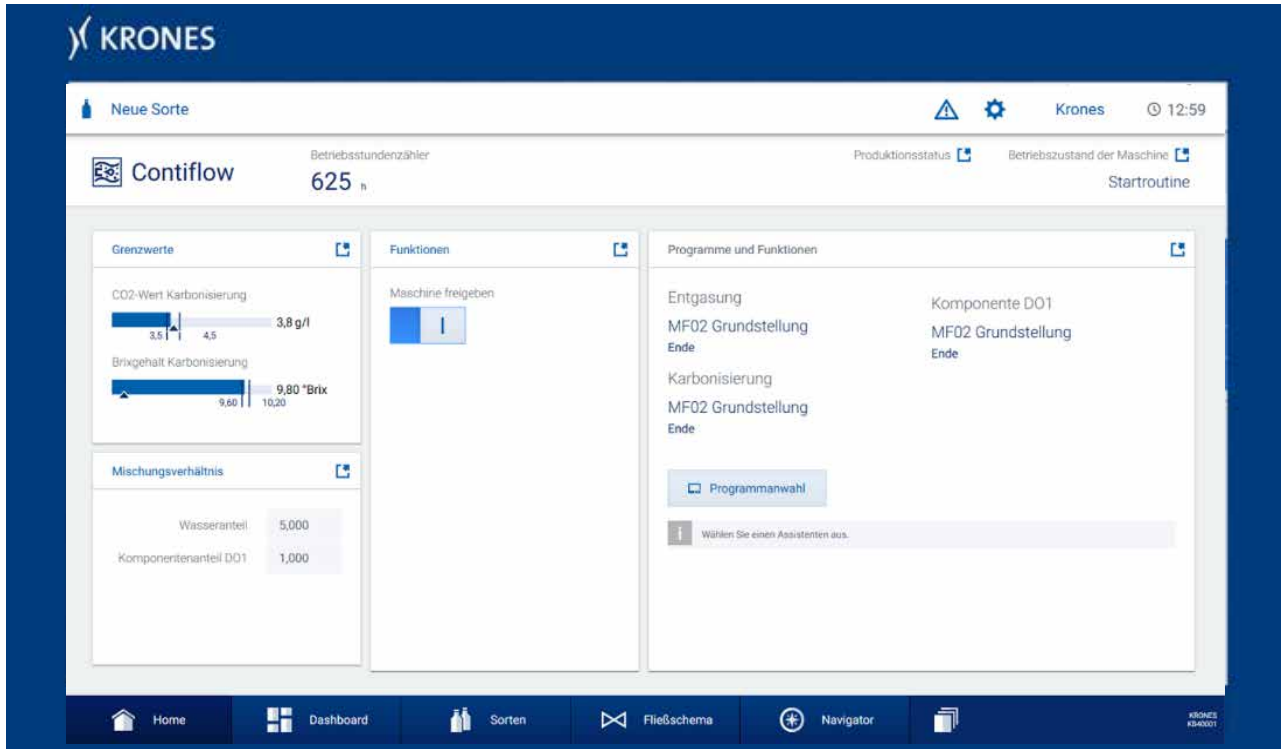
# Part of the new machine design
## Easy operation thanks to Connected HMI

The Contiflow is equipped with the new Connected HMI. The platform ensures that operators can easily communicate with the system in split seconds.

- Individual dashboard: widgets for a quick overview and direct access to the daily tasks
- Finding instead of searching: efficient faceted navigation optimised for all user groups
- Fast learnability: uniform design and interaction principles throughout all views and for all machines



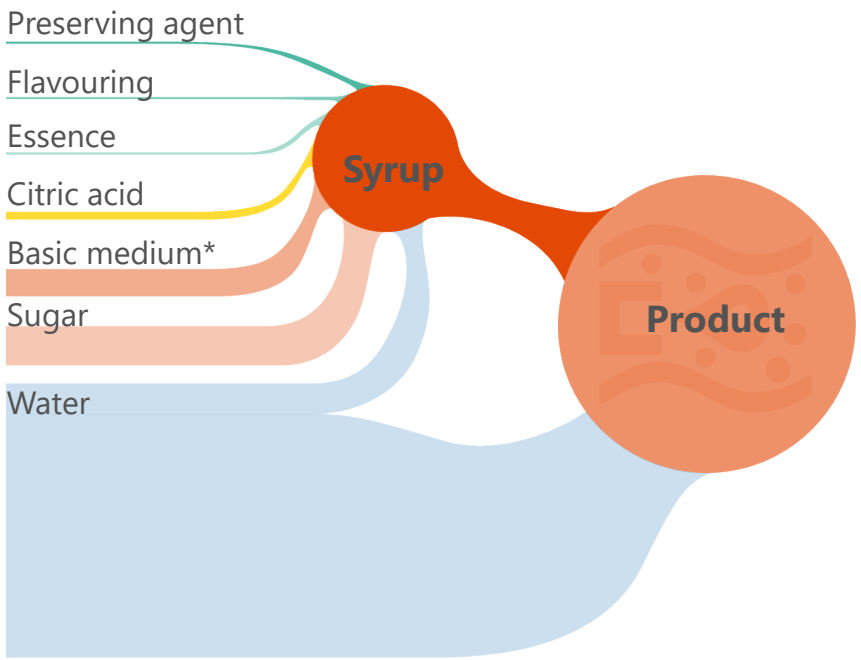

## Benefits to you

- **Connected:** maximum degree of networking between the machines and connection to superordinate IT systems
- **Secure:** powerful against external threats, state-of-the-art IT security devices
- **User-friendly:** clear and innovative navigation structure for intuitive operation

