

Application note

Oil refinery delayed coker unit clamp-on flow

Benefits:

- No shut down requirements, (Installation on existing pipe)
- No periodic calibration required
- No pressure drop



Summary

An oil refinery in Turkey needed to revalidate the inline flow meters in the delayed coker unit on the cold/hot feed lines. The refinery currently uses a Panametrics XMT868i transmitter with BWT transducers, it has been installed for the last five years.

Before validation with a TransPort PT878 portable flowmeter with C-ET transducers, the customer was considering level measurements from the storage tanks and a mass balance calculation. The customer had challenges reconciling the numbers, as the difference was too significant compared to the flow meter readings.

Application

Refinery delayed coker unit, high viscosity and density hot/cold main feed line.

Line size: 12"
Temp.: 285°C – 300 °C (545°F – 582°F)
Viscosity: 160 to 165 cP
Fluid: Vacuum residue

Challenge

The delayed coker unit operations team was concerned about their mass balance calculation and overall efficiency of the unit. There was no flow measurement that existed in the main feed line and there was no possibility of shutting down to install a new meter, the team had to rely on tank level meters for reconciliation.

The team had little confidence in using clamp-on flow meters for such harsh applications due to poor experiences in the past on simple applications such as water flow with other clamp-on meter manufacturers.

Solution

A trial was performed with a high temperature C-ET transducers in the main feed delayed coker line using the following from Panametrics:

- PT878 electronics
- C-ET-05 transducers
- CFG-V12 clamping fixture
- CPL-16 RTV couplant

After 1 hour of measurement, the customer calculation from production was 9500 m³/d whereas the PT878 flow meter measured 9103 m³/d. All XMT868i existing flow meters installed on the hot and cold charge lines added up to 9000 m³/d.

Comparison between the tank levels and the inline flow meters showed -3% deviation.

Outcomes:

The customer was convinced about the clamp-on meters performances in high-temperature coker lines.

Since the results matched within acceptable limits between the inline flow meters and level measurement, the customer decided to increase the delayed coker feed charge to the furnace meaning they were able to increase the production yield and efficiency.

The customer now uses Panametrics clamp-on flow measurement where no available flow measurement exists in high temperature lines as a permanent installation, and they will use Panametrics portable meters for annual validation of their furnace feed lines.

