



Wastewater Treatment Processes: Grit Removal

Purpose of grit removal

Wastewater grit materials (known as detritus) include sand, silt, cinders, stones, glass, metal particles and other large-sized, relatively non-putrescible organic and inorganic substances.

Grit removal is an essential element of preliminary treatment and its purpose is the following:

- 💧 Protects moving mechanical equipment and pumps from abnormal wear due to abrasion
- 💧 Reduces blockages in pipelines
- 💧 Prevents sedimentation of materials in aeration tanks and sludge digesters that result in loss of usable volume. The quantity of grit removed will depend on local circumstances but a rough indication of the quantity of grit to be expected is 7.5 to 90 m³ M.⁻¹ wastewater treated. The moisture content of grit is normally in the range 15 to 35%.

De-gritting devices

Hand-Cleaned Channels

These units are generally only used in plants with flows less than 4 M³/day. The channels have control devices (venturi flumes or weirs) at their outlets to regulate the velocity to about 0.3 m/s regardless of the wastewater flow. Velocities that are too low allow organics to contaminate the grit; excessive velocities carry grit to the downstream processes

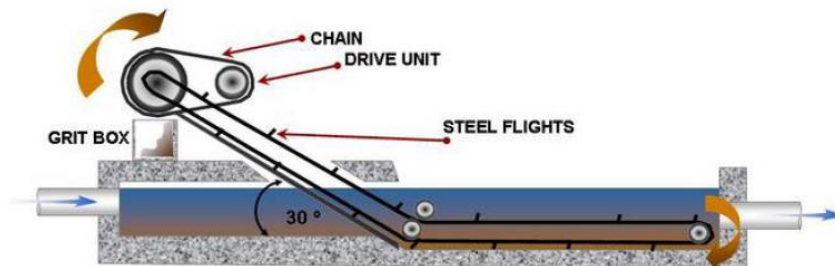


At least two elongated channels are provided so that one at a time can be closed off, drained and the accumulated grit removed manually by shoveling.

Mechanically Cleaned Channels

In larger plants, the channels are generally cleaned by a chain-and-flight grit scraper system without emptying the channels.

Typically, a bucket elevator, inclined screw conveyor or air lift pump removes the grit from a sump and deposits it into a container or storage hopper for disposal (see sketch below). The frequency of both the grit scraper and removal systems (manual or automatic) depends on the rate of grit accumulation.



Cyclone Degritters

Cyclone degritters use centrifugal force in a cone-shaped unit to separate grit from the wastewater. At a controlled rate, a pump discharges a slurry of grit and organics tangentially near the upper perimeter of the degritter. This feed velocity creates a vortex that produces a grit slurry at the lower orifice and a degrittied overflow near the top of the unit. In some systems, a mechanical mixer induces the centrifugal effect.