Company Profile

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References
Contact Data
The Company:  Centec Headquarters

Centec GmbH
Wilhelm-Röntgen-Strasse 10
63477 Maintal
Germany

- General Management
- Global Purchasing, Sales & Service
- Development & Engineering
- Sensor Manufacturing
The Company: Czech Subsidiaries

Prague Plant
- Detail Engineering
- Automation Engineering
- Switch Cabinet Manufacturing

Horatev Plant
- Unit Manufacturing
- Materials Warehouse
- Factory Acceptance Tests
The Company: From the Past to the Future

1976: Dr. Hubert Koukol founded the company offering high precision sensor technology.

1990: Dr. Robert Koukol entered the company as managing director after studying process engineering.

1993: Start of process unit development & manufacturing.


1998: Multi Component Mixing, Column Deaeration.


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## The Company: From the Past to the Future

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Water Purification</td>
</tr>
<tr>
<td>2006</td>
<td>Optical O₂ measurement</td>
</tr>
<tr>
<td>2009</td>
<td>Dealcoholization</td>
</tr>
<tr>
<td>2010</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Cold Block</td>
</tr>
<tr>
<td>2012</td>
<td>Lab Density Meter</td>
</tr>
<tr>
<td>2013</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Cold Block</td>
</tr>
<tr>
<td>2014</td>
<td>Manufacturing facilities in Horatev to be doubled</td>
</tr>
<tr>
<td></td>
<td>Start of systematical exploration of new global markets</td>
</tr>
<tr>
<td></td>
<td>Start of own tank building in Horatev</td>
</tr>
<tr>
<td></td>
<td>Optical CO₂ measurement</td>
</tr>
</tbody>
</table>

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The Company: Global Presence

- Centec Automatica, Czech Republic
- Centec LLC, U.S.A.
- Centec Predstavništvo u Beogradu, Serbia
- Centec RRR Systems & Sensors, India
- Centec América Latina, Brazil

Our own subsidiaries.
A network of distributors.

Your benefit.

Global Knowledge. Local Solutions.
Centec.
# Market Segments

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Chemical</th>
<th>Pharmaceutical</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewery</td>
<td>Chemistry</td>
<td>Pharmaceutics</td>
<td>Solar Energy</td>
</tr>
<tr>
<td>Soft Drinks</td>
<td>Petrochemicals</td>
<td>Biotechnology</td>
<td>Biofuel</td>
</tr>
<tr>
<td>Wine &amp; Spirits</td>
<td>Electronics</td>
<td></td>
<td>Coal-Fired &amp; Nuclear Power</td>
</tr>
<tr>
<td>Dairy</td>
<td>Semiconductor</td>
<td></td>
<td>Plants</td>
</tr>
<tr>
<td>Food</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

High precision sensors and process units. **From a single source.**
# High Precision Process Sensors: Overview

<table>
<thead>
<tr>
<th>Name of Sensor</th>
<th>Measured Parameter</th>
<th>Determined Parameter</th>
<th>Illustration of Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>OXYTRANS</td>
<td>O₂ Concentration &amp; Temperature</td>
<td>O₂ Concentration</td>
<td><img src="image" alt="OXYTRANS Illustration" /></td>
</tr>
<tr>
<td>CARBOTEC</td>
<td>CO₂ Concentration &amp; Temperature</td>
<td>CO₂ Concentration</td>
<td><img src="image" alt="CARBOTEC Illustration" /></td>
</tr>
<tr>
<td>RHOTEC</td>
<td>Density &amp; Temperature</td>
<td>Concentration</td>
<td><img src="image" alt="RHOTEC Illustration" /></td>
</tr>
<tr>
<td>SONATEC</td>
<td>Sound Velocity &amp; Temperature</td>
<td>Concentration</td>
<td><img src="image" alt="SONATEC Illustration" /></td>
</tr>
</tbody>
</table>
High Precision Process Sensors: OXYTRANS

Technical Data

- **Temp.**  
  -5°C - +98°C

- **Pressure**  
  max. 12 bar

- **Enclosure**  
  IP 65

- **Liquid Phase**
  - **Range I**  
    1 ppb - 2 ppm (± 1 ppb)
  - **Range II**  
    30 ppb - 50 ppm (± 30 ppb)

- **Gas Phase**
  - **Range I**  
    0 - 4,2 % (± 0,002 %)
  - **Range II**  
    0 - 50 % (± 0,03 %)

