



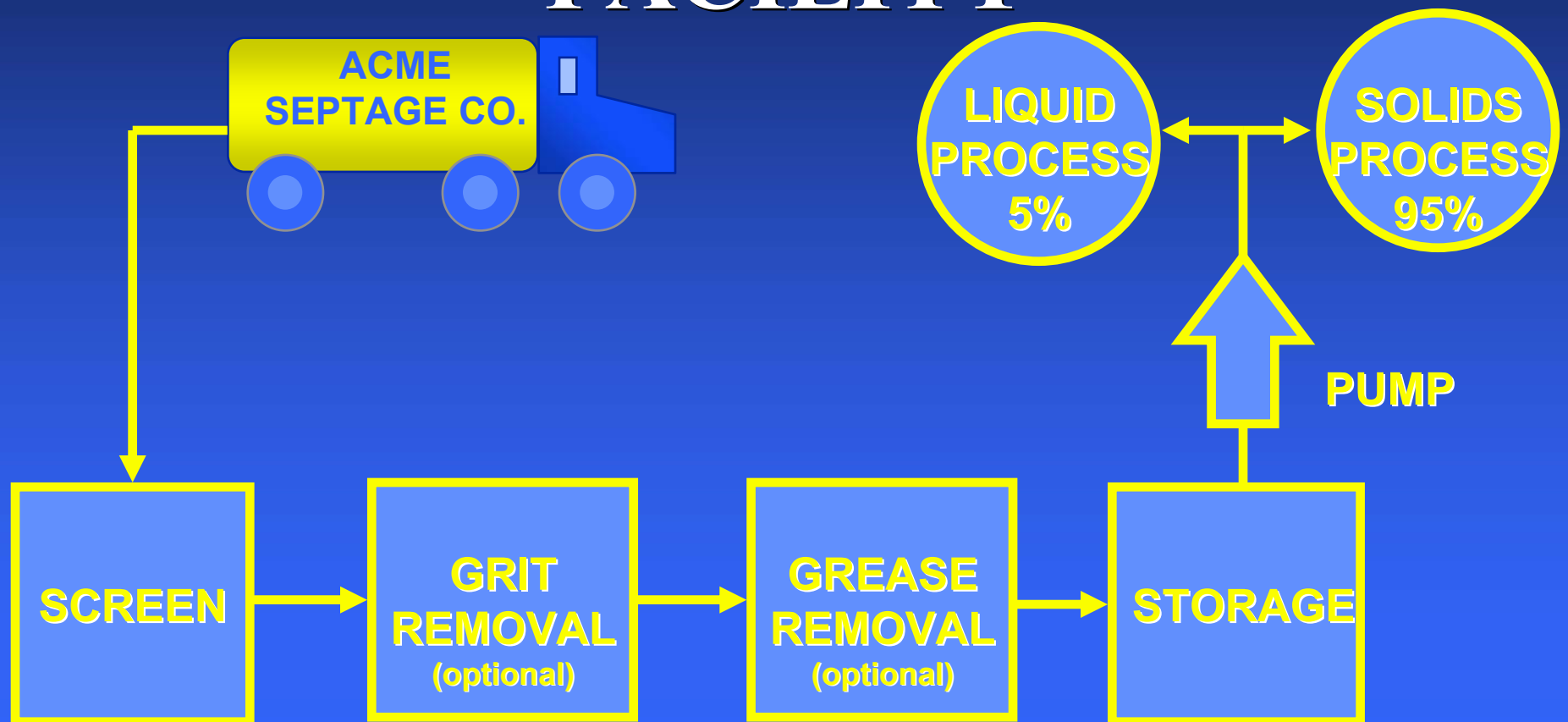
Screening and Grit Removal

presented by

Doug McCord

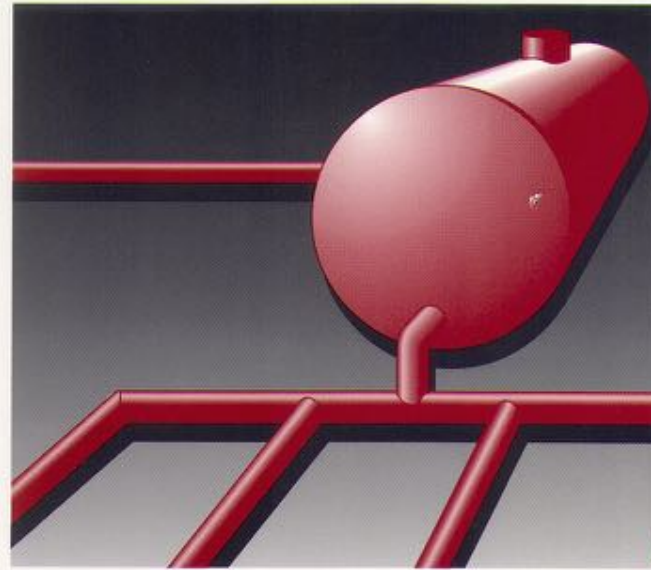
EnQuip.com

KEY COMPONENTS IN A SEPTAGE RECEIVING FACILITY





SEPTAGE HANDLING



MANUAL OF PRACTICE

 **Water Environment
Federation®**
*Preserving & Enhancing
the Global Water Environment*

Manual of Practice No. 24



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 = Expens\$

Grit Removal = Expens\$

**Screening + Grit Removal =
More Expens\$**



Screening:

