

# Krebs Water-Only Cyclones for Coal

## Overview

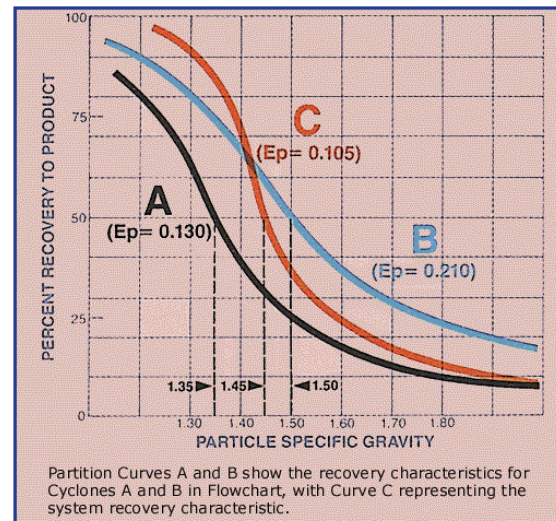
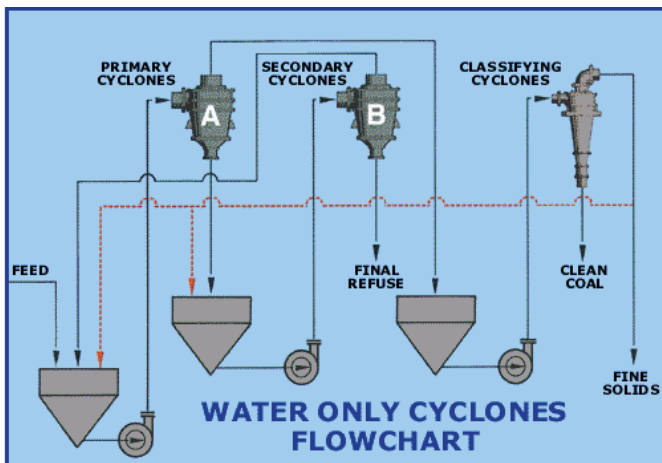
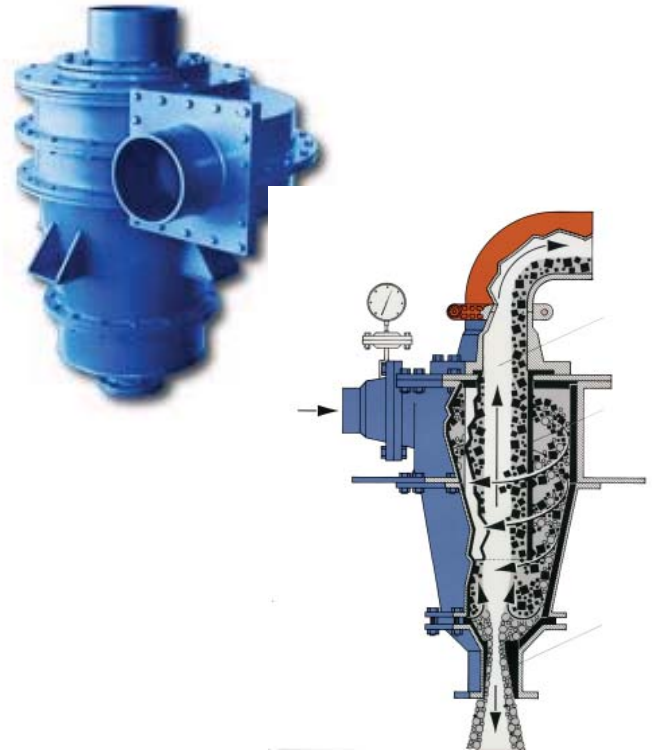
Water-Only Cyclones are used to “clean” (or “wash”) raw coal. This cyclone design relies on the fact that the mineral matter is denser than coal. In this case the truncated cone bottom allows a refuse bed to form which rejects lighter coal particles, while a relatively long vortex finder “vacuums up” the light coal particles.

A characteristic of this design is that some coal losses take place through the apex because larger coal particles are classified. This problem can be eliminated by using a 2-stage water-only cyclone circuitry where primary losses are re-cleaned in secondary cyclones. A much more efficient system results as shown in the partition curve graph.

Finer coals must be cleaned in smaller diameter cyclones, otherwise the drag forces in larger diameter cyclones cause all the fine particles to report to “clean coal”.

Pressure and feed density affect the separating gravity.

One can easily adjust separating density with apex size.



**# 3-204-KEW**

Krebs Water-Only Cyclones - Typical Operating Conditions							
Krebs Model Number	Maximum Feed Size	Finest Effective Size	Dry Feed STPH Range	Pulp Flowrate GPM Range	Pressure Drop PSI Range	Maximum Percent Solids	
						WT%	VOL%
D10LB-S-218	10 Mesh	100/150 Mesh	4-8	190-260	8-15	10	7
D15B-S245	1/8-in.	65/100 Mesh	12-18	400-580	10-18	12	8
D15LB-S327	1/4-in.	65/100 Mesh	12-25	510-720	10-20	12	8
D20B-S-260	1/2-in.	48/65 Mesh	25-45	820-1050	12-20	15	11
D20LSB-S-333	1/2-in.	35/48 Mesh	35-60	1100-1500	12-20	15	11
D26-S-224	3/4-in.	35/48 Mesh	50-90	1490-2200	12-22	20	15

### Liner Material for Coal Cyclones

It is FLSmidth Krebs' policy to offer the customer the most cost-effective materials available for each application. For this reason, we have several elastomer and ceramic options for the liners of each cyclone. Because the coarse, heavier materials migrate to the bottom of a cyclone and because the velocities in this region are the highest, it stands to reason this is where you would expect accelerated wear to take place. In some relatively easy applications, a nitride bonded silicon carbide ceramic apex insert along with upper liners of urethane or other elastomer is adequate to combat the wear. It's important to understand that the wearing away of upper liners before lower liners creates a ledge at the liner interface. This can cause particles that normally are spiraling downward toward the apex to be "kicked" inward toward the center of the cyclone and forced out the overflow by drag forces; this misplacement of coarse or heavy material is usually unacceptable in all applications.

Most coal applications require all wetted cyclone surfaces to be ceramic lined especially Heavy Media and Water-Only Cyclones where dense magnetite and raw coal (containing sand and rocks) impinges upon the liners. For severe applications, we may recommend that upper portions of the cyclone be protected with nitride bonded silicon carbide ceramic liners, while the lower sections and apex be protected with more abrasive resistant, high purity alumina liners. In extremely severe applications a metal/ceramic composite or a reaction bonded silicon carbide apex insert might be recommended. We suggest you discuss liner options with an FLSmidth Krebs Sales Engineer or your local Representative.


**MAIN OFFICE**

5505 West Gillette Road  
Tucson, Arizona 85743 USA  
[www.krebs.com](http://www.krebs.com)

TEL (520) 744-8200  
FAX (520) 744-8300  
EMAIL [krebs@krebs.com](mailto:krebs@krebs.com)

**EASTERN COAL SERVICE CENTER**

Elk Valley Business Park  
4998 S Elk River Rd, Suite E  
PO Box 357  
Elkview, WV 25071  
[www.krebs.com](http://www.krebs.com)

TEL (304) 965-5090  
FAX (304) 965-5093  
EMAIL [coal@krebs.com](mailto:coal@krebs.com)