Description

- Precise and immediate determination of O₂ content in liquids and gases
- Optical principle of measurement
- Lightweight portable device available
- Designed for high-end requirements, e.g. in breweries and power plants
- Hygienic design; CIP-capable
- Easy maintainable
High Precision Process Sensors: OXYTRANS

Measurement Principle

- An indicator layer in the sensor is illuminated with blue-green-light
- The indicator molecules are excited
- They emit a red light which is detected
- If oxygen is present, the energy is transferred to the oxygen molecules
- The measured signal decreases linear with the oxygen content

A) Luminescence Process in Absence of Oxygen

- Absorption of Blue-Green Light
- Indicator Molecule → Excited State → Emission of Red Light

B) Deactivation of the Luminescent Indicator Molecule in Presence of Oxygen

- Absorption of Blue-Green Light
- Indicator Molecule → Excited State → Energy transferred during Oxygen-Molecule-Collision causing no Red-Light-Emission of Indicator Molecule → Oxygen Molecule in Ground-State → Oxygen-Molecule in Excited State
High Precision Process Sensors: OXYTRANS

OXYTRANS TR-W

Description

- The perfect way to draw back the sensor for maintenance without stopping production or during CIP with aggressive detergents to protect the optical window
- Retractable unit made of stainless steel
- Manual or pneumatic version
- Hygienic design; CIP-capable
- Easy maintainable

Technical Data

<table>
<thead>
<tr>
<th></th>
<th>Range I</th>
<th>Range II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp.</td>
<td>-5°C - +98°C</td>
<td></td>
</tr>
<tr>
<td>Pressure</td>
<td>max. 12 bar</td>
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<tr>
<td>Enclosure</td>
<td>IP 65</td>
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<tr>
<td>Liquid Phase</td>
<td>1 ppb - 2 ppm (± 1 ppb)</td>
<td>30 ppb - 50 ppm (± 30 ppb)</td>
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<td>0 - 4,2 % (± 0,002 %)</td>
<td>0 - 50 % (± 0,03 %)</td>
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</tbody>
</table>
High Precision Process Sensors: CARBOTEC

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp.</td>
<td>-10°C - +100°C</td>
</tr>
<tr>
<td>Pressure</td>
<td>max. 10 bar</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP 65</td>
</tr>
<tr>
<td>Range</td>
<td>0 - 10 g/l</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0,05 g/l</td>
</tr>
</tbody>
</table>

Description

- Precise and immediate determination of dissolved CO₂ content in liquids
- In-line measurement based on abrupt localized decompression
- Applicable e.g. for beer, carbonated soft drinks and sparkling water
- Hygienic design; CIP-capable
- Easy maintainable
Measurement Principle

- A CO₂ sample is taken from the main stream (pos. A)
- The increase of volume forces the CO₂ out of the liquid into the gas phase (pos. B)
- The resulting pressure in the chamber differs from that of a non-carbonated liquid according to the volume of dissolved CO₂ in the sample
High Precision Process Sensors: CARBOTEC

Description

- Precise and immediate determination of dissolved CO₂ content in liquids
- Measurement based on Attenuated Total Reflection (ATR) technology
- No moving parts in the sensor
- Hygienic design; CIP-capable
- Almost maintenance free

Measurement Principle

- Infrared light is reflected at the surface when transmitting a crystal
- The surface is in contact to the carbonated liquid
- CO₂ absorbs the specific wavelength of the transmitting light
- Each reflection reduces the intensity of the light according to the CO₂ content in the liquid
High Precision Process Sensors: RHOTEC

Description

- Highly precise determination of the concentration of a media such as sugar, alcohol, acid or caustic
- Based on measurement of density
- Ideally suited for monitoring the quality of raw materials and final products
- Hygienic design; CIP-capable
- Maintenance free

Technical Data

- Temp.: -25°C - +125°C
- Pressure: max. 50 bar
- Enclosure: IP 65
- Range: 0 - 3 g/cm³
- Accuracy: ± 0,0001 g/cm³
High Precision Process Sensors: RHOTEC

**Measurement Principle**

- As the liquid flows through an "U"-shaped tube, the oscillating frequency of the tube is measured.
- The frequency is affected by any changes in the density of the liquid.
- Temperature drifts are automatically compensated by an internal Pt1000 sensor.