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



Manual Bar Rack





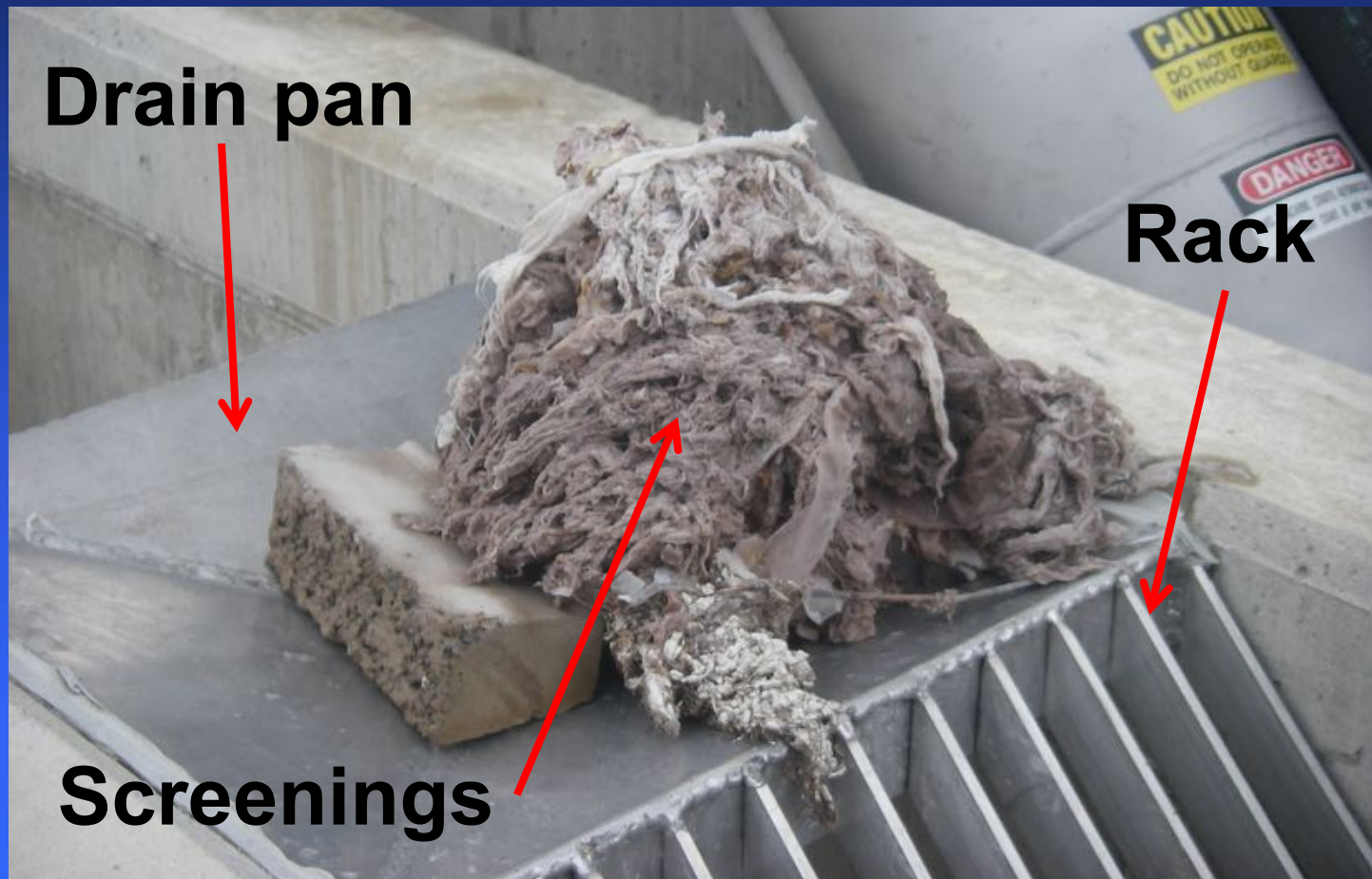
Manual Bar Rack



Rack



Manual Bar 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)**



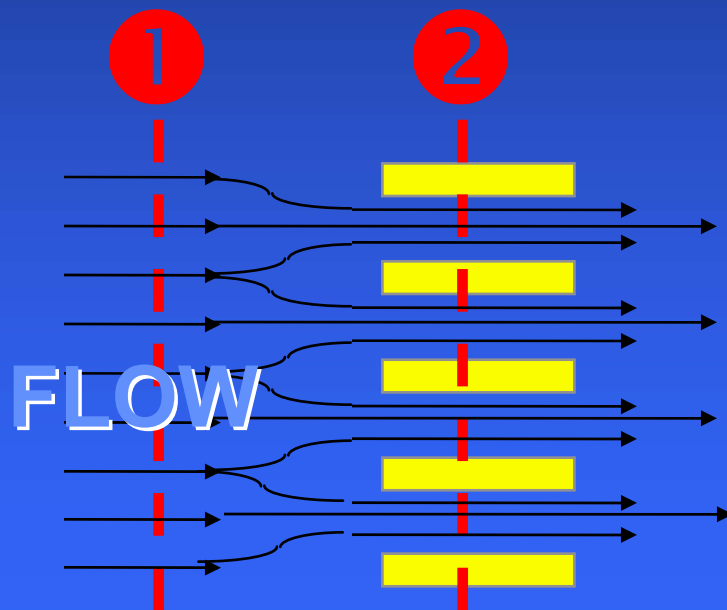
Mechanical Bar Screen



**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**

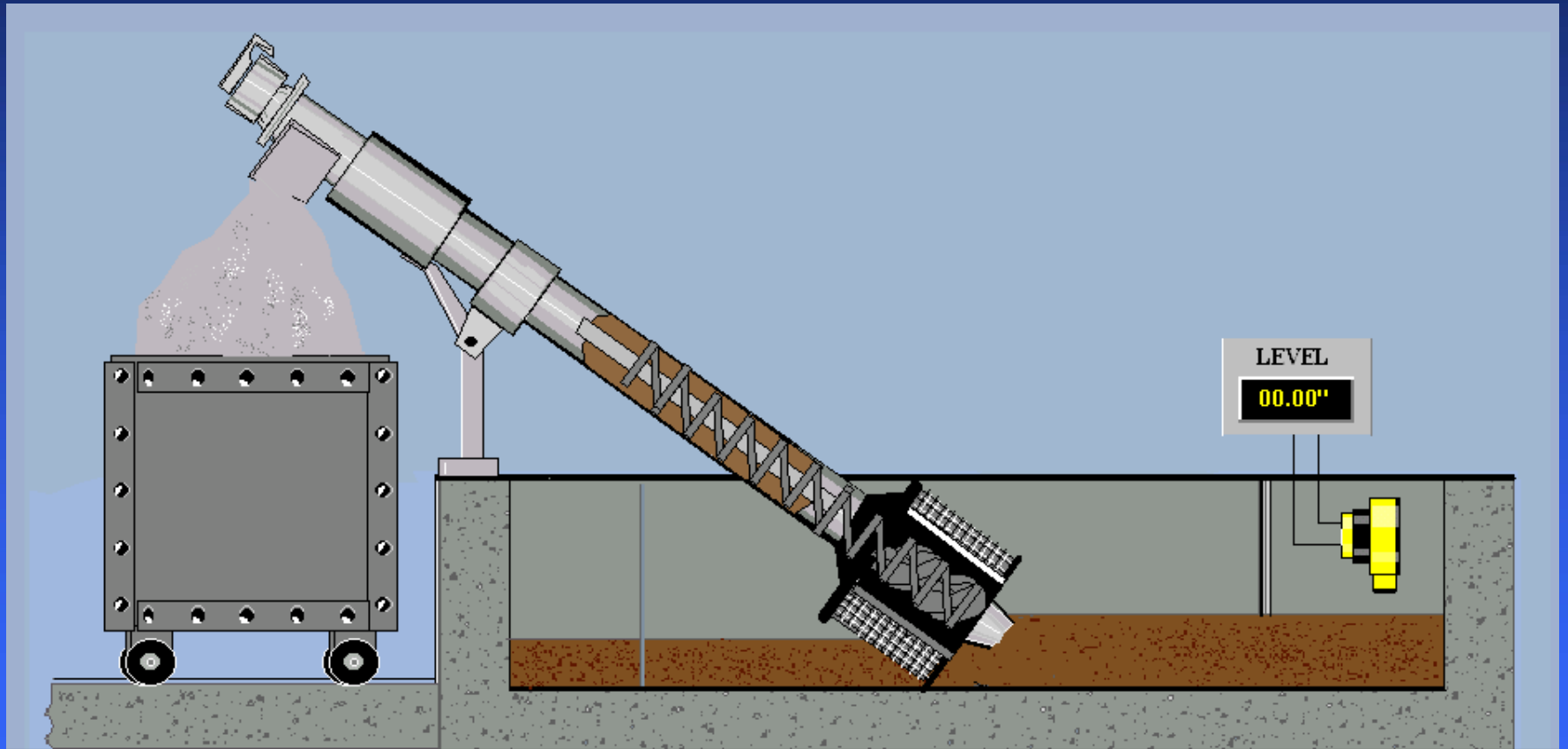


Mechanical Bar Screen

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



Cylindrical Fine Screen



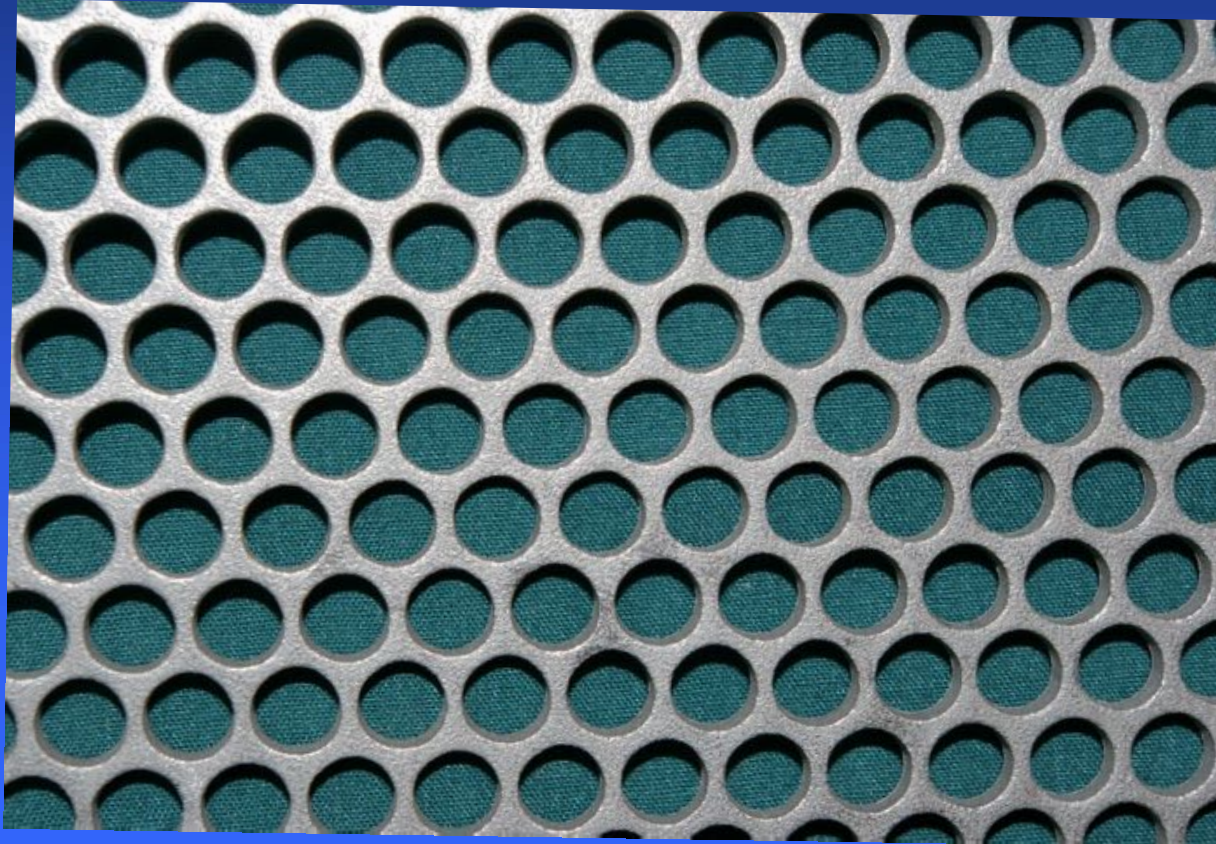


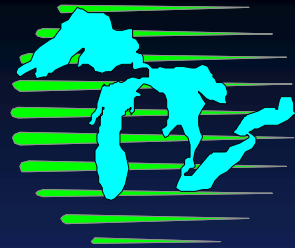
Cylindrical Fine Screen

“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 rakings is more convenient in some cases.”



