Black Clawson
Liquid Cyclone
Ruffclone

A free vortex type separator for efficient removal of contaminants such as dirt, grit, glass, sand, pins, bolts, staples and foil from all types of paper slurries at consistencies from 0.1 to 6.0%.

Available in a wide range of sizes to accommodate flows ranging from 100-10,000 GPM (360-380,000 lpm) per unit. the Liquid Cyclone is field proven, with over 1500 units in operation.

The Liquid Cyclone is specifically designed for removal of high and medium specific gravity contaminants from stock slurries up to 6.0% consistency and is available with both automatic and manual reject systems. The non-plugging features permit continuous operation with a minimum of operator attention. No continuous bleed-off is required. Stock losses are kept to an absolute minimum.

Arrangement is vertical, in four or five sections, for convenient servicing, minimum floor space, and easy replacement of individual components. Both manual and automatic models are self-supporting; all required structural steel is supplied with the unit. Automatic reject models can also be wall mounted at any convenient height, or floor mounted with the reject chamber below the floor. Rejects may be discharged into a trough or box, above or below the floor. Both Liquid Cyclones and Ruffclones have no moving parts, and no continuous reject stream. Rejects are discharged virtually fiber-free.

Stock enters the Liquid Cyclone through a tangential inlet having a downward slope. Accelerated centrifugal action is affected as the stock spirals downward along the wall contour toward the small end of the cone. The undesirable particles, grit, dirt, metal, etc., are forced to the outer wall and carried down and out at the bottom of the cone into a stilling chamber. Here, they are washed and good fibrous material which may have been carried along is reclaimed. Reject material is collected in the chamber at the bottom; cleaned fibers spiral up and exit out the vortex finder at the top of the unit.

The cone cartridge contains both upper and lower cones of CYRAM material cement packed in a steel jacket and flanged at each end. The upper cone section is the separation or cyclone area where reject material is separated by centrifugal action. Below is a modified cone, square in cross section at the top and round at the bottom. Dirt, and any good fibrous material which has been rejected downward with it, is decelerated and washed in this lower cone. The rejects settle into the reject chamber and the good fiber passes back up into the cyclone. There is very little fiber loss and it is extremely difficult to plug the unit.

APPLICATIONS:
In addition to secondary fiber applications, Liquid Cyclones are suitable for:

1. Preceding refiners...for plate protection
2. After refiners...for protection from broken plates
3. Deflaker protection in a broke system
4. After the blow tank...for rock and metal removal
5. In a groundwood system for grinder grit removal
6. Ahead of primary and secondary screens...for tramp metal protection
7. Removing sand from chip washer water
8. White water cleaning
9. On batch or continuous waste paper pulper discharge pumps
10. Anywhere grit is encountered

Liquid Cyclone or Ruffclone accept recirculation loop maintains constant discharge pressure for direct feeding a pressure screen or refiner even when downstream flow volume demand varies.
Sizing Liquid Cyclones and Ruffclones

Ruffclones generally operate in the 5-15 psi (35-105 kPa) pressure drop range, and remove nuts and bolts, staples, rocks, paper clips, and other large and heavy objects, at consistencies up to 6%.

To select the proper size Ruffclone for your application, find the flow volume and desired pressure drop in the Ruffclone range of this chart.

Liquid Cyclones generally operate in the 15-35 psi (105-238 kPa) pressure drop range, and remove metal clips, glass, sand, metal foil, and other small, heavy debris and abrasives from water and stock at up to 5% consistency.

To select the proper size Liquid Cyclone for your application, find the flow volume and desired pressure drop in the Liquid Cyclone range of this chart.

Remember:
- Both Liquid Cyclones and Ruffclones clean more efficiently at lower consistencies and higher pressure drop ranges.
- If constant outlet pressure is desired (for direct feed into a pressure screen, refiner, etc.), then size the feed pump for your maximum flow volume plus 10-20% for recirculation.
- 10-100 gpm (38-380 lpm) of elutriation water is added to wash the fiber from the rejects. Elutriation water pressure should be 10 psi (70 kPa) higher than feed pressure.