# Multi-ingredient mixing
## Overview

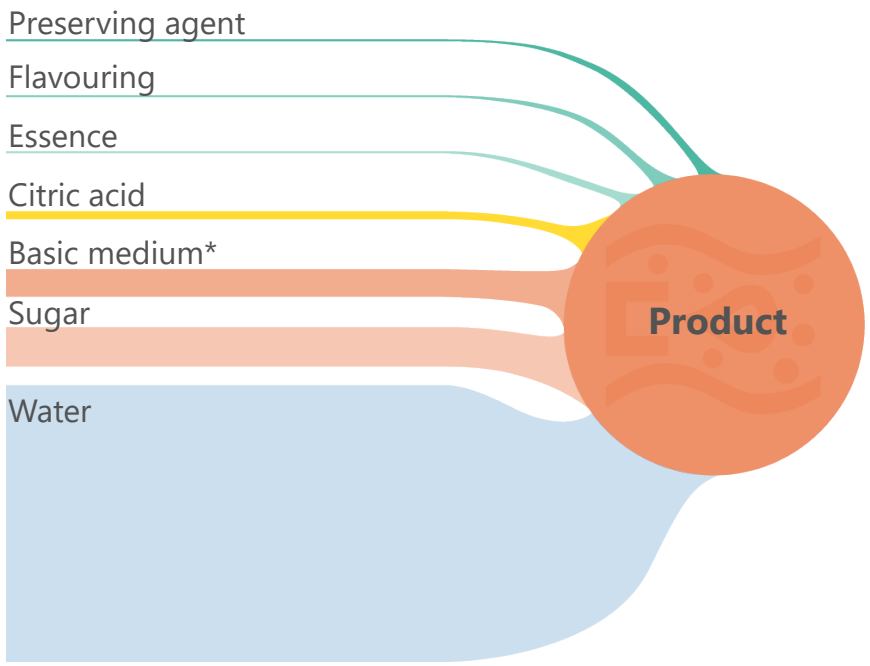
Multi-ingredient mixing or conventional variant with pre-manufactured syrup? An important decision as the two concepts for beverage manufacture require a different system concept in the syrup room.

### Conventional mixing with pre-manufactured syrup




* Colour, flavouring, plant extracts, acid

### Multi-ingredient mixing



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# Multi-ingredient mixing
## A concept with multiple benefits

### Inexpensive production

The individual ingredients can be handled more individually – for example during purchase, transportation and storage.

### No need for the conventional syrup room

In particular when it comes to carbonated soft drink or shandy batches on water or beer lines, individual components can be directly connected to the Contiflow via powder dissolving tanks or intermediate bulk containers.

### Fewer product losses

In contrast to ready-to-use syrup, the final mixing of the ingredients is not performed in a large batch tank. The individual flows can be stopped in a targeted manner during production stops or downtimes.

### More transparency

The concept makes improved traceability possible from the raw material to the filled bottle.

