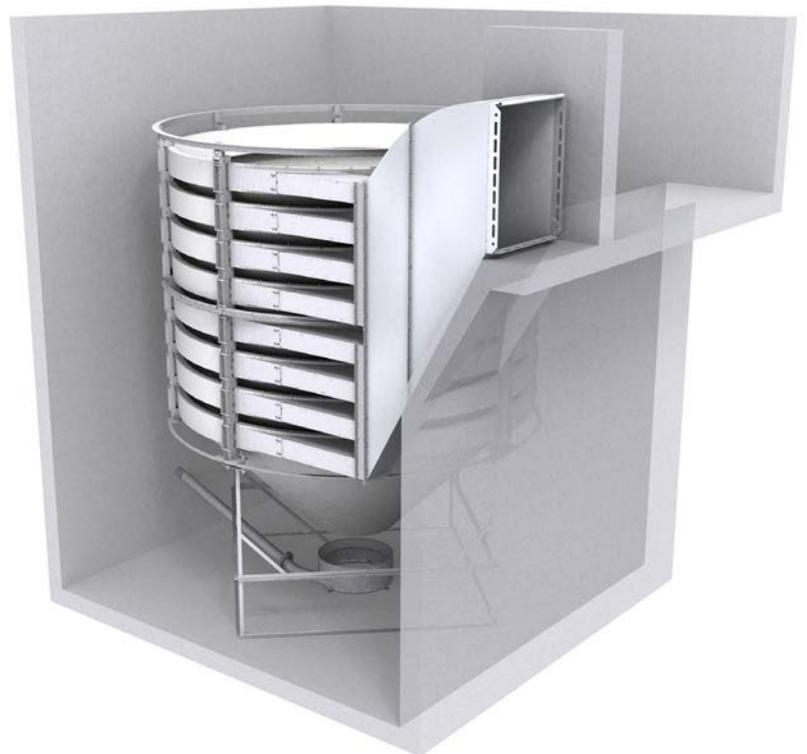


Detailed Information Package

HeadCell®

Stacked Tray Grit Separation



Massive surface area in a small footprint provides industry leading performance.

Wastewater Information Package - Introduction

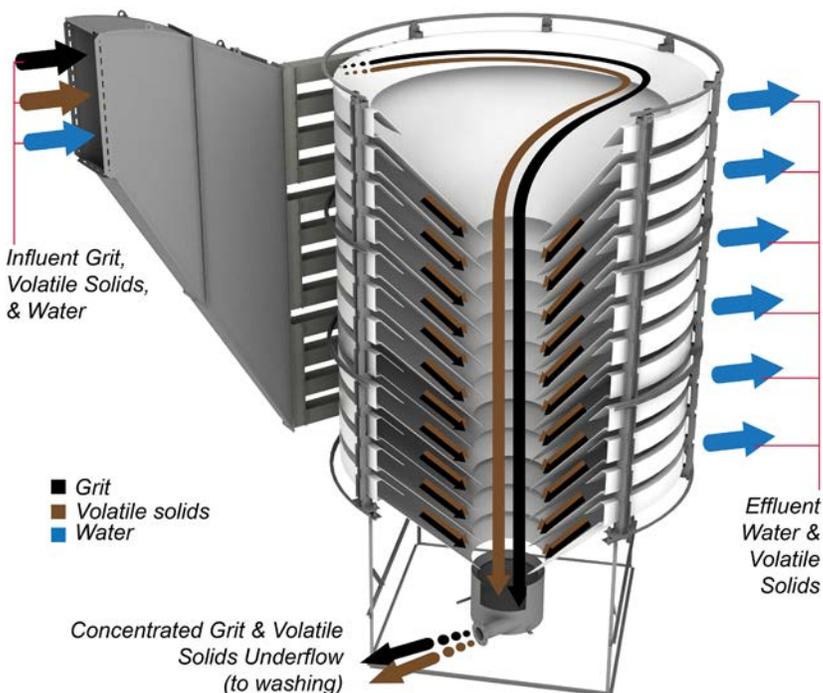
The HeadCell® provides high performance grit removal in a small footprint. The HeadCell® is a modular, multiple tray grit and settleable solids concentrator. It can be sized to remove grit cut-points as small as 75 microns (μm) with minimal headloss. The HeadCell® multiple tray grit separator was developed in 2000 by inventor Dr. George Wilson, founder of Systems (now a part of Hydro International). The HeadCell® optimizes the capture of grit and settleable material by maximizing surface area, minimizing settling distances and minimizing hydraulic inefficiencies. The HeadCell® provides sufficient surface area to ensure capture of fine and light grit particles in a low headloss process that easily fits into a gravity flow regime. The HeadCell® is all-hydraulic with no moving parts. Today, there are over 400 HeadCell® units installed worldwide.

