# TEST UNIT CRUDE OIL PRE-HEATER

## Introduction

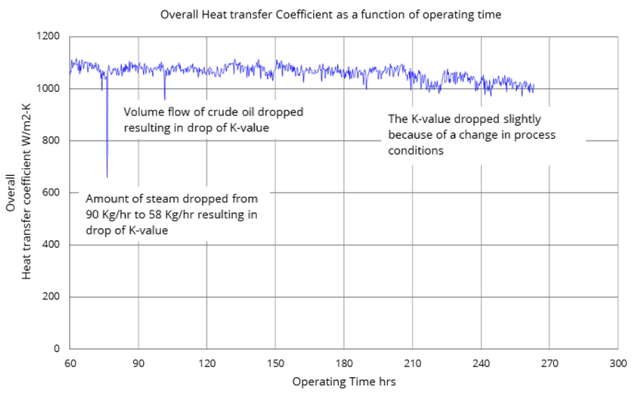
At the premises of an oil and gas company a test has been carried out to prove the performance of the self-cleaning fluidized bed heat exchanger for zero-foulingoperation.

As a reference, the conventional heat exchanger used at the client for the same process conditions required cleaning every month.

## Process Conditions

The tests were done at the following process conditions:

| Process Conditions | Tubes Side | | Shell Side |
|---|---|---|---|
| Medium | Crude | | Well water |
| Pressure | 6 barg | | 4.1 barg |
| Temperature ($^0$C) | In | Out | Max |
| | 30 | 70 | 153 |
| Flow (m$^3$/h) | 5 m$^3$/hr | | 150 m$^3$/hr |




## Test Unit

The test unit comprised a shell and tube heat exchanger with a single tube having external recirculation of the particles through a down-comer. In the down-comer the particles were separated from the crude and transported back to the inlet of the tube. The heat exchanger tube had an internal diameter of 54 mm and a length of 7.7 m. The particles used were from stainless steel cut wire with a size of 1.5 mm.

## Results

- In the test period the unit proved easy operation.
- The test unit remained clean for a total period of 750 hours. In the graph the heat transfer coefficient is shown for the first 250 hours.
- Beyond 210 hours of operation, a small change in process conditions affected the heat transfer coefficient slightly.