



CASE STUDY

INDUSTRY: REFINERIES



CUSTOMER: Qatar Petroleum

LOCATION: Qatar

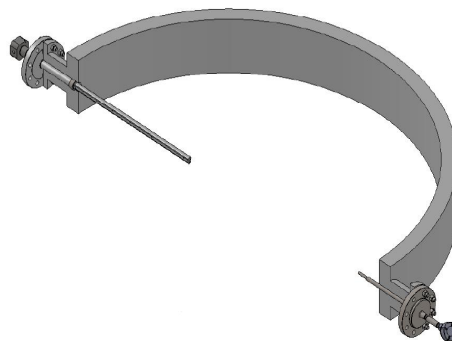


BACKGROUND: Qatar Petroleum was experiencing widespread failure of their averaging pitot tube flow meters in the incinerator stacks. Failure in over 20 locations throughout the facility was pushing the EPC firm, Petrofac International, to consider using optical-type flow meters instead of the current differential pressure type meters.

Due to their design, the failing sensors, supplied by a competitor, were cracking due to poor material selection (Inconel 600) compounded with extreme swings in gas temperature. These cracks occurred within the sensor's internal compartments allowing leaks between pressure chambers, and thus rendered the flow measurement useless.

SCOPE OF WORK: Armstrong's Veris Flow Measurement Group evaluated the application and proposed the Verabar as a viable solution. Temperatures up to 1,832°F (1,000°C) demanded the Verabar be machined out of an alloy that could withstand this severe service. Ultimately, the alloy Haynes 25 was chosen for all wetted parts and Hastelloy X was chosen as the flange material.

A Haynes 25 Verabar partial insert sensor was supplied to meet the maximum design temperature of 1,832°F (1,000°C). The meter was also supplied with a type K thermocouple of same material specification to allow for temperature compensation in the measurement.





BENEFITS: The Verabar's sturdy, one-piece design differs from the competitor's in that it is not susceptible to cracks nor internal leaks. Proper material selection by Armstrong engineers ensured that the sensor would perform long-term in face of extreme temperature stress. A partial insert sensor was offered opposed to a full insert to reduce the cost of the product and avoid thermal expansion issues. The partial insert design is also more appropriately able to handle higher fluid velocities which can be reached in the incinerator stack.

The Veris Flow Measurement Group's team of engineers and project managers were able to swiftly determine a proper solution and supply a flow meter that was agreeable to the customer; meeting the demands and expectations of the application.

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