Improving uptimes for coker valves

Continuing a round-up of the factors which can have a key influence on the uptimes of coker valves, this time focusing on firsthand experiences.

By Gobind Khiani

As discussed in part one of this article (Valve World, November 2018, page 39) it is widely known that the design reliability of coker isolation and switch valves is paramount if these valves are to meet the demands of this severe process. The component reliability of the valve is what delivers extended 'meantime between repair or failure'. This article will therefore identify some of the most important design considerations such as:

Robust body

A robust body design is a requirement to avoid leakage in the piping system and leakage through the body of the valve. Once again, use of sufficiently torqued Belleville® springs provide enough force to keep ball and seats locked in with no leakage past the complete assembly. See Figure 1.

Integral vs. separate seat ring

The integral seat provides higher reliability of sealing design and torque by eliminating dual seating components. See Figures 2a and 2b.

Purging

This method is adapted to prevent the buildup of solids inside a valve and help prevent damage to internal components. In addition, purging helps minimize repair or shutdowns as well as maintain torques, zero-leakage performance and operability. Purging also assists draining of process from within ball and seats and cavities, and maintains clearances without any solid particles present in the system.

The purging design is one of the most critical aspects of coker valves due to the state change of the process. The act of flushing and purging removes any residue or coke fine ingress from body cavities and redeposits into the process flow through the bypass line. The cavities will be void of hot residue when the valve starts to cool from a drum switch and prevent internal solidification. This delivers consistent torques over the production runtime. This live flowing purge eliminates a number one failure mode of coker isolation valves. See Figure 3.

In summary, the high reliability of individual components in coker valves is key to meeting expectations of mechanical availability and uninterrupted production goals.

Content and pictures courtesy of ValvTechnologies, Inc., USA.

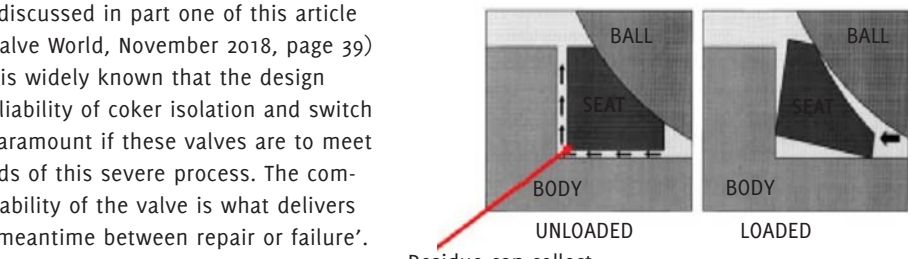

Fig. 2a: Seat designs: separate seat ring

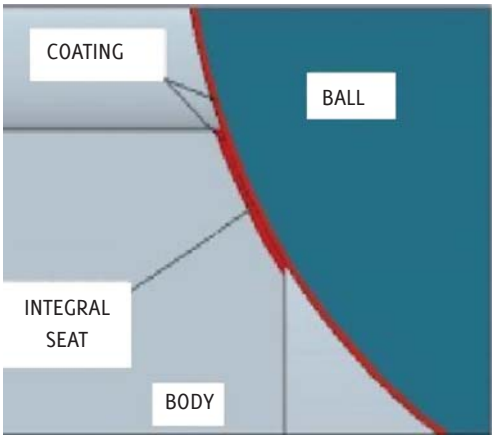

Fig. 2b: Seat designs: integral seat

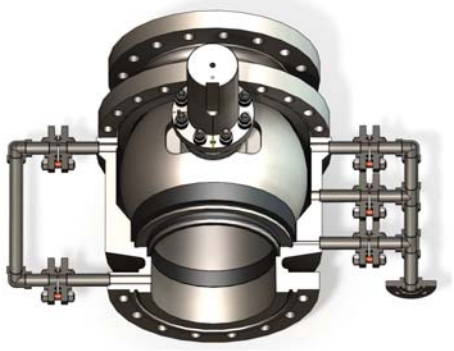

Fig. 3: A sample purging system for coker valves

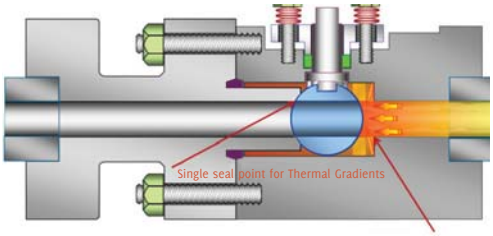

Fig. 1: Basic valve design

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