

E and EL Pulverizer Modifications for Optimum Performance

Since The Babcock & Wilcox Company (B&W) introduced the E and EL pulverizers, a significant number of functional and mechanical improvements have been made. These improvements provide added benefits to our customers such as increasing availability and reliability, and reducing maintenance.

Several of these B&W improvements are described in this brochure. Also, many of these enhancements have more detailed literature available. The item number is indicated after the appropriate section. These items are available through your regional B&W Sales or Service office, or by calling 1-800-BABCOCK.

E to EL conversions

The EL-type pulverizer (Figures 1 and 2) is a higher capacity pulverizer when compared to the original E-type pulverizer of the same size. E to EL conversions have significantly improved the availability, capacity, and reliability of E-type pulverizers. The EL-type pulverizer is also much less prone to coal *dribble* problems due to an improved bottom grinding ring and throat configuration. (see Figure 3). The E-type pulverizer can be upgraded to the EL design at one time, or it can be upgraded in stages. The most economical time to upgrade to the EL design is when a grinding zone overhaul is being performed.



Figure 2

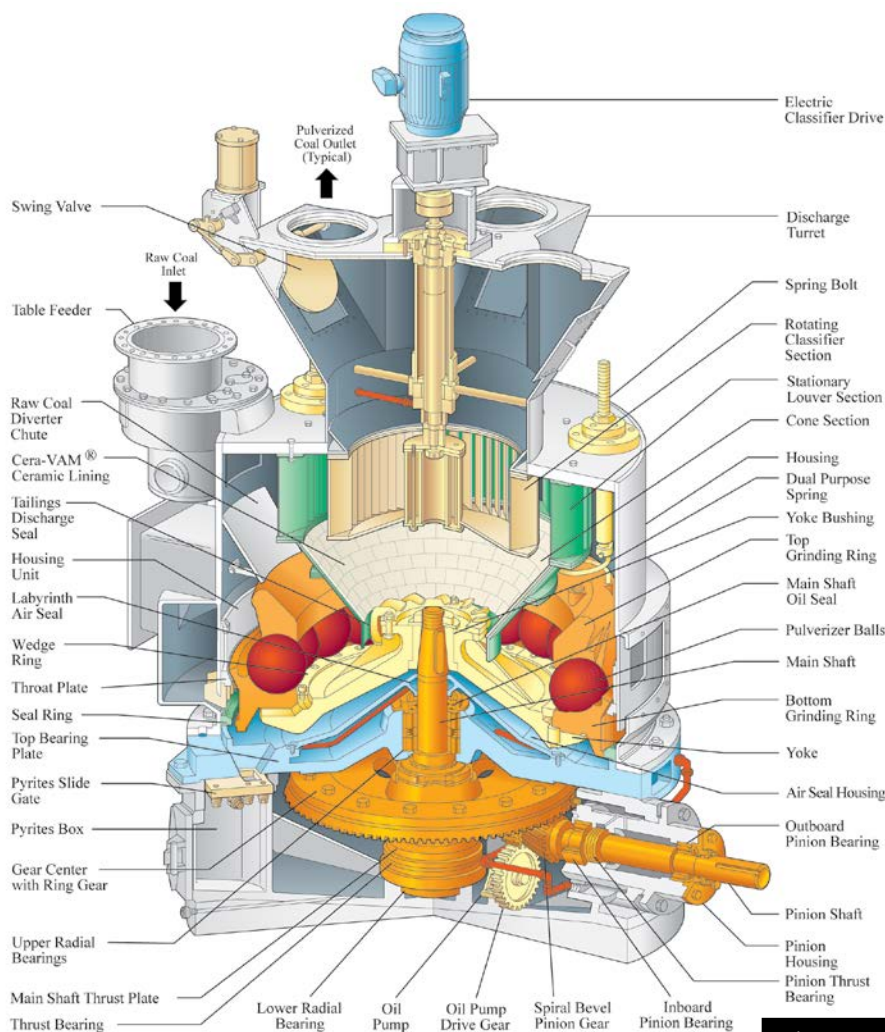


Figure 1

A complete conversion of an E-type pulverizer to the EL design typically includes a new top and bottom grinding ring, throat, relief gate, and housing units (wear plates). If the E-type mill includes a yoke-driven rotating classifier and a top ring designed for use with multi-coil springs and spider guides, the E to EL conversion would also include a stationary classifier or DSVS[®] rotating classifier, and single coil dual purpose springs and spring bolt assemblies. EL pulverizers may require larger size drive motors to grind the additional coal, as well as higher capacity primary air fans to supply the air flow needed to transport the additional coal through the mill. The existing pulverizer drive motor and fan can be retained after the retrofit is made, however, the full EL pulverizer capacity increase will not be realized.