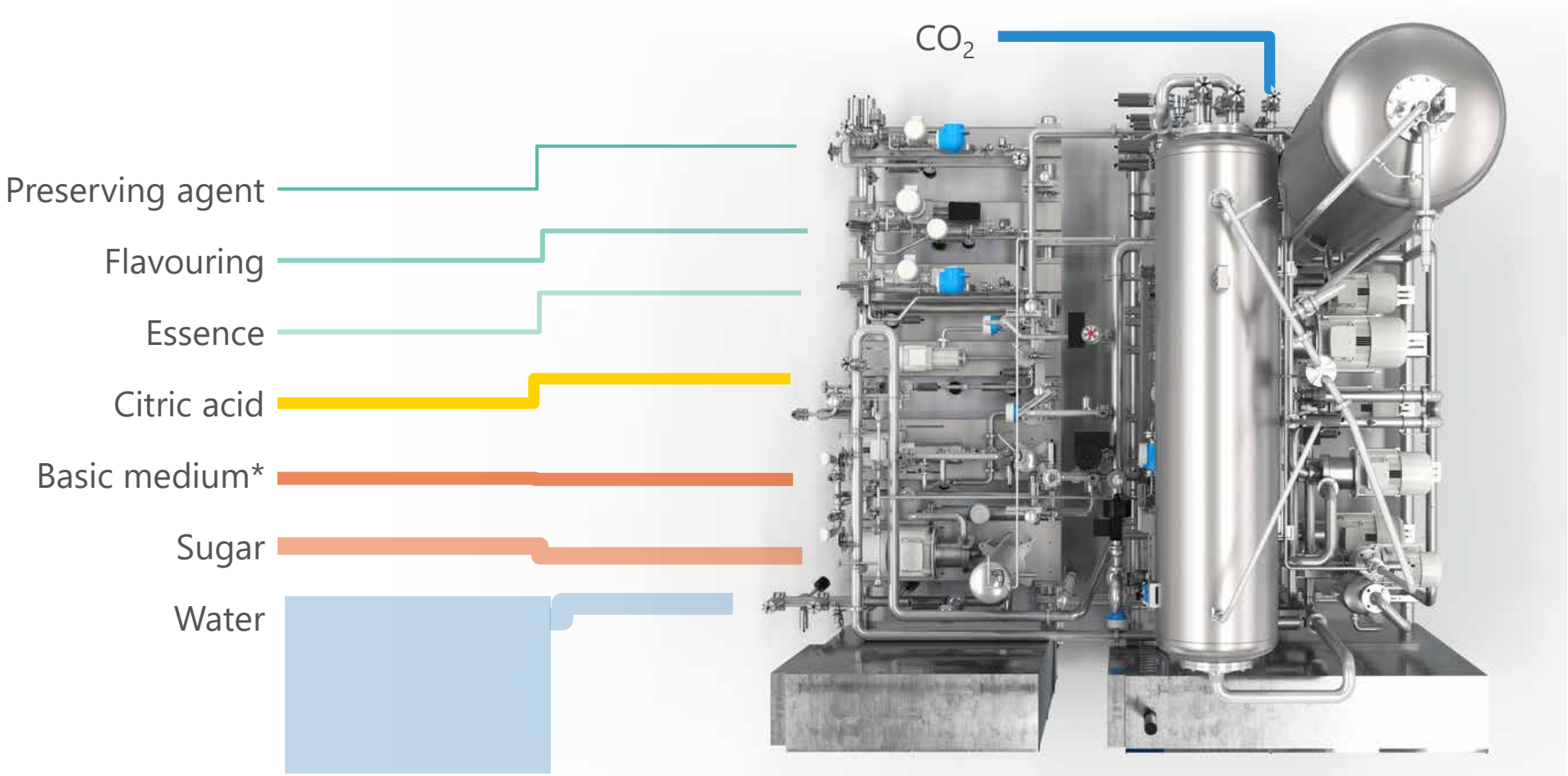
### Easy capacity increase

The direct feeding of the sugar to the Contiflow makes it possible to increase the capacity in existing syrup rooms.

### Increased flexibility

Changes to the production program can be handled and implemented with great flexibility.

# Multi-ingredient mixing
## Overview




* Colour, flavouring, plant extracts, acid



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# Quick product change-over within ten minutes

The product is changed over entirely without any operator intervention and offers the highest level of production flexibility.

## Fully-automatic process between:

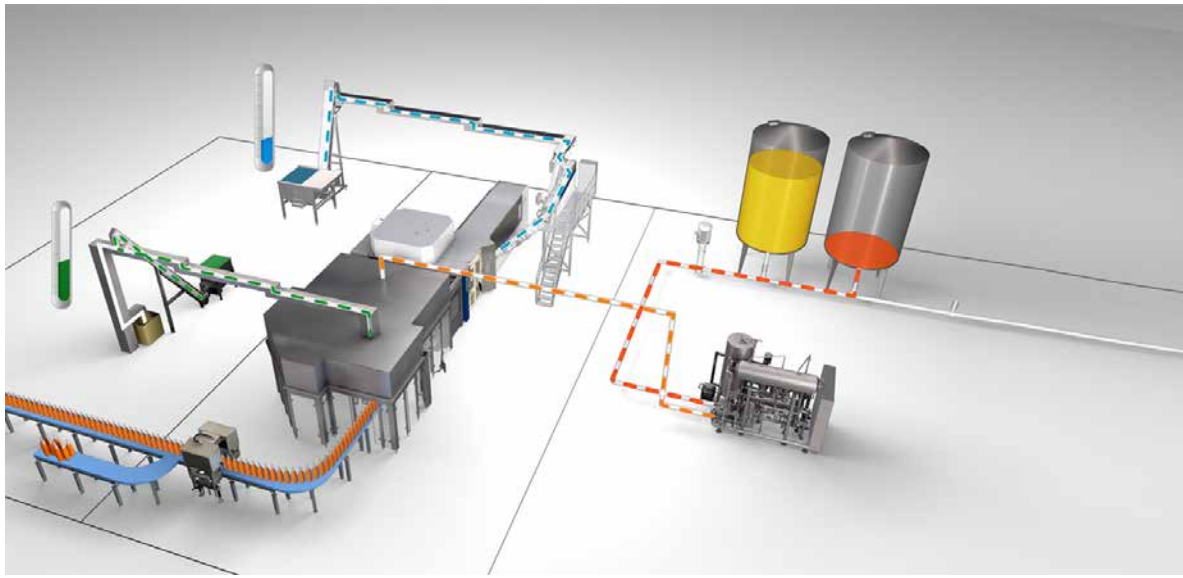
- Syrup room
- Mixer
- Filler

## Mixer with memory function

- Entry of the next product and time by the operator
- Reliable product change-over without any manual intervention

