



Weak acid, strong effect

Carbon dioxide neutralises alkaline wastewater in an environmentally friendly and cost-effective way.





The neutralisation of alkaline wastewater, as at this biological treatment plant, is a necessary process in many industries.



Neutralisation with liquid carbon dioxide requires minimal space.

Wastewater neutralisation – relevant to many industries

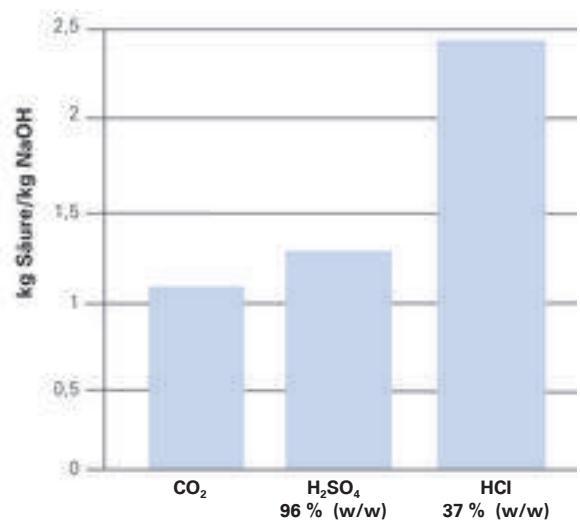
Alkaline wastewater is generated in a wide range of industrial plants. As a rule, it is produced by purification operations or through the use of alkalis in production. Even process-related contact with raw materials or residues can significantly increase the pH value of the wastewater.

In order to protect sewer systems and sewage treatment plants against damage and failure due to alkaline wastewater, European Union legislation stipulates that relevant quantities have to be neutralised prior to discharge. Here carbon dioxide and know-how from Messer ensure optimum results.

Carbon dioxide – first choice for neutralisation

Traditionally, mineral acids such as hydrochloric acid and sulphuric acid have been used as neutralising agents. But the requirement for environmentally compatible, safe and cost-effective methods means that neutralisation with carbon dioxide (CO₂) is becoming increasingly important.

An important advantage of carbon dioxide over mineral acids is its characteristic flat neutralisation curve. Dissolved in water, carbon dioxide



Carbon dioxide consumption compared with mineral acid

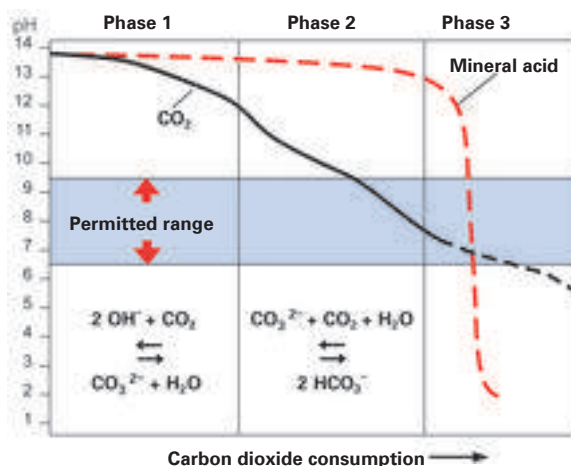
acts as a bivalent, weak acid. This means that its effect is dependent on the pH value. There is therefore no possibility of over-acidification, which is frequently the case when mineral acids are used. And there is also no need for an elaborate control system.

Since carbon dioxide is an inert gas, corrosion of surrounding hardware, associated with hydrochloric and sulphuric acid, does not occur.

Another advantage is that there is no need for investments for acid storage or for safety hardware typical with mineral acids.

Neutralisation with carbon dioxide does not increase the salt load of the waste water with chloride, sulphate, phosphate or nitrate. As well as being advantageous in environmental terms, this can also have a positive impact on discharge permits or load-based wastewater discharge fees.

Carbon dioxide is also superior to mineral acids when comparing the consumption figures.



Schematic representation of the neutralisation curves of sodium hydroxide solution when using carbon dioxide and mineral acid

Easy adjustment
of the pH



Wastewater neutralisation with carbon dioxide is also advantageous for smaller factories like this dairy.

Many industry sectors therefore use carbon dioxide not only to neutralise wastewater, but also to adjust the pH of process water. A solution that is of interest to, for example, pulp and paper manufacturers, steelworks, swimming pools and laundries.

Practical implementation with Messer

The first step in wastewater neutralisation with carbon dioxide is to select a suitable location. On many customers' premises, existing plant components can be used, such as a wastewater pipeline, a small basin or a pump sump.

For each project, the wastewater properties as well as the on-site conditions are checked in order to be able to propose the optimal technology in each case. Messer supplies the appropriate hardware for metering and injection, chosen from a large portfolio of technologies. Generally, the plant components are very compact. For example, larger quantities are dosed in liquid form, which is particularly economical in terms of energy use.

Naturally, Messer also ensures that your carbon dioxide requirements are fully met.

Carbon dioxide plus know-how

Messer's qualified scientists, engineers and technicians have accumulated a wealth of experience in the neutralisation of many different types of wastewater. Their know-how ensures that the carbon dioxide is used to best effect.

We offer a tailor-made package – consisting of engineering, hardware and supply – that meets every requirement. A large number of reference plants, with capacities ranging from just a few grams to 2000 kg of carbon dioxide per hour, are already using know-how and gases from Messer.

Your advantages at a glance:

- Over-acidification practically impossible
- No handling of hazardous, aggressive acids
- No corrosion problems
- No increase in the salt load of wastewater
- No investment costs for acid storage
- Low operating costs
- Minimal space and staff requirements

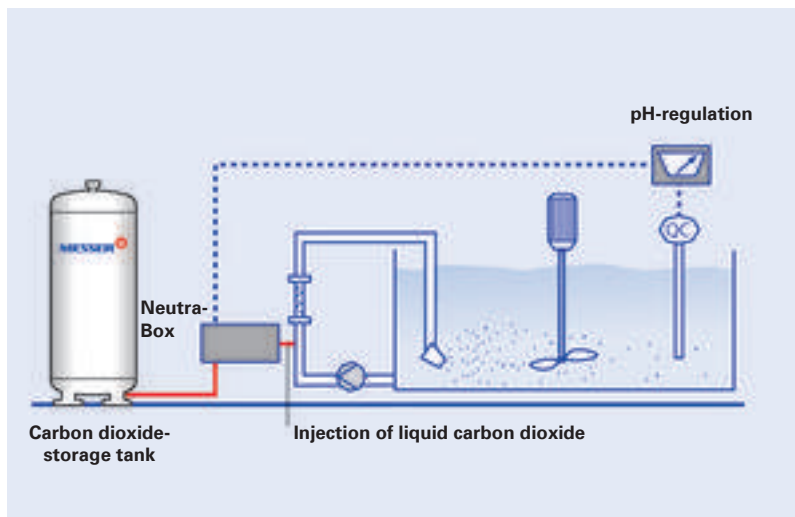


Diagram of the neutralisation process





Finding the best solution together

You too can benefit from our experience in the neutralisation of alkaline wastewater. Our applications engineers will provide you with advice tailored to your specific requirements:

- Foodstuffs industry
- Beverage industry and dairies
- Chemical and pharmaceutical industry
- Construction industry
- Natural stone and concrete processing
- Steel production to metal chemistry
- Power plants
- Drinking water production
- Waste management and recycling
- Glass production
- Pulp and paper industry
- Textile and leather industry
- Laundries
- and many more

If you have any questions, please do not hesitate to contact us.

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