The tube is electronically excited to oscillate at resonance:
- low density medium > high frequency or high tone;
- high density medium > low frequency or low tone.
High Precision Process Sensors: RHOTEC

Technical Data

- **Temp.**: +5°C - +85°C
- **Pressure**: max. 50 bar
- **Enclosure**: IP 65
- **Range**: 0 - 3 g/cm³
- **Accuracy**: ± 0,0001 g/cm³
- **Material**: glass, PTFE
- **Sample**: approx. 2 ml
- **Weight**: approx. 22 kg

Description

- Highly precise determination of concentrations in the laboratory
- Based on measurement of density
- Vol.%, °Brix, °Plato and other scales
- User-friendly 10” touch screen
- Compatible to MS Windows ®
- Various interfaces for data exchange (USB, WLAN, Ethernet)
High Precision Process Sensors: SONATEC

Technical Data

- **Temp.** -25°C - +125°C
- **Pressure** max. 16 bar
- **Enclosure** IP 65
- **Range** 400 m/s - 3,000 m/s
- **Accuracy** ± 0,05 m/s

Description

- Highly precise determination of the concentration of a media such as sugar, alcohol, acid or caustic
- Based on measurement of the speed of sound through a liquid
- Ideally suited for monitoring the quality of raw materials and final products
- Hygienic design; CIP-capable
- Maintenance free
High Precision Process Sensors: SONATEC

Measurement Principle

- As the liquid flows through the sensor head, the speed of sound between a transmitter and a receiver is measured.
- The sound velocity is affected by any changes in the density of the liquid.
- Temperature drifts are automatically compensated by an internal Pt1000 sensor.

The speed of sound between a transmitter and a receiver is measured; the sound pulse is created by piezo-elements and is moving perpendicular to the product flow.
High Precision Process Sensors: SONATEC
High Precision Process Sensors: COMBITEC

Technical Data

- **Temp.** -25°C - +125°C
- **Pressure** max. 16 bar
- **Enclosure** IP 65
- **Density Range** 0 - 3 g/cm³
- **Density Accuracy** ± 0,0001 g/cm³
- **Sound Velocity Range** 400 m/s - 3.000 m/s
- **Sound Velocity Accuracy** ± 0,05 m/s

Description

- Highly precise determination of the characteristics of 3-component liquids
- Combination of fluid density sensing and sound velocity measurement
- Largely applied e.g. in the brewing process as BEERMONITOR
- Hygienic design; CIP-capable
- Maintenance free
High Precision Process Sensors: COMBITEC
Sensor Control Options: Overview

Transmitter Version (with local display)

- compact unit
- separated by cable

- display
- sensor

- 4 - 20 mA (standard)
- Profibus (option)
- 4 - 20 mA (standard)
- Profibus (option)

Sensor (without local display)

- sensor
- MCM 68
- SIMATIC S7 A. Bradley
Sensor Control Options: External Display

Description

- Aiming for increased user-friendliness
- The perfect solution for installations that are difficult to access
- Cable length between sensor and display up to 15 meters
- Applicable for O₂, density and sound velocity sensors
- Two 4 mA - 20 mA outputs

Technical Data

According to the technical data of the corresponding sensors.
Sensor Control Options: MCM 68

Technical Data

- Memory: 512 kByte SRAM
- Temp.: -20°C - +60°C
- Enclosure: IP 65
- Display: 5.7” QVGA (320 x 240 pixel, 16 Bit colours)
- Weight: approx. 1.0 kg

MCM 68 can be connected to 4 sensors.

Description

- Simultaneous evaluation of the output signals of several different sensors
- Data is locally displayed or transmitted to process control system
- Applicable for O₂, CO₂, density, sound velocity, pH, colour and other sensors
- User-friendly 5.7” touch screen
- S7-compatible; Profibus interface
Skid Mounted Process Units: Project Management

- warranty agreements
- service agreements
- technical support
- product training
- product training
- documentation
- commissioning
- assembly
- delivery
- consulting services
- feasibility studies
- conceptual design
- budget proposals
- process engineering
- basic engineering
- detail engineering
- automation engineering
## Skid Mounted Process Units: Overview

<table>
<thead>
<tr>
<th>Core Competences</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Purification</td>
<td>Depending on the raw water quality (water analysis) and the quality standards expected of the purified water, Centec provides the appropriate water treatment technologies; from the desalination of seawater to the production of WFI.</td>
</tr>
<tr>
<td>Deaeration</td>
<td>Oxygen is removed from food and beverages in order to improve product quality and shelf life; a low oxygen content in boiler water avoids serious corrosion damages.</td>
</tr>
<tr>
<td>Product Preparation; Carbonation</td>
<td>Automated process skids by Centec are applied in all steps of the brewing process and for manufacturing of e.g. wine, soft drinks, mineral water and various dairy products; in many industries there is a large number of applications that require the injection of gases.</td>
</tr>
</tbody>
</table>
# Skid Mounted Process Units: Overview

