

Internally-fed rotary screens for craft brewing success

The craft brewing industry crossed an incredible milestone recently — with over 4,000 craft breweries in the United States, and about two more opening every day. Not since the 1880's has the country seen such an influx in locally-owned and operated breweries, and this trend appears here to stay. Yet this growth comes with increased challenges for the less glamorous side of beer production — the wastewater created by the brewing process.

Wastewater Pretreatment

Brewing beer is water-intensive. About 6-8 gallons of water are required for every one gallon of beer produced. While some of that water does end up in bottles, cans or kegs as steam during the sanitation process, more than half of it ends up as wastewater. Unlike what's typically found in municipal waste streams, the waste enzymes that result from beer brewing cause considerable disruption to the entire sewer system. Waste from beer comprises sugar, yeast and complex proteins that — in significant enough quantities — can dramatically change the microbial makeup of the waste stream. To reduce the biological oxygen demand (BOD) from these compounds, some forward-thinking breweries have chosen an anaerobic digester to combat these waste disposal issues. However, pretreatment of the brewery wastewater to remove coarse solids, like hops and spent grains, before they reach the anaerobic digester is critical for optimal system functionality, and will



assist the digester with further successful breakdown of organic materials.

Screening The Brew

Internally-fed rotary drum screening systems present an economical, reliable pretreatment solution for medium to large breweries to help eliminate suspended solids like spent hops and grains from the waste stream. Anaerobic digesters are then left to function at full productivity, while more solid waste is compacted, dried and altogether eliminated from the wastewater thanks to the screening system. This means overall waste output is reduced, so breweries pay fewer fees for landfill transport, while maintaining the integrity of their other equipment.



By understanding the cost- and energy-saving benefits of screening systems, brewery owners can equip themselves to more successfully manage their wastewater and focus on their craft.

Adding screens to the mix

To understand how rotary screening systems are an integral, beneficial component to a brewery operation, a basic grasp of the brewing process must first be explained.

Beer is made from barley malt that is ground and mixed with other grains to fuel the fermentation process. These ingredients are mixed with water and mashed so that the grain starches are converted to smaller carbohydrates, mostly fermentable sugars. This mash is separated into a clear liquid called wort which contains the sugars and other grain-derived components, and the non-soluble spent grains.

The wort and hops are boiled in the brew kettle to extract the hop resins and oils. The boiled out spent hops are usually added to the spent grain. For breweries that produce over 50,000 barrels a year that ends up being an

enormous amount of spent hops in need of disposal. If left within the system, that grain can cause significant damage to both the brewery process equipment, but also to the other facilities, pumps and pipelines within the wastewater stream further down the line. Some of the nation's largest craft breweries spend millions of dollars transporting their process wastewater to cities with more robust treatment systems, because their own municipalities simply can't take the increased level of BODs. While rotary screening systems don't make an impact on BOD reduction, eliminating the damage from spent hops and grains to an anaerobic digester mitigates unscheduled maintenance costs, and allows brewers to dispose of that waste more effectively.

Method of operation

Internally-fed rotary drum screens are designed for the high flow rate/low solids content of brewery wastewater, but are also ideal at managing other municipal and industrial wastewater. The cylindrical drums are mounted horizontally on four shaft-mounted trunnions that are supported on pillow block bearings. The influent — in this case, brewery wastewater — enters an engineered headbox, where the flow energy is dissipated, and is evenly distributed onto the



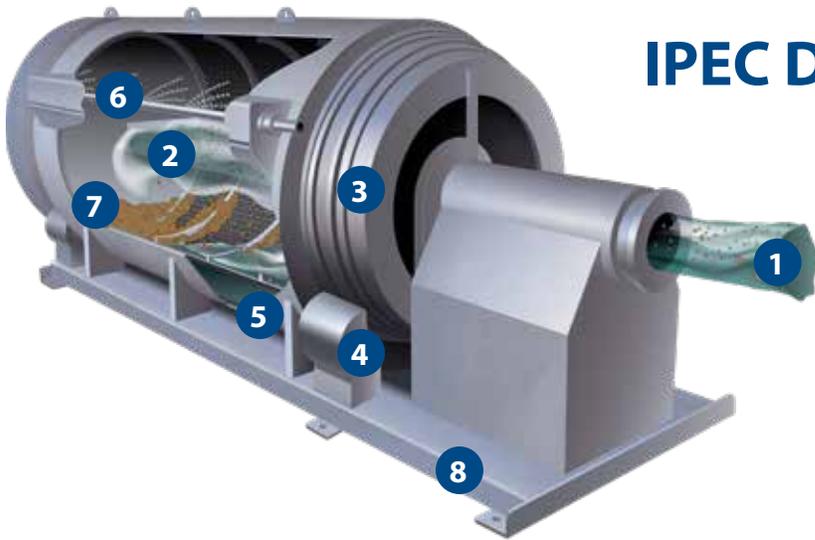
interior sidewalls of the drum. The spent hops and grains are retained on the screen surface, and the wastewater flows radially through the screen openings. Splash guards direct the liquid filtrate to a central drainage area, and the spent hops and grains are transported axially, by flights, to the open end of the drum. The rotation of the drum allows the entire screening surface to be continuously or intermittently washed by a fixed, external, spray bar fitted with a bank of spray nozzles.

The future of industrial pretreatment

As craft brewing continues to surge in popularity, and existing craft breweries expand their operations, a more careful look at pretreatment options will be crucial to limiting the impact of waste on both sensitive process equipment, and also the entire wastewater system of the

municipality. Engineers who evaluate pretreatment screens based on the debris makeup, flow rate and end use for the screenings will be poised to gain the biggest cost savings and productivity benefits of the screening solution.





IPEC Drum Screen Operation

- 1 Influent Enters Screen
- 2 Flow dispersed into drum from "Headbox"
- 3 Screen drum rotated with chain drive
- 4 Screen drum rotates on trunnion wheels
- 5 Effluent drains through screen and out bottom
- 6 Fixed External spray bar cleans screen
- 7 Solids exit screen end by way of continuous flights
- 8 Fabricated stainless steel base frame

Lowest Water Usage:

- Wedgewire drum designed specifically for each type of waste stays cleaner and only requires intermittent spray wash
- Only 40-50 psi (2.76-3.48 bar) spray wash pressure required – means lower water use than any competitive screen

Minimize Investment with Maximized Throughput:

- Specially designed headbox provides fast liquid removal, maximizing throughput
- Higher throughput allows our smaller screen to do the same job as a larger competitive screen

Lowest Possible Operations Costs:

- Built rugged for reliable performance and minimum maintenance in tough industrial wastewater applications
- Less moving parts with fixed spray wash bar means one less thing to worry about

JWC Environmental is a world leader in solids reduction and removal system for municipal wastewater collections, headworks and bio-solids operations. We offer our legendary Muffin Monster grinders and Monster Separation Screening systems, IPEC industrial screens and FRC DAF systems to solve unique wastewater processing situations.

JWC Environmental also services commercial and industrial applications with our Monster Industrial, IPEC and FRC products. We are ready to take on challenging size reduction problems in industrial processes as well as help customers run efficient and compliant industrial wastewater treatment operations.

JWC Environmental is headquartered in Santa Ana, California, and has a global network of representatives, distributors and regional service centers to provide customer support. For more information, visit us at www.jwce.com.



Headquarters
2850 S. Red Hill Ave., Suite 125
Santa Ana, CA 92705 USA
toll free: 800.331.2277
phone: 949.833.3888
fax: 949.833.8858
email: jwce@jwce.com



www.jwce.com