



Skid Mounted Liquids Processing Systems

Designed & Engineered
by Centec

Water Filtration & Purification
De-Aeration & De-Gasification
Carbonation & Gas Injection
Beverage Dealcoholisation
Continuous Fluid Blending
Flash Pasteurisation
CIP Systems
Instrumentation



centec are a market leading international German engineering group which designs and manufacturers specialist instrumentation and fluid process technology. The primary market sectors include Hygienic, Sterile and Hi-Clean applications within the Fermented Beverage, Soft Drinks, Pharmaceutical, Bio-Pharma, Personal Care and Food industries. Also Bio-Ethanol production, Blending of Chemicals, Micro-electronics production and Power Generation.

Water Treatment, Purification and De-aeration Gas Injection and Fluid Product Processing

○ Raw Water Treatment

Prefiltration, Water Softening and Ion Exchange.

○ Water Filtration & Purification

Micro, Ultra & Nano-filtration, Reverse Osmosis,
Electro-Deionisation, Pure Steam generation, API 'Water for Injection'

○ Water De-aeration & Liquid De-gasification

Water De-Aeration, De-Carbonation and De-Oxygenation of Liquids

○ De-Alcoholisation of Beverages

Alcohol removal and aroma capture

○ Gas Injection into Liquids

Vortex Venturi and Hollow-Fibre Membrane Technology.
Carbonation, Oxygenation, Nitrogenation, Wort Aeration,
Aeration of Waste Water, pH correction of Waste Water by CO₂ injection

○ Precision Liquid Proportioning & Blending

High Gravity Blending & Carbonation, Additions Dosing, Continuous Multi-Stream Mixing, Premix & Syrup Dilution, Yeast Pitching,

○ Flash Pasteurisation

Pasteurisation and heat treatment of liquids

○ In-Place Cleaning - CIP

Cleaning In Place, mobile, single duty and multi-channel

○ Automation & Sensors

Cleaning In Place, mobile, single duty and multi-channel

Raw Water Treatment

Equipment to Treat incoming Raw Water from Bore Holes, Reservoirs and Mains

Centec design and manufacture a variety of water pre-treatment systems for the initial demineralisation and improvement of incoming water. The regimes employed vary depending the water analysis, duty and final quality requirements.

DEIRONISER - Sand & Multi-Layer Iron & Manganese Filtration.

CarboFILTER - Activated Carbon Filtration

IONTEC - Ion Exchange Vessels and Columns 'Water Softeners'

InTRAP - Cartridge Filtration with Manual & PLC Automated back-flush

REVOTEC - Membrane Micro-Filtration Systems

Capacities: 1 - 500 m³/h depending on requirements and system design



Water Purification

High Grade Water for Critical Processes

Stringent water specifications are mandatory for regulatory compliance in the pharmaceutical industry, especially for APIs and WFI. Micro-electronics and semi-conductor production are just as demanding. Many modern water based, preservative free beverages & personal care products, as well as complex fluids, coatings & chemicals have increasingly high water requirements.

UltraV - Ultraviolet Disinfection

REVOTEC - Membrane Ultra & Nano-Filtration and Reverse Osmosis

HPW - High Purity Water Systems

EDI - Electro-Deionisation of Water to 0,06 $\mu\text{S}/\text{cm}$.

RDE - Pure Steam, WFI. Compliance to EU & US Pharmacopia

Centec are certified to EU Directive 93/42/EEC for the manufacture of Class IIb Medical Devices, '**Water Treatment Systems for Dialysis**'

NB: Centec pharmaceutical control systems comply with ISPE GAMP© 5



Water De-Aeration

De-gasification of Water & Clear Liquids

De-oxygenation of process water is essential for many products, especially fermented beverages and soft drinks, where oxidation and microbial risks are ever present. The removal of dissolved Oxygen and Carbon Dioxide also is required to minimise corrosion in boilers, turbines, etc. Centec achieve this without using chemical corrosion inhibitors. Deaerated water is needed for many other applications including producing deionised water, inks, coatings and silicon wafers, and for off-shore oil and gas extraction for example. The materials conform to US FDA, ideal for pharmaceutical water. Non-metallic membrane units and pipework is used for high chloride, salt water and corrosion risk duties.

