

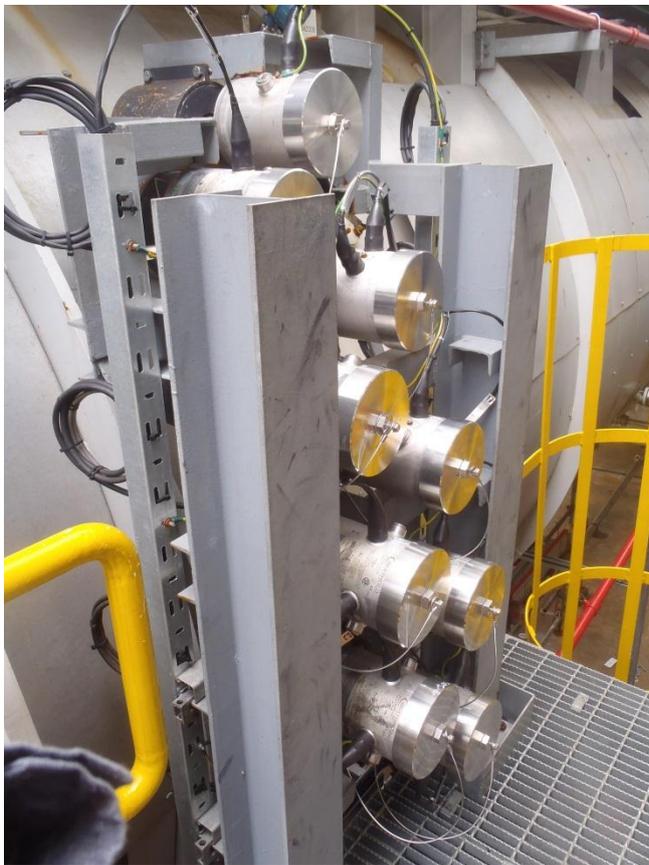
Filling the safety gap – radiometric gauges with SIL2 rating for test separator interface measurement - ref standard for MPFM calibration.

SIL assignment of processes and control loops has become almost a standard requirement in the oil producing industry during the past years. Especially when it comes to critical process conditions like high temperature, high pressure vessels for instance in separation, the potential damage to people, environment and equipment can be extreme and ensuring safety and risk assessment is a major concern. SIL rated measurement equipment that monitors process conditions inside vessels are well known to the industry and most are available with SIL certifications. However, due to the hostile conditions it is difficult for these measurement devices to last or to perform reliably. Where conventional technologies fail, radiometric measuring systems are very often the preferred solution.

Radiometric measurement systems, consisting of a gamma source and a radiation detector installed on opposite sides of the vessel, measure process conditions from the outside. The principle is comparable to a permanent x-ray inspection of the internals. As all measurement equipment is located outside the vessel, it is not exposed and therefore not affected by the high pressure, high temperature media inside the vessel. Another advantage of the radiometric technology is that it is not negatively affected by foaming, abrasion or high viscosity media. Scaling that might build-up over time can be easily compensated for and the thickness of scale even determined with the same measurement. For this reason radiometric systems are an indispensable tool for safety related measurements of critical processes. SIL2 rated radiometric devices have been recently introduced for level measurements, however many critical measurements on separators like interface (e.g. oil/water) or Multiphase Level Measurements require radiometric density systems for which no SIL certified radiometric equipment was available on the market. Finally, this gap has been closed. As the first supplier, Berthold Technologies now provides SIL2 certified radiometric measurement systems for both level and density applications.

“It was important for us to be able to supply SIL2 rated radiometric systems for both the level and density applications to the oil industry because the density information is needed to picture the important process of gravity separation. While the certification for the level gauge was a pretty straightforward task, the density gauges were much trickier to do and only possible due to our years of experience with this technology – we know where the pitfalls are!” said Thomas Bogner, Business Unit Manager of Berthold Technologies. Installing the density transmitters at different elevations of the vessel, a density profile, or the Multiphase Level can be determined, providing the user with accurate information on the levels of the different phases like sand, water, emulsion, oil and foam. Density transmitters are also used for critical pipeline measurements. One example application would be the timely and reliable detection of slugs, allowing operators to act before they enter the platform processes further downstream.

Besides safety and diagnosis functions required for SIL2 applications which ensure availability and operational safety, Berthold transmitters are characterized by an extremely stable measurement performance throughout the complete time of operation. This has been achieved by employing a patented sensor technology innovated by Berthold Technologies that corrects any outside temperature effects and even the aging of detector and electronic components, keeping the sensitivity of the device always on a constant level. As a result processes are run safely and reliably with optimum performance from the start of operation for 20 or more years – while at the same time re-calibrations and maintenance are typically not required during the complete operational period.



Picture1: Multiphase level measurement using several radiometric density detectors to monitor the process of separation and the emulsion layer height.