

REFERENCE HEATING JACKET

BALL VALVE WITH INNOVATIVE HEATING JACKET DESIGN

Claus process: Shut-off valves for liquid sulfur



In 2019 and 2020 Hartmann Valves delivered 3 sizes of Cl. 150 ball valves with heating jacket for a claus process in a refinery in the south of Norway. The valves are installed in pipelines with oversized flange connections. The high-quality metal-seated valve parts withstand the hot liquid sulfur inside the piping as well as the hot steam in the heating chamber of the valve. Due to the special design with outstanding heat transfer between the heating medium and the process medium the sulfur remains in the hot liquid phase.

Technical Details

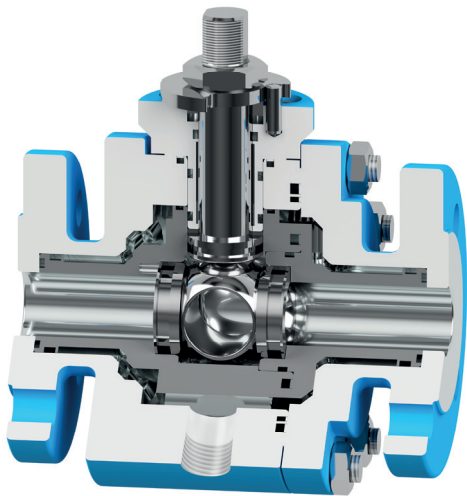
Process	Claus process
Valves	Type ASF (AHF) with incorporated heating jacket with 2 x 3/4" NPT heating jacket connections
Press. Claas	2" (DN 50) with 3" (DN 80) oversized flanges 3" (DN 80) with 4" (DN 100) oversized flanges 4" (DN 100) with 6" (DN 150) oversized flanges
Nominal size (DN)	150 lbs (PN 20)
Medium	Liquid sulfur
Operating Pressure	~5 bar
Operating Temperature	175°C
Heating Medium	Steam
Operating Pressure	4 bar
Operating Temperature	260°C

PROCESS AND VALVE REQUIREMENTS

The Claus process is the most significant gas desulfurizing process in refineries, natural gas processing plants and gasification or synthesis gas plants to recover elemental sulfur from gaseous hydrogen sulfide. The generated product – pure sulfur – flows through the pipelines in a hot liquid stage.

There are different challenges for the valves:

- Minimizing the temperature loss of the liquid sulfur inside the valve in open or closed position to hold the medium in liquid phases by using a suitable heating jacket.
- Long-term tight sealing of the internal valve parts against the hot liquid sulfur and occasionally against sulfur cement parts.
- Gastight heating jacket, suitable for the heating medium steam at the given design pressure and temperature.



HARTMANN VALVES SPECIAL VALVE DESIGN

Hartmann Valves developed an innovative design with an incorporated heating jacket in the valve body. The typical standard steam jacket with its complex structure is welded to the outside of the valve. Different from that, the innovative Hartmann solution integrates the steam channels into the valve body. As result, the heating steam and the liquid sulfur are much closer and the heat transfer is improved.

The high-quality chromium carbide hard facing on the metal ball and seat unit ensures a tight closing of the valve at the long term sulfur temperature of ~175°C and the steam temperature of up to 260°C. Even in case of solid parts like sulfur cement in the medium, the valve is tight and the sealings will not be damaged.

The typical Hartmann 3-stage stem sealing additionally guarantees low emission within the range of the TA-Luft and DIN EN ISO 15848 requirements.