

Sealing solution for a tube ball mill
in a coal-fired power station

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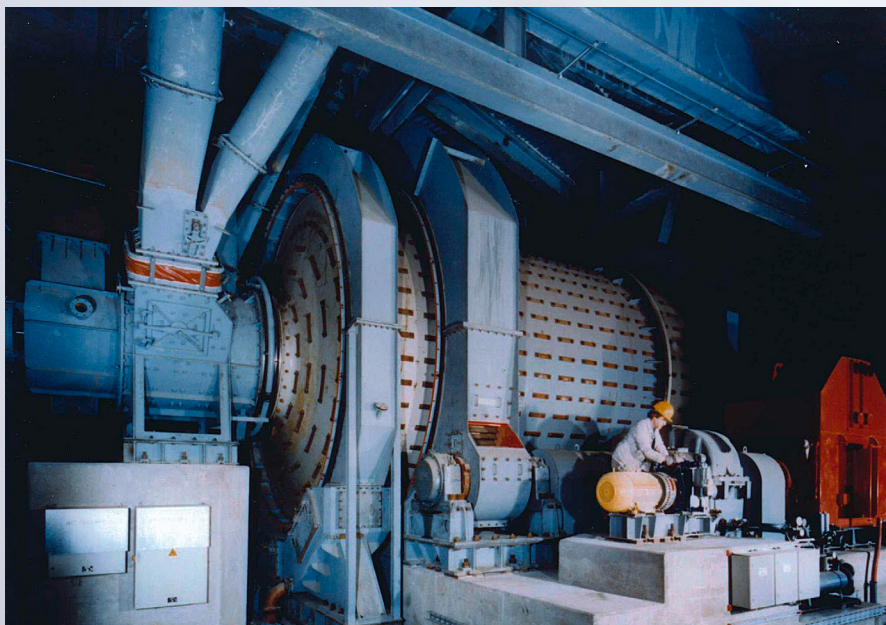
Espey WD200/500 for sealing a tube ball mill



Coal-fired power stations require coal dust for firing and generating steam. The coal dust is produced by tube ball mills. The Chinese customer in Dezhou drives 2 steam generators which are supplied by 12 tube ball mills. The mills are part of power plant technology delivered by Babcock Borsig Power Energy GmbH.

Process description

A tube ball mill is a horizontal cylinder partly filled with small steel balls that rotates around its axis, generating a tumbling action to the balls. Coal to be ground to a dust particle size that can be moved by air, is fed from one tube front end. The dust is conveyed to a coal mill, fired to heat water and to produce steam. The steam drives the power plants' generators.

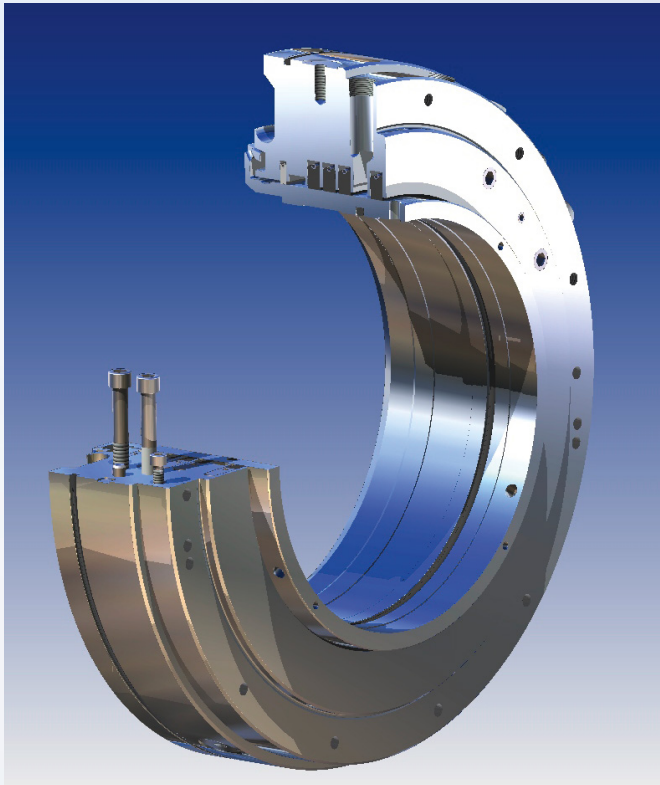


Tube ball mill for grinding coal in a coal-fired power station

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Mill throat seal type Espey WD200/500



Coal bunker and coal mill

Problem and challenge

Each mill needs 4 seals: 2 mill throat seals for a shaft diameter of 1,605 mm (63.2") and 2 end bearing seals for a shaft diameter of 160 mm (6.3"). The seals have to prevent coal dust from leaking into the atmosphere. The harsh operating loads and the high amount of coal dust generated by the grinding process place extreme stresses on the sealing system. It must be possible to mount the shaft seals easily without the need to dismantle the tube ball mill or its components. The seals are fitted to the ball mills' inlet and outlet modules between stationary and rotating components. The seals have to be designed for a temperature of 110 °C inlet (230 °F), and 320 °C outlet side (608 °F), a pressure of 1.08 bar abs. (15.7 PSI) and a rotation speed of 16 rpm. As barrier gas air has to be used. The seals must bear radial and axial shaft movements. Long-term operation without maintenance is required.

EagleBurgmann Espey solution

To fulfil the application requirement of no coal dust leakage to the atmosphere and harsh operating loads Espey designed the carbon floating ring seals type Espey WD200/500 as mill throat seal with a length of 275 mm (10.8") and type Espey WD200 as end bearing seal with a length of 75 mm (3.0"), each with 4 seal rings. The split housings and seal rings (partly self-adjusting) allow easy installation. The seals are designed to use air as barrier gas to prevent coal dust from leaking into the seal and to the atmosphere. To protect the tube mills' shaft all seals are equipped with a shaft sleeve. The seal is completely maintenance-free and has a long-term operation time.

Operating conditions

Application: tube ball mill
 Seal types: Espey WD200/500 for mill throat, Espey WD200 for end bearing
 Medium: coal dust, air
 Operation temperature: 110 °C (230 °F) for mill throat, 320 °C (608 °F) for end bearing
 Pressure abs.: 1.08 bar (15.7 PSI)
 Revolutions: up to 16 min⁻¹
 Shaft diameter mill throat: 1,605 mm (63.2")
 Seal diameter end bearing: 160 mm (6.3")
 Radial and axial play: present
 Barrier gas: air