

Case Study: Horizontal rotary autoclave - chemical processing

Problem

The customer was using unsuitable packing for the application and constantly overtightened the gland to ensure no air could enter the autoclave and no highly hazardous phenolic liquid could leak out.

High costs
plus health and
safety issues

Being in direct contact with the media and overtightened, the packing would become rock hard, creating high friction and overheating. This led to chipping and disintegration eventually resulting in excessive leakage of phenol (up to 2 litres/min - 26 gallons/hour).

The short life of the packing (2 weeks) caused frequent change-outs and manufacturing stoppages resulting in high maintenance costs. Leakage of highly hazardous phenolic liquid was a major health and safety hazard.

Application

Horizontal rotary autoclave in salicylic acid formation process.

- Temperature: 70-180°C (158-356°F)
- Shafts: Ø 200 mm (7 7/8") with vibrations
- Speed: up to 16 rpm
- Media: phenol and caustic liquid with CO₂ at atmospheric pressure
- Packing sizes: 7 x cut to length 3 m 25 mm (1") square section
- Gland pressure: from -0.7 mbar vacuum up to 10 bar (1 MPa)

Existing solution

Expanded graphite braided packing

Results and benefits

- Deterioration/contamination of product batch in autoclave during operation has been eliminated.
- No vapour leakage of phenolic liquid.

Improved safety

James Walker solution

Lionpak[®] 2302 is an ePTFE/graphite yarn packing with molybdenum disulphide (MoS₂) lubrication system - a dense packing with a high degree of resilience and dimensional stability.

The product provides good heat dissipation with the excellent thermal conductivity of MoS₂. The MoS₂ enhances high speed rotary operations by minimising friction and wear, giving the product a long and efficient working life. The base ePTFE and graphite composition provide excellent chemical resistance.



Improved operational safety



Reduction of maintenance costs



Significantly reduced frequency of packing change-out



Reduction in unscheduled downtime and manufacturing outages