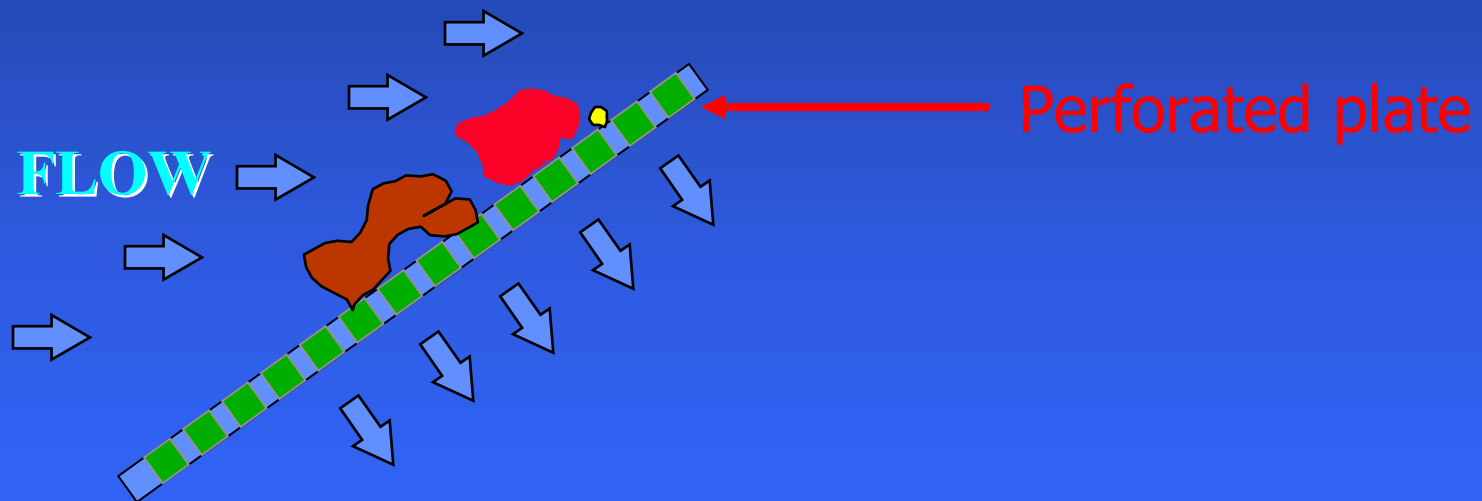
Cylindrical Fine Screen: Type 1: Perforated Plate

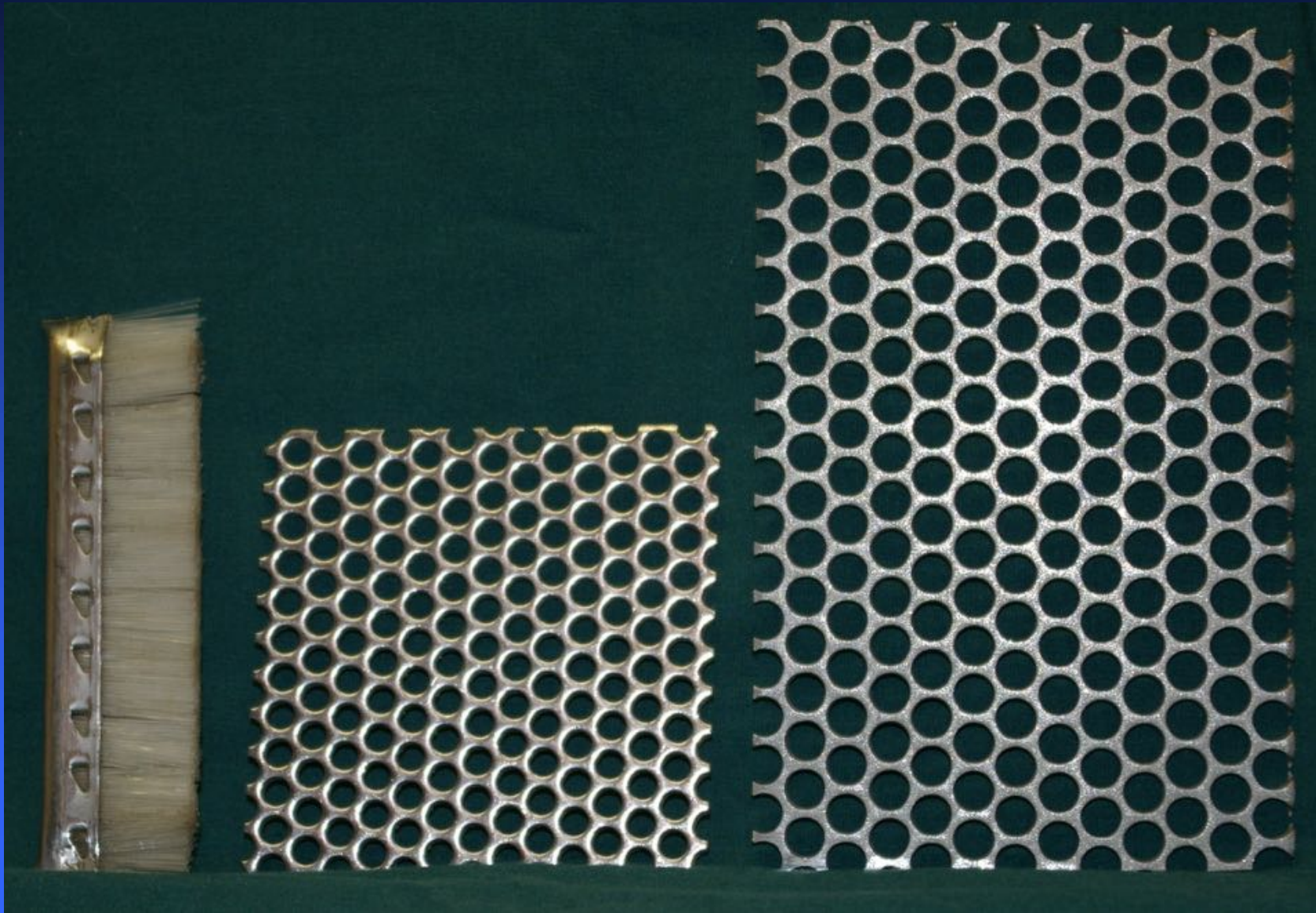




LAKE SIDE

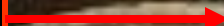
Perforated Plate (Hole machine)



