

Which Advanced Grit Management® system is right for you?



Choose Your Weapon for the War on Grit

The SlurryCup™ and TeaCup® units are both used for washing and classifying grit collected by a headworks grit collection unit. The units operate similarly but are applied somewhat differently. Both utilize a high energy vortex flow regime, where centrifugal forces are much higher than gravitational forces which reduces the device's reliance on gravity, extends particle residence time, enhances separation and minimizes short-circuiting. Additionally, the vortex motion generates a sweeping action in the boundary layer on the base of the vessel to move captured material to a central location for collection.

Advanced Grit Washing & Classification Comparison Points		
SlurryCup™		TeaCup®
Headworks grit washing Sludge dewatering	Applications	Headworks grit washing Grit removal Snail shell removal Sand removal at water treatment plants
95% removal of grit ≥ 75 micron	Performance	95% removal of grit ≥ 75 micron
< 15% Volatile Solids	Output Grit	< 20% Volatile Solids
Continuous discharge	Grit discharge	Intermittent or continuous discharge
1% TS inlet typical, 1.5% max.	Inlet Concentration	1% TS inlet typical, 1.5% max.
8 - 11'	Headloss	2 - 10'
No moving parts within vessel	Mechanical Components	No moving parts within vessel
150 - 1,000 gpm	Max. Flow in a Single Unit	70 gpm to 8 mgd
25-30 gpm continuous, plus 40-50 gpm intermittently, typically 20-30 sec every 2 hours	Water Requirement (50 psi)	30-50 gpm, 1-2 minutes every 2 hrs
1/8" smallest internal orifice	Clearances	3/4" smallest internal orifice

When Would I Choose SlurryCup™ over TeaCup®?

The SlurryCup™ produces grit slightly cleaner than the TeaCup® but requires a continuous water supply, has higher headloss and has tighter internal clearances. The SlurryCup™ is a good option for larger plants, peak flow > 10 mgd, as sufficient NPW is often available and a continuous discharge of clean grit is produced. When sufficient NPW is not available or screens larger than 1/4" are used, the TeaCup® is recommended. Both are very effective at retaining fine grit.

When Would I Choose the TeaCup® over the SlurryCup™?

Smaller plants, < 10 mgd peak, may benefit from the reduced water requirement. Using less water results in slightly higher volatile solids in the output grit. The TeaCup® is less expensive than the SlurryCup™ which can also benefit smaller plants and budgets. The TeaCup® also offers the option to store collected grit in the bottom cone, discharging intermittently. When sufficient head is available and peak to average flow is within a 3:1 turndown the TeaCup® can be used for both grit collection and washing or for sand removal from surface water, prior to treatment at water treatment plants.

What is Boundary Layer Washing (Classification)?

In a high energy or open, free vortex flow regime a boundary layer or friction layer develops between the rotating vortex and the horizontal bottom of the unit, the thin predictable boundary layer provides a very effective way to separate organic and inorganic particles. The slower moving boundary layer is deep enough to envelop and capture grit particles but is too thin to retain organic particles settling at the same velocity. Organics tend to be less dense and therefore larger, they are not enveloped in the boundary layer but exposed to the turbulent vortex above. The boundary layer moves towards the center of rotation, hydraulically sweeping the captured grit particles to a central collection point without need for mechanical elements that would be subject to abrasive wear. See boundary layer illustration below.

What is the Hydraulic Valve on the SlurryCup™?