High spin stationary classifier

Redesigned stationary classifier louver sections recirculate additional ground coal back to the grinding zone for improved fineness and/or throughput for a given fineness.

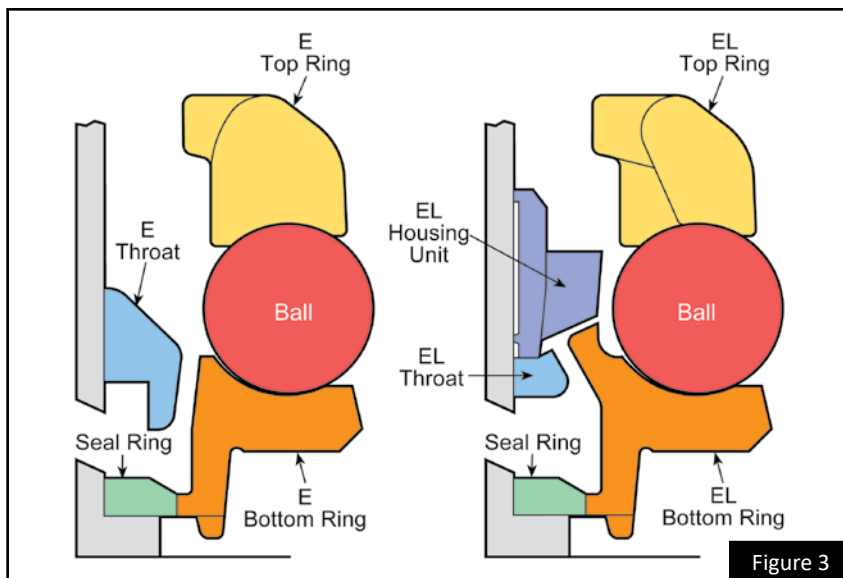


Figure 3

These sections are available for most sizes of E and EL pulverizers. A new classifier cone/tailings section is generally required with this modification.

Raw coal diverter chute

B&W provides a raw coal diverter chute to direct the incoming coal towards the center of the pulverizer, or inboard of the grinding elements. Installation of a diverter chute will reduce the inventory of coal inside the pulverizer resulting in a reduction in pressure drop and increased fineness.

Bolt-through housing units

The original design housing units are held in place with a clamp at the top while the bottom rests on the pulverizer throat plate. Occasionally the housing unit may experience excessive vibration, cracking, or erosion of the top clamp causing the housing unit to shift out of position. B&W has developed a housing unit design that uses bolts through the housing unit and the pulverizer housing. This new design provides a more secure housing unit mounting system and is easier to install.

Two-fluted EL pulverizer housing unit

A new housing liner designed for EL pulverizers will include two flutes instead of the traditional single flute design for reduced localized wear and extended life of the housing liner (see Figure 4). This new housing liner is cast from B&W's VAM[®]-20 material and is recommended for applications using highly abrasive

coals. The second flute adds wear material and helps break up eddy currents in the coal flow patterns that can occur upstream of the flute leading to excessive wear. In extreme cases with highly abrasive coals, the traditional housing unit may wear completely through causing erosion of the pulverizer housing. The two-fluted housing liners are interchangeable with the single flute liners. The two-fluted housing units are not available in the bolt-through design. (Order Brochure # PS-385 and PS-411)

