Screening
and
Grit Removal

presented by

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EnQuip.com
KEY COMPONENTS IN A SEPTAGE RECEIVING FACILITY

- ACME SEPTAGE CO.
- LIQUID PROCESS 5%
- SOLIDS PROCESS 95%
- SCREEN
- GRIT REMOVAL (optional)
- GREASE REMOVAL (optional)
- STORAGE
- PUMP
Definitions:

Screenings

Grit Removal
According to MetCalf & Eddy:

“A screen is a device with openings, generally of a uniform size, used to retain coarse sewage solids. The screening element may consist of parallel bars, rods, or wires, grating, wire mesh, or perforated plate, and the openings may be of any shape, generally circular or rectangular slots. A screen composed of parallel bars or rods is called a rack. Although a rack is a screening device, the use of the term “screen” should be limited to the type employing wire cloth or perforated plates. However, the function performed by a rack is called screening, and the material removed by it is known as screenings, although rakings is more convenient in some cases.”
Screening = Expense

Grit Removal = Expense

Screening + Grit Removal = More Expense
Screening:

1. Manual Bar Rack ("rack")
2. Mechanical Bar Screen ("screen")
Manual Bar Rack
Manual Bar Rack

Rack
Manual Bar Rack

Drain pan

Screenings

Rack
Manual Bar Rack

- Inexpensive
- Labor intensive
- Inefficient
  typically wide openings
Mechanical Bar Screen

1. Vertical (MOP: reciprocating rake)
2. Cylindrical (MOP: Fine Screen)
Mechanical Bar Screen

1. Vertical (MOP: reciprocating rake)
2. Cylindrical (MOP: Fine Screen)
Mechanical Bar Screen

Vertical screen (reciprocating rake)
(similar to manual bar rack but with automation)
Mechanical Bar Screen
(Vertical straight bars)

Velocity within bars (line 2) is greater than that in the channel (line 1)
Mechanical Bar Screen

Vertical (MOP: reciprocating rake)

1. Expensive
2. Automatic
3. Wet screenings
4. Low labor
Mechanical Bar Screen

1. Vertical (MOP: reciprocating rake)
2. Cylindrical (MOP: Fine Screen)
Cylindrical Fine Screen
“A screen is a device with openings, generally of a uniform size, used to retain coarse sewage solids. The screening element may consist of parallel bars, rods, or wires, grating, wire mesh, or perforated plate, and the openings may be of any shape, generally circular or rectangular slots. A screen composed of parallel bars or rods is called a rack. Although a rack is a screening device, the use of the term “screen” should be limited to the type employing wire cloth or perforated plates. However, the function performed by a rack is called screening, and the material removed by it is known as screenings, although rakiing is more convenient in some cases.”
Cylindrical Fine Screen:
Type 1: Perforated Plate
Perforated Plate
(Hole machine)
PLASTIC BRUSH FOR WIPING SCREEN

PERFORATED SCREEN
PERFORATED PLATE SCREENS
NOT FOR USE ON SEPTAGE

PLUGGED SCREEN
Cylindrical Fine Screen
Cylindrical Fine Screen: Type 2: circular slots
3-Plane Bar Screen

Rotating Rake

Rake teeth pass through full bar depth

Slotted bars
3 Plane Bar Screen
(“slot machine”)
Penetration

Bars in Rack

Rake Head
Concrete Channel
Raptor® Septage Acceptance Plant

FINE SCREEN

INLET with VALVE

SCREENINGS DISCHARGE

OUTLET
Ball valves:
Jam and stress actuator

Pinch Valves:
Forgiving, simple, and durable
Weather Protection Package
Based on septage or sludge at 3% solids, with ¼ inch bar spacing
MAGNETIC FLOW METER

SECURITY ACCESS SYSTEM W/ RECEIPT PRINTER

PLC BASED CONTROLS

BAGGING ATTACHMENT

WEATHER PROTECTION
Mechanical Bar Screen

Cylindrical (MOP: Fine Screen)

1. Expensive
2. Automatic
3. Washed and compacted screenings
4. Low labor
5. Efficient
Mechanical Bar Screen
Grinders
5+ HP GRINDER
Continuous Operation
High Maintenance

<table>
<thead>
<tr>
<th>Model</th>
<th>Screen Dia.</th>
<th>HP (kW)</th>
<th>Screenings Capacities</th>
<th>Max. Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRS3200</td>
<td>20” (500mm)</td>
<td>2 (1.5)</td>
<td>90 FT³/HR (2.55 m³/HR)</td>
<td>400 GPM (91 m³/HR)</td>
</tr>
</tbody>
</table>

Note: Grinder 30004T-1204 uses standard 5HP (4kW) motor.
Downstream of a grinder
Downstream of a grinder
Grit
Grit

Inorganic dense materials:

Think sand.
Grit

Easy to settle grit.

Hard to separate organics from grit.
Grit
Detention time to settle grit.
Energy needed to wash away organics:
1. Aeration
2. Vortex
Aerated Grit Removal

IN-LINE GRIT COLLECTOR

LAKESIDE

- UP TO 2.0 MGD CAPACITY
- SIZED FOR 1-3 MIN DETENTION TIME AT PEAK FLOW
IN-LINE GRIT COLLECTOR

Diagram showing the components of an in-line grit collector:
- Trough w/Cover
- Settling Chamber
- Baffle
- Effluent Trough
- Grit Screw
- Air Diffuser
Aerated Grit Removal
Vortex grit removal
Screening and Grit in one unit
Screening and Grit in one unit
RAPTOR® COMPLETE PLANT GREASE REMOVAL

- GRIT CHAMBER
- AIR DIFFUSERS
- HORIZONTAL GRIT SCREW
“It's unwise to pay too much, but it's worse to pay too little. When you pay too much, you lose a little money - that is all.

When you pay too little, you sometimes lose everything, because the thing you bought was incapable of doing the thing it was bought to do.

The common law of business balance prohibits paying a little and getting a lot - it can't be done.

If you deal with the lowest bidder, it is well to add something for the risk you run. And if you do that, you will have enough to pay for something better.”

John Ruskin - Economist
1819 - 1900