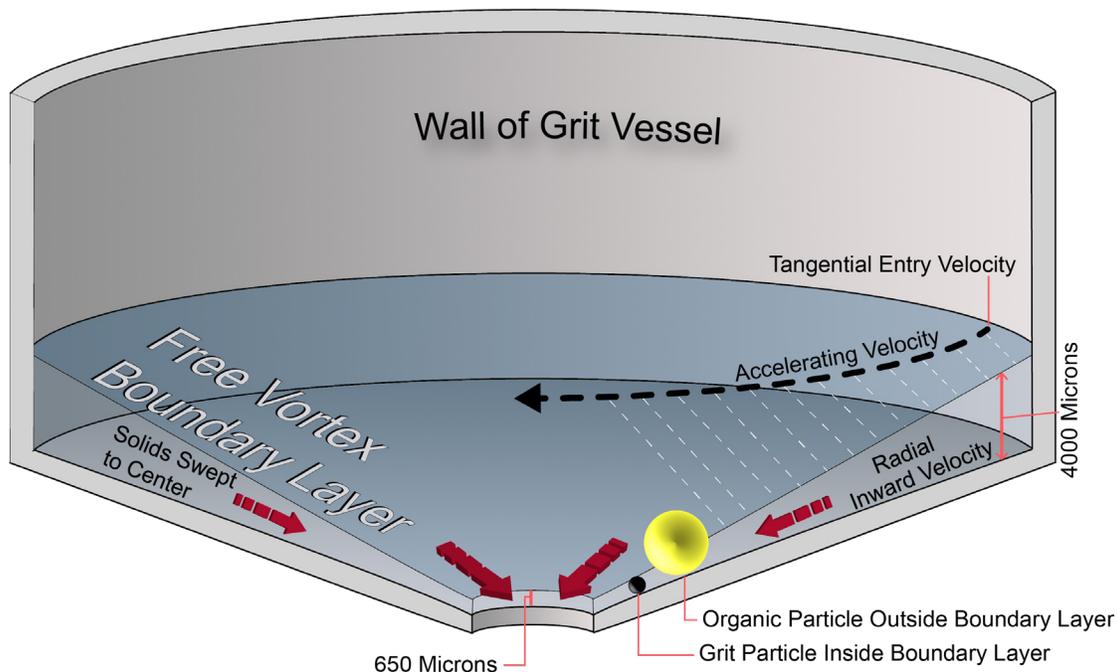
Grit moves in the boundary layer, across the bottom of the unit which is the surface of the baffle ring, passes through the baffle gap, under the baffle into the spin chamber and out of the bottom of the SlurryCup™ as a concentrated slurry. The baffle isolates the spin chamber from the rotating mass of liquid preventing resuspension of captured grit. Non-potable water enters the hydraulic valve to pressurize the spin chamber and produce a water curtain at the baffle gap, preventing organics from flowing through the gap while allowing grit to be rinsed as it continuously exits the SlurryCup™. The clean grit slurry passes through the grit slurry outlet and vortex flow controller to the dewatering unit. The flow controller limits the underflow rate to avoid overloading the clarifier area of the dewatering unit. The baffle has a 3" center opening to allow large debris to be automatically and periodically removed during the blowdown sequence.

Cups Past and Present

The TeaCup® has been used for grit collection, washing and classification since 1982 and the SlurryCup™ has been used for grit washing and classification and sludge dewatering since 1994. Over decades of use, numerous improvements have been made to the design, application and operation of these products driven by experience, field and lab testing and customer feedback. Today's products are more durable, easier to operate and less prone to plugging than the original products, while still providing effective grit capture, washing, and concentration.

The TeaCup® was originally supplied in mild steel with a 2" underflow connection which could plug under heavy grit loads and from large debris. The installing contractor provided the controls and underflow piping. Hydro now supplies the equipment in stainless steel, with a minimum 3" underflow connection and provides the underflow piping as well as controls to reduce the potential for plugging and automate the underflow sequence ensuring the system is operated correctly.

The SlurryCup™ now includes a larger hydraulic valve to handle higher grit loads and automated backwash and blowdown sequences to keep the baffle gap clear and purge larger material from the system. The inside bottom and lower vertical wall of the unit are now coated with Belzona, a high strength, abrasion resistant, polymeric coating adding a secondary layer of abrasion resistance. And finally, we now require 1/2" or finer screening prior to all of our grit equipment to reduce the potential for plugging.



Learn more

To learn more about how **Hydro International's Advanced Grit Washing Solutions** can improve your plant, visit hydro-int.com, or contact us:

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