

Advanced seal design reduces sootblower packing

At the Aguirre steam plant, Salinas, PR, the boiler's 52 horizontal sootblowers required frequent repacking. Each stuffing box held seven V-shaped braided packing rings which only lasted a few months before steam leaks became severe and replacement was necessary. To cure this maintenance headache, the plant installed an advanced packing system manufactured by A.W. Chesterton Co. Stoneham, Mass.

Engineering analysis showed that original packing inserts were not capable of handling all of the physical and thermal forces that the 30-ft-long sootblower lances placed upon them, including: (1) frictional forces which occur as each blower is cyclically inserted up to its full 30-ft length, rotated and withdrawn; (2) outward radial forces caused by the thermal expansion of the hot blower shaft; (3) downward compressive forces existing when the packing set supports the weight of the inserted lance; and (4) a combination of non-uniform forces caused by wobbling when steam flows through operating the unit.



The new packing system consists of several components each of which serves a different role in combating the forces that caused the original packings to fail. (figure right)



The three center rings are made of die-formed, precompressed, pure graphite tape. These rings have low frictional properties and are engineered to withstand heavy compression. Two braided graphite rings sandwich the inner die formed rings to prevent debris from lodging between the shaft and the packing materials. Both sets can withstand temperatures up to 5000°F. The graphite materials used for these rings are impregnated with an inorganic inhibitor that reduces the potential for corrosion.

A split carbon or bronze sleeve spacer is located at the innermost section of the stuffing box. The two halves of the sleeve are constructed of 99% pure graphite or bronze with a high compressive strength. The sleeve acts as a support bushing and a spacer, accepting the

weight of the sootblower and reducing the number of packing rings needed. Lastly, the system uses Belleville-style disc springs to maintain constant, optimal sealing pressure on the packing set. (photo right). This sealing pressure prevents leakage caused by ageing, consolidation of the packing materials or thermal cycling. The disk springs also eliminate the need for frequent retightening of the gland.

According to Felix Robledo, Aguirre's chief mechanical maintenance engineer, the plant first installed a single packing set on one sootblower as a trial. One month later, the blower's drive chain snapped. The blower had to be manually retracted from the furnace, which required that the cooling system to the unit be turned off. Although the lance was red hot upon removal, the packing set was undamaged. And even after one year of service, the packing still did not leak. Based on the results of the trial, the plant began converting all of its sootblower packings to the new system earlier this year.

