Oldcastle Infrastructure™
A CRH COMPANY

SlurryCup™

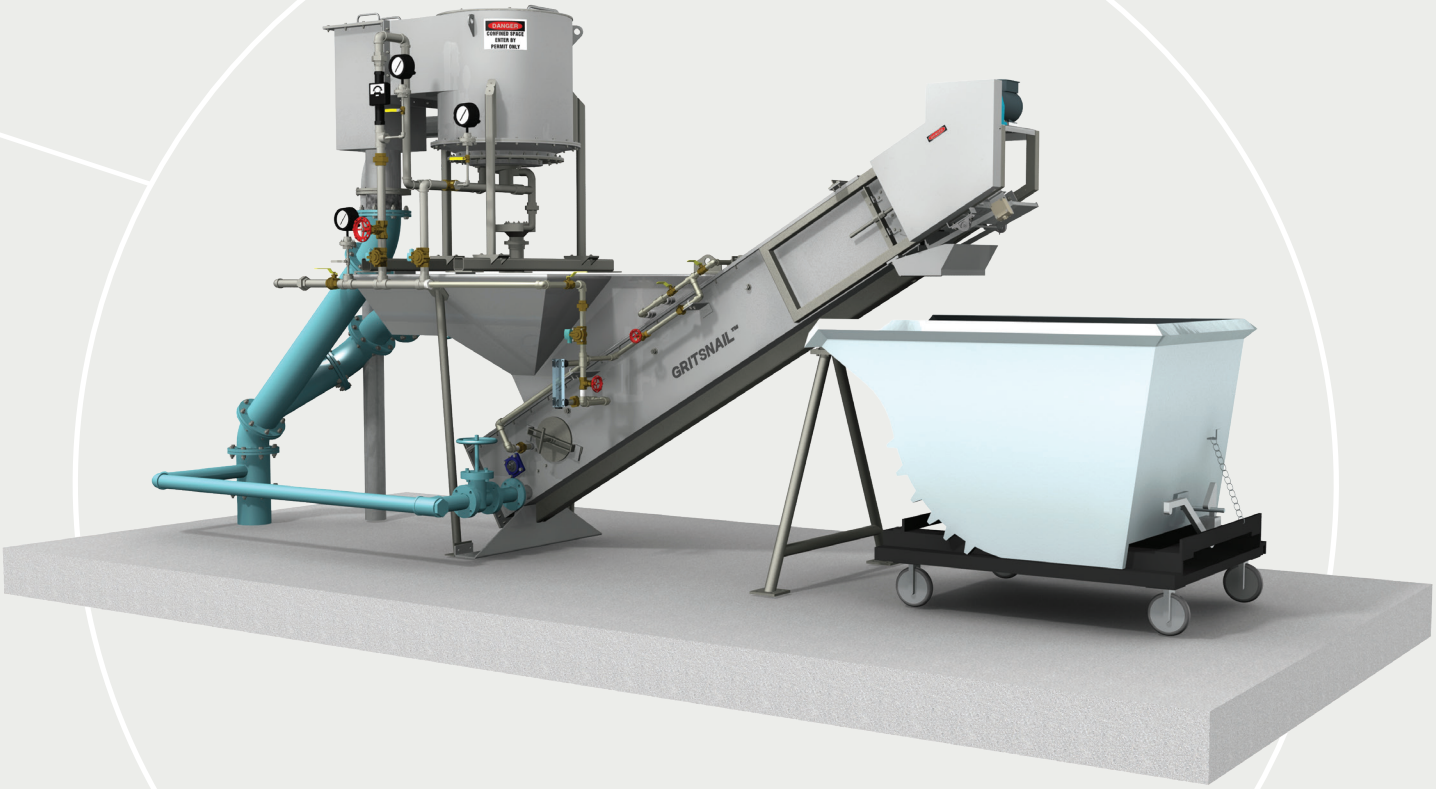
Grit Washing and Sludge Degritting

Engineered by Hydro International

SlurryCup™

Increasing performance as flows increase.

The SlurryCup™ system is a highly efficient process used to capture, classify, and remove fine grit, sugar sand, and high density fixed solids from grit slurries. Engineered by Hydro International, the SlurryCup also effectively removes grit from both primary and secondary sludge.