## For quick product change-overs, the filler requires:

- Additional drain valves
- A separate water connection
- An increased inert gas flow rate





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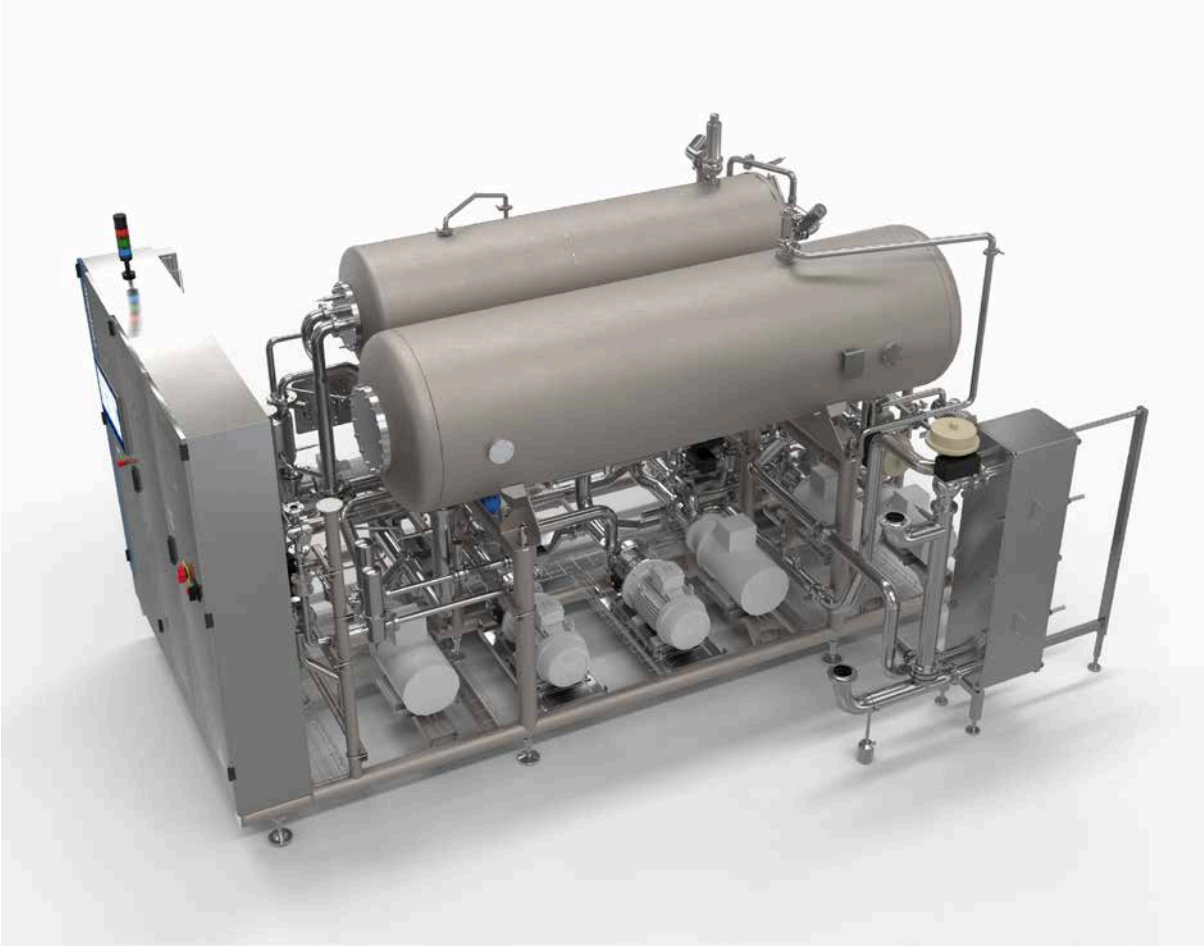
# Additional equipment

- Quick product change-over within ten minutes
- Production protocol
- Extensive measuring devices for: conductivity (water/product), Brix (incl. sugar inversion), $CO_2$, $O_2$, alcohol, ...
- Gas sterile air filter
- Additional dosing devices in the product discharge:
  - For the smallest quantities, e.g. flavouring for flavoured water
  - For fruit pieces/inclusions
- Finished-product connections for directly transferring the product to the subsequent machine
- PHT cooling unit for the finished product
- Sensors for pending maintenance and for the recording of media/consumption data
  - Equipment for reducing media consumption:
    - Sealing water cooling of the vacuum pump with external coolant
    - Sealing-water cooling with product water in reverse flow
    - $CO_2$ saving function for superimposed gas at the carbonation tank





