Kanadevia INOVA

Iron Hydroxide

Removing Unwanted Sulphur

Optimum biogas yield with high methane content by binding hydrogen sulphide

Disruption to formation of methane
Biogas is produced from the anaerobic conversion of biomass. Besides methane and carbon dioxide, the gas often contains hydrogen sulphide. Too much hydrogen sulphide interferes with the plant's microbiological process: it inhibits the formation of methane, and can also lead to corrosion. Unlike biological desulphurisation with atmospheric oxygen, adding iron oxides doesn't interfere with the biogas formation process and results in higher-quality gas with greater methane content.

Tried-and-tested solution
We recommend using a proven product containing iron: iron hydroxide, a reactant based on iron(III) oxide hydrate. Using iron hydroxide allows the hydrogen sulphide produced in the digester to precipitate and bind directly to the fermentation substrate. Kanadevia Inova only uses the best-quality iron hydroxide, because this is key to successful desulphurisation. Talk to us. We'll be glad to advise.

Solution with benefits
Iron hydroxide acts like a detox cure on the biogas process, ensuring that sulphides are bound directly to the fermentation medium, preventing the formation of H_2S and avoiding H_2S inhibition of methanogenesis. It also helps avoid corrosion of concrete and plant components. An additional advantage is that it improves the availability of trace elements, and sulphur remains in the digestate as fertiliser.

The chemical reactions involved

Reduction of iron(III) oxide:
$$2\ Fe(OH)_3 + H_2S \rightarrow 2\ Fe(OH)_2 + S + 2\ H_2O$$

Precipitation of sulphide:
$$Fe(OH)_2 + H_2S \rightarrow FeS\downarrow + 2\ H_2O$$

Easy to use
Iron hydroxide is easy to handle: it can be added as the fermentation substrate is fed in, for example via a slurry store or the solid feed system. It's also straightforward to dose.

Because it's not a hazardous material, it's not subject to specific for regulations storing and handling. It's categorised as not hazardous to water, and classified as non-hazardous due to its chemical properties.

Benefits speak for themselves
Iron hydroxide is a highly effective reactant in powder form for binding hydrogen sulphide in the digester. It can be used as a desulphurisation agent on its own.

Unlike alternatives involving dosing atmospheric oxygen, which are only moderately effective in counteracting the formation of hydrogen sulphide and tend to dilute the biogas, using iron hydroxide enables optimum biogas yield and a high methane content. The calcium compounds contained in the powder increase the buffering capacity of the fermentation substrate and effectively protect it from acidification. The fermentation substrate is not salinated and there are no adverse effects in terms of how the digestate is utilised or disposed of. Since iron hydroxide is not corrosive, it doesn't cause any additional damage to the components of your biogas plant.

Guarantee values for iron hydroxide

The figures are for dry matter	
Iron (Fe)	approx. 50%
Moisture	5% –< 15%
Lead (Pb)	< 0.01500%
Nickel (Ni)	< 0.01200%
Chromium (Cr)	< 0.00020%
Cadmium (Cd)	< 0.00015%
Arsenic (As)	< 0.00800%
Mercury (Hg)	< 0.00010%
Thallium (Tl)	< 0.00010%
Perfluoroalkyl surfactants	< 0.00001%
Bulk density	approx. 0.680–1.600 g/cm³
Grain size distribution	min. 90.0% < 0.50 mm

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