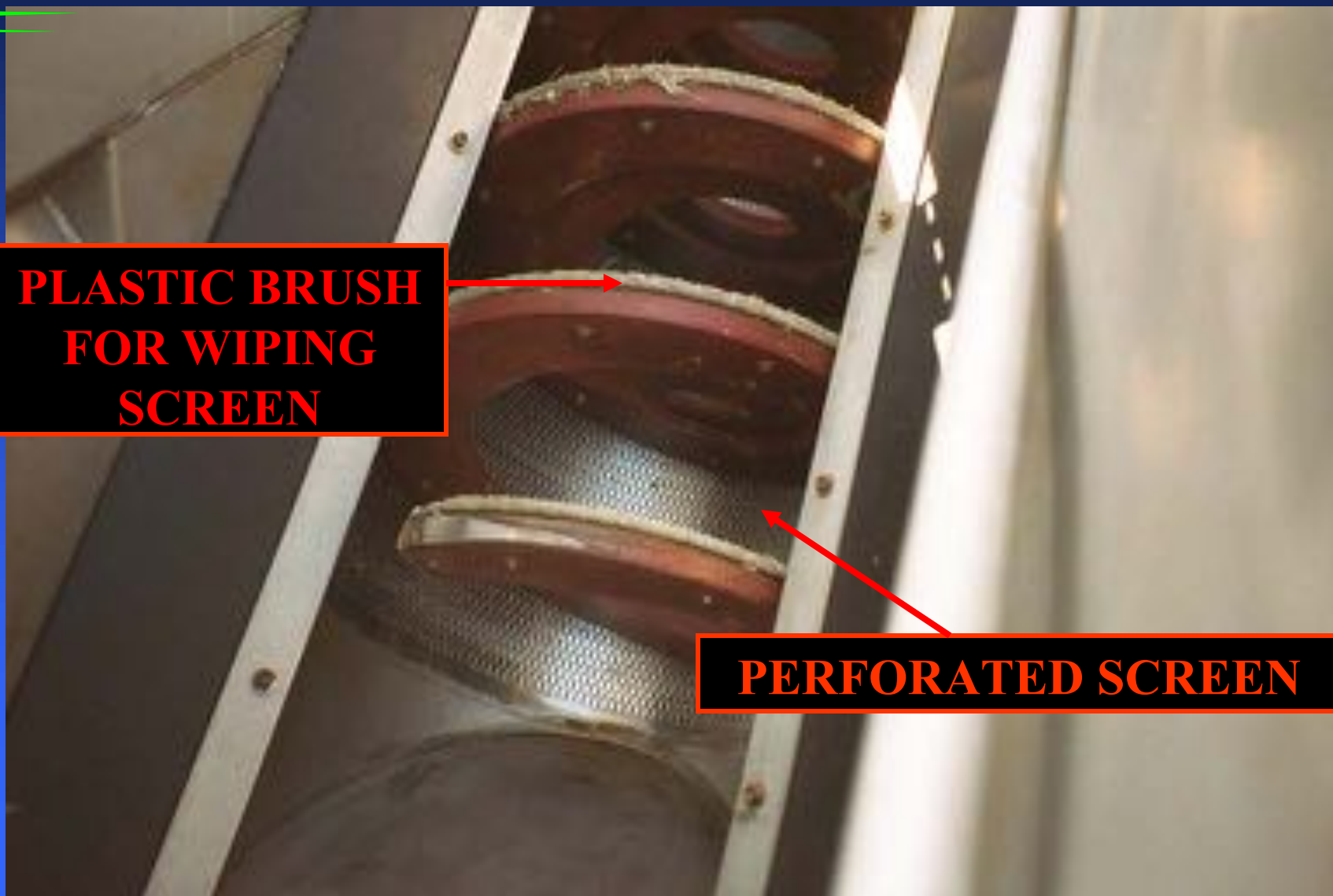




**PLASTIC BRUSH
FOR WIPING
SCREEN**

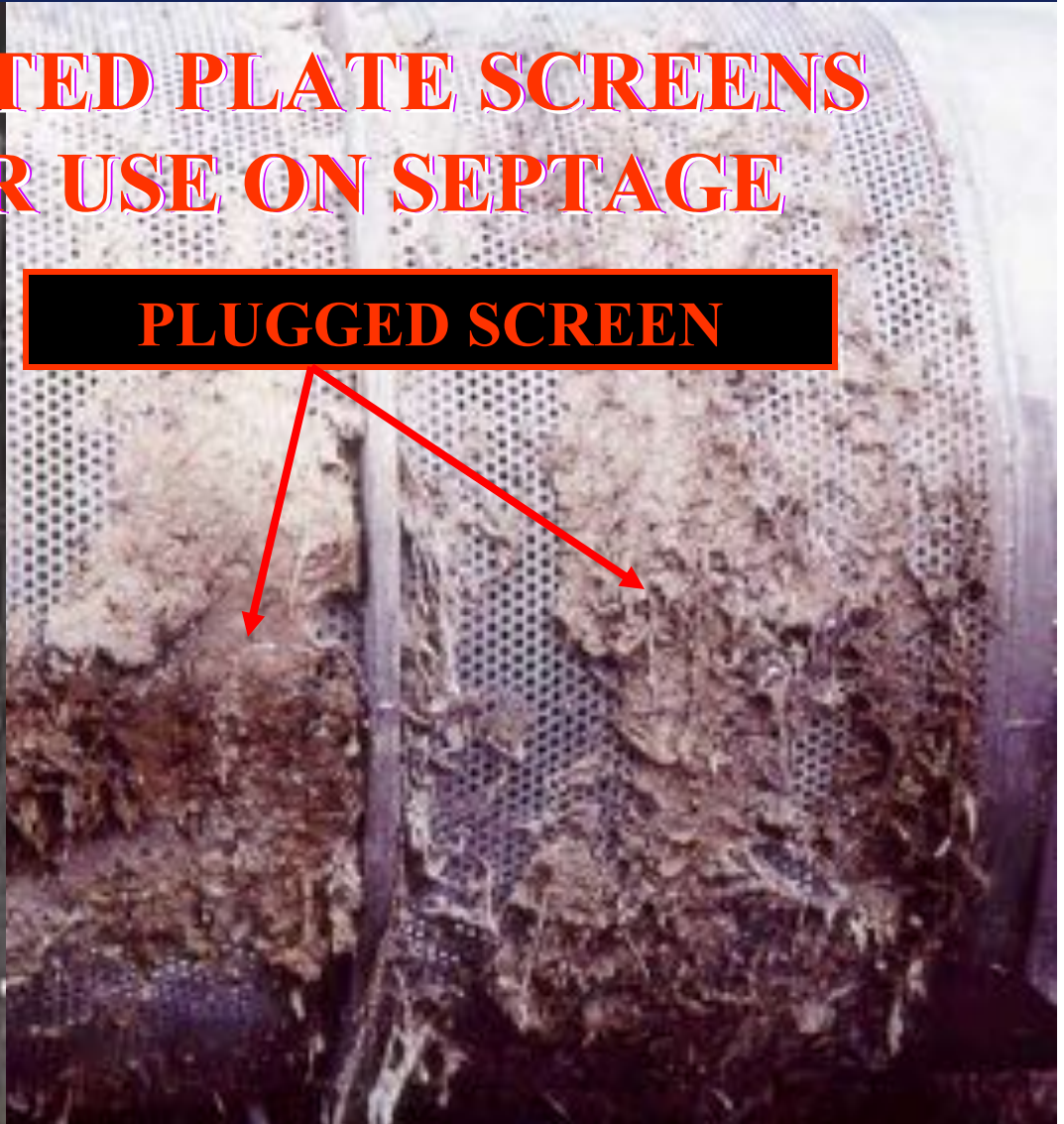


PERFORATED SCREEN



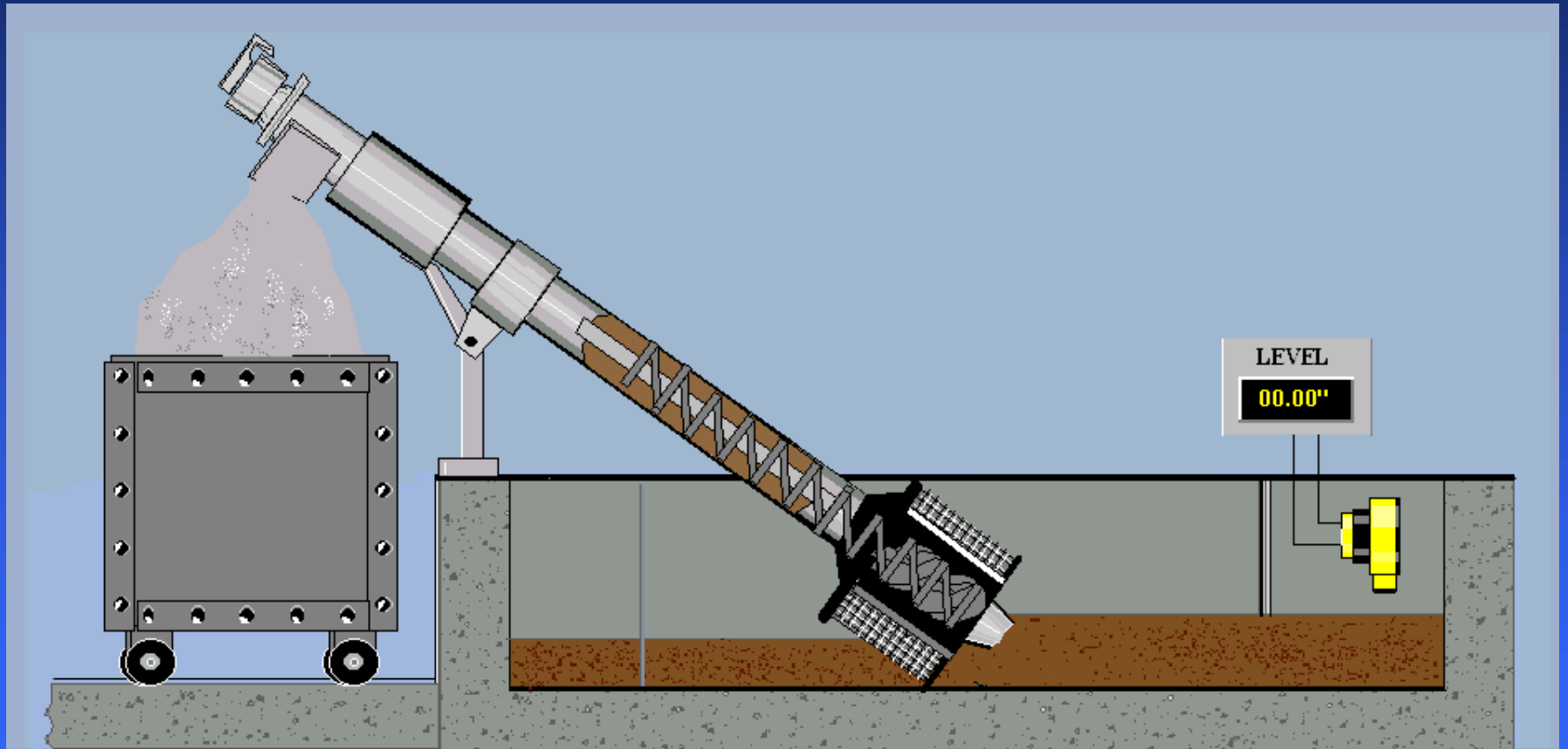


**PERFORATED PLATE SCREENS
NOT FOR USE ON SEPTAGE**





Cylindrical Fine Screen



