Inert Coatings for Inconel® Oil and Gas Sampling Equipment

Specialty alloys still need SilcoNert® and Dursan® coatings to ensure sample stability and prevent adsorption of trace-level sulfur and mercury compounds onto metal surfaces.

Achieve Analytical Precision Combined with Greater Efficiency

Inconel® alloys are specified instead of stainless steel to withstand corrosion and high mechanical loads in downhole oil and gas sampling environments. These sampling applications require accurate quantification of sulfur impurities in crude oil and natural gas like hydrogen sulfide (H_2S) and methyl mercaptan (MSH) to ensure successful downstream production of fuels, plastics, additives and other everyday petrochemical products.

However, just like stainless steel, these alloys have chemically active metal surfaces that rapidly adsorb sulfur and other compounds which must be quantified at trace-levels with methods like gas chromatography. This adsorption effect makes accurate analysis impossible unless the Inconel® substrate is first coated with an inert silicon barrier. Fortunately, SilcoTek is able to apply its well-known inert coatings SilcoNert® 2000 and Dursan® to Inconel® field sampling and analytical equipment, leading to better results in the lab.

Experimental Summary

Inconel 600 was tested as coated (SilcoNert 2000 and Dursan) and uncoated versions using active sulfur gases known to adsorb to metallic surfaces. To obtain a proper perspective of the inertness of these alloys, a chromatographic system was designed to test adsorption in the presence of low concentrations (56 ppb) of sulfur gases hydrogen sulfide and methyl mercaptan along with an internal standard, carbonyl sulfide, that does not adsorb to metals like stainless steel. Coated and uncoated test coils were placed in-line with a gas chromatographic system that already displays a high degree of inertness to active sulfur gases. For the Inconel 600 alloy, it was shown that even in a flow-through situation where there is minimal contact time with the tubing ID (compared to typical static storage testing over a period of time), there was a high degree of adsorption of reactive sulfur gases. This adsorption effect is highly reduced or totally eliminated when the sample flow path is internally coated with either Dursan or SilcoNert 2000.

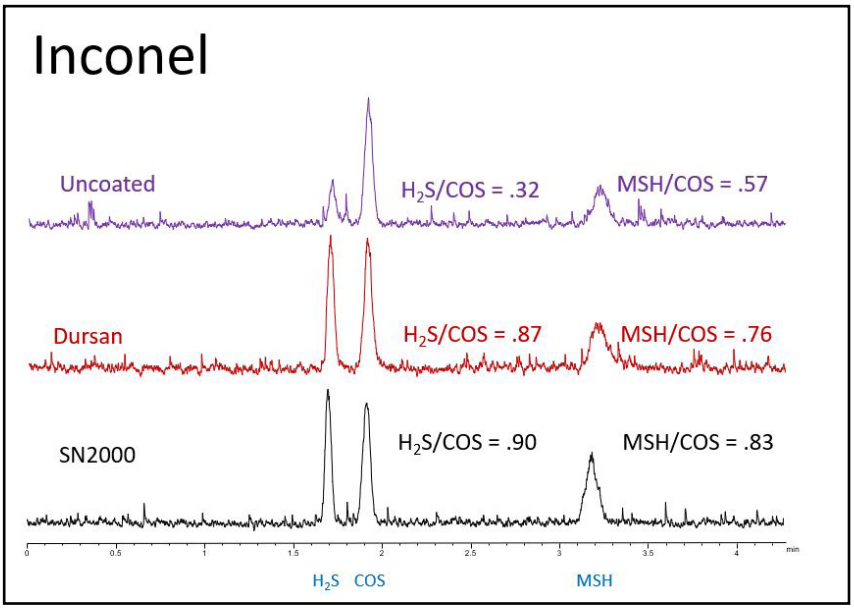

Fig. 1. Uncoated vs Dursan-coated vs. SilcoNert 2000-coated Inconel response to sulfur gases. Note the improvement in peak shapes due to less adsorption between the uncoated and coated samples.

Protect analytical precision and improve efficiency by choosing SilcoTek coating technology to provide you with the ultimate inert surface for your oil and gas sampling equipment needs.