

The clever way to reduce sludge

Sludge is a cost factor. Companies can influence the quantity of sludge they ultimately need to dispose of, but they do not always know how. Some measures can even produce additional sludge.

With wastewater comes sludge. “This is unavoidable,” says Jörg Gierschewski. Anyone who treats wastewater ends up with a portion of dirt – solid substances that need to be disposed of.

Gierschewski offers some food for thought: “The amount of sludge is increasingly becoming an economic factor that many companies underestimate.” It is the upstream process that determines the quantity of sludge that is ultimately created. “In some cases, sludge is only created because of how the wastewater is treated. Companies can have a big influence on this.”

Gierschewski is Head of the Water Treatment Products department at EnviroChemie. The chemical engineer knows the area inside out, having dealt with specific processes in water treatment for more than a decade. For instance, he has found many companies still using very traditional methods with ferric chloride and lime water or sodium hydroxide for their wastewater treatment. “This was the standard 20 years ago,” says Gierschewski. “It does work – but it generates additional sludge.” In simple terms, one effect of using iron chloride is a reduction in the pH value of the water, which then has to be raised again using additional agents. “If I use an alkaline coagulant from the beginning, I benefit from several positive effects at once,” comments Gierschewski. “I need fewer water chemicals, which reduces the amount of sludge created – so I save on two fronts.”



Image: Experienced water experts determine the right parameters for economical wastewater and sludge treatment.

Reducing the quantity of sludge

Coagulation and emulsion splitting are especially crucial for companies with oily or greasy wastewater. This is because greases and oils disrupt the biological wastewater treatment processes and therefore have to be removed beforehand. “The finer the particles are, the longer it takes until they settle in the cleaning process,” explains Gierschewski. The particles bounce off one another when they come into contact, and as a result they stay in motion. A useful way to counteract this effect is to slow down the molecules by neutralising their electrical charges. This can be done by adding iron or aluminium, for example. Here it is crucial to find a product that not only serves its

purpose, but also does not increase the amount of sludge. To this end, EnviroChemie has developed special products that deliver a maximum cleaning effect even when just small quantities are used.

“A lot of knowledge and EnviroChemie’s many years of experience have gone into all of these steps,” underlines Gierschewski. The company has tested around 200 different water chemicals for a wide range of industrial applications. Depending on the respective requirement, these can be used at the point at which they unleash their full effect. This is not just about whether more sludge is produced when certain agents are used – the final water content of this sludge is just as relevant. “If I use agents that make the sludge watery and sticky at the beginning of the process, I won’t be able to get it dry again at the end,” remarks Gierschewski. A greater volume results in extra costs, as disposal is paid for by the tonne.

Correct dewatering, ideal flocculation

The solutions to this problem are the right dewatering and the best possible flocculation.

“Flocculants turn small dirt particles into large molecules; the many particles in the water can then join this molecule,” says Gierschewski. The more stable the resulting large floc is, the more easily it can be dewatered later on. “A lot of expertise is required here, too,” adds the water chemistry expert. “You need to find the right mixing ratio of the flocculant, the best sludge mix and the ejected sludge. Using the right flocculant can save a considerable amount of money.”



Image: The water separated during sludge treatment can be reused as feed water for cooling towers, for example.

Getting the sludge as dry as possible is not the only benefit – in many cases, the water gained can be put to use by feeding it back into processes, for example as feed water for cooling towers. The topic of reusing and recycling resources is growing in importance, and not only in relation to water. It is now possible to precipitate certain substances from the wastewater in a targeted way so that they can be returned to circulation. “The classic example is phosphorus,” says Gierschewski. Whereas, in the past, sludges containing phosphorus were burned or sent to landfill, today there are regulations stipulating that the raw material is recovered. “This has become an interesting hot topic for the fertiliser industry in particular.” Other materials are also candidates for recycling, however.

Optimum nutrient ratio

The use of the right water chemicals also determines how much sludge is generated during biological treatment: “After all, biological treatment only works when the right nutrients are in the water,” explains Gierschewski. The substances that are in or have been added to the wastewater also determine how efficiently the bacteria work. “The better the conditions, the better they work and the less inert biomass they create,” explains Gierschewski. “Therefore, the ideal nutrient ratio also ensures that there is less excess sludge.” This can be adjusted with nutrients specially matched to the respective plant. Accordingly, the excess sludge can be dewatered highly effectively using flocculation aids designed specifically for the dewatering unit. This also lowers disposal costs.

Sludge is created at many points of the wastewater treatment process and in many different ways. Every company has its own individual and highly sophisticated system that generates sludge. Those that possess the necessary technical and chemical knowledge in this area can run their plant technology economically.

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