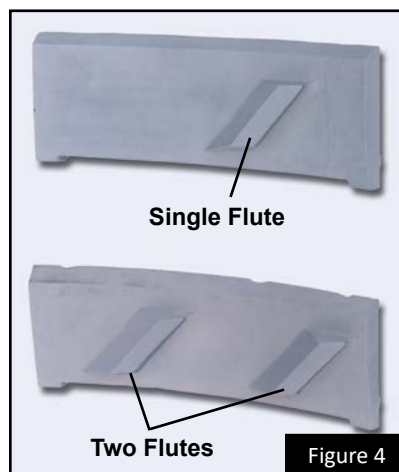


Figure 4

LongLife™ 13-5/8 inch diameter grinding ball

The 13-5/8 inch diameter LongLife™ pulverizer balls for EL-64, EL-70 and EL-76 pulverizers provide 40% more wear material compared to the standard 12-1/4 inch diameter balls (see Figure 5). The larger balls are used with a set of specially matched top and bottom grinding rings all cast in VAM-20 material.

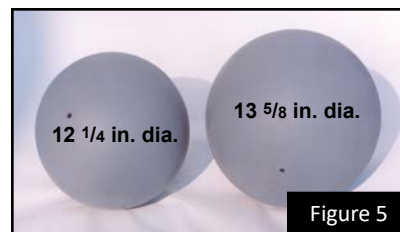


Figure 5

Increased wear life translates to fewer grinding zone overhauls. When using the 13-5/8 inch balls, B&W's patented On-Track™ system is required. (Order Brochure # PS-384)

On-Track™ retrofit package

B&W's On-Track grinding element package limits ball and top ring movement that often leads to shaft failure, spring failure and grinding ring chipping (see Figure 6). With B&W's On-Track package, rotational and horizontal movement of the top grinding ring is minimized with the use of a snubber guidance system. Heavy-duty grinding rings feature deeper ball tracks and additional material to better resist chipping. The On-Track package can be added to any standard EL-64, EL-70 or EL-76 pulverizer. It is especially beneficial to those mills that experience significant shaft or spring failures or extensive ring chipping. (Order Brochure # PS-386)

High inlet air temperature operation

Coals with lower heating value and higher moisture content, such as Powder River Basin coals, require a much higher pulverizer inlet air temperature. The following three modifications were developed by B&W to optimize pulverizer operation when using these types of coals.

High temperature bottom ring with heat shield

When operating with inlet air temperatures above 500F (260C), original design EL bottom grinding rings are more susceptible to breaking from excessive thermal stresses. B&W offers a bottom grinding ring designed specifically for use with high inlet air temperature applications. The design utilizes a steel ring seat which acts as a heat shield surrounding the outer perimeter of the bottom ring to reduce the thermal stresses which can sometimes cause premature failure.

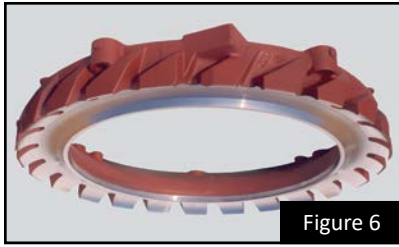


Figure 6

High temperature throat plates

To maintain the required mass flow of air per pound of coal, the higher temperature inlet air causes higher volume flow and higher air velocity entering the grinding zone. The higher velocity will upset coal circulation within the pulverizer, which can lead to mechanical damage and reduced reliability. To prevent this effect, the throat gap should be adjusted to provide proper air velocity. However, standard throat plates will not allow sufficient throat gap adjustment to reach the desired velocity for primary air temperatures above 500F (260C). B&W offers high temperature throat plates to provide the necessary throat gap for these types of coals.

Oil cooler

During high inlet air temperature operation it is possible for the pulverizer's lubricating oil to exceed the design temperature limits and degrade its lubricating properties. To maintain the oil's lubricating properties, B&W offers an external shell and tube water cooled heat exchanger to reduce lube oil temperatures. This system utilizes the existing oil pump.