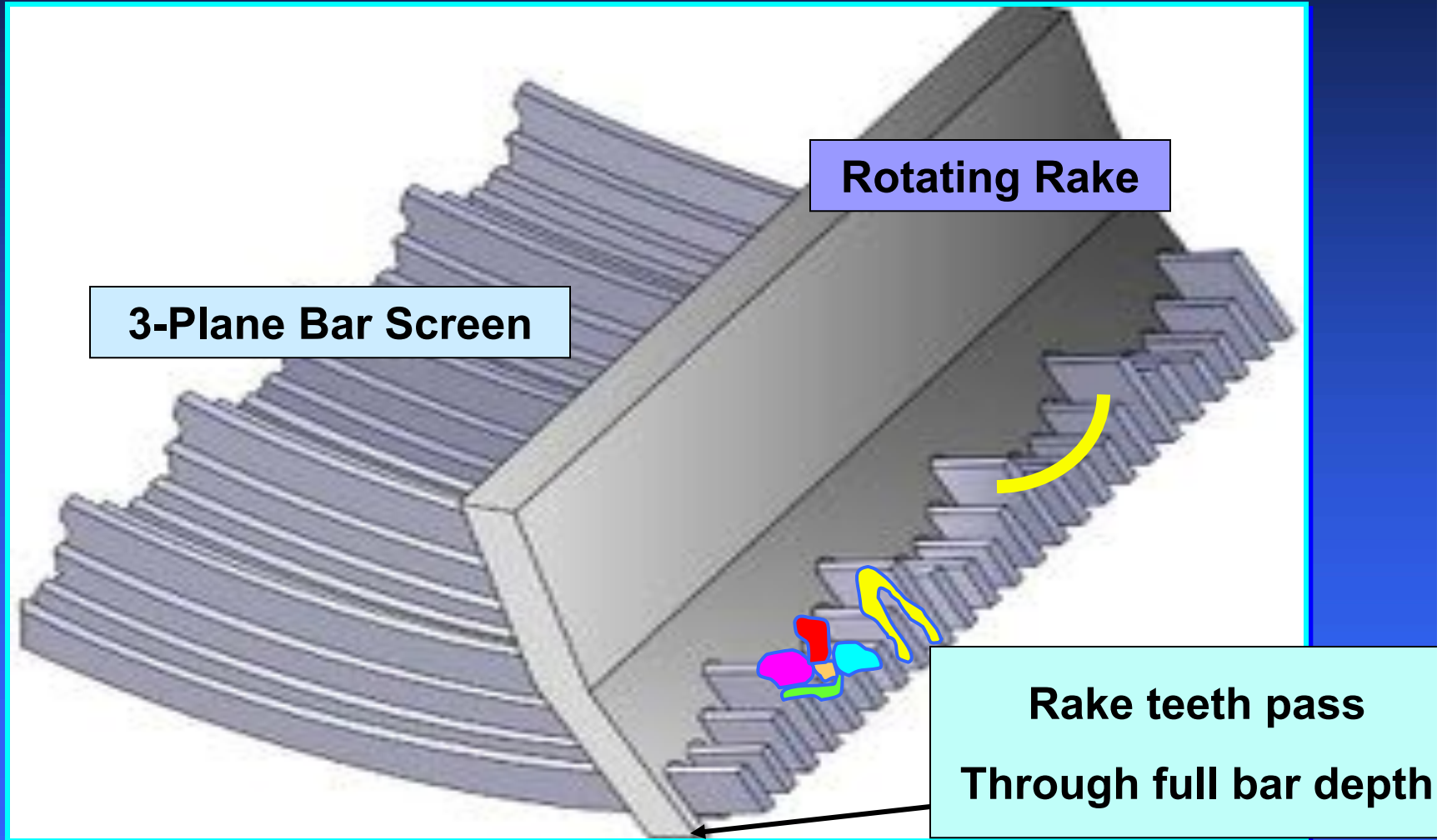


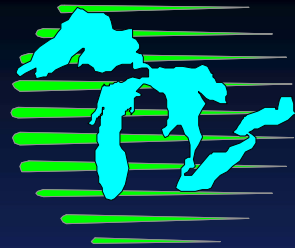
Cylindrical Fine Screen: Type 2: circular slots





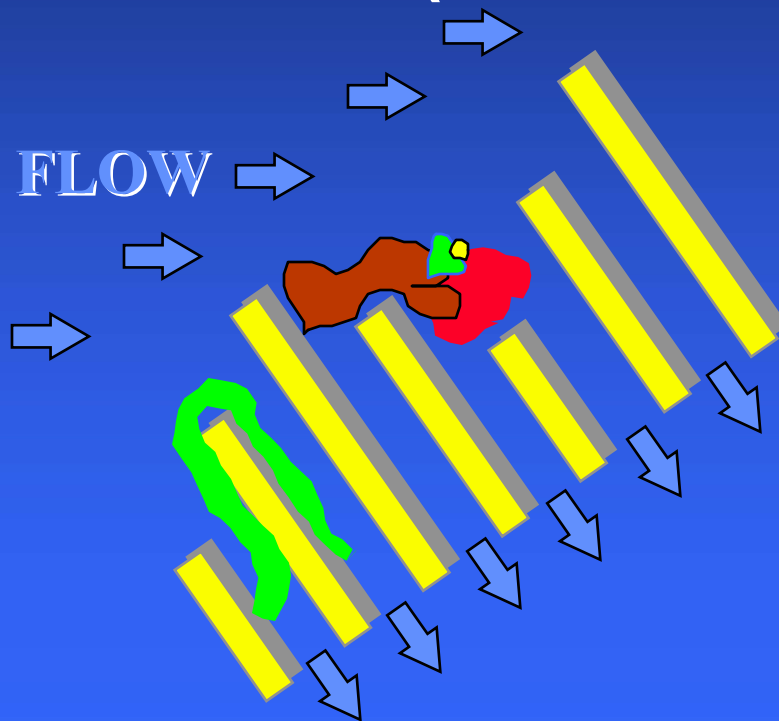
Slotted bars





LAKE SIDE

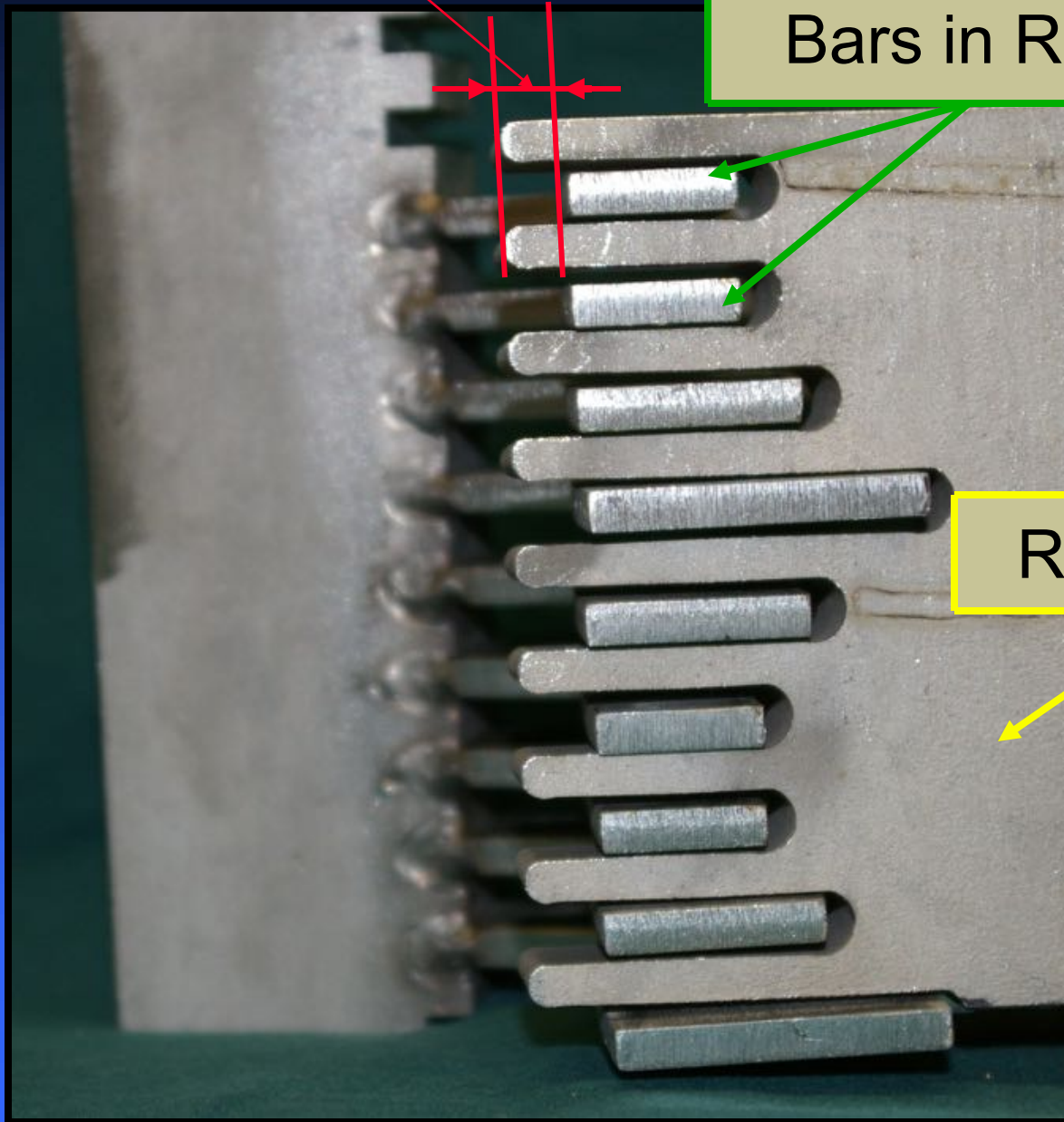
3 Plane Bar Screen ("slot machine")