<table>
<thead>
<tr>
<th>Core Competences</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Purification</strong></td>
<td></td>
</tr>
<tr>
<td>DeSaTec</td>
<td>Seawater Desalination</td>
</tr>
<tr>
<td>IONTEC</td>
<td>Water Softening &amp; Demineralization</td>
</tr>
<tr>
<td>REVOTEC</td>
<td>Reverse Osmosis</td>
</tr>
<tr>
<td>STILL</td>
<td>WFI Distillation</td>
</tr>
<tr>
<td><strong>Deaeration</strong></td>
<td></td>
</tr>
<tr>
<td>DGS</td>
<td>Membrane Deaeration</td>
</tr>
<tr>
<td>DeGaS</td>
<td>Column Deaeration</td>
</tr>
<tr>
<td>VeGaS</td>
<td>Vacuum Deaeration</td>
</tr>
<tr>
<td><strong>Product Preparation; Carbonation and Nitrogenation</strong></td>
<td></td>
</tr>
<tr>
<td>Standardizer</td>
<td>Milk Standardization</td>
</tr>
<tr>
<td>EASYOMER</td>
<td>Hops Pre-Isomerization</td>
</tr>
<tr>
<td>Wort Aerator</td>
<td>Aeration of Wort</td>
</tr>
<tr>
<td>Yeast Pitch</td>
<td>Pitching of Yeast</td>
</tr>
<tr>
<td>Carbonator</td>
<td>Carbonation</td>
</tr>
<tr>
<td>Core Competences</td>
<td>Units</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Product Preparation; Carbonation and</td>
<td>CO₂ is added for carbonation of beverages such as beer, soft drinks and sparkling water; nitrogenation enhances the head stability of some beer.</td>
</tr>
<tr>
<td>Nitrogenation</td>
<td></td>
</tr>
<tr>
<td>Mixing and Dosing</td>
<td>In many industries liquids need to me mixed, e.g. deaerated water with syrup or water with acids and caustics.</td>
</tr>
<tr>
<td>Pasteurization, Cleaning and</td>
<td>Centec technology is applied for pasteurizing beverages, food and pharmaceutical products; we are a specialist for cleaning and sterilization concepts for product wetted components and complete process plants.</td>
</tr>
<tr>
<td>Sterilization</td>
<td></td>
</tr>
<tr>
<td>Dealcoholization</td>
<td>Our systems produce alcohol-free products and rectified alcohol.</td>
</tr>
</tbody>
</table>
# Skid Mounted Process Units: Overview

<table>
<thead>
<tr>
<th>Core Competences</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>Product Preparation; Carbonation and Nitrogenation</td>
<td>DeCarbonator, Nitrogenator, Blender</td>
</tr>
<tr>
<td></td>
<td>Carbonation &amp; Decarbonation, Nitrogenation, High Gravity Blending</td>
</tr>
<tr>
<td>Mixing and Dosing</td>
<td>MultiMixer, ADoS</td>
</tr>
<tr>
<td></td>
<td>Multi Component Mixing, Additive Dosing</td>
</tr>
<tr>
<td>Pasteurization, Cleaning and Sterilization</td>
<td>INTRAP, FlashPasto, CIP &amp; SIP, RDE</td>
</tr>
<tr>
<td></td>
<td>Product Sterile Filtration, Flash Pasteurization, Cleaning- &amp; Sterilization-in-Place, Pure Steam Generation</td>
</tr>
<tr>
<td>Dealcoholization</td>
<td>DeAlcoTec</td>
</tr>
<tr>
<td></td>
<td>Dealcoholization</td>
</tr>
</tbody>
</table>
DeSaTec: Desalination of Seawater and Brackish Water

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>10 – 15,000 m³/day</td>
</tr>
<tr>
<td>TDS in</td>
<td>up to 4.5% (seawater)</td>
</tr>
<tr>
<td></td>
<td>up to 1.0% (brackish water)</td>
</tr>
<tr>
<td>Temp.</td>
<td>+10°C - +30°C</td>
</tr>
<tr>
<td>Pressure</td>
<td>min. 2 - 3 bar</td>
</tr>
<tr>
<td>TDS out</td>
<td>max. 0.05%</td>
</tr>
</tbody>
</table>

