

Common residential wastewater myths demystified

Not everything that can go down the drain, should

Presented by: Xylem Applied Water Systems



The design and operation of residential wastewater systems can be a complicated and confusing subject for many, so it's no surprise that more than a few myths exist. By addressing and debunking some of the most common misconceptions, professional contractors can better assist homeowners with the installation and maintenance of these essential water systems.

Myth 1: Bigger is better (when it comes to pump size)

In most cases, bigger is not better when it comes to residential wastewater pumps. Whether a residential system requires an impeller or grinder pump, the pump should be sized for the application.

Although oversizing pumps is a common industry practice, it's also an expensive and inefficient one. For example, oversizing the flow by 5 percent increases the pump's energy demand by more than 15 percent, and an increased flow of 10 percent raises the energy consumption by 30 percent. An oversized pump will also short-cycle, turning on and off in rapid succession, which leads to premature pump failure.

A pump is considered oversized when it does not operate within 20 percent of its best efficiency point (BEP) on the pump curve. When a pump operates outside of this efficiency range, it increases the likelihood of cavitation – a noisy and damaging condition caused by vapor bubbles forming and collapsing at the pump impeller. Long-term mechanical damage to the pump can result when any of the following occur:

- Increased vibration and noise
- Suction recirculation
- Reduced bearing life
- Reduced shaft seal life
- Shaft fatigue

Proper pump selection is a critical element in minimizing life-cycle costs and reducing energy consumption. By matching the equipment more precisely to actual system demands, pumps will use less power and require less maintenance, reducing costs and extending equipment life.

Myth 2: It's wise to select a sump pump based solely on horsepower (HP) rating

Motor design is key to the performance and service life of a pump. But determining the size of the motor required to drive the pump is something people often struggle with.

For instance, the average homeowner may be aware that a 1/2 horsepower wastewater pump is a common pump size for a standard home because it can easily handle most applications. But what that homeowner may not realize is that all 1/2 HP pumps are not the same, and their output can vary from manufacturer to manufacturer.

The first step toward proper pump selection is to ensure that the required system flow and head fall on or marginally below the pump performance curve. Once the head capacity is established, the pump curve can be used to determine the horsepower – the amount of energy that must be supplied to operate the pump – required to meet the head and capacity requirements for the application.

It's important to consider whether the pump will ever be required to operate at a flow rate higher than the design point. If, for example, the pump will operate at the end of the head capacity curve, the actual horsepower requirement may exceed the design point selected motor horsepower and overload the motor. For this reason, it's critical to size the motor not for the design point, but for the end of the curve or maximum horsepower requirements.

The type of impeller – the moving element inside the pump volute, which drives the liquid – must also be taken into consideration as impeller size can greatly impact pump performance. For example, a vortex impeller might be preferred in a given situation because of its solid-handling capabilities, but the system might also require a higher HP rated pump. A pump performance curve shows the performance of a given pump with multiple size impellers. It is important for dealers and contractors to refer to the pump performance curve to identify the best, most efficient pump and impeller to select and install.

Goulds Water Technology (GWT), a Xylem brand, offers comprehensive in-person and virtual trainings on wastewater pumps and their applications through the GWT Factory School in Seneca Falls, New York, and its online e-Learning education platform. During the training seminars, water professionals learn how to select a wastewater pump, taking into consideration flow, system capacity, total dynamic head and other

crucial calculations. They will also learn the advantages, disadvantages, features and applications of wastewater pumps and accessories.

Myth 3: All kitchen waste can go down the garbage disposal



Although people like to think there's nothing garbage disposals can't handle, that's not the case. In fact, many common foods – and even some liquids – can clog garbage disposals and plumbing systems whether the blades can chew them up or not.

Buildups of fats, oils and grease present a significant challenge to residential and municipal wastewater pumping stations. Accumulations of these substances can clog the impeller, reducing pump efficiency or causing pump blockage. This can result in interruptions to operations and the need for costly maintenance. Obstruction by grease in particular is one of the most prevalent causes of force main backups and sewage overflows, costing the wastewater industry billions of dollars annually.

Seemingly harmless foods, like vegetables and pasta, can cause serious pump clogs, costing homeowners hundreds of dollars in repair. Below is a list of food that homeowners should not send down the garbage disposal.

- Pasta and rice: These grains can bloat in the pipes and create significant clogs.
- Stringy vegetables: Celery, rhubarb, asparagus, artichokes, chard, kale and lettuce are too stringy or fibrous to go down the disposal; they can easily wrap around the blade, clogging the drain.
- Eggshells: The thin membrane on the inside of the shell can wrap itself around the blade of the disposal.

- Coffee grounds: Though they appear to go down the drain just fine, coffee grounds can get stuck in garbage disposal traps. Over time, this can cause a system to clog.

Myth 4: Flushable wipes can easily travel through a sewage system



Flushable wipes might be a convenience, but that ease of use can come at a high cost as demonstrated in news reports about the detrimental effects these wipes can have on plumbing systems. It's important to understand how these flushable wipes can cause system destruction and what pumps should be installed to better handle them.

The term "flushable" itself is somewhat misleading. Many consumers believe that when a wipe is labeled flushable, it is safe to flush it down the toilet. But, unlike toilet paper, wipes don't disintegrate easily or quickly and can clog sewage treatment equipment and home septic systems. Clogging can occur when a number of wipes get stuck in the pump, or if debris builds up on the flushable wet wipes that are already stuck in the system.

Because of these potential harmful effects, flushable wipes need to be removed and dumped, often at the municipal level. They are removed using a large filter screen that is lifted by a hoist, or in a settling area that separates and removes the wipes by a front-end loader, since wipes don't break down within the time frames for which sewage treatment plants are designed.

Myth 5: A grinder pump can handle anything

Installing a grinder pump is a common practice to alleviate pump clogs and sewer obstructions caused by wipes and other hygiene products that get flushed down the toilet.

Unlike a regular pump, which pumps out what flows in, a grinder pump is outfitted with steel blades that shred and macerate solids found in sewage into tiny bits. The liquid slurry is then pumped out to the central sewage system or septic tank.

While grinder pumps are a good choice if solids like flushable wipes are present in the wastewater stream, they are not a panacea. When materials like flushable wipes cause clogs, the only way to fix the plumbing issue is to remove them from the system. Grinders are effective in this situation only for clog prevention, not removal.

About the author: Bo Gell, Americas product manager, wastewater, has worked in Xylem's Applied Water Systems business unit for six years. Gell has extensive experience in residential, commercial and marine pumps.