

SilcoTek® Coatings Improve Reliability, Lower Costs, and Ensure Compliance at your Refinery

Petrochemical Coating Solution Guide



When ideal materials for engineering and construction of petrochemical processing and analyzer systems fail to provide proper surface properties, SilcoTek® coatings offer the best solution for optimizing performance and cost.

- **Versatile** - bring robust chemical inertness, stability and corrosion resistance to a variety of substrates and applications
- **Effective** - fully coat complex geometries and tortuous pathways with a thin, flexible, and durable coating
- **Valuable** - save money with equipment that lasts longer, performs better, and assures compliance to regulatory standards

Introduction

The petrochemical industry fuels the modern world. In addition to transportation, petrochemicals contribute to a majority of basic human necessities, including housing, hygiene, health and food.

Converting crude oil into useful products involves complicated, multistage chemistry and processing. Engineers are charged with quickly and accurately measuring the chemical contents of process streams without delay in order to maintain productivity and meet legal requirements.

SilcoTek® provides coatings that protect sampling, analyzer and production components from the negative yet inevitable consequences of processing highly reactive chemicals like sulfur and mercury while helping to assure compliance with environmental regulatory standards. This solution guide covers the materials challenges those working in the petrochemical industry face and how SilcoTek's coatings solve them.

Materials Challenges in the Petrochemical Industry

• **Lost time and performance:** regulated chemical compounds such as H₂S must be measured at ultra-sensitive levels, but instrumentation constructed of bare stainless steel alone fails to provide adequate results

• **Frequent maintenance:** oil and gas processing streams are corrosive to untreated stainless steel, yet exotic materials like Hastelloy® are expensive and greatly hinder profitability

• **Poor reliability:** commonly chosen solutions like PTFE fail at high temperatures, lack durability, and easily delaminate in demanding applications common to petrochemical processing

Problem	Solution	Result
Poor analytical accuracy with H ₂ S, Hg, NOx, etc.	SilcoNert.	Improved sampling reliability and throughput
Corrosion	Dur-san.	Longer lifetimes and lower costs
Slow instrument response	SilcoNert.	Drastically faster signals and higher efficiency
Regulations e.g. Tier 3, EPA 325	SilcoNert.	Assured compliance with accurate results
Oxidation	Silcolloy.	Sustained appearance and performance in extreme conditions
Moisture	Dur-san.	Reduced contamination, corrosion, and sample loss

Applications where SilcoTek Coatings Boost Performance

- Downhole crude sampling and testing
- Olefin and aromatic production
- General process monitoring
- Flare gas sampling (40 CFR Part 60 Subpart -Ja)
- ULSD / ULSG (Tier 3)
- Fence line monitoring (EPA 325)
- Ammonia slip monitoring
- Odorant sampling
- Offshore / splash zone
- Ethylene and propylene purity

Common Parts that Benefit from SilcoTek Coatings

GC & MS components	Fittings	Filters
Valves	Pressure regulators	Injectors
Sample cylinders	Reactors	Downhole/wireline tools
Tubing	Probes	Custom parts

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Coatings that Expand Material Limits

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Fence Line Monitoring
For regulatory compliance and safety.

Passive sampling tubes

Process Sampling

For efficient and repeatable analysis of sulfurs, mercury, and more.

Sample cylinders, regulators, valves

Flare Gas Analysis

For regulatory compliance by reliably assessing H₂S content.

Probes, tubing, instrumentation

Analyzer House

For rapid detection of process upsets or contamination.

GC & MS wetted sample flow paths

Production

For more uptime by fighting corrosion and preventing feedstock impurities.

Piping, reactors, mixers

SOLUTIONS THROUGHOUT YOUR REFINERY

Advanced Surfaces for Advanced Performance

SilcoTek's patented chemical vapor deposition (CVD) coatings provide numerous advantages over alternatives, giving petrochemical customers ultimate performance along with flexibility in system design, fabrication, and installation.

1. Innovative Deposition Process Makes Integration Easy

The CVD process binds the coating to the molecular structure of the base metal, leading to a flexible layer that can bend with tubing and doesn't flake like PTFE. Plus, the gas-phase process thoroughly coats complex geometries and narrow internal passageways.

2. Maximum Chemical Inertness for Reliable Analysis

Analyzing trace levels of sulfur, mercury, and ammonia is necessary for quality control and regulation compliance in the refinery. Uncoated instrumentation calibrates slowly and fails to provide the accuracy and resolution of inert-coated systems.

3. Super Alloy Corrosion Resistance at a Fraction of the Price

SilcoTek coatings on stainless steel are cost-effective replacements for expensive materials like Hastelloy®. They provide a dense barrier to attack while simultaneously preventing iron, nickel and other metal ions from leaching out of equipment and into the process stream.

SilcoTek coatings drastically outperform uncoated 316L SS in ASTM G85-A2 acidified salt spray testing.



Upgrading stainless steel with Dursan® or Silcolloy® is an effective alternative to costly super alloys.

Making the Impossible Possible

SilcoTek coatings were born in the lab but grew up in the refinery. Whether you need better sulfur analysis to comply with the law or want to extend the life of your parts in corrosive environments, our coatings provide solutions that don't require system redesign and won't bog down your supply chain.

Working with SilcoTek is a unique service experience that puts customers and the quality of their parts first. This drives an endless commitment to providing fast, high-quality, mistake-free coatings every day. Our ZIP Code - **Z**ero Disappointments, **I**ntegrity in all we do, and **P**lus 1 customer service - embodies these beliefs and drives our mission.

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