

Oil and grease-free for the Queen's tea

Oxygen in piping systems is extremely combustible and explosive. Merely very small amounts of oil or grease contamination in a piping system can cause an explosion. In ozone production, often pure oxygen is transformed into ozone. The world's largest manufacturer of ozone generators offers its customers added safety thanks to SERTO's new cleaning service. Thanks to this, even the Queen can enjoy clean London water.

At Ozonia AG in Dübendorf near Zurich, ozone generators are manufactured in diverse sizes for a variety of applications. Ozone is required for many processes in a number of different industries. For example, the water in swimming pools is disinfected with ozone, sterile water is manufactured for the production of medicines in the pharmaceutical industry, cooling water circulation is cleaned for power plants or the drinking water for entire regions is treated with ozone. Ozone is a viable replacement for the environmentally hazardous chlorine.

Ozone replaces environmentally hazardous chlorine

"It doesn't matter whether large plants or smaller standard equipment are used to prepare ozone, oxygen is always transported through pipe systems for this purpose", explains Rolf Lieberherr. The head of Materials Logistics is responsible for purchasing and implementing the right products. Oxygen in pipe systems is extremely combustible and explosive. The smallest amount of contamination in tubes or tube unions can be catastrophic.

Ozone has increasingly become an important substance around the globe. Environmentally hazardous substances such as chlorine, biocides, and chromic acid can be replaced, and toxic substances such as hydrogen sulphide, dioxin or cyanide can be made harmless. The most important application area for ozone is however drinking water treatment. It is used here as a disinfectant, or to improve colour, taste and odour, eliminate dissolved metals as well as organic compounds and to increase filtering speed.

Ozonia products are used throughout the world and often in quite sensitive areas, for example in drinking water treatment in the Syrian desert or in the treatment of cooling water for a nuclear power plant in Australia. "Mistakes are not tolerated", emphasises Lieberherr. In London, Ozonia products ensure that the municipal drinking water is clean and that the Queen's tea tastes good.

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Oxygen, vital but explosive

For the manufacture of ozone, a single oxygen atom is "attached" to pure oxygen O₂ to create ozone (O₃). To do this, an oxygen particle O₂ is split through electrical discharge into its two atoms, which then look for a whole O₂ atom to "attach to". Since ozone is very volatile, it is always generated directly where it is needed.

Oxygen is a colourless and odourless gas. Pure oxygen does not burn, but is absolutely essential for combustion and creates compounds with all other elements. Most substances combust intensely and rapidly with compressed or pure oxygen. Some substances react so violently that they combust right after ignition or they self-ignite, such as oils and greases.

Hot fire can melt aluminium

For a fire to occur, three elements must be present: a fuel, a source of ignition and oxygen. "If one part is missing, there can be no fire", explains Milan Asanin from Marketing at Ozonia. In pipe systems, the source of ignition is not easily recognisable. A fire can occur where there is friction, high flow velocity, heating up through turbulence or through adiabatic compression, in other words when a fast flowing gas suddenly hits an obstacle, for example a closed valve.

If tube unions are contaminated with mineral oils or greases, oxygen can oxidise with the carbon constituents. The very high temperatures which are thus generated cause the surroundings to self-ignite and start a chain reaction. "One customer who used the wrong, uncleaned replacement part watched his aluminium tools melt in the fire after the explosion", reports Angelo Scacchi, Production Manager at Ozonia.

Cleanliness norm recognised world-wide

The significance of clean tube unions in oxygen circuits has been recognised by all the major institutes. The American Society for Testing and Materials (ASTM) for instance in its globally recognised G93-96 norm specifies a cleanliness grade of less than 55 mg/m² of non-volatile residual contamination.

"With our long-term partner SERTO we now have a service provider that guarantees delivery of oil and grease-free tube unions", says a contented Rolf Lieberherr. The company in Aadorf has been supplying tube unions in all the required sizes to Ozonia for years. "The SERTO products fit especially well in our standard equipment with small dimensions and limited internal space", explains

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Scacchi. The unions are generally a wrench size smaller than the DIN norm. That is why you will find SERTO unions in nearly all catering coffee machines.

“The new service has been well received by our customers“, says René Glaus, Product Manager at SERTO Ltd. The environmentally friendly cleaned, individually bagged products, documented according to a certified process, have a guaranteed cleanliness grade < 33 mg which is significantly below the required 55 mg.

In-house cleaning is no guarantee

Similar to many other companies, the tube unions were previously cleaned in-house at Ozonia using ultrasound which was very cost and employee intensive, "but we never really knew just how clean they were“, according to Lieberherr, "and when we supplied our customers with replacement parts, we carried the responsibility.“ Besides the costs, the uncertainty was a major factor which led to the use of this new service. René Glaus believes he can scatter all doubt. Cleaning is offered for copper, brass and stainless steel products. And plastic parts are also available pre-cleaned.

The components are placed individually in special baskets for the cleaning process at SERTO, so that the cleaning media can easily flow off. Depending on the material, the tube unions pass through a series of alkaline and acidic cleaning baths. If lubricants or seals are required, only products specifically approved for oxygen applications are used. After inspection, the components are packaged individually in plastic bags, sealed and marked.

Cleaning process is environmentally friendly

The cleaning machinery runs with environmentally friendly, degradable acids, alkalis and DI-18 water instead of trichloride. The recuperated and treated “waste water” can be disposed of later in the regular sewage system.

Since 1952 SERTO stands for tube unions – the only ones in the world – that can be mounted and dismantled radially. The Group employs 150 persons world-wide and shows approx. 45 million Swiss francs (€ 32 mill) in revenue. The Swiss products are implemented in the chemical industry, the metal industry, in plumbing, catering coffee machines and in many other sectors, such as ozone production.

Ozone generators for soft drinks, salmon and tea

Quality you can rely on is a must at Ozonia because this Swiss firm supplies ozone generators to, among other, leading mineral water manufacturers around the world where the bottles go through ozone-cleaning in

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the bottling plants. The company originally a joint venture founded in 1992 by Degremont and Air Liquide formerly belonged to the ABB Corporation and supplies systems for water treatment in salmon fish farming as well as for the cleaning of dialysis machines and generates sales in the order of 30 million euros. Other applications in which the Ozonia ozone generators can be found are waste water treatment in the paper industry or drinking water treatment in southern Germany. In addition, several municipal water utilities, for example in Barcelona, Paris and London, depend on this Swiss expertise for clean water. So the Queen can enjoy her five o'clock tea.

182 Zeilen, 1.068 Wörter, 8.099 Zeichen
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