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Combining pumps and sewage grinders to solve rising wastewater challenges



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Wastewater collection networks suffer greatly when blockages occur. However, you don't have to fall victim to frequent clogging or shutdowns. Discover how you can keep things moving with a combination of high-efficiency pumps and sewage grinders.

The composition of wastewater has changed dramatically in recent years. An increasing number of items, such as personal care wipes, is going into the waste stream. At the same time, there is a clear focus in all countries to reduce water consumption. Less water and more solids and fibrous materials places tough demands on collection networks. In many cases, wastewater pumping stations that worked well just a few years ago are now struggling.

Not only do they have to face the increased risk of blockage, moving towards a sustainable environment also requires reduced energy consumption and high efficiency for all machines and processes. While settling for low-efficiency options such as vortex impellers may offer some relief to increasing blockage, it also carries a heavy burden in terms of high long-term energy costs and environmental impact.



Picture 1. Some of the factors that affect today's and tomorrow's wastewater collection and treatment.

Blockage means costly consequences

Many wastewater collection networks have major problems with the reliability of their equipment. The main cause remains system blockage, which accounts for the majority of equipment failures, operational interruptions and costly technician interventions. The consequences of these failures have aggravated, with high financial penalties for pollution events and serious damage to the company's reputation.

Overflow from the collection system may result in contamination of garden or road areas, which will require cleaning and disinfection following the event. It can also result in pollution of natural watercourses if an adequate pathway for sewage ingress into a watercourse exists. In the more extreme cases, sewer blockages can cause internal flooding of property. Aside from the distress and inconvenience caused to the householder, this can also pose significant health risks through contamination by disease spreading pathogens.

Why do pumps still block?

There are many reasons why pumps block. Firstly, the composition wastewater differs from country to country, and city to city. The composition also changes over time, which means pumping wastewater cannot be compared to pumping other process liquids that are consistent in their properties. Pump stations that need to deal with a combination of wastewater and storm water can face large flow variations.

Secondly, a lot of pumps used in wastewater applications include impeller designs that have not been optimized for handling wastewater with high concentrations of rag. This means you have to compromise on free solids passage to achieve short-term efficiency gains or use standard designs more suited to pumping liquids without high levels of solid content.

Thirdly, the pumping station itself may not be optimally designed to assist in the efficient presentation of the rag to the pump. This makes the already difficult task of handling high rag content all but impossible.

Pumping stations with low hydraulic load, incorrect benching design, incorrect sizing and inlet positions all make for an environment which significantly increases the risk of blockage, regardless of the pump installed.

Finally, in more developed markets, the existing infrastructure was often designed 50 years ago but is still expected to operate, despite completely different conditions. Municipalities often struggle to allocate funding for upgrades, which can be quite extensive once a company reevaluates their operation concept, piping system, pumps, and other system requirements.

Choose the right equipment for the job

It is clear that some pumping equipment using optimized hydraulic designs is better at handling solids-laden wastewater streams. As an example, Sulzer's submersible sewage pumps type ABS XFP with a Premium Efficiency motor and the unique Contrablock Plus impellers offer some of the market's highest hydraulic efficiencies and feature superior rag handling capacity. Through computational fluid dynamics (CFD) modeling and extensive real-world blockage testing, these impellers are optimized for the best efficiency and reliability.

However, when it comes to critical pumping stations, you may require more than just the best pump and impeller. In many cases the consequence of failure is so high that the right business decision is to use both a grinder and the best rag-handling pumps. The same goes for pumping stations with improper design or ones that are already facing the problem of excessive rag content.



How do I know if I need a grinder?

For critical pump stations that require maximum functionality, or as an extra protection against clogging, a grinder can be installed before the pump.

When deciding whether your pumping station needs a grinder or not, we recommend assessing your business risk (see table below).

		Consequence of failure		
		Low	Average	High
Risk of failure	Low	1	2	3
	Average	2	3	4
	High	1	4	4
Consequence		High	Risk	High
Pumping station score		4		

Table 1. Assessing the business risk for your wastewater pumping station.

First, you need to determine the risk of failure. It depends on the design of the pumping station, the hydraulic load, the impeller type, and the expected rag content. Then, you have to look at the consequences of failure focusing on an acute overflow. Will it flood local residences (private or commercial), pollute a river or water table, or cause major access problems (for example by blocking a road)?

When working with construction of new pumping stations, you also need to consider future challenges and the risks they will bring.

When you choose to work together with Sulzer, we can use the assessment model shown above to help you choose the right combination of grinders and the best-in-market wastewater pumping equipment to reduce the likelihood of any system failure.

Take advantage of our expertise

At Sulzer, we continuously strive to design, develop and manufacture the most innovative, reliable and resource-conserving solutions on the market. The result is future-proof solutions that reduce your operating costs. Our equipment is supported by a comprehensive range of services that help you achieve true lifecycle economy, both in individual equipment and in the wastewater collection and treatment network as a whole.

Talk to us today to find out how we can help you solve your wastewater challenges, today and tomorrow.

Sulzer now also offers a comprehensive range of powerful sewage grinders. Together with our innovative pump technology, they form a complete solution for handling today's and tomorrow's tough wastewater challenges – ensuring trouble-free operation and maximum uptime.

Our dual-shafted sewage grinders use low speed and extremely high torque to cut through tough solids. They also feature the unique Wipes Ready™ suite of technologies, designed to capture all wipes in the waste stream and shred them into small pieces that will not reweave into a ragball in sewage systems.

Muffin Monster™ is a world-known brand for grinders, now part of the Sulzer family of innovative wastewater products.