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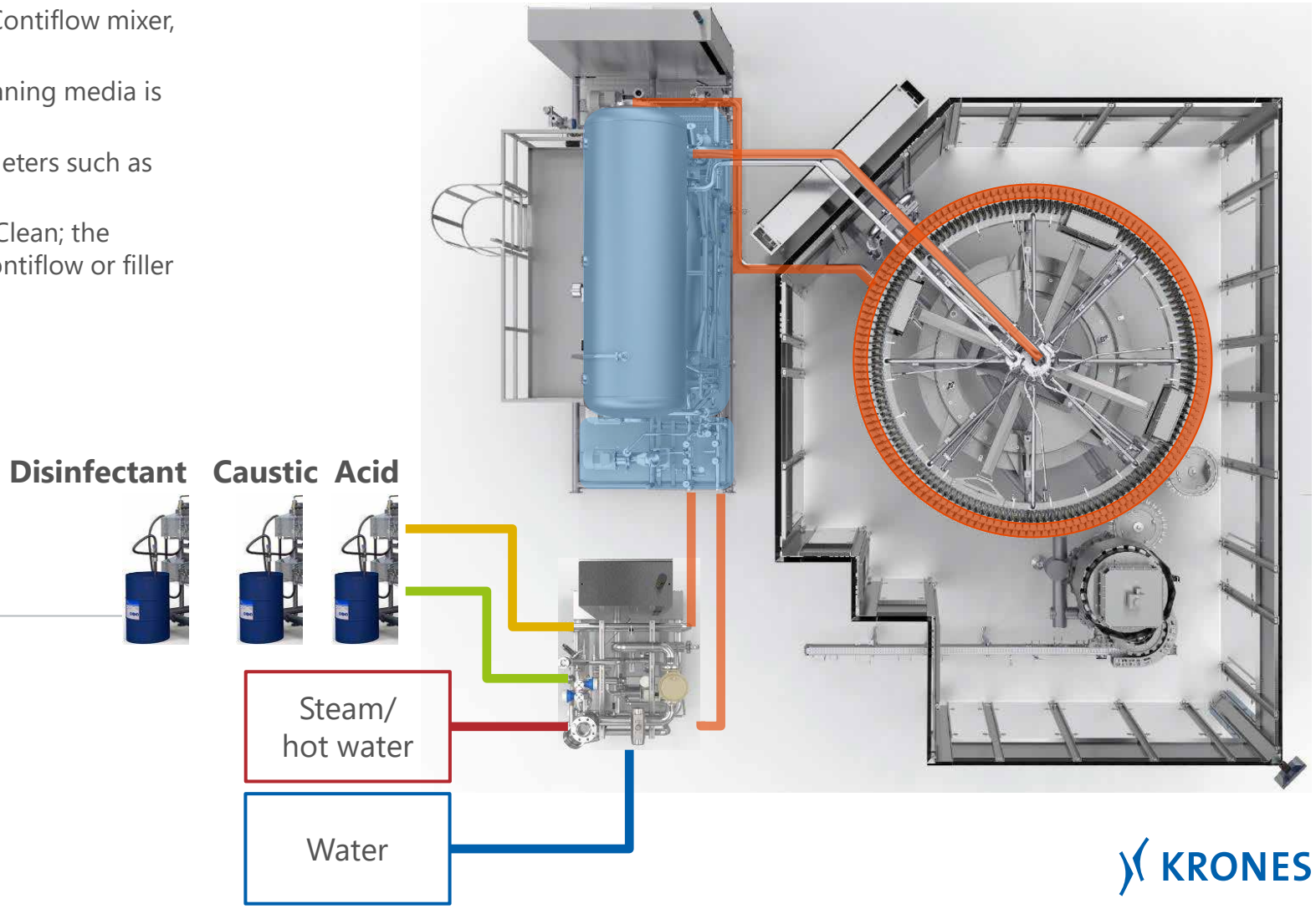
# Possible additional equipment
## CIP module

If the cleaning circuit only comprises the filler and the Contiflow mixer, it is possible to integrate a CIP module:

- Operates according to the principle of “lost CIP”: cleaning media is discarded following its successful use
- Controls and monitors the necessary cleaning parameters such as the flow rate, temperature, concentration, etc.
- Control: The same CIP master control as in the VarioClean; the system is operated using the touch-screen on the Contiflow or filler (at the Modulfill VFS-M)




## Benefits to you

- Targeted cleaning which is independent from the other machines in the line
- No investment in a separate CIP system necessary
- Reduced footprint
- Increased flexibility



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# The Contiflow as part of a holistic sustainability concept
EquiTherm Coldfill

## Initial situation

- In the mixer, the product is first cooled down to a filling temperature.
- In order to avoid condensation on the filled containers, they are heated again in the tunnel heater before labelling.

## Energy cycle with the EquiTherm Coldfill

A heat pump provides the mixer and the tunnel heater with thermal energy by ...
- taking on the cooling energy of the mixer,
- bringing it to a higher energy level via electrical energy and
- providing it to the tunnel heater afterwards.

## Benefits to you

The system reduces the gas consumption of the heating system and lowers both the water consumption and the energy required by the cooler. For you, this means: You will consume significantly less natural resources and save costs at the same time!

