

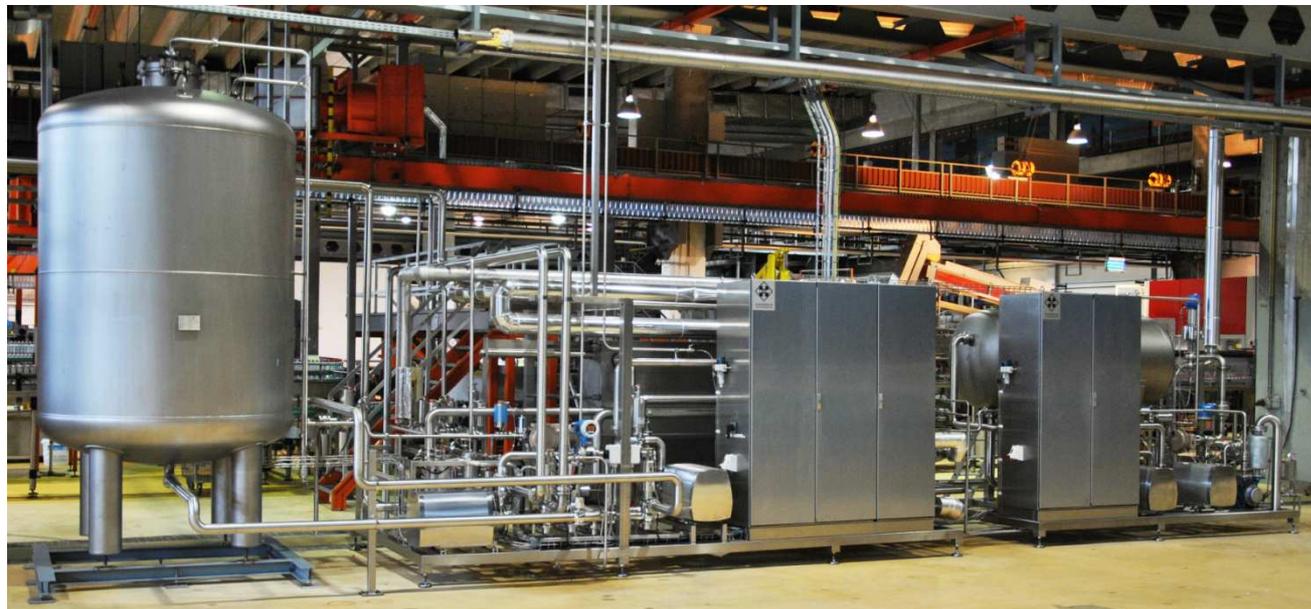
Finely effervescent taste and maximum hygiene in beverage production

Belgian iconic mineral water "SPA" produced with turnkey solution from CavitatorSystems

In English "SPA" represents a synonym for health and wellness. The "SPA" premium mineral water brand, named after the small Belgian Ardennes thermal bath spa, stands for the highest quality, pure water with a low mineral content. The Belgian family company, "Spadel", wanted to make its mineral waters and lemonades more finely effervescent for even greater mouth freshness, while simultaneously reducing CO₂ consumption and increasing the hygiene standard. In addition the company wanted to bring a further bottling line to the latest state of the art in terms of process technology. Finally, in future all beverages are to be bottled at normal temperature without the use of any preservatives, but however they should still meet the strict microbiological hygiene regulations.

Complex process technology

CavitatorSystems GmbH, Landshut, manufacturer of the patented "CAVSYS® Cavitator" for intensively mixing liquid and semi-liquid media together or with gases, has become nationally and internationally established as a supplier of complex process technology systems. For the manufacture and treatment of beverages function modules are produced for degassing, pasteurisation, syrup preparation/dosing or gas dosing as single units or combined, e.g. as mixers, in the performance range of 1,000 to 50,000 litres/h of beverage according to customer requirements. The cavitator is used for mixing, emulsifying, homogenising, dispersing, dissolving and saturating liquids amongst one another or with gases or for aerating liquids. By employing cavitators carbonic acid is dissolved in the beverage to almost 100 percent. Gushing is substantially reduced and the bottling rate increased. The intensive mixing leads to finely effervescent beverages and the quality is retained or even improved in terms of taste due to the fine effervescence; gushing during bottling and label problems due to wet bottles are avoided. The deposition of clouding material, such as fibres and pulp is largely prevented. Through the use of cavitators the cooling can be reduced or even completely dispensed with while retaining the same performance. Cavitation technology facilitates bottling a product with a higher temperature, leading to a drastic reduction in energy costs.



