



Ozone use in Laundry

Commercial, institutional and industrial laundries are designed to handle a wide range of fabrics that become soiled in a large number of ways. Such facilities handle linen and towels, incontinence pads, clothes, uniforms, and restaurant linen. In its role as a powerful oxidant and biocide, ozone eliminates or alleviates a variety of laundry problems. The equipment is market proven and offers large cost savings that have an immediate positive effect on the bottom line.

Although the properties of ozone have been known and studied since the mid 19th century, it is only during the last two decades that it has been applied in commercial and industrial contexts. Initially, circa 1906, ozone was used as a clarifying, deodorizing and purifying agent in drinking and wastewater treatment plants in Europe, where it gained a level of acceptance over the years.



PROPERTIES OF OZONE

Ozone is a gas that is formed by the breakdown of elemental, diatomic Oxygen (O_2) and the recombination of a percentage of the oxygen atoms into a triatomic molecule (O_3). Although normal oxygen, a component of the stronger oxidizing properties and reacts more quickly, often in fractions of a second, with a wide range of substances.

In addition, it is one of the most effective biocides known to science, better even than chlorine, bromine and other commonly used disinfectants. Unlike the latter substances, however, it does not form hazardous disinfectant byproducts (DBP's) such as dioxin and nitrites that are harmful to the environment or are toxic to animals and humans. Once ozone has fully reacted with substances in water or air, excess gas decomposes quickly to normal oxygen and is reabsorbed into the atmosphere.

Ozone can be generated from two sources: ambient air or pure oxygen. Because it reacts so easily with other elements and is inherently unstable, it exists for only a short time before combining with another substance or reverting to normal oxygen. Accordingly, it must be generated on-site at the point that it is to be used. Unlike chlorine and other dangerous disinfectants, it does not need to be handled, transported or stored, thereby posing little hazard to personnel at the facility. Finally, when used in proper concentrations, ozone is an effective corrosion inhibitor, and in the washroom context can reduce the need for substances like chlorine, which are extremely corrosive for equipment and fabrics.

THE ENVIRONMENTAL ALTERNATIVE

Our rapid population, economic growth and low rainfall have placed increased demands on our water utilities. Water production requirements coupled with rigorous quality standards for the finished treated water present more challenges. Disinfection requirements set forth in the Surface Water Treatment Rule along with other criteria prompted a major shift to ozone and other strong non-halogenated oxidants to replace chlorine. Ozone and like processes offer additional benefits including complete or partial oxidation of colour, manganese, synthetic organic chemicals along with taste and odour causing compounds. Ozone gas is injected into the wash water via a vacuum operated venturi valve, and is produced only when the cold water supply solenoid valve on the washer opens to fill the washer extractor. This dosage is regulated at 2.0 g of dissolved ozone per litre of water.

Laundering with Ozone typically provides the following reduction in utilities (in %):

- Water In 40%
- Sewer 40%
- Hot Water (gas) 95%
- Internal washer heating (steam) 95%
- Operating energy (electricity) 25%
- Gas for dryers 30%



OZONE - CHEMICAL SYNERGY

In its role as a powerful oxidant and biocide, ozone works in the context of commercial and industrial laundry washrooms to boost the cleaning activity of the various chemicals and chemical compounds. It accomplishes this in several ways:

Replenishes oxygen in the wash water

Many chemicals in the wash cycle are themselves oxidants and require oxygen in their reactions with the different types of soils. Ozone, itself a form of oxygen, increases the supply of that substance, thereby increasing those chemicals' effectiveness as cleaning agents. This allows a reduction of harsh bleaching chemicals in the wash cycle.

Purifies the wash water

Ozone oxidizes the soil components of the wash water causing them to form precipitates or to go into suspension so that they can more easily be removed from the wash liquor.

By this process, the chemicals themselves are re-energized and the load on them is reduced, so they can be used in even smaller quantities and still is. Because ozone increases the saponification and lubricating effects of the wash chemicals, the wash liquor does not need to be as hot. Instead of washing at the "traditional" temperatures of 140°F to 160°F Cold water means less costly water. Cold water means less wear on the linen.

Efficient Deodoriser

Odour in soiled fabrics is often caused by sulphur and nitrogen compounds or by petrochemicals in the soil. Ozone's ability to break the single and double bonds that hold the molecules together in those compounds allows it to eradicate the odours and, in cases where the latter result from microbes, to prevent them from recurring.