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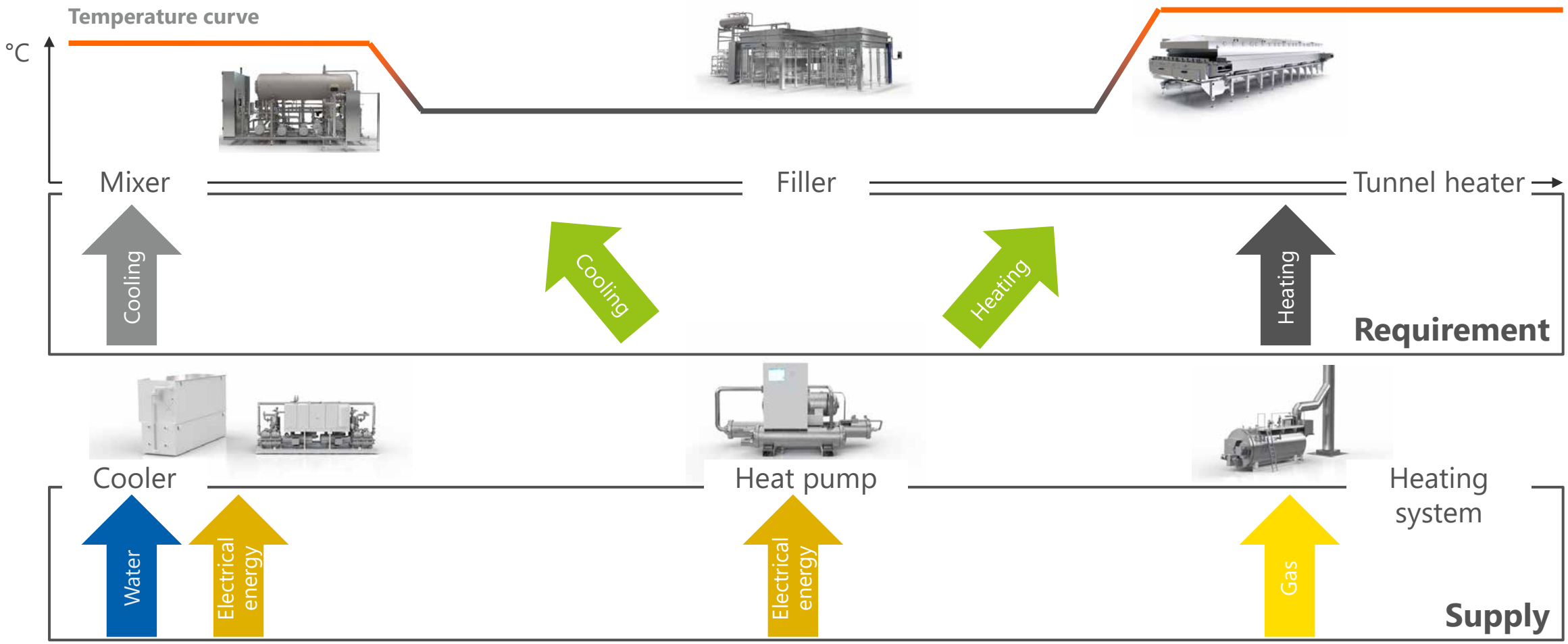
# The Contiflow as part of a holistic sustainability concept

## The system structure



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# Integrated mixer as part of the Modulfill VFS-M

Quicker and more compact than ever: in the Modulfill VFS-M, the Contiflow mixer is connected directly to the filler. This way, the product is transported to the distributor via the carbonation tank installed at a raised position. The traditional filler bowl is therefore no longer necessary.

- Reduced media consumption thanks to short mixing phases (no ring bowl, shorter pipe distances between the mixer and the filler, optimised pipe routing inside the mixer)
- Reduced $CO_2$ consumption thanks to small head space (no the ring bowl)
- Loss-reduced filling at the end of production thanks to raised position of the buffer tank
- Reduced power consumption by use of gravity (product discharge pump with 11 kW replaced by a recirculation pump with 1.1 kW)

# Advantages of the integrated mixer

## Faster filling speeds

The direct connection between the Modulfill VFS-M and the Contiflow mixer positively affects the filling duration. The integration in conjunction with the raised tank enables up to 250 millilitres to be filled per second.

## Accelerated change-over

You will be well equipped for type and handling parts change-over: the optimised interface between filler and mixer and the integration of LineXpress minimise the product change-over to less than ten minutes.

## Ease of operation, reduced space requirement

As the mixer and the filler are directly connected to each other, they can share a central HMI. In addition, the valve manifold was reduced and integrated in the mixer. The complete process control sensor system is installed inline.

| Your benefits in figures | Savings*/ duration |
|---|---|
| Less loss during emptying and change-over | Up to 30 percent |
| Fast change-over times during product change-overs with LineXpress | <10 minutes |
| Space saving thanks to a compact design and optimised interfaces | 10 to 15 percent |
| More compact filler clean room design possible as the product tank is installed on the mixer | 600 millimetres in height |
| Lower amount of cleaning agent required for CIP | Up to 15 percent |
| Savings in operating costs | Up to 10 percent |

* Compared to line arrangement with separate filler and mixer



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# Optional: Integrated syrup supply tank
## Prevention of product loss

To prevent waste of valuable syrup in the production process, it pays to use an integrated syrup supply tank - especially if the line and syrup room are not located directly next to each other. A longer syrup feed pipe tends to result in a larger mixing phase and thus larger product loss. Especially if the filling line is in stop-and-go mode during displacement of the feed pipe contents.

