Question 51: What is the panel’s experience with recycle gas moisture analyzers?

PIZZINI (Phillips 66)

Phillips 66 has had experience with the Ametek and Panametrics moisture analyzers. Weare talking about moisture in the reformer recycle hydrogen, so we are looking for 10 ppm to 50 ppm with varying success. I do not think we could say that one is a lot better than the other. The Ametek 5000 was designed for that application. More recently, we have been looking at a different technology: tunable diode laser (TDL) spectroscopy. It is an infrared beam that passes through the sample, so it is less susceptible to high moisture. We are getting some experience with that technology. Regardless of any of these types of analyzers, it is important to minimize hydrocarbon carryover into the sample system.

The next slide contains a few Best Practices for recycle moisture installation. You want to make sure you pull upstream to the compressor to avoid getting lube oil contamination in the sample. Our advice is to use a probe and insert it roughly one-third of the way into the pipe, either from the top or the side but not from the bottom. Use a high alloy, such as Hastelloy or Alloy 20, so the probe will still there in 10 years. We recommend heating the sample line to prevent condensation of droplets of hydrocarbon, primarily in

the sample system. If the analyzer is some distance away from the samples, we recommend a fast loop to a location with minimal back pressure, typically to a flare.

PATRICK BULLEN (UOP, A Honeywell Company)

In the application using GE-Panametrics for isomerization units where the normal reading is near zero, it can be difficult to calibrate or check the sample. Therefore, we need to have the analyzer online continuously. UOP have developed a recommended preventative practice to send the probes back to

the manufacturer for recalibration every six months.

PIZZINI (Phillips 66)

Historically, Panametrics and Ametek moisture analyzers have been used with varying success depending on the nature of the recycle stream. The Ametek 5000 was specifically design for this application and has an integral moisture generator used to check calibration. If there is only a little HC liquid carryover in the recycle, and if the sample systems are set up correctly, then the Panametrics and Ametek analyzers work well. We are starting to use tunable diode laser-type analyzers that are on the market and have found them to work well if there is little HC carryover and condensation in the sample lines. The TDL analyzer is less susceptible to high moisture as compared to the electro-chemical cell analyzers.

Maintaining accurate, online moisture measurement is difficult and requires a commitment for routine calibration and maintenance. The precise, absolute value is prone to inaccuracy; however, there is value in the general moisture trend, especially when used in combination with unit yield monitoring.

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