SlurryCup™ / Grit Snail® I System

Performance

- Removes 95% of grit particles 75 µm and larger at the design flow rate
- Less than 15% volatile solids and greater than 60% total solids when used with an Oldcastle dewatering system

Applications

- Grit washing at WWTP headworks
- Primary and secondary sludge degritting
- Continuous grit discharge

Benefits

- Industry leading performance
- Boundary layer grit washing cleans and retains fine grit particles
- No moving parts and no power needs
- Durable 304 or 316 stainless steel construction
- Reduces downstream deposits and mechanical wear

Design Notes

- Increasing performance as flows increase
- All hydraulic design with no internal moving parts is simple to operate and ensures long component life
- Large diameter easily handles peak flow grit volumes
- Hydraulic valve provides secondary grit washing

Capacity

- Handles flow of 150 to 1,000 gpm (9.5 to 63.1 L/s)
- Two SlurryCup™ units can be mounted on a single Grit Snail® clarifier to increase capacity
- Solids concentrations up to 1.5%
- Sizes from 24” to 56” (0.61 to 1.42 m) diameter

Configurations

- Inlet and outlet can be oriented to accommodate many piping configurations
- The system can be provided with an optional maintenance access platform

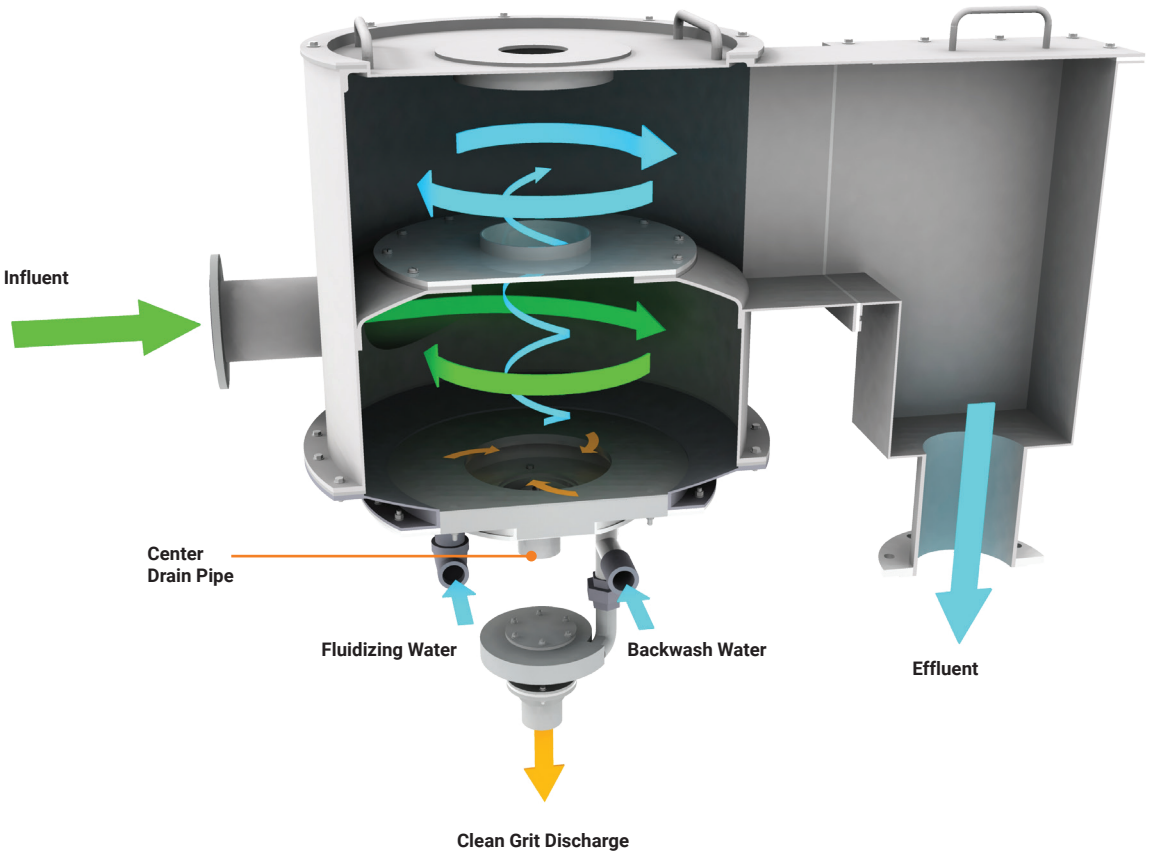
Visit the SlurryCup™ product page to learn more. SlurryCup™