Thanks to the integrated supply tank

- Mixing phases which would otherwise have to be drained, are fed directly into the tank, depending on the tank content: The Contiflow Brix controller can balance out the resulting Brix fluctuation in the syrup (depending on the product and mixture ratio).
- The syrup feed pipe can be emptied with gas instead of water.

**The integrated supply tank directly next to the Contiflow**

# Optional: Two syrup supply tanks

## Reduction of change-over times

But not only product losses can be minimised with this supply tank concept. The integration of two tanks instead of only one can also substantially reduce change-over times.

Often, flushing and the supply of the new syrup to the Contiflow take longer than Contiflow and Modulfill require for their own flushing programs. The result: The Contiflow cannot start production preparations and has to wait – and valuable production time is lost.

As an option, two supply tanks can be integrated:

- If there is a product change-over, the second tank is already filled and thereby immediately ready for operation.
- The first tank can then be cleaned without any hurry and prepared for the next production batch.

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# Optional: $CO_2$ savings function

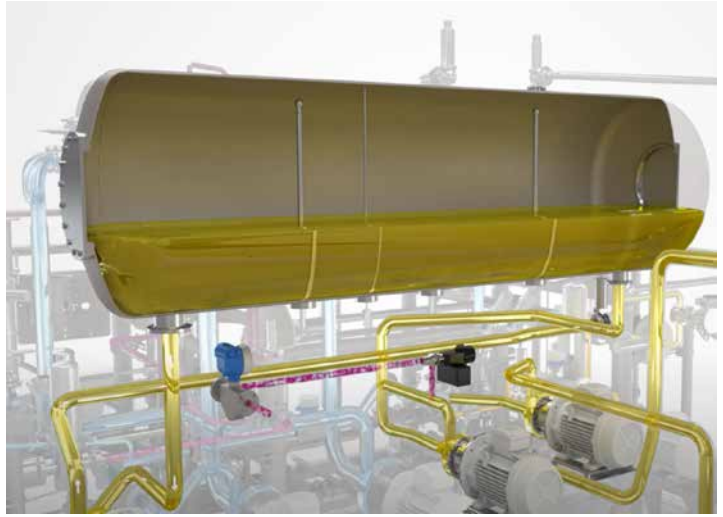
## Savings options

### Option 1: Adjusted pressure control

Thanks to the adjusted pressure control during a production stop at the filler, the Contiflow only remains in production until a fill level is reached in the tank which requires a $CO_2$ discharge.

Instead of discharging $CO_2$ into the open, the Contiflow will also stop production.

Once the fill level in the tank drops again, production can be resumed quickly. The continuous supply of the filler with product is thus ensured at all times.



### Option 2: Change-over of the production gas (pressurisation gas change-over)

The use of $N_2$ or compressed air instead of $CO_2$ during production represents a major savings potential. In this case, $CO_2$ is only used during start-up of the line. Although there is a possibility of the gas in the tank and the $CO_2$ in the product mixing, experience has shown that this does not lead to any relevant changes (neither $CO_2$ loss nor $O_2$ absorption by the product)

It must be assessed whether this function is useful for products which are sensitive to oxygen.



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# Optional: Water savings function

## Savings options at the vacuum pump

### Standard feature: Temperature monitoring

As soon as the sealing water has reached a certain temperature, fresh water is added to the circuit until the temperature drops. This variant is efficient but substantially increases the water consumption as water is permanently being drained.

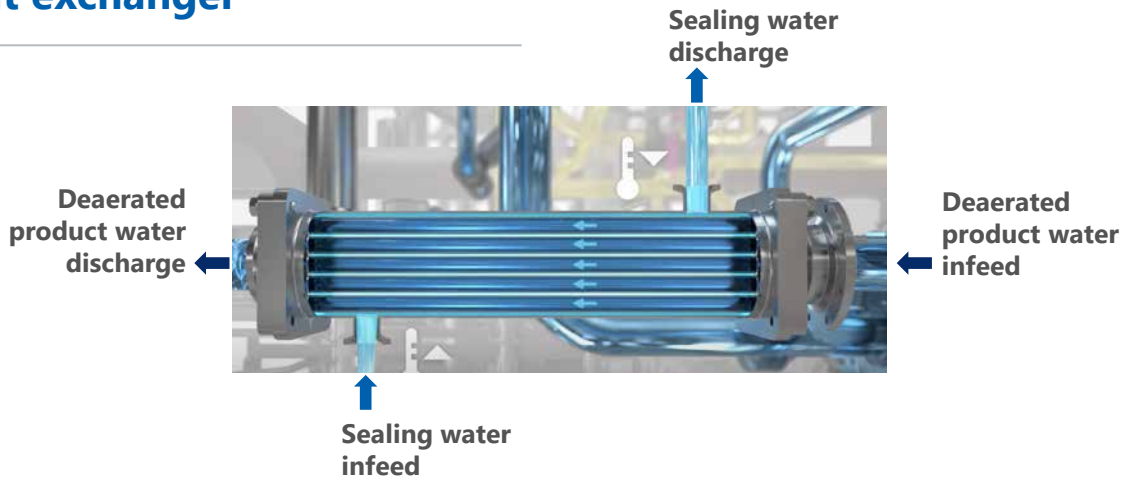
| Water savings per year | 1,040,000 l |
|---|---|
| Water requirement without cooling unit | 270 l/hour |
| Water requirement with cooling unit | 10 l/hour |
| Production time | 16 hours/day<br>250 days/year |