**Description**

- Production of drinking water according to WHO standards or process water for industry
- Applicable e.g. for hotels, ships, beverage manufacturers, chemical plants etc.
- Based on reverse osmosis with optional disinfection and mineralization
- Easy to install and operate
- Low energy consumption
IONTEC: Water Softening & Demineralization

**Technical Data**

- **Capacity**: up to 1.500 hl/h (500 m³/h)
- **Temp.**: +2°C - +60°C
- **Pressure**: 0 - 8 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404 / 1.4435 epoxy / PP / PE
- **PLC**: SIMATIC S7

---

**Description**

- For softening water, Ca⁺⁺ and Mg⁺⁺ in the water are exchanged for the Na⁺ of the cation exchange resin.
- For demineralization, the water passes through cation and anion resin with H⁺ and OH⁻.
- Once most ions of the resin have been replaced, the resin is exhausted and the system needs to be regenerated.
- Mixed bed units are available.
REVOTEC: Reverse Osmosis

Technical Data

Capacity: up to 1.500 hl/h (150 m³/h)
Temp.: +2°C - +60°C
Pressure: 0 - 8 bar
Cleaning: CIP up to +85°C
Material: 1.4301 / 1.4404 / 1.4435 epoxy / PP / PE
PLC: SIMATIC S7

Description

- Water is purified by passing through a semi-permeable membrane at high pressure reversing the natural osmosis
- With reverse osmosis all suspended solids, bacteria, viruses, salts and ions remain in the retentate
- Membranes with larger pores allow the passage of various larger particles
## Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>up to 20 m³/h</td>
</tr>
<tr>
<td>Columns</td>
<td>up to 8</td>
</tr>
<tr>
<td>WFI Temp.</td>
<td>80°C</td>
</tr>
<tr>
<td>Bacteria</td>
<td>&lt; 10 CFU/100 ml</td>
</tr>
<tr>
<td>Endotoxin</td>
<td>&lt; 0.25 EU/ml</td>
</tr>
<tr>
<td>Conduct.</td>
<td>&lt; 1.1 μS/cm (20°C)</td>
</tr>
<tr>
<td>Material</td>
<td>1.4404 / 1.4435</td>
</tr>
<tr>
<td>PLC</td>
<td>SIMATIC S7</td>
</tr>
</tbody>
</table>

## Description

- Water for Injection (WFI) is required to manufacture parenteral drugs.
- The unit consists of several distillation columns producing pyrogen-free steam.
- Each column is heated by steam produced in the previous one; for the first column, plant steam is used for heating.
- The steam condenses into WFI and is further processed.
DGS: Membrane Deaeration

**Technical Data**

- **Capacity**: up to 2,000 hl/h (500 m³/h)
- **O₂**: < 10 ppb residual
- **Temp.**: +2°C - +45°C
- **Pressure**: 0 - 6 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404 / 1.4435
- **Membrane**: PP / polyolefin / epoxy
- **PLC**: SIMATIC S7

**Description**

- Automated and highly efficient deaeration of water applying hollow fibre membranes
- Cold water flows along the outer side of the membranes; through their inner side and in the opposite direction passes under vacuum the strip gas CO₂ or N₂
- The partial pressure difference between both sides forces the O₂ out of the water into the gas phase
**Functionality**

- According to Henry's Law, the gas solubility in a liquid decreases as the partial pressure of this gas above the liquid decreases.
- Vacuum and/or strip gas lead to a diffusion of $O_2$ from the liquid phase into the gas phase.

A compact bundle of hollow fibres maximises the surface for the gas exchange between the water and the vacuum and/or strip gas inside the membranes.
**DeGaS-Cold:** Column Deaeration

### Technical Data

- **Capacity**: up to 2,000 hl/h (200 m³/h)
- **O₂**: < 10 ppb residual
- **Temp.**: ambient temperature
- **Pressure**: 0 - 8 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404
- **Cooling**: glycol, ice water, ammonia
- **PLC**: SIMATIC S7

### Description

- Automated deaeration of water
- Water at ambient temperature runs top down a column
- Strip gas CO₂ or N₂ flowing in the opposite direction removes the O₂
- The partial pressure difference between both sides forces the O₂ to percolate
- The O₂ leaves the column at its top together with the strip gas
DeGaS-Hot: Column Deaeration

