



How to Avoid Risk of Ignition When Oxygen is Present in Valve Applications

White Paper



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Introduction

Manufacture of cryogenic valves where oxygen is present requires careful adherence to strict BAM and DIN standards to avoid ignition during use.



Noel Doidge

Noel is product manager for Parker Bestobell industrial and marine range.

It is a well known fact that oils and grease can spontaneously ignite and burn explosively in atmospheres which are enriched with oxygen. Indeed, all organic materials and most metals and metal alloys burn in oxygen. Oil and grease can cause a chain reaction in oxygen equipment which may even cause metal to burn or melt.

Image 1. Parker Bestobell cryogenic check valve - all valves are degreased for oxygen duty, assembled in clean room conditions and pressure tested prior to dispatch.

Never lubricate a valve spindle with oil or grease.

When oil and grease come into contact with oxygen within a cryogenic valve, the remains of melted or burned metal are ejected out of the valve casing and oxygen can then leak out. This can cause fire to spread intensely and quickly to neighbouring inflammable material outside of the equipment. Oil and grease must therefore never be used to lubricate a valve spindle if it comes into contact with oxygen.

This is why it is so important when purchasing valves that are to be used in applications where oxygen is present to ensure they have been degreased for oxygen duty.

Ensure that valves are inspected and checked for the presence of oil and grease.

In many industrial systems, shut-off valves are installed and the screw threads are lubricated with oil and grease to reduce friction, which can cause an issue if oxygen is present within the application. To avoid this, it is essential to ensure that all valves are inspected and checked to ensure they are free from oil and grease. With Parker Bestobell's valves these checks are carried out prior to despatch to the customer.

Download Parker Bestobell Cryogenic Valves for Industrial Gas Applications Technical Product Catalogue.



Use only material and parts approved for the relevant operating conditions.

Pressure influences material behaviour, for example, by decreasing the ignition temperature and increasing the combustion speed. Therefore, in a pressure oxygen system, we use only materials and parts for which the design is approved for the relevant operating conditions.

To avoid any issues, Parker Bestobell valves are properly prepared through the use of suitable material pairs and a special construction design and careful manual finishing of the individual assembly under special clean room conditions. All materials used are tested at the Federal Institute for Material Testing (BAM) with test procedures in accordance with DIN EN 1797 in order to verify their usability in connection with oxygen.

Parker Bestobell's valve cleaning procedures.

To check for the presence of oil and grease, each valve is subjected to a cleaning process specifically developed for the valve, regardless of its later use. Cleaning results are regularly monitored and are subject to the requirements of the European Standard EN 12300 "Purity for cryogenic operation". Actual values must be far below the limiting value of 500 mg/m² stipulated in this standard because some customers' specifications only allow 100 mg/m².

Due to our special cleaning procedure, Parker Bestobell achieves a purity value below 20 mg/m², which is four times lower, therefore greatly reducing any risks of ignition. The high purity of our cryogenic valves is documented and confirmed in the acceptance test certificate, providing reassurance to customers.

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**— Noel Doidge,
Product Manager**

As a result, all Parker Bestobell cryogenic valves are suitable for oxygen use, which means that special instructions on the presence of oil and grease are not necessary for the customer to specify.





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