Applications Note

Prevent Mercury Loss During Transport and Storage with SilcoNert® 2000

To ensure accurate analysis of low levels of mercury in streams sampled from flue stacks, sampling systems must be inert. Laboratory testing and field results have proven that SilcoNert 2000 treated sampling and testing equipment is inert to active compounds such as mercury and mercury species down to levels as low as 1 ppb.

As regulations and guidelines for monitoring and controlling mercury emissions are developed and implemented, proper equipment will be needed for accurate sampling and analysis. The most popular methods of sampling will be based on continuous mercury monitoring systems (CMMS) and sorbent tube samplers. These systems are often degraded or compromised by the loss of mercury species due to reactions and adsorption of mercury species on the inner surfaces of transfer and monitoring equipment.

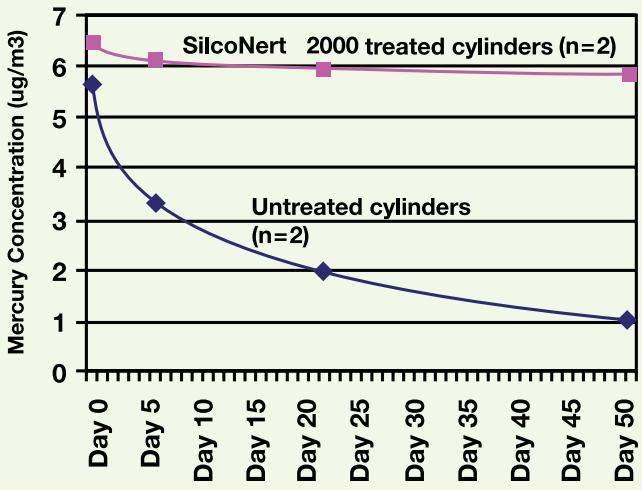
SilcoNert 2000:
The most inert surface available for mercury sampling

Unlike fluoropolymers, the SilcoNert 2000 layer will not contaminate systems when used in high temperature applications. SilcoNert 2000 is a proprietary (U.S. Patent #6,444,326), silicon, chemical vapor-deposited (CVD) coating, specifically designed to improve the chemical/mercury inertness of steel, stainless steel, alloys, glass, and ceramics. The unique non line-of-site CVD process produces a flexible, high temperature capable, amorphous silicon layer that diffuses into the metal lattice. The coating will conform to the most intricate surfaces while maintaining high dimensional tolerances. SilcoNert 2000 will deform with tubing surfaces allowing for radius bends and will not interfere with threaded or compression joints; making SilcoNert 2000 the ideal coating for process sampling and stack sampling in coal fired generators.

- Improve analytical sensitivity and reliability for mercury, SOx, or NOx compounds
- Eliminate costly retests
- Maximize scrubber performance
- Meets system inertness requirements
- Rugged, withstands temperatures up to 450°C
- Won't contaminate system like fluoropolymers

The data in figure 1 compares SilcoNert 2000 treated 304 grade stainless steel gas sampling cylinders (Swagelok®, Solon OH) and untreated sample cylinders. Each cylinder was filled with 8 ug/m^3 of elemental mercury (approximately 1 part per million) (Spectra Gases, Alpha NJ). The mercury in each cylinder was measured over time to determine the changes in concentration.

Figure 1: SilcoNert 2000 treated cylinders and sampling components provide an inert sample path which prevents adsorption of active compounds like mercury and ensures accurate sampling. [1]



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The data demonstrates that SilcoNert 2000 treated stainless steel surfaces provide superior mercury inertness performance compared to untreated stainless steel. Results show that SilcoNert 2000 treatment is ideal for components and tubing exposed to mercury samples in CMMS and sorbent tube mercury sampling systems.

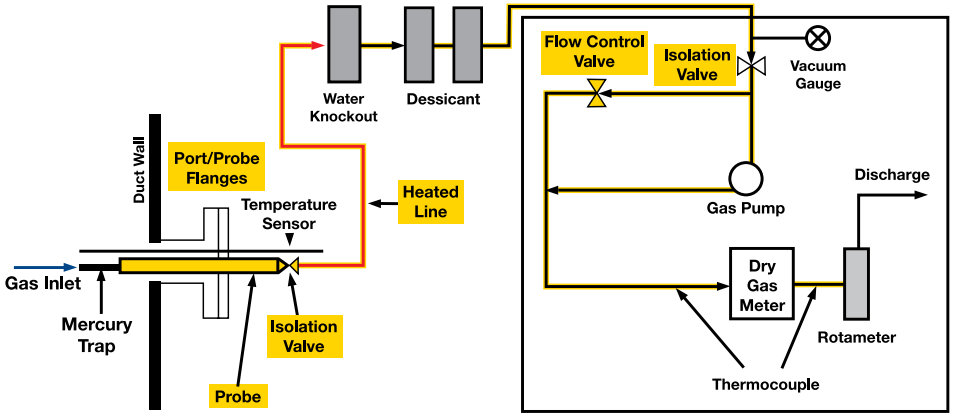
Apply SilcoNert 2000 to the entire mercury sampling pathway to ensure ultimate mercury sampling inertness

SilcoNert 2000 is an inert barrier coating that can be applied to the entire surface of stainless steel monitoring equipment, regardless of geometry. It can be applied to many of the components in a mercury sampling stream, including

- probe tubing
- impingers
- fittings
- filters
- housings
- transfer tubing
- valves

A typical sampling train schematic is shown in figure 2. Application of SilcoNert 2000 to all of the components of a stack or continuous emission monitoring system will greatly improve analytical reliability and sensitivity, and will be needed as regulations are promulgated and emission quotas are enforced.

Figure 2: Typical schematic of a mercury sampling system.[1] SilcoNert 2000 dramatically improves mercury inertness for all exposed surfaces.[2]



Summary

SilcoNert 2000 provides a stable surface for accurate mercury analysis the first time, every time. Based on laboratory and field testing, SilcoNert 2000 dramatically improves analytical reliability of continuous mercury monitoring systems and sorbent tube mercury sampling systems. To learn more about how SilcoNert 2000 can improve the performance of your system, visit our web site at www.SilcoTek.com, or call us! 814-353-1778.

References

1. Higgins, Martin; Barone, Gary; Smith, David; Restek Corporation; Neeme, Ted; Spectra Gases Inc., "A Comparison of Surface Adsorption Effects in Mercury and Sulfur Analyzer Systems" ISA Symposium, 2007.
2. Proposed Method 324. Determination of Vapor Phase Flue Gas Mercury Emissions from Stationary Sources Using Dry Sorbent Trap Sampling. United States Environmental Protection Agency. Washington, D.C. P. 5.

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