Technical Data

- **Capacity**: up to 2.000 hl/h (200 m³/h)
- **O₂**: < 10 ppb residual
- **Temp.**: +8°C - 95°C
- **Pressure**: 0 - 8 bar
- **Cleaning**: CIP up to +95°C
- **Material**: 1.4301 / 1.4404
- **Heating**: steam
- **Cooling**: glycol, ice water, ammonia
- **PLC**: SIMATIC S7

**Description**

- Automated deaeration of water
- Water heated to about 75°C runs top down a column
- Strip gas CO₂ or N₂ flowing in the opposite direction removes the O₂
- The partial pressure difference between both sides forces the O₂ to percolate
- The O₂ leaves the column at its top together with the strip gas
DeGaS-Cold / Hot: Column Deaeration

Functionality

- According to Henry's Law, the gas solubility in a liquid decreases as the partial pressure of this gas above the liquid decreases.
- Vacuum and/or strip gas lead to a diffusion of $O_2$ from the liquid phase into the gas phase.

Containing several layers of highly efficient packings, the column is designed to maximise the surface for the gas exchange between the water and $CO_2$ or $N_2$. 
VeGaS: Vacuum Deaeration

Description

- Deaeration by spraying liquid products into a vacuum vessel
- Applicable e.g. for ketchup or soy milk
- The level of vacuum is adjusted based on the required O₂, CO₂ or N₂ content, temperature and product characteristics
- The deaerated product falls to the bottom of the vessel from where it is further processed

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>up to 1.500 hl/h (180 m³/h)</td>
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<tr>
<td>O₂</td>
<td>depending on product</td>
</tr>
<tr>
<td>Temp.</td>
<td>+2°C - +85°C</td>
</tr>
<tr>
<td>Pressure</td>
<td>0 - 8 bar</td>
</tr>
<tr>
<td>Cleaning</td>
<td>CIP up to +85°C</td>
</tr>
<tr>
<td>Material</td>
<td>1.4301 / 1.4404</td>
</tr>
<tr>
<td>PLC</td>
<td>SIMATIC S7</td>
</tr>
</tbody>
</table>

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**Standardizer: Milk Standardization**

**Technical Data**

- **Capacity**: up to 60,000 l/h
- **Fat**:
  - 0 - 5% (milk)
  - 18 - 50% (cream)
- **Accuracy**: ± 0.05%
- **Material**: 1.4301 / 1.4404
- **PLC**: SIMATIC S7

**Description**

- Raw or pasteurized milk is separated into skimmed milk and cream by a separator.
- Part of the cream is added to the skimmed milk in exact portions in order to reach a precisely defined fat content.
- The milk fat content is permanently and automatically measured and controlled.
- Any variations of the fat content of the standardized milk are avoided.
EASYOMER: Hops Pre-Isomerization

Technical Data

- Capacity: min. 200,000 hl per year
- Hops: natural, pellets, extract
- Reduction: up to 30%
- Pressure: 0 - 10 bar
- Cleaning: CIP up to +125°C
- Material: 1.4301 / 1.4404
- PLC: SIMATIC S7

Description

- Optimized use of hops (natural hops, pellets and extract) due to increased yield of bitter substances
- Achieved by isomerization of the hops solution applying new, scientifically proved parameters
- Hops reduction up to 30% possible
- In compliance with the “German Purity Law” and without effect on taste
Wort Aerator: Aeration of Wort

Description

- $O_2$ is required for yeast growth and the establishment of a yeast culture
- Accurate and continuous aeration of wort due to highly precise optical $O_2$ measurement and reliable flow meters
- A Vortex injector automatically delivers the right amount of sterile $O_2$ that mixes homogeneously with the wort
- Integrated yeast dosing as option

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>up to 3.000 hl/h</td>
</tr>
<tr>
<td>Range $O_2$</td>
<td>0 - 50 ppm</td>
</tr>
<tr>
<td>Cleaning</td>
<td>CIP up to +85°C</td>
</tr>
<tr>
<td>Material</td>
<td>1.4301 / 1.4404</td>
</tr>
<tr>
<td>PLC</td>
<td>SIMATIC S7</td>
</tr>
</tbody>
</table>
**YeastPitch:** Pitching of Yeast

### Technical Data

- **Capacity:** up to 3,000 hl/h
- **Yeast Cells:** 0 - 100 Mio/cm³
- **Cleaning:** CIP up to +85°C
- **Material:** 1.4301 / 1.4404
- **PLC:** SIMATIC S7

