



Are SilcoTek coated products for oxygen service? (No.)

Technical Insight

Author

David Smith, Ph.D.
R&D Manager

SilcoTek® Corporation

Synopsis

Occasionally, customers have inquired whether parts coated by SilcoTek are certified for oxygen service. SilcoTek coated parts are not certified for oxygen service, nor does SilcoTek endorse or provide certification as an option for their customers.

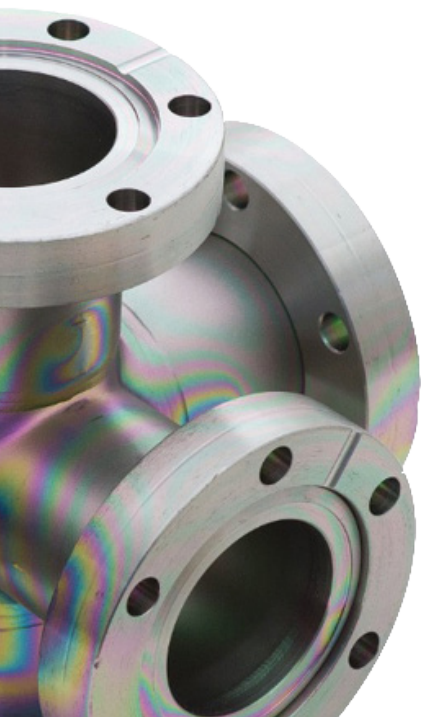
Background

The cleanliness standards required for safe oxygen service are demanding, and depending on the certification body required, can be varied and confusing. From the website of Precision Companies, who offers oxygen service cleaning and certification (<https://www.precgroup.com/oxygen-cleaning-service-industrial/>):

What Is Oxygen Cleaning?

Oxygen system cleaning (or “oxygen cleaning”) involves using different techniques, equipment, and solvents to remove contaminants from oxygen service equipment. Oxygen cleaning techniques are unique because they use oxygen-compatible solvents and specially designed equipment and processes to ensure the safe and complete removal of hazardous and potentially fire-causing contaminants.

Several different governing bodies regulate the solvents, equipment, and processes used in oxygen cleaning, as well as the standards for industrial oxygen system cleanliness in different sub-sectors. This includes the Compressed Gas Association (CGA), the Institute of Environmental Services and Technology (IEST), ASTM International (formerly the American Society for Testing and Materials), SAE International (the Society of Automotive Engineers), and NASA’s Kennedy Space Center (KSC).



While the overarching philosophies of these organizations have always largely agreed with each other, their specific requirements and recommendations have been historically inconsistent. Recent revisions to many key regulations have aimed to create a more uniform standard for oxygen service cleaning and the overall maintenance of industrial oxygen systems. As these revisions take effect and every in-house and third-party oxygen cleaning provider adjusts their services to comply, these revisions will have significant operational and financial consequences for industrial companies and their oxygen systems.

Fire occurs when oxygen, fuel, and heat energy (e.g., a spark) combine. Pure oxygen environments, therefore, require the absence of a fuel, like a hydrocarbon-containing material, and heat energy. Additionally, materials are easier to ignite at higher pressures and/or rapid flows of oxygen, which can be the case for oxygen service coming from a compressed gas cylinder. The presence of particles can be the cause of static discharge (spark) or from particle impact that strikes a material and generates heat. To summarize, it is very important with oxygen service to exclude any hydrocarbon contaminants and particulate matter, particularly in compressed and/or high-flow oxygen delivery systems.

Data and Discussion

Unfortunately, for SilcoTek processes such as SilcoNert 2000, SilcoKlean 1000, Dursan and Notak, hydrocarbons are present in either the surface functionalization or the bulk of the deposition. And except for Notak, all other SilcoTek processes generate particles, that although are visually removed post-processing, are still present at a microscopic level.

Conclusion:

Because of the presence of hydrocarbon moieties, particles, or both on SilcoTek-treated parts, it is a near-impossibility to clean a processed part in preparation for oxygen service certification. As a result, SilcoTek discourages using parts coated by SilcoTek for oxygen service. However, customers are encouraged to conduct testing to best understand appropriate limitations of the coated parts.



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+1 814-353-1778