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The Cutting Edge of Brewery Wastewater Management Solutions Starts Here.

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Spend Less on Spent Grains with Proper Waste Management

When designing a brewery, waste management is often an afterthought. Selecting the proper equipment, from cooling systems to fermentation vessels, is no easy task. Inventory logistics, labor concerns, and market research all need attention. Just like you don't want outdated fermentation and plumbing apparatus, you also don't want an obsolete or nonexistent waste management system. This is why taking time to consider waste management is a crucial step in managing wort and producing beer. With a properly designed waste management system in place, you can avoid costly production delays, potential fines from local, state or federal environmental agencies, and what may be every brewer's worst nightmare: product contamination.

Submersible pumps are an ideal wastewater solution for breweries everywhere. They lie snugly beneath the floor, freeing up space within the brewery while working hard to withstand solids, corrosion, and high temperatures across every stage of the brewing process.

With the proper submersible pump, your beer–and customers–will thank you.

To help ensure your waste management system can maintain your sanitation requirements, consider the following:

Solids Handling

Solids used in the brewing process, such as spent grains, hops, flavoring agents, and yeast, can flood into the waste stream during the mashing and lautering process. These soft solids also get rinsed into drains during cleaning and sanitation.

In small quantities, these solids can be harmless. But the adhesive properties of protein and carbohydrate chains extracted during the mashing process often cause these spent grains to clump together, forming dough balls. These dough balls are especially prominent when using unmalted grains (e.g., flaked wheat and oats), which are extremely popular in modern beer styles. Dough balls have emergent properties from their singular counterparts and can range from very elastic to very hard and form in various sizes.

Dough balls create unfavorable conditions for submersible pumps not designed for solids handling. They can clog strainers and obstruct impellers, hindering proper pump operation that can lead to pump failure. And when a pump fails, flooded waste streams and putrefaction of the waste in the sump can lead to product contamination and an unhappy group of customers.

Pump failures also occur when other solids from the brewing process make their way into the waste stream. In a brewery, it's common to see packaging materials (e.g., bottle fragments, bottle caps, cans, plastics) and other debris like hair nets, gloves, and pallet chunks in the sump pit, as well.

Shredder pumps rip, tear and break solids into small pieces for easy, trouble-free flow, making them an ideal choice for brewery applications. Industrial Flow Solutions™ (IFS) offers BJM Pumps® SK and SKX series pumps that feature tungsten carbide tip Fang™ impellers and 360° shredding action that obliterate solids, preventing clogging and premature pump failure.

Corrosion Resistance

A brewery designed for effective cleaning will inevitably utilize various cleaning agents to achieve a sanitized space and craft a high-quality, safe beer. The clean-in-place (CIP) method is preferred in brewing applications and involves the automated cleaning of pipes, vessels, and other processing equipment without significant disassembly. CIP uses cleaning chemicals combined with turbulent water to clean interior piping and spray balls to clean large surface areas. These chemicals can be extremely caustic or acidic. While they are tuned for specific cleaning processes and designed to work with brewing equipment, they can cause corrosion of waste management system components – leading to expensive repairs or replacements.

Conducting a material compatibility analysis is an important step in avoiding corrosion when selecting a pump for a brewery waste system. A chemical compatibility chart like the one below will help you identify the type of pump you need for your cleaning processes.

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Material Composition & Chemical Compatibility Guide

			316 SS	304 SS	Titanium	FKM	Buna	EPDM	Santoprene	PolyPropylene	NORYL®	Neoprene *
PUMPS	SKXF		S			S		O	S			
	Perfecta®	GF		S		S	S			S	S	S
		IGF	S			S		O		S	S	S
		TIGF			S	S		O		S	S	S
S = Standard Offering O = Optional Offering *Material only for Float Switch Cord *NL versions of Perfectas will not be affected by this column as they do not include a float												
APPLICATION CHEMICALS	Sodium Hydroxide (>80%)		B	C	D	D	D	B	A	A	A	B
	Sodium Hydroxide (<20%)		B	B	A	D	A	B	A	A	A	B
	Hydrogen Peroxide (<10%)		B	B	A	A	D	A	A	A	A	D
	Hydrogen Peroxide (100%)		B	B	B	A	D	D	B	B	A	D
	Sodium Metasilicate (Used in PBW)		A	A	N/A	A	A	A	N/A	A	N/A	A
	Phosphoric Acid (>40%)		D	D	C	A	D	B	A	A	A	B
	Phosphoric Acid (crude)		B	D	C	A	D	B	A	B	A	D
	Peracetic Acid		A	N/A	N/A	A	N/A	B	B	B	N/A	N/A
	Acetic Acid (>80%)		B	D	A	D	C	A	A	A	A	C
	Iodine		D	D	A	A	B	B	A	C	C	D
	Chlorine Water (Chlorine Dioxide)		C	C	A	D	D	C	D	D	C	D
	Chlorine (Dry)		B	A	D	A	B	A	D	D	B	C
	Tri-Sodium Phosphate		B	B	N/A	A	A	A	A	A	A	A
	Nitric Acid (<10%)		A	A	A	A	D	A	A	A	A	B
	Nitric Acid (50%)		A	A	A	A	D	D	B	B	B	D
	Nitric Acid (Concentrated)		A	A	A	A	D	D	D	D	B	D
	Benzene Sulfonic Acid		B	B	B	D	D	D	D	D	A	A
	Potassium Hydroxide		A	B	D	B	B	A	A	A	A	B
	EDTA (ethylenediaminetetra-acetic acid)		B	B	A	D	A	A	A	N/A	D	B
	Bleach (<20% Sodium Hypochlorite)		C	C	C	A	B	B	B	A	A	C