How it Works

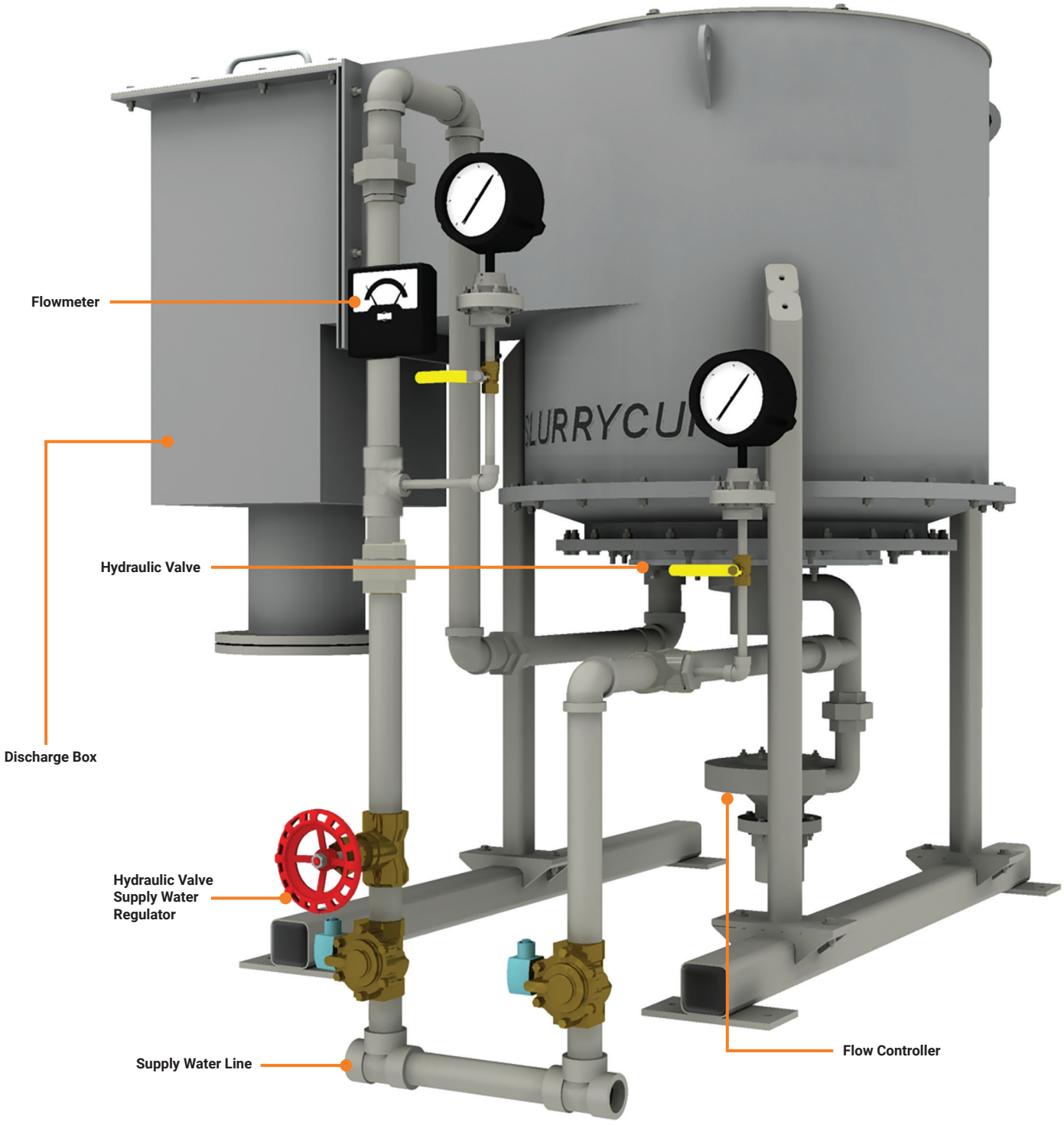
Flow enters the stainless steel vessel tangentially at a controlled rate and velocity. The flow regime established in the device forms an open free vortex which results in high centrifugal forces and a thin predictable boundary layer. Grit is forced to the outside perimeter or held in suspension until it falls by gravity into the boundary layer which sweeps the grit, but not volatile solids, into the collection chamber at the bottom of the unit.

The concentrated slurry exits the vessel through a hydraulic valve where a secondary wash occurs prior to discharge. Two levels of washing produces clean grit ready for dewatering. The water containing the volatile solids exits from the overflow through the discharge box for additional treatment by downstream processes.

