Question 87: Some sources advise that the main column inlet flange should not be insulated because the bolts will reach operating temperature and lose strength. Thermal cycling compounds the problem. We did not insulate this flange and found coking in this region. How do you minimize heat loss and coking but still maintain bolt strength?

Tom Lorsbach (UOP)

UOP's standard specification for piping states "Flanges, including valve body to bonnet flanges, on insulated process lines or equipment with an operating temperature over 800°F (425°C) shall not be insulated". The reason for this is so that the bolts do not lose strength or expand too much at high temperature, potentially causing a flange leak.

Our observations have been that there usually is some coke deposited at the flange, but usually not excessive quantities of coke. The risk of a flange leak outweighs the requirement to clean coke from this location during turnarounds.

Weather shielding of this flange is often used in cold climates and is a viable mitigation of coke deposition at the inlet nozzle flange. A band of thin gage metal 2" - 3" away from the flange will keep the flange warmer by lessening the effects of wind and rain but won't elevate the temperature above that allowable for the flange.

An additional mitigation of coke deposition at the main column inlet flange could be improvement of reactor vapor line insulation so that the reactor vapors are directionally warmer at the column inlet.

Tags

Coker

Crudes

Process

Reactor Vessel

Reliability

Year

2011