

HRSG Penetration Seal Inspection, Repair, And Replacement

Valtech Engineering is increasingly supporting CoGen turn-arounds with our penetration seal and fabric expansion joint capabilities.



Our most recent CoGen revamp project was for a major refinery on the Texas gulf coast. In anticipation of the maintenance event Valtech's field engineers inspected 20 penetration seals on top of the CoGen HRSG unit and 30 on the bottom. Sixteen seals were identified as in dire-need of repair and/or replacement. Over 10 days, out of the longer turn-around schedule, Valtech's field-service crew arrived with parts, equipment and replaced all 16 damaged seals at a steady pace. A surprise arose when a 17th seal sustained mechanical damage due to maintenance work occurring nearby. The Valtech team was able to quickly

engineer a proper repair, expedite required parts/materials and make the repair comfortably within the site's schedule.

What is a pen-seal? Penetration-seal is an industry term used to describe the bellows elements that seal the HRSG headers to the units outer-casing. Where those headers pass in and out of the casing there is a circumferential gap around each pipe that allows the internal process and temperature to leak out and thereby measurably erode performance of the CoGen unit. It is important to ensure pen-seals remain leak-free and in good repair to guarantee name-plate performance of the unit. If the leaks are substantial enough it can dictate an unplanned shutdown and repair of the unit.



HRSG penetration seals have an average lifespan of 8-10 years in service. Failure modes include: cycle life failure, corrosion failure, and mechanical damage. To maintain efficiency as well as safety it is important to understand the condition of your penetration seals and how to repair or replace before a scheduled maintenance window.

The initial step is to conduct an HRSG penetration-seal and expansion joint inspection to detail current fitness, early-detection of common failure mechanisms and draft accurate repair plans. Seals with mechanical damage should be assessed by a trained engineer for recommendation. Seals with corrosion and/or cycle life failures will

require replacement.

OEM fabric penetration seals can often time be replaced with in-kind fabric seals. Metallic bellows penetration seals can have fabric or metallic seal replacement options depending on location and design temperatures. Operating conditions and accessibility challenges also influence repair decisions. To understand the options available schedule an onsite inspection of your CoGen unit about 1 year before any scheduled turn-around activities.



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Fabric expansion joint inspection and replacement options are also available.



CoGen units also require fabric expansion joint inspection, maintenance and replacement on a regular basis. Valtech includes these services along-side pen-seal scope to consolidate all expansion joint requirements and expertise into one on-site team during the turn-around.

These proactive actions are key to improved CoGen reliability, to avoid costly performance-lag and unscheduled shut-downs caused by failed pen-seals and expansion joints. Don't be blind-sided. Let us help you take a proactive approach to these critical components.

Valtech Engineering Field Services Team is able to offer a complete boiler inspection and detailed report with repair and replacement options. If you feel these services can benefit your team contact Valtech Engineering at: sales@valtechengineering.com or call 888.372.2205

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