HeadCell® Process Description

The stack of hydraulically independent polyethylene trays are supported by a stainless steel framework and submerged in a concrete chamber. Flow is introduced to the chamber via gravity, downstream from a $\frac{3}{4}$ " (20 mm) or finer screen, with a typical upstream channel velocity of 2-3 ft/sec (60-90 cm/s) at maximum flow. The channel directs the flow into the influent distribution header which is designed to match channel size and water depth. The influent distribution header feeds the manifold which evenly distributes influent tangentially into the multiple-tray system. Tangential feed establishes a forced vortex flow pattern where solids settle by gravity into a boundary layer along the sloped surface of each tray and are slowly swept to the center opening. The center opening of the trays allows the grit to settle into a single sump located below the center of the unit. The settled solids are pumped from the grit sump to a washing and dewatering system.

Degritted effluent flows out of the space between the trays and into the surrounding basin. The effluent typically discharges from the grit chamber over a weir, which can be located on any side of the basin, and into an effluent trough. Headloss is normally less than 12" (30 cm) through the HeadCell at peak flow.

HeadCell® Process Illustration



HeadCell® Technical Information

The trays are available in four sizes. Tray diameter and the number of trays are project specific based on flow, design particle cut point and equipment layout. Using a combination of number and diameter of trays, the HeadCell can be sized for cut-point capture of 75, 106, 150, and 212 μm grit (2.65 specific gravity). The stack of trays is fully submerged in a square or existing basin located either above or below grade. Collected grit is continuously fluidized and pumped to a washing and dewatering system. The HeadCell is supplied with a globe valve (to regulate the system water flow rate to the grit collector), a ball valve (for shut off), and a flow meter.

- Handles peak flows from 1-50 Mgal/d (40-2200 L/s) in a single stack of trays
- Tray sizes available: 4', 6', 9' and 12' (1.2, 1.8, 2.7 and 3.7 m) diameters
- Trays are LDPE
- Frame, grit sump, and inlet manifold are stainless steel
- Valves are bronze

HeadCell® Details

Performance

- Guaranteed removal of 95% of all grit 75 µm (specific gravity 2.65) and larger

Applications

- Protect plants with highly efficient downstream processes such as Cannibal® systems, fine bubble aeration, centrifuges, digesters, etc.
- To protect advanced biological processes such as BNR, MBR, ENR, and SBR
- Upgrade performance at existing plants
- New construction where no primary clarifier is present
- Space confined/limited facilities
- Protect advanced biological processes
- Protect sludge processing equipment

Design Considerations

- Plant water is used to continuously fluidize the grit sump
- The grit pump can be supplied by Hydro International or by others. The grit pump should be located as close to the HeadCell as possible to minimize suction length
- Smaller capacity HeadCell units can be supplied and/or installed in a stainless steel tank
- The settled grit will have organics settled with it and will require grit washing and dewatering equipment. In most cases the washing system is the SlurryCup or TeaCup and dewatering is handled by a Grit Snail



Key Features

- The inlet manifold receives flow from the influent channel and distributes flow evenly to each individual tray
- The stacked trays provide a large amount of surface area, structure the flow, and minimize settling distance in a small footprint
- A single grit collection sump is located at the bottom center of the unit