Rework tank - pasteurisation - degassing

Reliable process – Modern control

In the Spa Monopole factory the new CAVSYS® Cavitator C-65-15 with a modular design has been installed for beverage production on a PET line on which alternately up to 15,000 litres/h of mineral water and sweet beverages are bottled. The system consists of the three modules "Degassing", "Pasteurising" and "Carbonating + Mixing" and was put into operation in the filling area. In the planning phase the components for the measurement and control system, pumps and tanks were presented in 3D drawings. The pipework is 1.4404 stainless steel, double-seated valves provide reliable separation of various process paths during production and cleaning.

The main control cabinet with S7 PLC is integrated into the pasteurising module. The PLC programs are equipped with the latest CC-Edit (colour change editor), which enables easy modification - without a programmer - of valve switching and the process sequence. The PLC controller has a VPN access and data transfer to the customer's IT system. Operation is through an external panel PC

with touch screen installed at the bottling input and comfortably accessible for the operator. Here, all production and cleaning programs, momentary measurements, flow diagrams and the operational history can be operated and read off.

Exact degassing and carbonation

During the production of mineral water it is first degassed (residual oxygen < 0.5 mg/litre) and then carbonated (4 to 9.0 g/litre of CO₂), Ready-mixed lemonades are passed through the CAVSYS® pasteuriser directly and then carbonated to the required CO₂ value. The cavitator ensures intensive mixing and the desired finely effervescent carbonic acid structure which has a much fresher effect in the mouth. The objective of bottling lemonade at temperatures from 15 to 18°C without any preservative is completely fulfilled.



No overpasteurisation – energy efficiency > 95%

For the Spa Monopole mineral water production Cavitator Systems has fitted the pasteuriser module with an additional "Rework tank" (5,000 litres). This tank has a hot retention section for approx. 300 litres; the pasteurising temperature between 65 and 90°C and the through-flow time can be freely selected/programmed. The product recooling is operated via plate-type heat exchangers in the energy-efficient heat recovery method (energy efficiency > 95%). Alternatively, an iced water circuit can be used. The product flow is controlled in relation to the filling level of the rework tank; overpasteurisation does not occur. The process water inlet valve is opened to push the product from the pasteuriser into the rework tank in dependence of the free volume in the rework tank and the bottler idle time. The required amount of water for this is determined by a flow meter in the pasteuriser feed. The temperature in the pasteuriser remains at the product-specific temperature to ensure an immediate restart. Here product is used to push the water through an outlet valve.

The fully automatic cleaning of the new system is integrated into the CIP process (hot water 90°C, 1.5% sodium hydroxide solution at 65°C, P3-Oxonia 0.2% at 20-35°C). The gas paths including CO₂ filtration are cleaned in the SIP process (steam 150°C/5 bar).

Requirements perfectly fulfilled

The high demands of SPA Monopole on the new beverage production system were completely fulfilled. Microbiological inspections by the SPA Monopole quality management and the external Institute Henri Jean confirmed the high hygiene standard. Documentation and training for the qualified personnel in the national language (French) and the scheduled acceptance stages were implemented consistently by CavitatorSystems. In full load operation all stated guarantees were confirmed: Deadline conformance, no bacteriological contamination between pasteuriser and bottler input, no dead spots, no take-up of oxygen, CO₂ consumption is reduced and repetition of carbonation with an accuracy of +/- 0.08 g/litre. The beverages are produced without preservatives, are significantly more finely effervescent and give a fantastic mouth freshness sensation.



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