Eriez’ CrossFlow Separator is a highly efficient hydraulic classifier for the separation of material based on particle size, shape and/or density. This technology can also be used for desliming, counter-current washing and acid neutralization of minerals.

The CrossFlow separates particles based on hindered-settling principles providing an economical and efficient means of classifying material such as silica and frac sands, mineral sands and industrial minerals.

Ores containing a mixture of high- and low-density components can also be upgraded based on their difference in specific gravity. Examples include iron ore, and heavy mineral with silica contamination and run-of-mine coal containing various ash-forming components such as rock and pyrite.

The hindered-settling environment creates the optimum conditions for efficient counter-current washing to rinse, clean, and neutralize ore prior to secondary unit operations.

Applications include:
- Sizing and Classification
- Density Separation and Concentration
- Washing and Neutralization of Minerals

At this processing plant, four CrossFlow Separators are classifying phosphate matrix in a split-feed flotation plant.
Unlike traditional teeter-bed technologies, the Eriez CrossFlow uses a unique “tangential” feed presentation system to introduce feed into the top of the separation chamber. This novel approach can provide unit capacities up to three times that of a conventional classifier and eliminates particle misplacement caused by excessive feed volume and plant fluctuations.

In the CrossFlow, feed particles descend against a rising flow of teeter water established by a uniform system of water injection pipes located in the base of the main separator housing. Based on the settling characteristics of the ore and the water addition rate, a fluidized bed of solids is established in the separator.

Particles with a low settling velocity (fine/low density) that cannot penetrate the teeter bed are carried over the top of the separator with the bulk of the fluidizing medium. Particles with a high settling rate (coarse/high density) settle through the fluidized bed and are eventually discharged at a high solids content through the underflow control valve.

CrossFlow Features

- High capacity
- Precise, efficient classification
- Improved efficiency with fluctuating and/or dilute feed streams
- Easy, on-line cut-point control using true density measurement
- Fully automated discharge control system
- Dewatering cone for consistent underflow discharge characteristics
Traditionally, particle size and/or density cut-point has been controlled by adjusting only the fluidization flow rate and the relative level of the teeter bed. More recently, Eriez engineered a superior control system that improves metallurgical results by regulating the true density of the teeter bed through continuous measurements of differential pressure.

This approach better handles the continuous changes in feed stock characteristics such as pulp density, mineralogy and particle size distribution. As a result, the CrossFlow is better able to deliver a continuously efficient separation.

3.6x3.6 meter (12x12 ft) CrossFlow Separator for the classification of potash prior to a split feed flotation circuit.

2.2x2.2 meter (7x7 ft) CrossFlow Separator for the recovery of fine tungsten.

CrossFlow Separator installation for the recovery of heavy mineral.

One of many ways to provide feed to the CrossFlow. In this case, cyclone underflow is discharged directly into the ceramic-lined feed box of a 3x3 meter (10x10 ft) CrossFlow Separator.
## CROSSFLOW SEPARATOR SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>DESCRIPTION</th>
<th>DIMENSIONS (W x L x H)</th>
<th>APPROX. WEIGHT</th>
<th>CAPACITY*</th>
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<td>MM</td>
<td>KG</td>
<td>LBS</td>
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*Please note that all capacities are in long tons.

For more information, visit flotation.eriez.com
APPLICATION: PARTICLE CONCENTRATION

Hindered-bed separators can concentrate particles based on size, density and shape. With feed stocks having a relatively tight size distribution, separations based on density and shape can be successfully achieved.

Common applications include removing rock (SG 2.65) from coal (SG 1.35), upgrading iron ore, and the removal of silica from heavy-mineral concentrates. In addition, minerals such as mica can be separated from ores such as phosphate and sand due to its flat shape.

- High-density rock (left) has been removed from a low-density coal (right).
- Removal of mica from a phosphate ore based on particle shape characteristics.
- Silica removal from heavy mineral concentrate prior to dry beneficiation.
- Lab test showing highly efficient teeter-bed separation.

![Graph](image)

Partition curve from an industrial unit showing a low gravity cut (SG<sub>50</sub>) and efficient separation of rock from a coal feed stock.

Comparison of teeter-bed separator to spiral concentrator for upgrading 2.0x0.150-mm coal showing superior performance of the CrossFlow with respect to the washability curve.
**APPLICATION: SIZING/CLASSIFICATION**

Minerals can be separated based on particle diameter when treating feed stocks having a consistent density but a wide size distribution.

The novel CrossFlow feed presentation system improves upon the already quiescent hindered-settling environment of a teeter-bed separator. As a result, very efficient size cuts can be provided when treating mono-density feed stocks such as those found in silica sand, frac sand, and phosphate matrix.

![Typical Classification Curves](image)

This graph shows the typical size distributions generated during normal operations using two CrossFlow Separators in series to produce 3 tightly-sized product streams for a frac-sand application.

![Examples of particle size separations](image)

**APPLICATION: WASHING**

In the CrossFlow separator, particles settle against a countercurrent flow of fluidization water. As a result, this quiescent, plug-flow system provides an excellent method for rinsing, cleaning and washing material.

The CrossFlow provides an efficient method for acid neutralization where particles are continuously washed by fresh teeter water. One such example is for treating low pH zircon which can be rendered neutral in a relatively small foot print while generating a minimum amount of acidic liquor.

For more information, visit flotation.eriez.com
WORLD AUTHORITY IN ADVANCED SEPARATION TECHNOLOGIES
Customer-Focused Service Spanning the World of Minerals

Eriez Flotation Division is committed to providing state-of-the-art equipment and process solutions for new and existing projects worldwide. We understand and quickly respond with integrity, competence and effectiveness to the needs of our clients. Our versatility is demonstrated by the diversity of our engineering services and the varying sizes of projects we have successfully completed around the world.

Contact the nearest Eriez Flotation Division office for technical support or design engineering to suit your specific application.

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