SlurryCup™ Flow Pattern



SlurryCup™ Components



Case Study

SlurryCup™ / Grit Snail® Sludge Degritting
22 years of sludge degritting and still running strong

Owner

North Shore Water Reclamation District (NSWRD)

Hydro Equipment

Two (2) 46” (1.2 m) SlurryCup™ Sludge Degritting Units

One (1) 4 yd^3/hr Grit Snail® Dewatering Escalator

Project Parameters

90% removal of all grit 75 µm and larger at Peak Flows

28 Mgal/d (1,200 L/s) Peak Daily Flows

Objective

With the degritting process accomplished by grit tanks, an aged technology, the water reclamation facility was facing numerous maintenance intensive impacts from grit throughout the plant that they wanted to avoid.

Solution

The small footprint SlurryCup / Grit Snail sludge degritting system provided the performance they required in this challenging application.

Project Background

The Clavey Road WRF is located in Highland Park, Illinois; a suburb 25 miles north of Chicago. The facility is located next to a distinguished 27-hole private country club, with two other golf courses just north of the facility. To the south sits the Chicago Botanic Garden which has 50,000 members and is Chicago’s 7th largest cultural institution as well as the city’s 12th largest tourist attraction.

Additionally, the facility is located in a prestigious residential neighborhood just a little over a mile from the shore of Lake Michigan. These factors require extra attention to the facility’s daily operations including the odor control process.

The facility is run by the North Shore Water Reclamation District (NSWRD), the second largest utility in Illinois which serves over 300,000 people. The Clavey Road WRF discharges into the Skokie River which is a tributary of the North Branch of the Chicago River.

The facility was built in the 1950’s and processes 28 Mgal/d (1200 L/s) during peak flows. Clavey Road WRF has ¼” screening prior to influent being sent to their primary clarifiers. These clarifiers also act as their grit removal system. This was leading to significant amounts of grit in their primary sludge as well as causing detrimental impacts to other downstream processes.

Gurnee and Clavey’s Sludge Degritting Systems After Initial Start-up in 1998

The Problem

Grit particles that settled in the clarifiers would reduce the operating capacity of their clarifiers until eventually they would need to be taken offline to manually clean out the grit that had accumulated in the basins.

Additionally, grit would bypass the clarifiers and end up in their aeration basins. Grit would gradually smother the diffusers and increase the facility's energy consumption until it got to a level where these too would have to be cleaned out.

Sludge from the primary clarifiers would be sent to their sludge thickening processes prior entering digestion. Grit that was trapped in their sludge would not be processed in the digesters, it would just take up space which degraded digestion performance. Eventually, these digesters would also need to be taken offline and manually cleaned out. Additionally, during all of the various grit clean-out tasks, odor issues would increase when formerly submerged processes were drained.

Tired of the necessity of these onerous cleaning processes as well as the frequency, NSWRD required a better solution.

Clavey Road's Sludge Degritting SlurryCup / Grit Snail System in 2021

The Solution

In 1998, the facility installed a SlurryCup / Grit Snail sludge degritting system from Hydro International, now a part of Oldcastle Infrastructure to help keep impacted processes operating at peak capacity and extend the amount of time between required cleanings. At the same time, NSWRD also installed a nearly identical sludge degritting system at their Gurnee, Illinois facility just 17 miles to the north. Both systems consists of two (2) 46" SlurryCup systems mounted on a single 4 yd^3/hr Grit Snail dewatering escalator.

At the Clavey Road facility, operators have optimized operation of the system and run only one of the SlurryCup units during dry weather while both SlurryCup systems operate during wet weather events when grit loads entering the plant spike. This allows the plant to optimize operation of their sludge thickening unit.

Installing the new sludge degritting solution significantly reduced how frequently they would need to clean out the clarifiers, digesters, and aerated grit basins. With the new system they only need to clean out their clarifiers once every 2 years and their aeration basins every 4-5 years.

Downstream of their sludge degritting system, they see just a fraction of the grit entering downstream processes than they had previously. When reached for comments, the Director of Operations for NSWRD said that "The [sludge degritting] system has worked quite well for us for over 22 years."

Clean, Dry Grit Output from Clavey's Sludge Degritting Solution

System Advantages

- Over 90% removal of all grit 75 microns and larger
- Removes as much as 20X more grit than a conventional cyclone / classifier system
- First flush solids handling capacity minimizes grit loss
- Low organic content (< 20% VS) of classified grit, reduces volume going to disposal
- 60% total solids content in output grit
- Enclosed system improves odor control
- Significantly reduces O&M costs
- SlurryCup / Grit Snail sludge degritting is a proven, tested technology with a long history of operation

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