



GET IT OUT: EFFECTIVE REMOVAL OF INORGANICS

Modern wastewater treatment processes are not designed to operate with inorganic solids in the waste stream. The impact of this type of debris to wastewater treatment equipment can range from loss of efficiency and performance to significant damage, all of which have financial ramifications for plant operators.

While grinders are typically a cost-effective method for protecting the pumps at pump stations, there are other critical junctures within a treatment plant where operators have an opportunity to protect valuable assets with screening technology.

The key to making a wise investment is to understand each of the strategic locations for screens, which kind of screen is appropriate, and what associated equipment will optimize the removal of inorganic materials.

Screening Basics

In an ideal scenario, the core equipment within wastewater treatment plants would contend only with water and organic materials. The organics would be converted to methane gas, for use as bioenergy, and CO₂. This assumes that all inorganics had been removed earlier in the process. However, as no separation process is 100% efficient, it is important to get the proper equipment in the proper places to come as close as possible to that goal.

Grinders are good in situations where it is acceptable to pass the inorganics downstream, but there comes a point in time when a vast majority of inorganics must be removed before they impact a treatment process. Once the waste stream enters the wastewater plant, where everything is happening in one location, screening is the answer.

Coarse screening is ideal for removing larger, heavier objects, so it is best placed at the front end of a wastewater plant where all sorts of debris is trying to make its way in. Fine screening to remove smaller pieces is often placed a short distance later. However, additional fine screening can offer further protection when placed just before a membrane bioreactor, or MBR, which isn't designed to handle any significant level of inorganics and is expensive to repair.



Some plant operators will also place fine screens in front of a digester to enhance the activated sludge process.

Consulting engineers can assist in designing screens to handle the expected flow rate.

Associated Equipment

To complement the screening process, companies like JWC Environmental offer washer compactors. These machines effectively separate the material so organics can return to the treatment stream while inorganics are dewatered and compacted, thereby minimizing the weight and number of trips needed to transport them to a landfill.

For example, the JWC Monster Wash Press may be outfitted with a JWC Muffin Monster® grinder to pre-condition the screenings before they enter the washer compactor. The grinder breaks open rags, plastics, and trash to promote washing and removal of soft organics during the wash cycle. The grinder also provides safety for personnel by breaking down sharps and vials containing potentially harmful liquids into a homogenous discharge, resulting in superior compaction and reducing the volume of discharge that must be hauled away.

Using a programmable wash cycle in the wash press controller, discharge from the grinder (or directly from the screen), enters a pre-wash zone where it is saturated with clean water to separate organics from solids. An auger rotor transports the soaked debris into an active wash zone where a paddle rotor agitates



the material, enhancing wash water penetration throughout the debris. As a result, soft organics can then pass back through a screen to be returned to the plant's waste stream for treatment.

The washed solids move to the dewatering zone of the auger rotor where the process of removing the free liquids in the screenings begins. In the final stage, more water is removed and the solids are compacted. The resulting discharge emerges from the Monster Wash Press as a dry, solid plug.

Screening is an economical and efficient technology to protect expensive wastewater assets. When conditions call for screens, it is important to install them at the proper point in the process and select the appropriate complementary equipment to optimize the removal of inorganics.

To assist you in sizing and fitting your next wastewater screening design, JWC has created a quick reference guide to help you measure and convert your specs for screens and components.

CONCENTRATIONS MADE EASY

- 10,000 ppm
- =
- 10 parts per thousand (ppt)
- =
- 1:100 dilution
- =
- 1% solution
- =
- 10,000 mg/l
- =
- 38,000 mg/USGPM
- =
- 1.34 oz/US gallon

CONVERSIONS MADE EASY

- US gallon = cubic feet x 7.48
- US gallon = liters x 0.264
- US gallon = imperial gallon x 1.2
- Pounds/day = mg/l x (US gpd/1,000,000) x 8.34
- Degrees F = (1.8 x degrees C) + 32
- Degrees C = (degrees F - 32) x 5/9
- Kilogram = pound x 0.454

HEAD DROP MADE EASY

- 1.0 psi = 27.69" of W.C.
- 1.0 kPa = 1.02 m of W.C.

SCREEN SIZES MADE EASY

U.S. MESH	INCHES	MICRONS	MM
-	0.2362	6000	6.000
5	0.1570	4000	4.000
-	0.1181	3000	3.000
10	0.0787	2000	2.000
12	0.0661	1680	1.680
-	0.0591	1500	1.500
14	0.0555	1410	1.410
16	0.0469	1190	1.190
18	0.0394	1000	1.000
20	0.0331	841	0.840
25	0.0280	707	0.710
30	0.0232	595	0.590
35	0.0197	500	0.500
40	0.0165	420	0.420
45	0.0138	354	0.350
50	0.0117	297	0.297
60	0.0098	250	0.250
70	0.0083	210	0.210
80	0.0070	177	0.177
100	0.0059	149	0.149
120	0.0049	125	0.125
140	0.0041	105	0.105
170	0.0035	88	0.088
200	0.0029	74	0.074
230	0.0024	63	0.062
270	0.0021	53	0.053
325	0.0017	44	0.044
400	0.0015	37	0.037
550	0.0009	25	0.025

JWC Environmental, a Sulzer Brand, is a world leader in solids reduction and removal systems for municipal, industrial, and commercial applications. Our solutions include our legendary Muffin Monster® and Channel Monster® sewage grinders, Auger Monster® all-in-one headworks, Monster Wash Press and Monster Separation Systems®, Monster Industrial shredders, and IPEC industrial screens to solve unique wastewater processing situations. We partner with our customers to help them run efficient and compliant wastewater treatment operations as well as solve challenging size-reduction problems in industrial processes. JWC Environmental is headquartered in Santa Ana, California and has a global network of representatives, distributors and regional service centers to meet local customer needs. More information on JWC Environmental is available at www.jwce.com



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