Penetration

Bars in Rack

Rake Head





LAKE SIDE





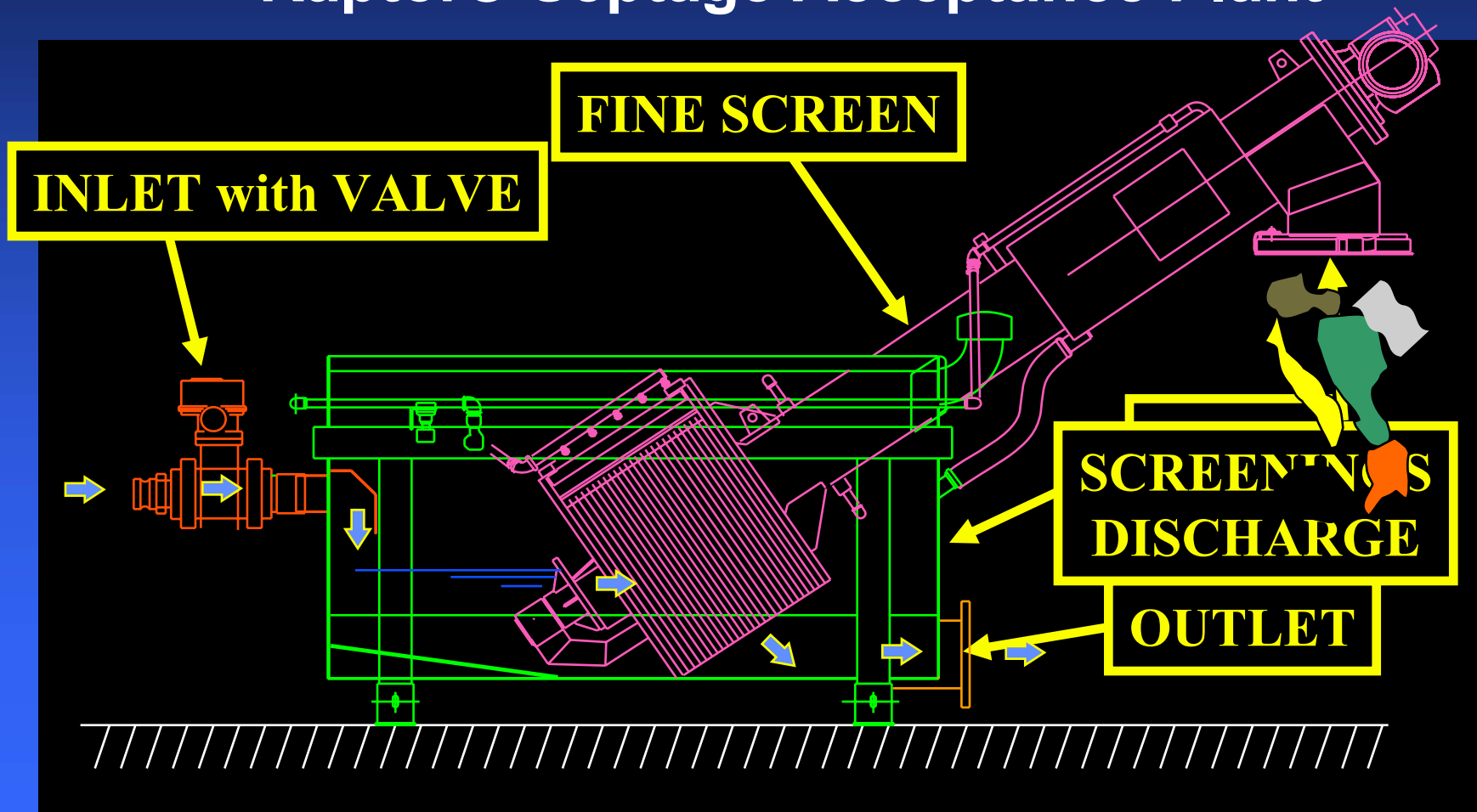
Concrete Channel







Raptor® Septage Acceptance Plant





LAKE SIDE

Equipment Corporation



Ball valves:
Jam and stress actuator



Pinch Valves:
Forgiving, simple, and durable







Weather Protection Package





LAKE SIDE

Equipment Corporation

31SAP

400 gpm

40SAP

700 gpm

47SAP

1,000 gpm

Based on septage or sludge at 3% solids, with ¼ inch bar spacing





LAKE SIDE

Equipment Corporation

OPTIONAL FEATURES



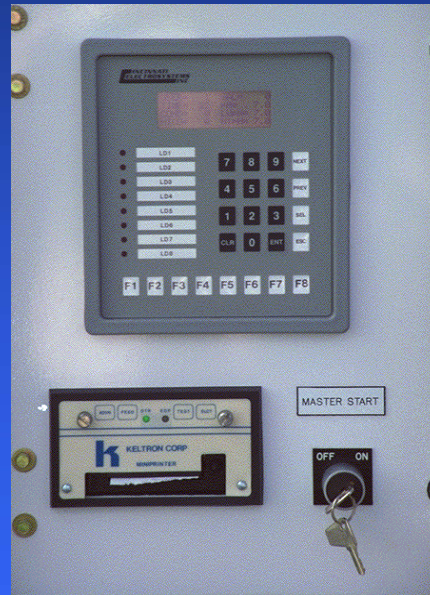
MAGNETIC FLOW METER



PLC BASED CONTROLS



BAGGING ATTACHMENT



SECURITY ACCESS SYSTEM
W/ RECEIPT PRINTER



WEATHER PROTECTION



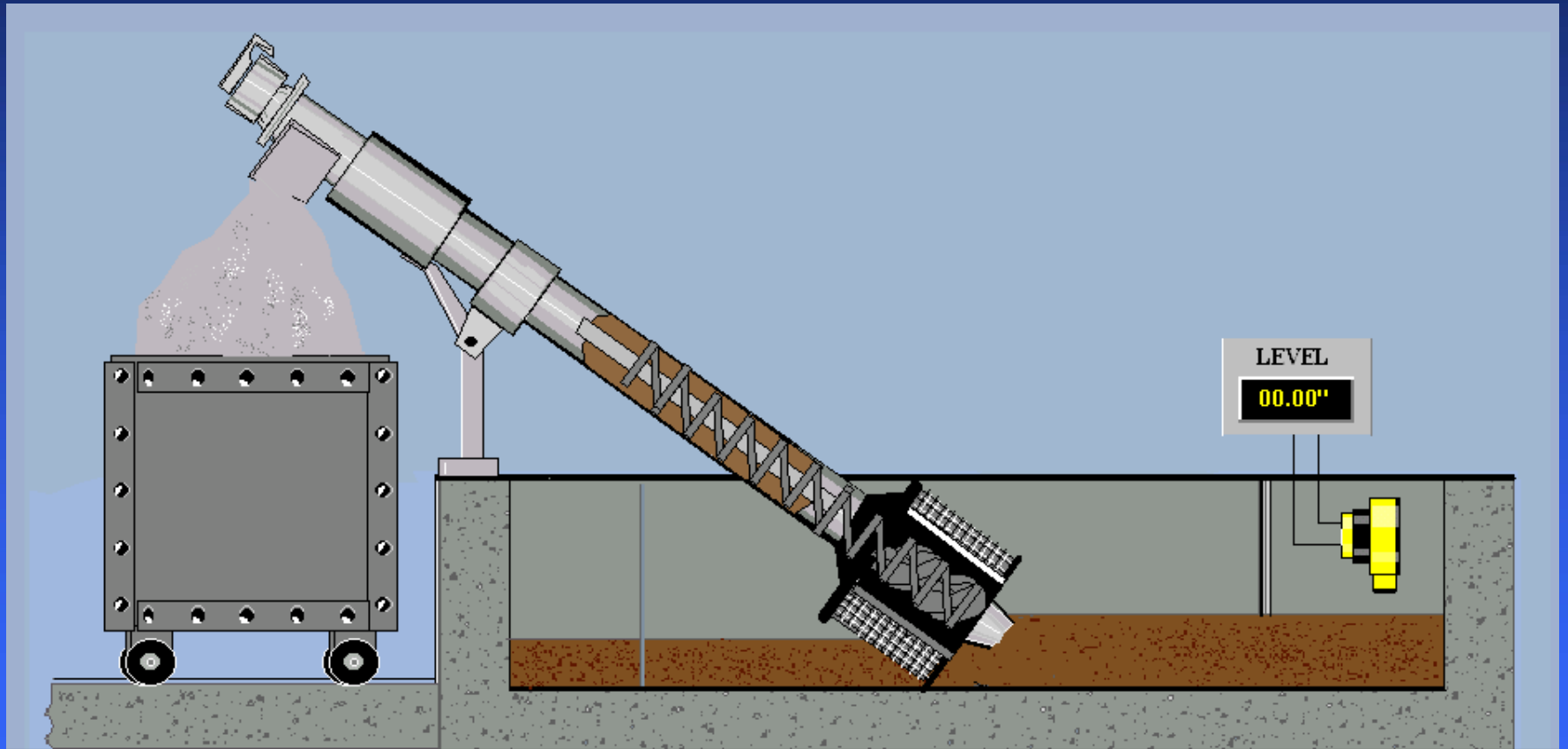
Mechanical Bar Screen

Cylindrical (MOP: Fine Screen)

- 1. Expensive**
- 2. Automatic**
- 3. Washed and compacted screenings**
- 4. Low labor**
- 5. Efficient**