Main shaft air seal housing with replaceable seal rings

New design air seal housings are available with replaceable seal rings. This modification allows EL users to reduce maintenance costs by replacing only the labyrinth seals without the need to replace the entire air seal housing assembly. In some applications, original design air seal housings can be machined to accept the replaceable seals.

Spring bolt assemblies

Spring bolts and adjusting nuts are available with ACME threads for installation in existing spring bolt brackets. ACME threads minimize galling and require less torque to make spring adjustments.

Complete new ACME threads spring bolt assemblies are also available with a new key/keyway design that includes a seal and wiper installed between the spring bolt and lower part of the bracket. A permanently lubricated thrust washer is installed between the adjusting nut flange and the nut retainer to reduce the amount of torque required to rotate the nut. A spring bolt bracket erosion guard and spring bolt thread dust shield is also provided. (Order Brochure # PS-202)

Pneumatically-operated pyrites gates

Pneumatically-operated upper slide gates have been developed for some of the larger size E and EL pulverizers. This system provides an improved design in the slide gates for long service and positive shutoff. The minimal effort required to empty the pyrites box can significantly reduce maintenance time. Fabricated pyrites boxes can sometimes be attached to the existing pyrites box to increase holding capacity. If space is available between the pyrites box and floor, an additional pneumatically operated slide gate can be installed at the outer side of the fabricated box.

Grinding zone access door

An access door located on the back side of the mill provides an additional opening for direct access to the area of the grinding zone that is difficult to reach

from the large maintenance door (see Figure 7). Access can be gained through this opening to adjust springs and remove tramp iron. The door is included as part of the On-Track™ package to provide access for installation for the one snubber assembly that is not easily accessible from the large maintenance door. (Order Brochure # PS-384 and PS-386)

Cera-VAM® erosion protection

Internal pulverizer components can be protected from erosion by using Cera-VAM® ceramic tile lining. Ceramic-lined panels are available for the pulverizer housing and the classifier cone. Special panels can be made to protect just about any internal pulverizer component (see Figure 8). New design burner pipe swing valve assemblies, including ceramic-lined seats are also available. Extensive commercial application of Cera-VAM ceramic has proven to extend the life of protected components, thereby reducing overall operating costs. (Order Brochure # PS-297)