It should be noted that ozone has been used successfully by the dry cleaning industry to remove the smell of smoke, fish and other strong, odours from soiled garments.

Improves Waste Water Quality

The benefit of ozone in the wash does not stop at the drain. Ozone can be very beneficial in the waste stream and in water reuse systems. The high oxidation capacity of ozone aids in the process of coagulation, flocculation and filtration. It attacks soil and decomposes much of it to air, water and carbon dioxide. Ozone bleaches out colour and removes odour, reduces BOD, COD, TSS, total organic carbon along with many other compounds found in the waste stream. Ozone's high reactivity permits oxidation in a continuous process. This technique has roughly doubled the rate of reduction of COD in the water medium.

The high oxidation power of ozone (disinfection, control of DBP's, taste and odour) also enhances the downstream coagulation, flocculation and filtration. Items washed in ozone treated water come out smelling fresh and clean; even wipers have no oily odour and feel soft.

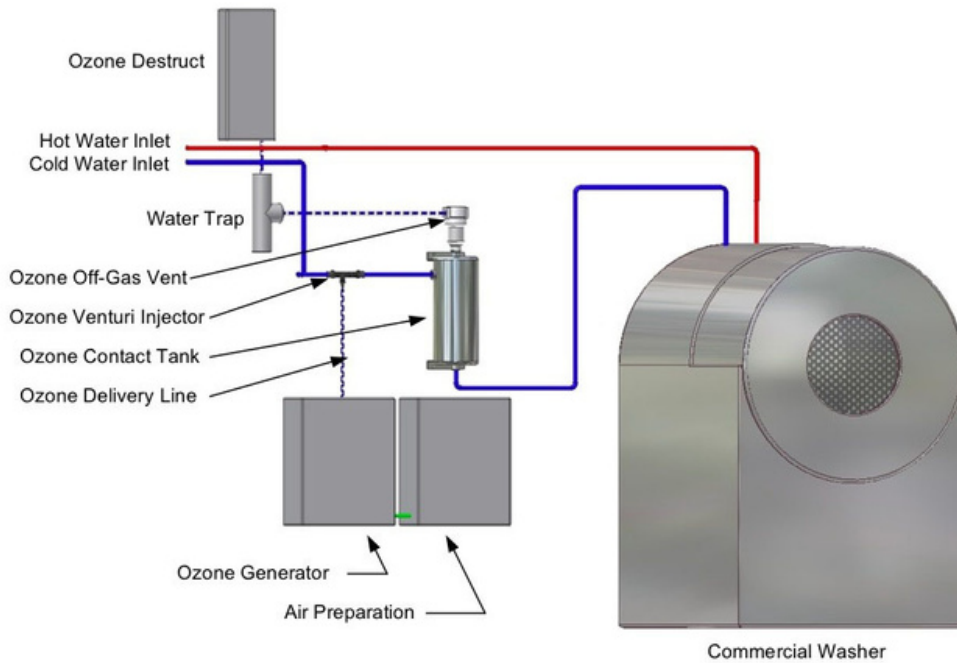
SOME SPECIFIC COMPOUNDS OXIDIZED BY OZONE:

- Tannic Acids (plant-originated acids)
- Sulphides
- Spores of mold (very effective)
- Cigarette Smoke: (A puff of cigarette smoke contains 4 billion particles and more than 1500 compounds, ranging from light, reactive gasses (deadly carbon monoxide is one), suspended chemical particles and tars. Ozone destroys most of these products and even "burns" the lighter tars in the air and converts them to harmless carbon.
- Chlorine and its derivatives
- Dioxin
- Nitrates
- Sodium
- Phosphorous
- Trihalomethanes (toxic product of a chlorine)

Ozone is unmatched as a deodoriser. Ozone has a strong characteristic odour even in very low concentrations. Its effect on the olfactory membrane makes it difficult or impossible to detect other odours when ozone is present. In low concentrations (0.01 to 0.02 ppm) ozone acts as a masking agent on most odours. Tests have demonstrated that room odours were undetectable even when ozone concentrations were less than 0.01 ppm.

Eltech Ozone Pvt Ltd

Process Layout and Ozone Model



*Ozone Generator and
Oxygen Concentrator*



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