Mechanical Bar Screen

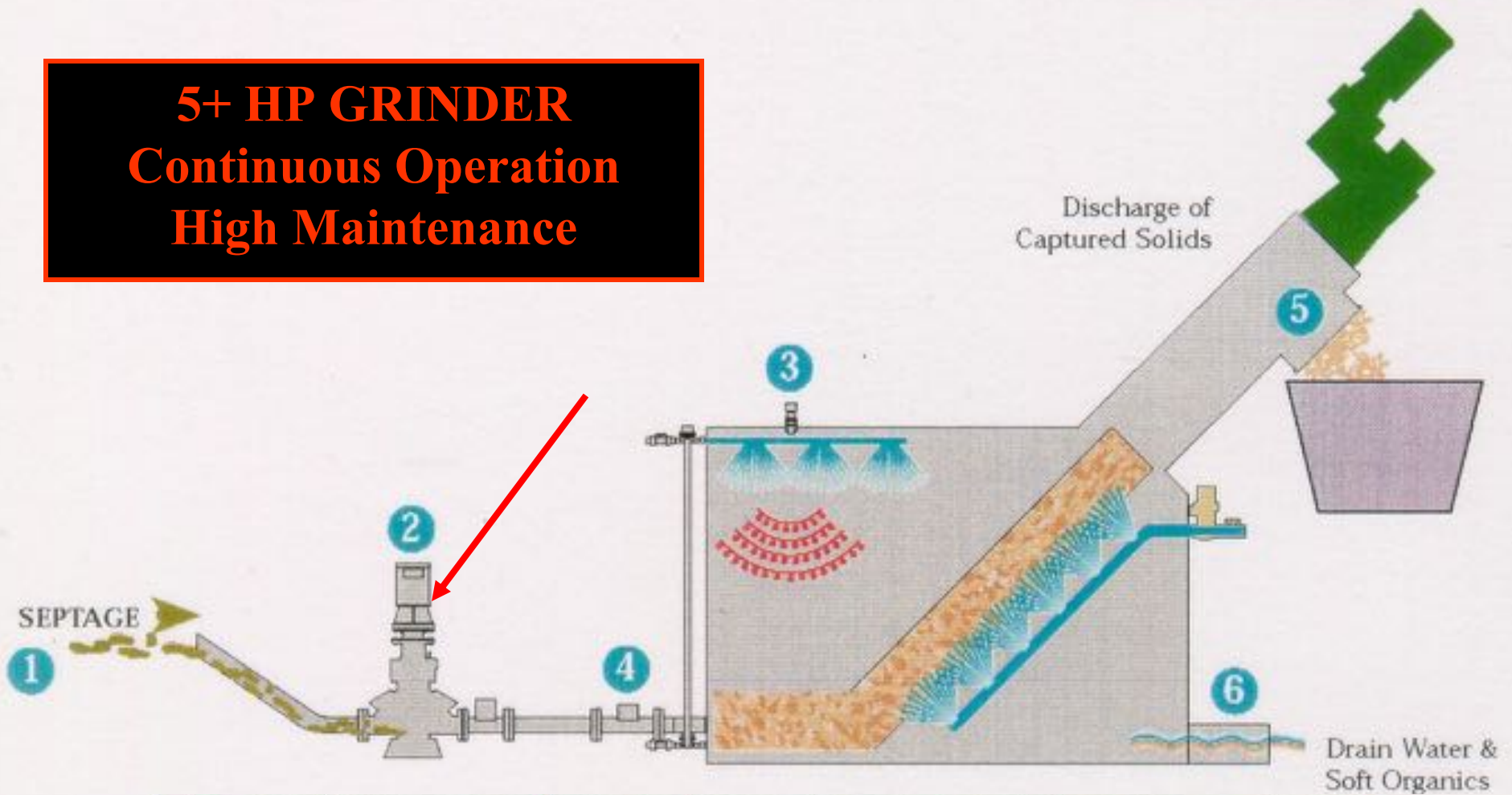




Grinders



5+ HP GRINDER
Continuous Operation
High Maintenance



| Model | Screen Dia. | HP (kW) | Screenings Capacities | Max. Flow |
|---------|-------------|---------|--|---------------------------------|
| SRS3200 | 20" (500mm) | 2 (1.5) | 90 FT ³ /HR (2.55 m ³ /HR) | 400 GPM (91 m ³ /HR) |

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:

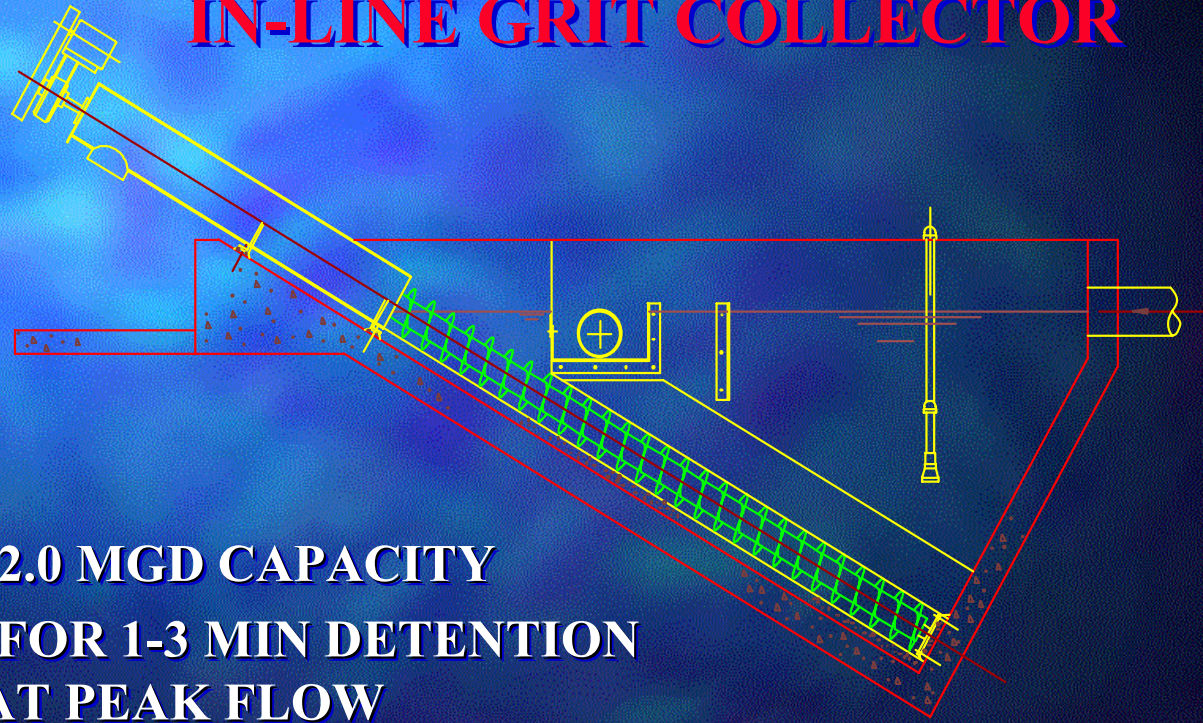
- 1. Aeration**
- 2. Vortex**

Aerated Grit Removal

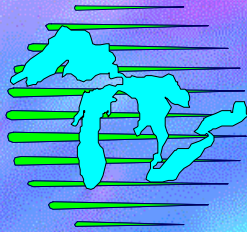


LAKE SIDE

IN-LINE GRIT COLLECTOR

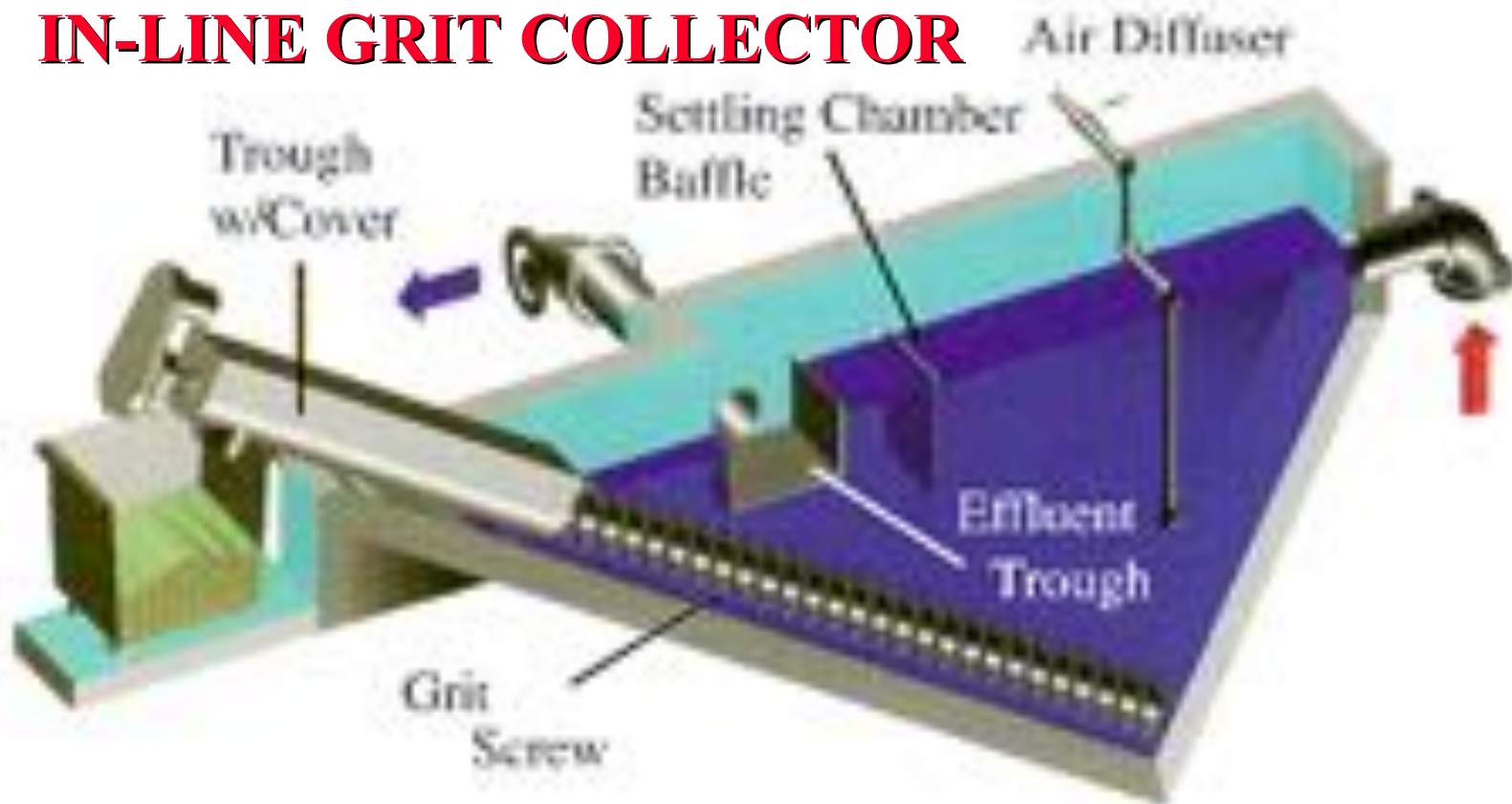


- UP TO 2.0 MGD CAPACITY
- SIZED FOR 1-3 MIN DETENTION TIME AT PEAK FLOW



LAKESIDE

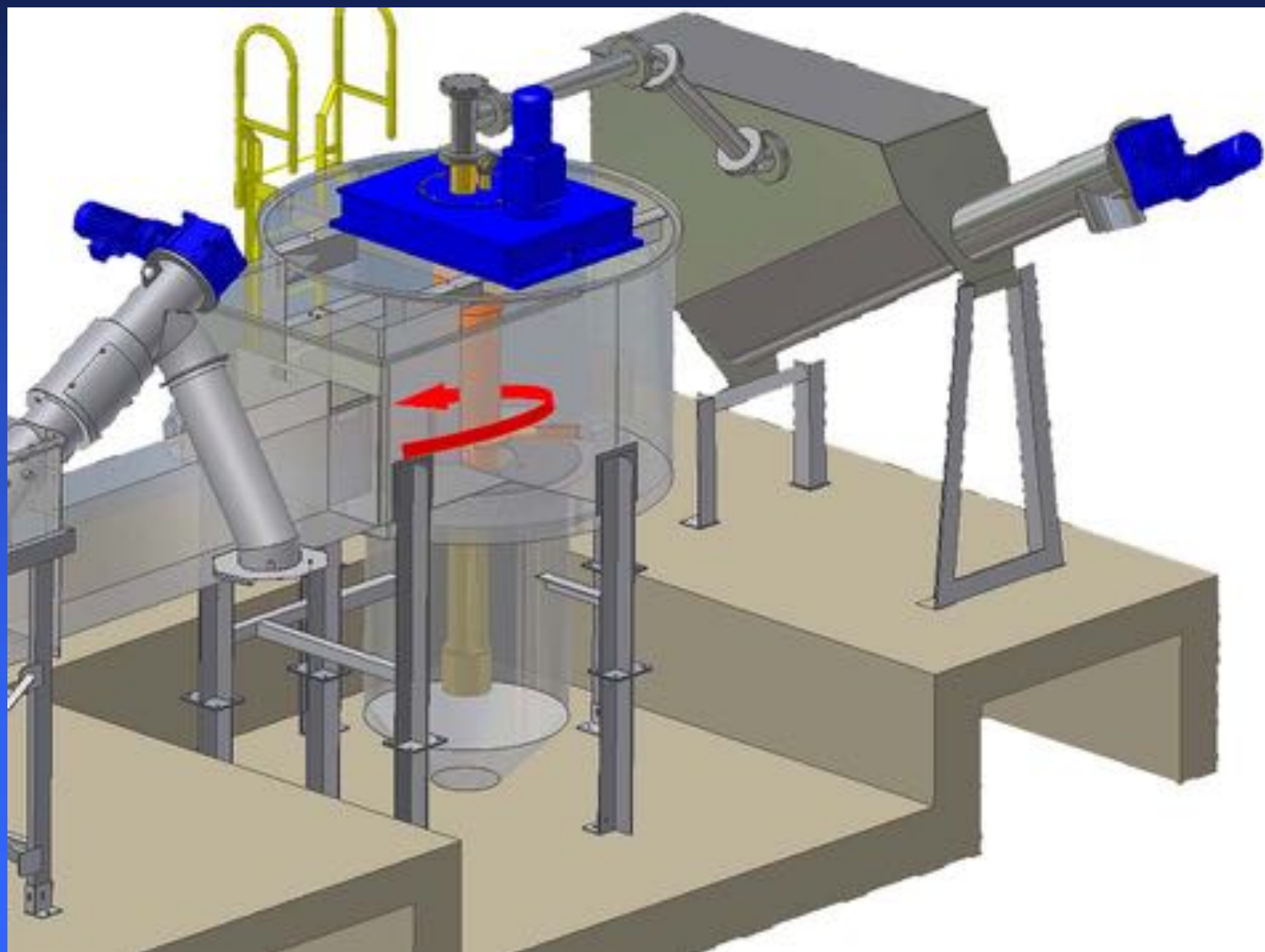
IN-LINE GRIT COLLECTOR



Aerated Grit Removal



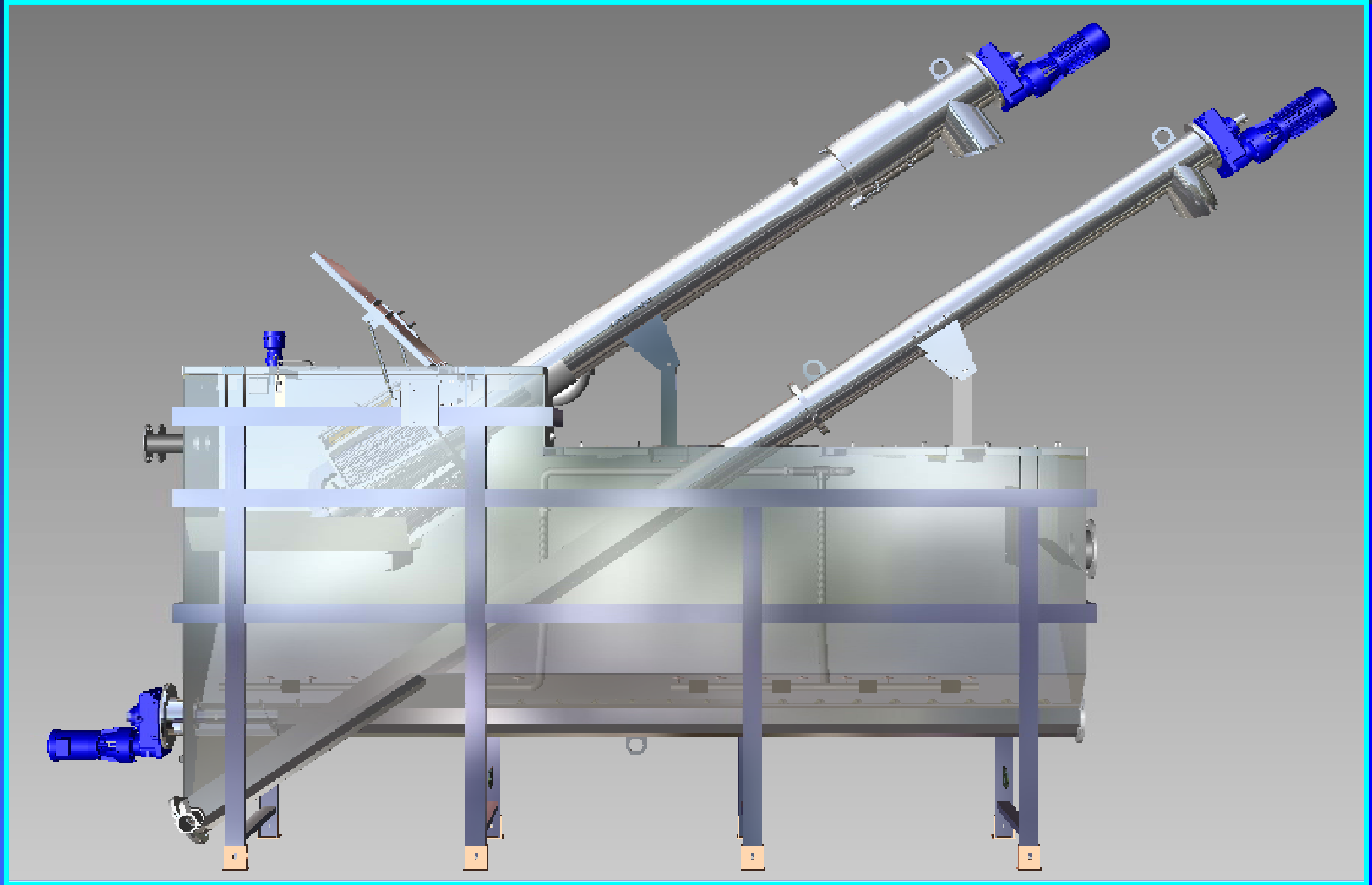
Vortex grit removal







Screening and Grit in one unit

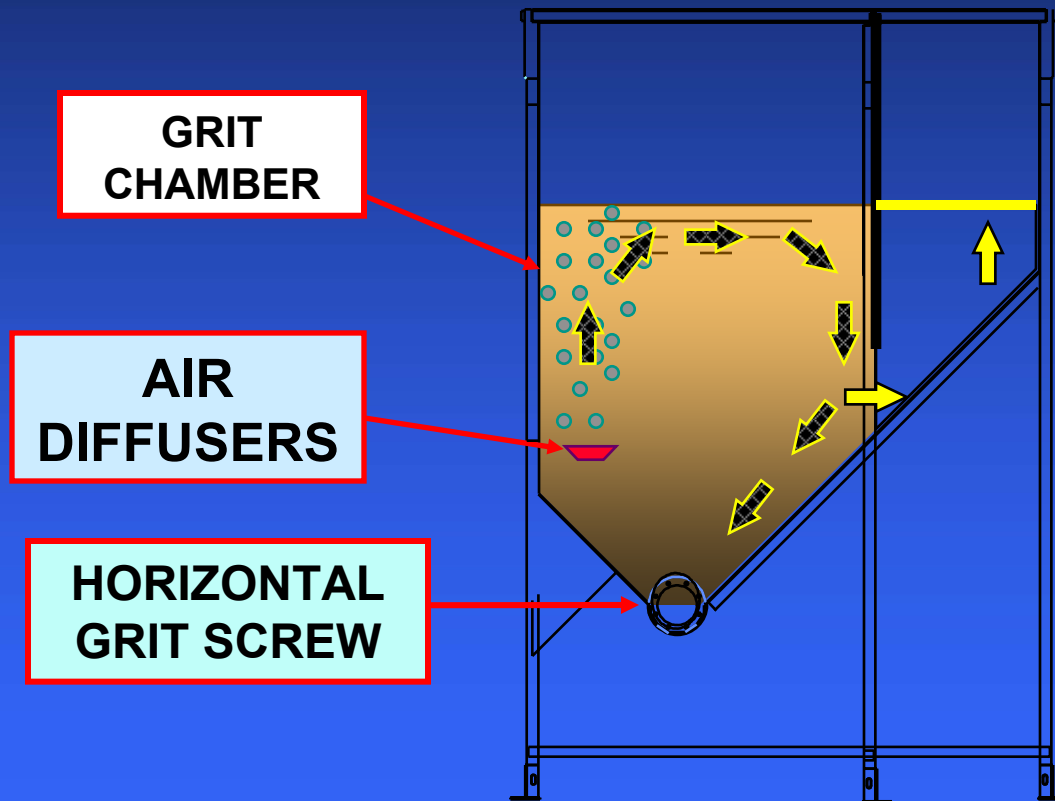




Screening and Grit in one unit



RAPTOR[®] COMPLETE PLANT GREASE REMOVAL





“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***