AM Technology
Engineering Chemistry

AMT TN-14

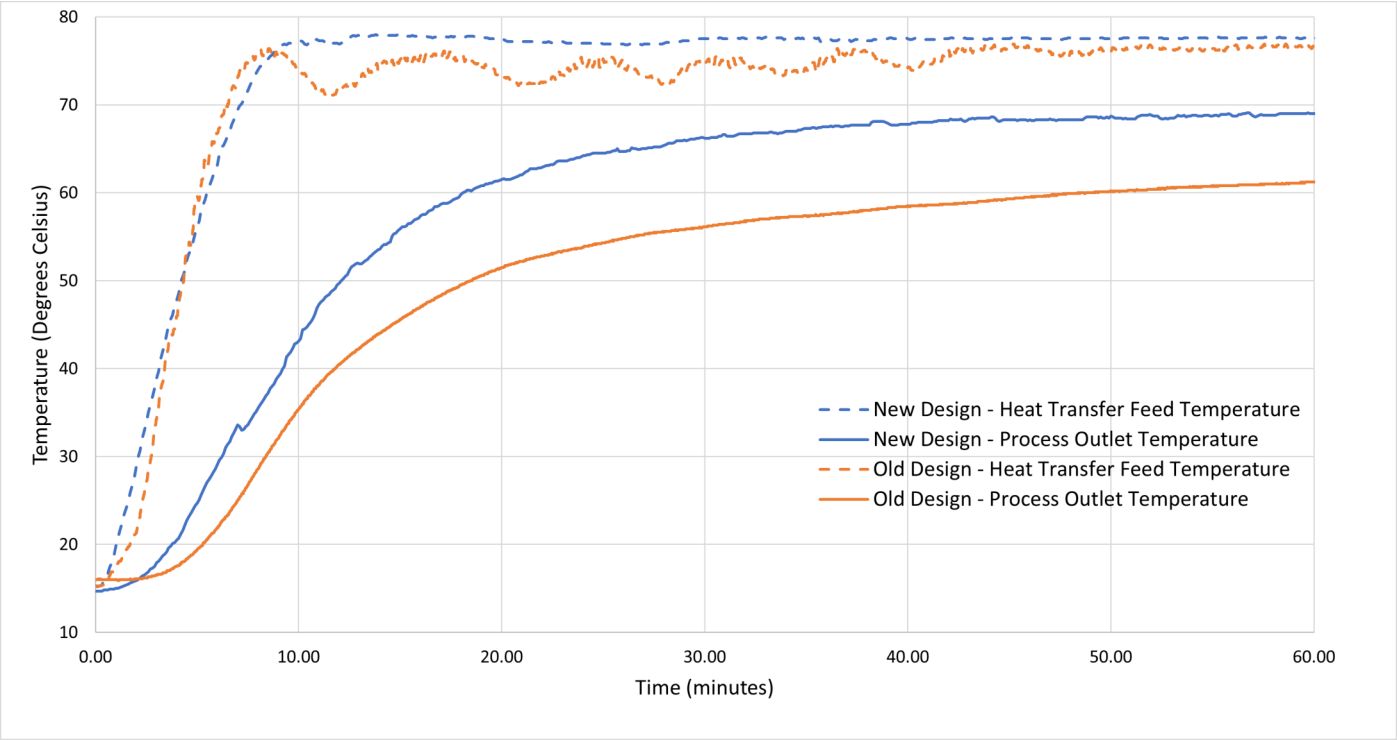
Improved Heat Transfer Jacket Performance for the Coflore® ACR

Overview

This technical note summarises the heat transfer improvements to the Coflore ACR following implementation of a new jacket design. The new jacket was designed to allow for greater flowrates of heat transfer fluid intending to increase process control and thermal stability.

Test Procedure

Heat transfer performance testing was performed for the existing and new jacket designs using a Huber Unistat 360. The Huber Unistat 360 was filled with Julabo HL60 Silicone oil, water was pumped into the Coflore ACR at 9 mL/min, equating to a 10-minute residence time, with spring type agitators in each reactor cell (90 mL reactor volume). Starting with an internal bath setpoint of 15°C, the setpoint was set to 80°C. The maximum process temperature, and time to reach thermal steady-state are summarised below.



Conclusion

The tests show that the redesigned jacket reached higher temperatures, at a faster rate than the previous jacket revision. This relates to a faster approach to steady state when starting up, and greater responsiveness to a change in heat transfer feed conditions during operation. Higher temperatures were achieved by simultaneously reducing heat losses in feed and return heat transfer hoses and reducing the pinch temperature across the ACR.

The tests also showed a significantly faster approach to thermal stability in the heat transfer unit, allowing for faster screening of process conditions and greater process stability.

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