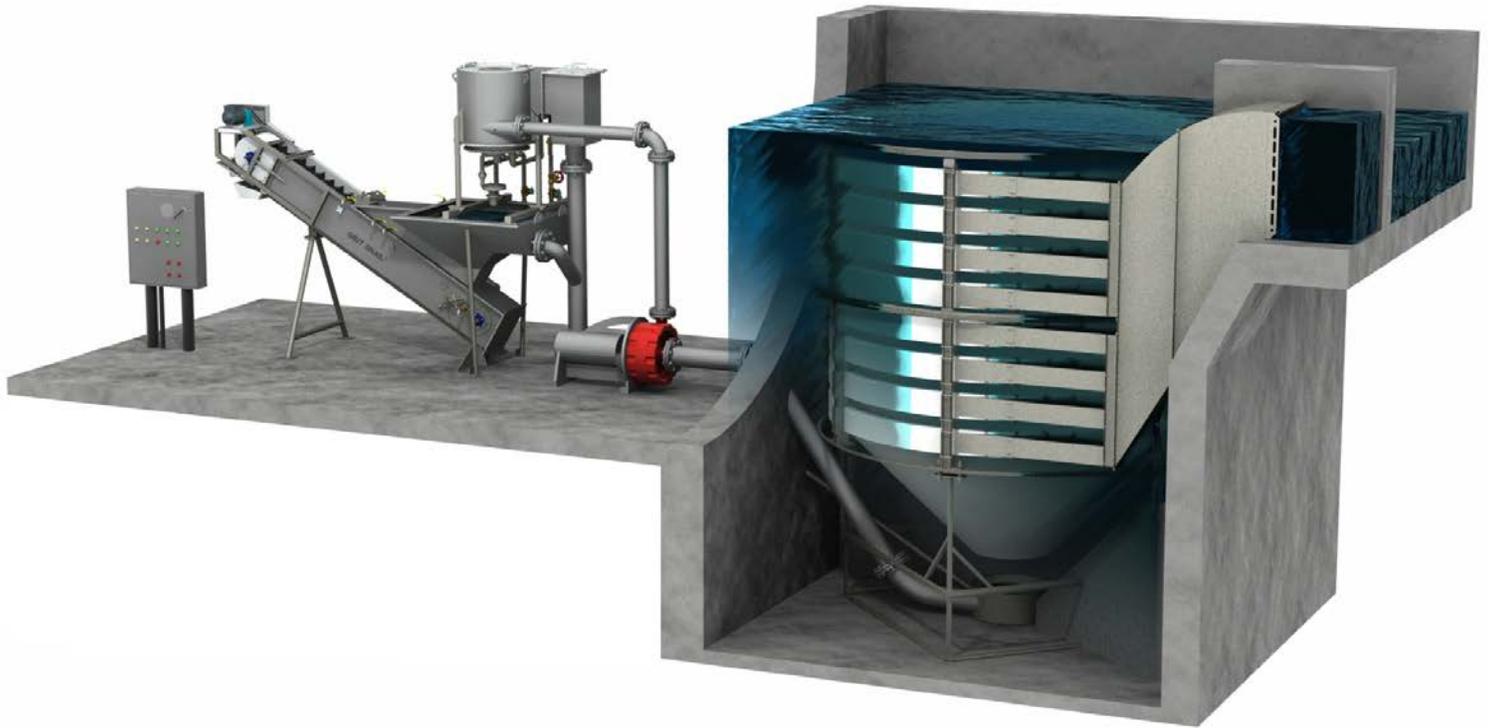
Performance

- Guaranteed removal of 95% of all grit 75 µm (2.65 specific gravity) and larger.
- When supplied as a complete system Hydro International will guarantee 90% removal of all grit as small as 75 µm and delivery of a product containing less than 20% organics and more than 60% TS

Advantages

- Structured flow with short settling distances eliminates inefficiency and increases grit capture
- High efficiency advanced grit (75 µm) removal
- Large surface area with a small footprint effectively utilizes space
- Evenly split flows eliminate thermal short circuiting
- Continuous boundary layer flow over hydrophobic surfaces minimizes grease build-up and keeps trays clean
- All-hydraulic design with no moving parts ensures long component life with minimal wear
- Sized for peak flow and peak grit loads
- Virtually no turndown ratio limitations
- Modular and expandable
- Retrofits into existing aerated grit chambers or equalization basins when sufficient depth is present





The Ideal Retrofit Solution

The unique stacked tray configuration of the HeadCell makes it the ideal technology for retrofitting into existing structures to increase performance.

In wastewater treatment projects, costs resulting from construction, permitting, financing, and civil design work can be as much as 75% of total project costs. With equipment costs typically only 25%, maximizing the use of existing structures can significantly lower overall project costs. When plant space is at a premium one of the best options for many plants is to use existing tankage for alternative uses. In these cases, process technology is evaluated by its ability to fit within reusable tanks or fit within available plant space. Grit removal systems are no exception.

As many plants look to upgrade their grit removal process, reusing existing tanks or aerated grit chambers for retrofit with the HeadCell system is an excellent option. Using stacked, conically shaped trays allows a significant increase in settling surface area. Increasing surface area allows higher hydraulic capacity in a given footprint while also targeting finer grit particles. Depending on the system configuration, grit particles as fine as 75 μm can be effectively removed in the same space as the original aerated grit chamber with improved performance and much lower energy costs.

Why Pay More for Advanced Grit Management?

- Advanced Grit Removal
(Removes 70-90% of total grit load)
 - Higher equipment cost
 - Lower installation cost
 - Smaller footprint
 - Slightly higher total installed cost
- Costs of Conventional Grit Removal / Impacts
(Removes 30-50% of total grit load)
 - Aeration basin cleaning (\$25-200K)
 - Digester cleaning (\$50-500K)
 - Clarifier rebuild (\$50-400K)
 - Centrifuge repairs (\$25-250K)
 - Process offline for cleaning (\$20-250K)
- Any single Grit Impact could quickly pay for the additional cost of an Advanced Grit Removal system.



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