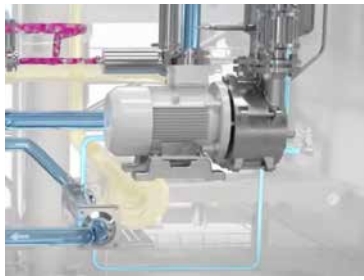
### Option 1: Heat exchange with external cooling unit

The sealing water circuit is permanently cooled by a special heat exchanger. Therefore, an external coolant such as glycol or ice water is required.

### Option 2: Heat exchange with integrated heat exchanger

The sealing water is cooled according to the counter-current principle through a tubular heat exchanger with deaerated product water. No additional coolant is required for this variant. This option can also be retrofitted.





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# Benefits to you

## Economical use of syrup

The syrup consumption can be reduced drastically thanks to the production at the bottom limit of the Brix range. In addition to that, a Brix-value-controlled admission of the syrup prevents the loss of syrup dosing the start and the end of production as well as during a product change-over.

## Flexible output

The mixer production output can be individually adjusted from 33 to 100 percent of the rated output. The regulated output results in a reduced gas consumption.

## Low operating costs

The demand of process water is reduced to a minimum by admitting the sealing water at a later point depending on the temperature.

## Automated processes

The rinsing function via water or syrup supply starts automatically already during the production. The operators are relieved and can focus on other tasks.

**Requesting a new machine**
You can easily send a request for a non-binding quotation in our Krones.shop.



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# Certified ecological efficiency
## Machines with enviro seal

At Krones, the enviro label stands for excellent ecological efficiency. Products that bear the enviro label have proven in an objective test procedure that they efficiently use energy and media, and that they produce in an environmentally-friendly way. The requirements are defined by the EME standard that has been developed by TÜV SÜD (technical inspection authority) for assessing production plants. The enviro test procedure, too, has been certified by TÜV SÜD as an independent expert. Therefore, you can be sure that: an enviro label stands for ecological efficiency.

### This is why the Contiflow is enviro-classified

**Energy efficiency**

- Use of the latest and optimally designed drives and pumps

**Media efficiency**

- Minimum water consumption of the vacuum pump due to recirculation and cooling of sealing water using product water
- Less $CO_2$ losses thanks to saving mode
- Syrup loss is prevented by Brix-controlled syrup feeding (optional)
- High-precision dosing: Reduces the use of expensive raw materials

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# Krones total expertise

## Precision filling systems for beer and carbonated soft drinks

### For PET: Modulfill VFS with PFR valves

- More flexible and faster thanks to PFR (Proportional Flow Regulator) technology
- Highest hygiene level thanks to the Monotec design
- Beer filling with a minimum oxygen absorption and the lowest $CO_2$ consumption
- **Modulfill VFS-M:** Block synchronisation with mixer for minimum product losses

### For glass: Modulfill HES

- Beer filling with a minimum oxygen pick-up and the lowest $CO_2$ consumption
- Minimum change-over times thanks to automatic probe adjustment and handling parts that can be changed without tools
- Short cleaning duration thanks to an automated exterior cleaning system
- Highest hygiene level thanks to the Monotec design

### For cans: Modulfill FS-C

- Available both for craft beers and for outputs of up to 135,000 containers per hour
- Multiple can formats without change parts thanks to combined centring bells with flexible formats
- Servo drive technology for a lower energy consumption and higher flexibility
- Low-maintenance, grease-free main bearing with automatic oil-circulating lubrication system
- Available in a block arrangement with the Krones Modulseam
- Option: Compact clean room for increased hygiene requirements

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# Everything from a single source

## Training sessions at the Krones Academy – trained personnel for an increased efficiency of your line

The multifaceted offer by the Krones Academy ranges from operation, servicing and maintenance courses through to management training. We will gladly also create your individual training programme.

## KIC Krones cleaning agents make your machine shine

An immaculate production environment is essential if your product is to shine. KIC Krones provides you with the optimum cleaning agents and disinfectants for each individual production step.

## KIC Krones lubricants for each production step

Whether for gears, chains or central lubrication systems – our greases and oils are true all-round talents. They can reach every lubrication point, protect your line and ensure gentle treatment for your products thanks to their food-grade quality.

## Krones Lifecycle Service – Partner for Performance

It goes without saying that also after the purchase of new machines, Krones takes care of your lines: The Krones LCS experts are always there to help you reaching your goals and turn your wishes into optimal LCS solutions.

## High-quality components from Evoguard and Ampco

Are you looking for shut-off, separation or control valves? For hygienic or aseptic applications? Would you like to have pump technology that perfectly fits into your machines? You will find exactly what you are looking for at Evoguard and Ampco Pumps. The two Krones subsidiaries cover the entire spectrum of process technology components that you need for high-quality production.

# SOLUTIONS BEYOND TOMORROW

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