



*UOP Unionfining Process
Universal Oil Products now owned by Honeywell*

Product SENSOR Sampling PIBSS
Application Diesel Hydrotreater Sample with High Levels of H₂S
Industry Refining/Hydrotreating/Desulfurization

Challenge In petroleum refining there is a need in various process units to remove contaminants from distillate streams to prepare for subsequent processes like catalytic cracking or fuel blending. Examples of some of these contaminants might include; sulfur, nitrogen, olefins and aromatics. The most common type of hydrotreating reactions is desulfurization, because many refining processes require the use of catalyst, and sulfur poisons the catalyst, which is very expensive to regenerate and/or replace. The desulfurization reaction results in the production of hydrogen sulfide (H₂S) gas.

Sour Diesel samples are collected from a high pressure/high temperature separator downstream of a reactor used to strip away the sulfur resulting in the production of H₂S gas. The diesel in this product separator contains high levels of H₂S which is toxic to humans at relatively low levels. Many operators wear gas alarms that alert them to H₂S in the ambient atmosphere at levels as low as 5 ppm.

In addition to the gas hazard present, this process operates at 1,000 psig and 600°F (315°C), which makes grabbing these samples especially hazardous.

Solution SENSOR Sampling PIBSS or Pressure Isolating Bottle Sampling System is designed to trap a fixed amount of sample, isolating it from the process, and blowing it down into the sample bottle at nitrogen purge pressure which is typically 5 to 7 psig, protecting the operator during the sampling process.

This particular version of the PIBSS, is equipped with a cooling jacketed collection vessel and a steam sparger located in the bottom used to drive off much of the H₂S while simultaneously cooling the sample in the collection vessel before blowing it down at nitrogen pressure into the sample bottle. The sample point is located at the bottom of the separator just before the NHT Stripper in the next section of the process. To get the fast loop, you could connect to either side of the control valve (points located in **RED**).

Taking this sample regularly allows operations to check the efficiency of the catalyst and gives them early warning of potential catalyst poisoning. It also allows them to plan more effectively around when a shut down would be required to either regenerate or replace the catalyst.