### Description

- During fermentation the yeast converts sugars into alcohol and CO₂
- Homogeneous spread of yeast into wort
- Wort and yeast are blended together in the mixing nozzle; the process is controlled by a comparison of either
  - the flow rates of yeast and wort or
  - the turbidity before and after blending
- Integrated wort aeration as option
Functionality

- The nozzle is specifically designed according to the process parameters
- Gas can be injected from several direction and splits into fine bubbles
- Extremely homogeneous mixture
- Time and space for gas binding are minimized

The increase of the diameter after the injection of e.g. CO$_2$ results in a reduction of the flow velocity and thus high turbulence; the turbulence splits the CO$_2$ into very fine bubbles and leads to a very fast and homogeneous mixture of liquid and gas.
Carbonator: Carbonation

Technical Data

- **Capacity**: up to 2,000 hl/h
- **CO₂**: 0 - 10 g/l dissolved
- **Temp.**: +2°C - +50°C
- **Pressure**: 1 - 10 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404
- **PLC**: SIMATIC S7

Description

- Continuous carbonation of beverages and other liquid media
- A specifically designed Vortex injector is applied for adding CO₂ into the stream
- Very homogeneous mixture resulting from extremely fine gas bubbles
- The gas content is permanently and automatically measured and controlled
DeCarbonator: Carbonation and Decarbonation

Description

- Continuous carbonation, decarbonation and deoxygenation of beverages
- Hollow fibre membranes enable the gas transmission into or out of the liquid
- Homogeneous gas exchange due to microscopic pores in the membrane
- The gas content is permanently and automatically measured and controlled

Technical Data

- Capacity: up to 1.500 hl/h
- CO₂: 0 - 10 g/l dissolved
- Temp.: +2°C - +20°C
- Pressure: 0 - 6 bar
- Cleaning: CIP up to +85°C
- Material: 1.4301 / 1.4404
- PLC: SIMATIC S7

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Nitrogenator: Nitrogenation

Description

- Continuous nitrogenation of beverages
- Based on hollow fibre membranes or a specifically designed Vortex injector
- Very homogeneous injection of N\textsubscript{2} due to the applied technologies
- The gas content is permanently and automatically measured and controlled
- Integrated carbonation as option

Technical Data

- Capacity: up to 1.500 hl/h
- \(N\textsubscript{2}\): 0 - 100 ppm dissolved
- Temp.: +2°C - +20°C
- Pressure: 1 - 10 bar (Vortex injector)
  0 - 6 bar (membranes)
- Cleaning: CIP up to +85°C
- Material: 1.4301 / 1.4404
- PLC: SIMATIC S7
**Blender: High Gravity Blending**

**Technical Data**
- **Capacity**: up to 2,000 hl/h
- **CO₂**: 0 - 10 g/l dissolved
- **Orig. Grav.**: 0 - 20°P (± 0,05°P)
- **Alcohol**: 0 - 10 vol.% (± 0,03 vol.%)
- **Temp.**: +2°C - +30°C
- **Pressure**: 0 - 10 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404
- **PLC**: SIMATIC S7

**Description**
- Certain high gravity beverages need to be blended with deaerated water to achieve the desired alcohol content.
- Other minor ingredients like flavors can be added at the same time.
- Applying in-line sensor technology, the process is highly precise.
- Integrated carbonation as option (Carboblender).
MultiMixer: Multi Component Mixing

Technical Data

- Capacity: up to 1.500 hl/h (150 m³/h)
- Temp.: +2°C - +85°C
- Pressure: 0 - 10 bar
- Cleaning: CIP up to +85°C
- Material: 1.4301 / 1.4404 / 1.4435
- PLC: SIMATIC S7

Description

- Accurate and continuous blending of two or more steams of liquids
- Allowing high flexibility in manufacturing
- Applicable in various industries for mixing of e.g. water with syrup or with acids or caustics
- Densities and concentrations are permanently and automatically measured and controlled
**ADoS: Additive Dosing**

**Description**

- Accurate and continuous adding of ingredients into a main liquid stream
- Allowing high flexibility in manufacturing
- Applicable in various industries for adding minor amounts of e.g. flavours, sweeterers, vitamins, colours
- Densities and concentrations are permanently and automatically measured and controlled

**Technical Data**

- **Capacity**: up to 1.500 hl/h (150 m³/h)
- **Temp.**: +2°C - +85°C
- **Pressure**: 0 - 20 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404 / 1.4435
- **PLC**: SIMATIC S7
**Technical Data**