VeGaS - Vacuum Deaeration Units: 5 to 150 m³/h, <10 ppb

DeGaS - Cold and Hot 'stripping' Column Deaerators: 5 to 150 m³/h, <5 ppb

DGS - Hollow-Fibre Membrane Deaerators (US FDA): 1 to 300 m³/h, <1 ppb



De-Alcoholisation

Extraction of Alcohol from Beer, Cider and Wine

Consumer demand for low alcohol beverages is increasing, while flavour and quality demands remain high. Older techniques for reduced alcohol production rarely fulfil customer expectations. Centec's dealcoholisation systems gently remove the alcohol from beer, cider and wine. Importantly, they can recover the volatile flavours and aromas which consumers expect from a high quality beverage. Centec's expertise in sensors, fluid blending and automation are used to produce the perfect product.

DEALCOTEC

Input Capacity: 200 litres/h up to 20m³/h (more on request)

Post-treatment alcohol content: down to 0.01% v/v

Operation: 24h/day, CIP every 1-2 weeks

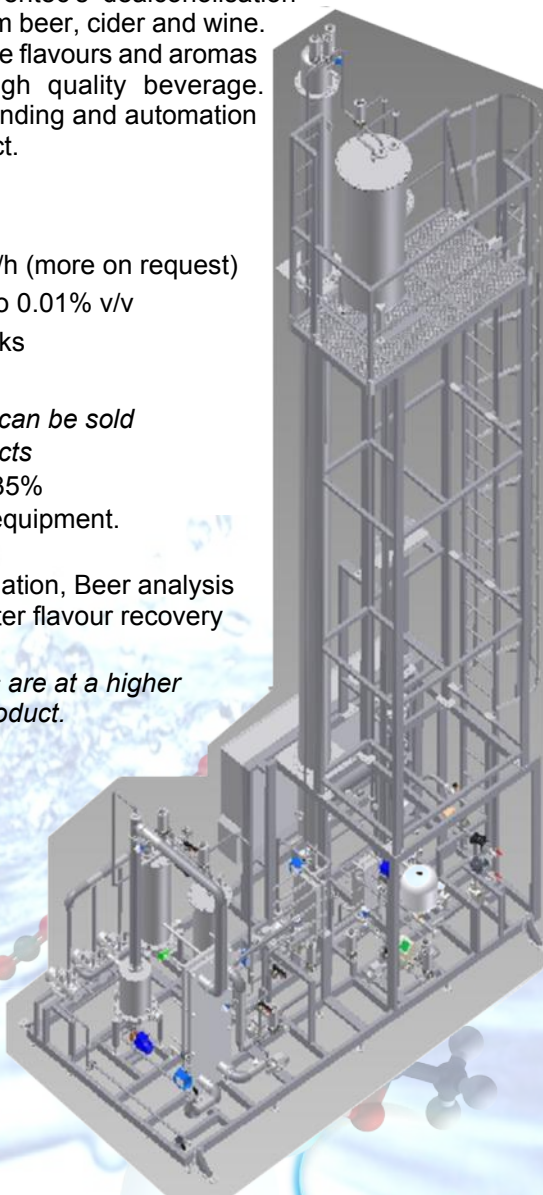
The alcohol recovered is food grade, it can be sold or used as an ingredient in other products

Recovered Alcohol Concentration: 30-35%

Concentrates to 75-90% with optional equipment.

Other options also include: CO₂ Carbonation, Beer analysis monitoring, Flash Pasteurisation, Greater flavour recovery

NB: After dealcoholisation the products are at a higher microbiological risk than the original product.



Gas Injection

Carbonation, Oxygenation & Nitrogenation

Centec carbonation systems enhance drinks worldwide, improving the flavour, mouth-feel and shelf life of soft drinks, beer, water and cider. Nitrogenation helps to stabilise the 'head' on non-carbonated beers. Oxygenation is essential for yeasts in breweries and in other biotech, biochemical and bio-pharmaceutical processes. Centec '**Vortex Ventri**' nozzles are designed specifically to inject gases into liquids. As part of automated systems, complete with precision Centec sensors, stable dissolved gas concentrations are achieved in a range of products. Hollow Fibre Membranes (US FDA) are used for specific applications, e.g. N₂

Vortex - Centec's special Venturi Gas Injection Nozzles

CDS - Carbon Dioxide Injection Systems for Water, Beverage and Liquids

NDS - Nitrogen Injection Systems for Water, Beverage and Liquids

OSS - Sterile air & O₂ injection for wort & fermentation broths (O₂ 0-30 ppm)

SBA - Waste Water Aeration to improve aerobic digestion

Capacity range: 1 - 150 m³/h

To reduce the pH of Alkaline Waste Water carbon dioxide can be injected - Reduced acid use & less CO₂ emissions



Proportioning & Blending

Continuous liquid monitoring, proportioning and mixing systems for accurate blending of fluids and premixes

More products, shorter runs, faster change-overs, reduced storage, cost pressure? 'A significant challenge for many processors'. 'Continuous' high precision production with minimal tank storage of finished products can be the solution. Centec have a range of automated solutions for a variety of applications..

