



Linde's SOLVOCARB product line has been developed as a reliable and safe solution to meet neutralisation and remineralisation needs across a broad application spectrum from wastewater to drinking water.

Discover our full portfolio at our website.

Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages, and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation, and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – Making our world more productive.

www.linde-gas.dk, www.linde-gas.ee, www.linde-gas.fi, www.linde-gas.is, www.linde-gas.lt,
www.linde-gas.lv, www.linde-gas.no, www.linde-gas.se

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→ Success story



Making our world more productive

SOLVOCARB®

Supporting growing businesses with accurate and reliable pH control solutions.



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Customer.

Alter Farmacia is a Spanish pharmaceutical company established in 1939 with several factories around the country. In addition to traditional pharmaceutical products, it also

Supporting a growing business in the pharma and food industry.

Challenge.

The industrial machinery used to produce powder milk and baby formula needs to be regularly subjected to cleaning in place (CIP) procedures. The resulting wastewater is characterised by high pH values, which needs to be brought down to acceptable levels in the homogenization tank of the wastewater treatment (WWT) plant. The water can then be fed to the biological process for further treatment.

In the past, Alter used a sulfuric acid (40% w/w) dosing system to do this. However, this system sometimes overshoot the final effluent pH setpoint, reducing the pH to around 4.6. Given that the consent limit set by the municipal WWT plant was between 8.5 and 6.5, the occasional instance of non-compliance was creating difficulties with local authorities, and the company sometimes incurred financial penalties. This is a familiar issue for operators using mineral acids as the turbulence in their effluent system is often insufficient to completely mix and disperse the higher density acid solution. In addition, the use of mineral acids was causing significant corrosion issues at the dosing point and raising safety concerns relating to handling.

produces powdered milk and infant food products under the Nutriben brand. At its facilities in Mecó (Madrid), approx. 300 m³/day of alkali wastewater needs to be regulated for pH control.

Solution.

Linde's global and local water treatment experts teamed up with Alter's technical team, working closely with them to design a new pH control system capable of addressing the customer's pH control, corrosion, safety and capacity challenges.

This joint team came to the conclusion that the best way to meet these challenges was to replace the mineral acids in use with carbon dioxide (CO₂) as the neutralisation agent.

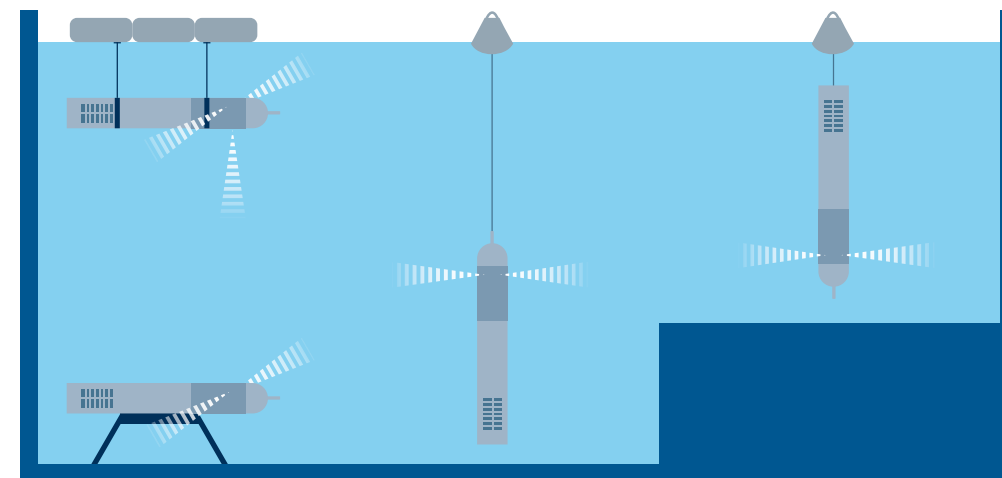
After testing with the SOLVOCARB® family of solutions for dissolving carbon dioxide, Linde demonstrated that the wastewater could be successfully neutralised to the desired pH level and accurately controlled with no risk of falling below pH 6.5 – even in the event of significant overdosing. This is due to the self-buffering properties of carbon dioxide species in water. In addition, safety was no longer a major concern as, compared with mineral acids, CO₂ is less corrosive to infrastructure and presents no handling issues.

Alter thus decided to install Linde's SOLVOCARB hose solution with a semi-manual dosing system and used it with great success over the following four-year period.

Expanding WWT plant capacity with SOLVOCARB.

As part of a recent expansion project, Alter ran into a new challenge, namely insufficient WWT plant capacity. An expanding business meant that Alter needed to handle a higher volume of wastewater, but the treatment plant in place was struggling to accommodate the increased flow rate due to retention time limitations. Alter was thus looking to expand its existing WWT facility and optimise the design to enable more accurate pH control and extended retention time, while also boosting capacity to support their growing operations. Alter wanted, in particular, to automate and accelerate the neutralisation process by distributing the CO₂ more homogeneously. Once again, Linde was the partner of choice.

SOLVOCARB Mobile, Linde's submerged venturi jet mixer dissolver for CO₂, emerged as the best fit to replace the existing system and distribute the CO₂ more homogeneously. The patented venturi nozzle design ensures excellent bubble distribution and thus reduces the neutralisation time.



Flexible installation. Submerged venturi mixer for better mixing power and homogeneous carbon dioxide dissolution.

Due to its capacity to handle a wide variation in pH values and flow rates, SOLVOCARB Mobile was a key element in the new plant design, developed by Linde and validated by Alter experts.

The new plant design entailed installing a SOLVOCARB Mobile unit, complete with gas dosing equipment and a programme logic control (PLC) system. The whole system is automatically controlled through the pH signal from the outlet of the plant.

SOLVOCARB Mobile technology highlights.

Linde's SOLVOCARB product line was developed specifically to provide a reliable and safe solution to meet neutralisation and remineralisation needs across a broad application spectrum from wastewater to drinking water.

SOLVOCARB Mobile highlights include ease of operation and flexible installation. Its lightweight design eliminates the need for cranes. In addition, four different installation options give

SOLVOCARB. Efficient and safe neutralisation.

“Since we moved to SOLVOCARB®, we’ve reduced our tariffs and widened our pH handling envelope. The replacement of mineral acids with environmentally friendly carbon dioxide as the neutralisation agent has improved safety and helps prevent corrosion in our infrastructure. We now have much greater control over the pH value of the water we treat in our wastewater treatment plant. Furthermore, we have also installed two Linde SOLVOX® units for oxygenation in our new biological reactor at the water treatment plant, which increased our plant capacity.”

Mrs. Inés García, Quality and Environment at Alter

customers the flexibility they need to support all configurations – from shallow basins and ponds to tanks with challenging shapes. Furthermore, it can be installed without halting operations.

The system comprises a pump and a low pressure drop gas-liquid venturi contactor that provides excellent bubble distribution for effective gas dissolution. The venturi and nozzle were specifically engineered to maximise efficiency while minimising energy consumption. It is made from stainless steel and a chemically inert thermoplastic material offering good resistance to solvents, alkali solutions and permeate waters.

Benefits at a glance.

- Accurate pH control
- Even bubble distribution for the avoidance of localised pH variations
- Non-corrosive, with positive impact on safety and infrastructure
- Minimal maintenance required
- Flexible installation
- Portable, lightweight CO₂ diffuser
- Energy efficiency
- Good chemical resistance to solvents, alkali solutions and demineralised water
- Can be retrofitted to existing plants for capacity increases