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# Metal Penetration Seals & Clamshell Retrofits for HRSGs

## Application Brief



In combined-cycle power generation, optimal operating performance depends on capturing all available heat while reducing emissions. Properly maintaining penetration boiler seals helps decrease energy loss, increases plant safety, and minimizes the risk of a forced outage.

### Advantages of Metal Penetration Seals:

- 100% gas-tight operation
- Accommodates axial, angular, and lateral movements
- Stainless and nickel alloys available for corrosion resistance
- Low maintenance
- External insulation options available

Metal penetration seals can operate at flow temperatures up to 1400°F and have the longest service life under design conditions. Metal bellows are the #1 choice for premium HRSG manufacturers.

### Clamshell Retrofit Seals

Clamshell seals perform the same service as standard penetration seals, but consist of two sections of a single bellows that are field welded around the pipe, by a specialized TIG welder. A clamshell prevents the cutting of pipe sections during bellows installation.







# On-Site Services

**BADGER** performs On-Site Service for inspection, installation, supervision and repair of fabric and metal expansion joints. Site inspections are the core of our HRSG product offerings, as every site has unique installation requirements. Our experienced technicians can identify potential interferences from pipes and structural supports and assist with outage planning.



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**METAL & FABRIC EXPANSION JOINTS**

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Metal Penetration Seals for HRSG Boilers-05.2019-Rev01

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