HGB-CDS - A combined High Gravity Blender & Carbonator (1 - 150 m³/h)

ADoS - Minor Additions Premixing & Dosing System

MSB - Multi-Stream Liquids Blending System (1 - 150 m³/h)

PreMIX - Soft Drinks Syrup Blending, Deaerated Dilution & Carbonation

EMTEC - Oil & Water Phase monitoring and pre-emulsion blending

HDS - Yeast Dosing & Pitching

SDA - Soft Drinks Analysis Systems



Flash Pasteurisation

Heat Treatment for Consumer Safety & Optimum Quality

Heat treatment is an essential part of any process system which handles products that are susceptible to microbiological contamination. Pasteurisation is a fundamental and legal requirement for food and beverage processing. The control of temperature and time is critical. Centec FlashPASTO systems enable users to produce safe products, comply with regulations and due to the rapid & efficient cooling also maintain the correct flavour and product colour.

After FlashPASTO treatment (even when carbonated), products can be routed direct to fillers, avoiding large storage tanks (BBTs). Where bottles and cans are pre-sterilised tunnel pasteurisers can be avoided too; a great cost saving

FPS - FlashPASTO Pasteuriser & Cooler

Capacity: 1 to 80 m³/h (10 - 800 hl/h)

Products: Water, Beer, Cider, Soft Drinks, Juice, Milk...



A Centec FPS 800

"The largest beer flash pasteuriser operating in Germany"



Cleaning in Place

Automated CIP Systems for Product Safety and Efficient Processing

Cleanliness is essential for product safety, consumer health and production efficiency. With fermented products micro-biological security cannot be understated. For cleaning to be effective and at minimum cost, good hygienic design of components and systems is essential. Centec fully automated CIP plants precisely monitor, control and record temperatures, times, flow rates and velocities as well as the concentration of detergent, sanitizers, caustic & acids.

CIP - Cleaning in Place

Single tank Hot CIP Systems and Mobile Systems

Multi-Tank Hot CIP Systems

Multi-Tank Cold CIP Systems



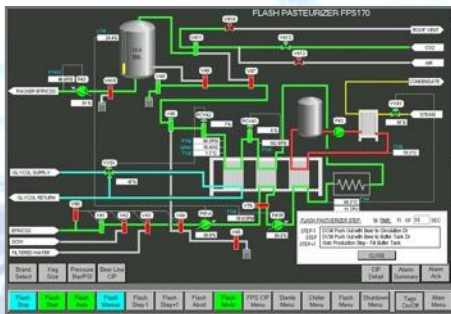
Automation & Sensors



Process Automation and Centec Sensor technology

The control of modern process systems can be highly complex. Centec are very well established manufacturers of sophisticated instruments and sensors for monitoring the physical characteristics of liquids, including oxygen and carbon dioxide content, density, concentration, alcohol content and others. This puts Centec in the almost unique position of having such in-depth knowledge and expertise. The engineering behind their control technology reflects these skills, while using standard components, software and design protocols. Centec normally use well known German and major European components which are generally most appropriate for the job. However specific customer preferences and site standards can normally be accommodated; *we know flexibility is key.*

GAMP© 5 compliant automation and control systems for pharmaceutical systems.



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Centec skid manufacturing facility in Czech Republic

Purpose built 2000 m² x 12 m high Production Shop with 20 Ton overhead crane. 2000 m² Skid Assembly Area and Engineering Office. 3D Design. Specialist automation and electrical division.

centec - 'An Experienced and Highly Capable Team'

Certified to: ISO 9001:2008
and 93/42/EEC

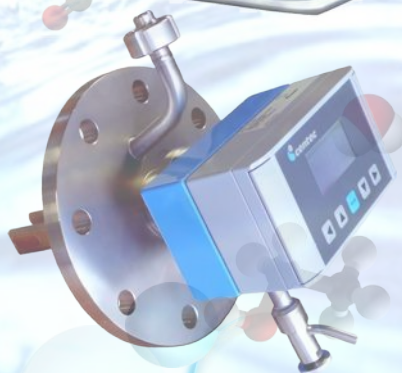
Fluid Process Technology and Precision Sensors



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