- **Capacity**: up to 1.500 hl/h (150 m³/h)
- **Particles**: 0,1 µm (min. size)
- **Temp.**: +2°C - +85°C
- **Pressure**: 2 - 8 bar
- **Cleaning**: CIP up to +85°C
- **Material**: 1.4301 / 1.4404 / 1.4435

**Description**

- Single- or multi-stage system containing back flushable cartridge filters with specific pore sizes
- The product is sterilized by removing micro-organisms and bacteria
- Differential pressure detection can be used to monitor the condition of the filter and to enable back-flushing
**FlashPasto: Flash Pasteurization**

**Technical Data**

- **Capacity**: up to 1,000 hl/h (60 m³/h)
- **Range PU's**: 10 - 500
- **Past. Temp.**: +68°C - +165°C
- **Pressure**: 1 bar - 25 bar
- **Cleaning**: CIP up to +125°C
- **Material**: 1.4301 / 1.4404 / 1.4435
- **PLC**: SIMATIC S7

**Description**

- Automated heat treatment of products to eliminate bacteria without injuring their colour, taste and effectiveness
- Applicable for e.g. beer, soft drinks, dairy and pharmaceutical products for improved quality and shelf life
- Optimized regarding the level of heat input, energy recovery and cooling
- Buffer tank as option in front of filler
CIP & SIP: Cleaning- & Sterilization-in-Place

Description

- Efficient cleaning across a wide range of processes in various industries
- Sterilization with chemicals or steam may be required after the cleaning process
- Small mobile skids through to multi-tank channel systems for large plants
- Lost CIP and batch CIP units available
- Optimum cleaning performance at lowest consumption of resources

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Capacity</td>
<td>customized</td>
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<tr>
<td>Media</td>
<td>caustic, acid, steam</td>
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<tr>
<td>Temp.</td>
<td>+2°C - +85°C (liquid)</td>
</tr>
<tr>
<td></td>
<td>+2°C - +165°C (steam)</td>
</tr>
<tr>
<td>Pressure</td>
<td>0 - 7 bar</td>
</tr>
<tr>
<td>Material</td>
<td>1.4301 / 1.4404 / 1.4435</td>
</tr>
<tr>
<td>PLC</td>
<td>SIMATIC S7</td>
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</table>

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**RDE:** Pure Steam Generation

## Technical Data

<table>
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<tr>
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<tbody>
<tr>
<td>Capacity</td>
<td>up to 15,000 kg/h</td>
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<tr>
<td>Steam</td>
<td>up to 165°C</td>
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<tr>
<td>Bacteria</td>
<td>&lt; 10 CFU/100 ml</td>
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<td>Endotoxin</td>
<td>&lt; 0.25 EU/ml</td>
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<tr>
<td>Material</td>
<td>1.4404 / 1.4435</td>
</tr>
<tr>
<td>PLC</td>
<td>SIMATIC S7</td>
</tr>
</tbody>
</table>

## Description

- Applicable for sterilization of equipment
- A tubular heat exchanger produces steam that enters a separation column above.
- Since any droplets remain in the lower segment of the column, the steam is absolutely pyrogen-free.
- When condensed, the steam becomes WFI water quality.
## Technical Data

<table>
<thead>
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<tbody>
<tr>
<td>Capacity</td>
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<tr>
<td>Alcohol</td>
<td>0.01 - 0.4 vol.% residual</td>
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<td>Alcohol</td>
<td>up to 90 vol.% rectified</td>
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<td>Temperature</td>
<td>+8°C - +95°C</td>
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<td>Pressure</td>
<td>0 - 8 bar</td>
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<td>steam</td>
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<td>glycol, ice water, ammonia</td>
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<td>PLC</td>
<td>SIMATIC S7</td>
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</table>

### Description

- After gentle pre-heating, the product runs top down an evaporation column.
- Exhaust vapor flowing in the opposite direction remove the alcohol; the resulting alcohol-free product is chilled.
- The vapor can be concentrated and condensed to deliver sellable alcohol.
- The aroma from the vapor can be recycled to the product.
## References

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Chemical</th>
<th>Pharmaceutical</th>
<th>Energy</th>
</tr>
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<tbody>
<tr>
<td>Coca Cola</td>
<td>AMD</td>
<td>Aventis</td>
<td>BS Energy</td>
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<td>Gerolsteiner</td>
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<td>DSM</td>
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<td>Bayer</td>
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<td>Evonik Degussa</td>
<td>Fresenius</td>
<td>EWE</td>
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<td>Hexion</td>
<td>Roche</td>
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<td>SAB Miller</td>
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