LEGEND		Pump Model
		SKXF
Ratings		Perfecta GF
A	Excellent	Perfecta IGF
B	Good	Perfecta TIGF
C	Fair	Material Type
D	Poor	Metals
N/A	No Data	Elastomers

IFS offers a wide range of 316 stainless steel pumps that provide ample protection from most CIP chemicals. Our BJM Pumps SKX and SX Series pumps are field-proven to handle a wide variety of corrosive materials that normally wear down a cast iron or aluminum body pump.

For the harshest of chemicals, the extremely versatile Perfecta® pump is a great solution. The NORYL® non-metallic pump body provides exceptional resistance to strong acids and alkalis. The 316SS or titanium shaft and hardware coupled with neoprene cables offer maximum corrosion protection.

High Temperatures

Another major factor to consider when designing brewery waste streams is temperature. High-temperature fluids are inherent in the mashing, sparging and boiling brewing processes. CIP also uses very hot water, e.g., 180° F. The run-off from these processes will enter your waste stream, often retaining its high temperature.

Most submersible pumps are not rated for these hot temperatures and can experience failures in many different modes. Elastomers in mechanical seals can expand and contract, allowing fluid to enter the motor windings. Start and run capacitors can overheat and blow out, while normal cycling combined with high-temperature fluids can cause thermal overloads. All of these conditions will cause massive damage to your submersible pump.

Only IFS offers true high-temperature protection with our BJM Fahrenheit® Series pumps. These pumps withstand temperatures up to 200° F in continuous duty. Class R insulation protects the motor from thermal overload, while FKM seals perform better in high heat. Temperature dissipation is improved by filling the motor with oil and utilizing high-insulation class windings. Even the power cables are assembled with a Santoprene jacket to reduce splitting and thermal shear failure.

Our SKXF Series pumps combine powerful shredding with corrosion-resistant 316SS and reliable performance in high-temperature applications, making them the ideal choice for brewery operations–we can raise a glass to that.

Additional Measures

While many precautions can be taken to predict how a pump will perform, there is always the chance that different environmental factors can have unanticipated interactions creating non-favorable conditions for your pump. Seal fail is the most common pump failure and all elastomers used in seals have their limitations. For example, in certain CIP applications we have observed that specific heat cycling of sodium hydroxide rich environments will cause FKM elastomers to corrode at a rate not anticipated by chemical compatibility study.

To account for possible seal failure and keep operations functioning, BJM Pumps® offers a seal leak detection system, Seal Minder®, also known as a seal fail or moisture detection circuit, that will raise alarm when a leak first occurs.

The Seal Minder® is a system comprising of a sensor probe inside the oil chamber and a relay in a controller. An electric pulse is sent through the probe and an alarm will sound dependent on the conductivity of the fluid in the chamber. This change indicates that an outside fluid has penetrated the elastomer barrier, however this early detection will ultimately minimize damage to your pump and reduce that time that a pump is down.

Along with the replacement of elastomers due to acute failure, the second line of defense is an accelerated maintenance schedule. Every application's needs will be different; however, it is good practice to replace all elastomers annually, or as needed. This schedule does not allow the seals to degrade to the point of failure, saving the rest of the pump from damage.

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With four decades of food and beverage experience, IFS can help you design and specify a wastewater pumping system that's perfect for your needs. Contact us to talk to an expert.
The toughest conditions deserve the toughest pumps capable of best-in-class performance every day, every shift, in every sump. Learn more at www.flowsolutions.com.

Turning flow problems into flow solutions.

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