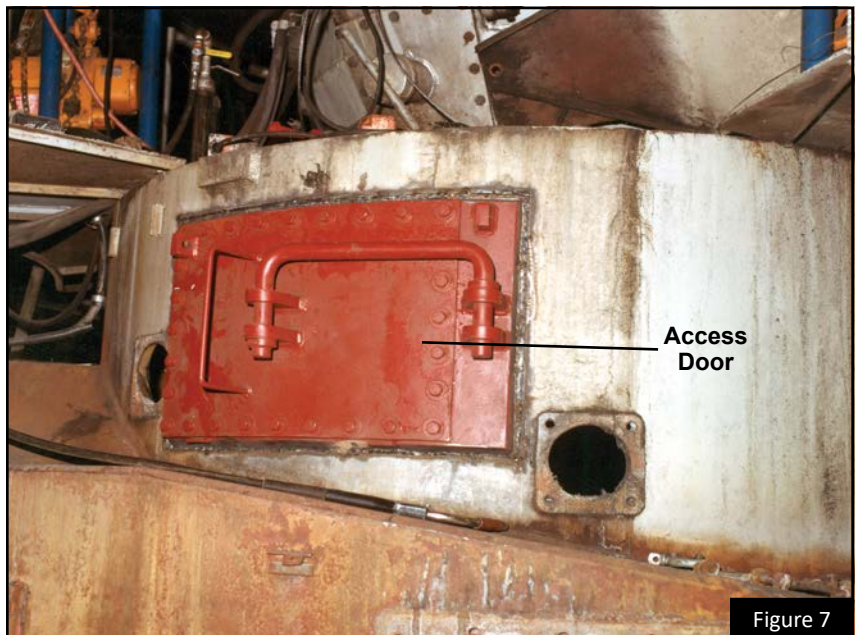


Figure 7

DSVS® rotating classifier

The DSVS® rotating classifier provides a means to increase coal fineness and/or throughput (see Figure 1). This mill retrofit goes well beyond the improvements achievable with stationary classifier retrofits, especially when over 80% through a 200 mesh screen is required. Rotating classifier pressure drop is lower than that of stationary classifiers. In addition, grinding zone pressure drop is lower with the rotating classifier because it does not recirculate as many fine particles back to the grinding zone as is the case with stationary classifiers. Even when higher throughput is required at the expense of 200 mesh fineness, rotating classifier has the ability to maintain the very high percent passing 50 mesh fineness. (Order Brochure # E101-3136)

Why choose B&W for your pulverizer modifications?

Who knows more about your E or EL-type pulverizer?

- B&W invented them and is continually researching, designing and testing improvements.
- B&W has extensive experience in grinding all types and blends of coals.
- All retrofit parts and materials are engineered and manufactured to the original specifications to ensure proper fit and performance.

For more information on any of the modifications covered in this brochure, contact your regional Sales or Service office, or call 1-800-BABCOCK.

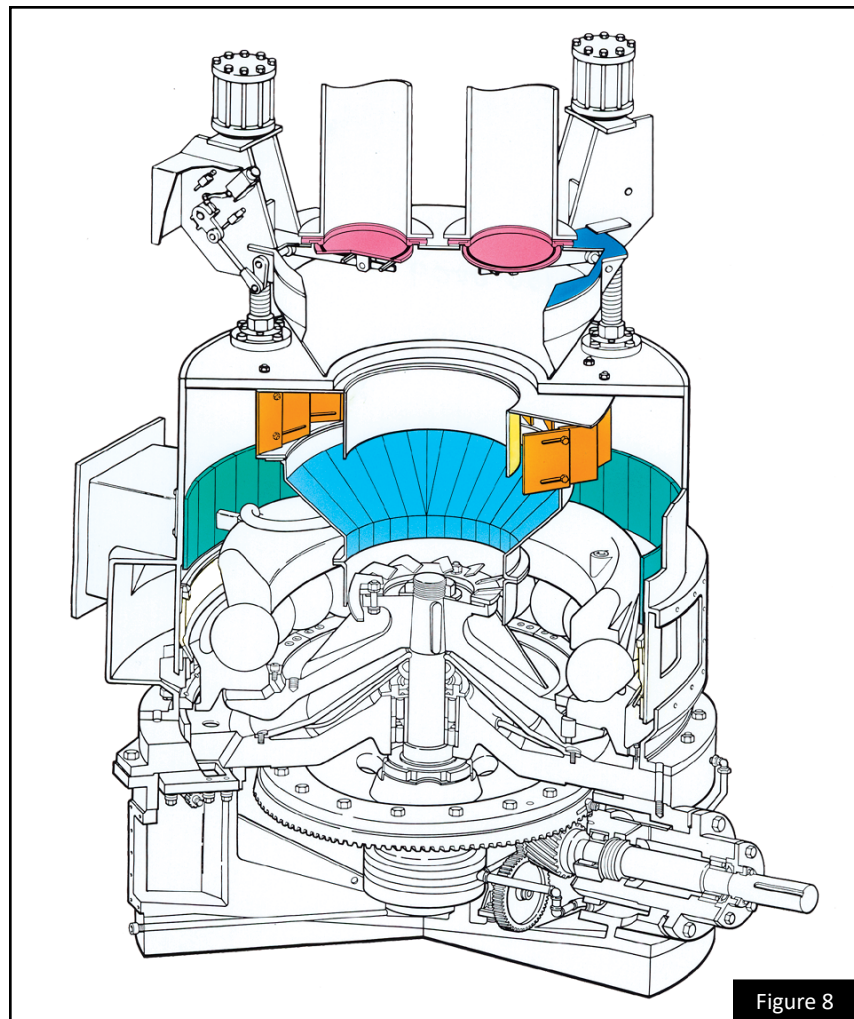


Figure 8

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