



HydroXan

– *The Clean Oxidizer*

by Dennis Ashworth

People are dirty. Not the type of dirt that you can see like the dirt on your legs after playing soccer – but the terrible stuff you cannot see. When a swimmer dives, jumps or simply steps into a swimming pool or spa – they start to perspire and wash off ‘bather waste’. The longer bathers stay and exercise submersed in the water, the more ‘bather waste’ they leave behind.

Body Sweats Profusely

The body sweats profusely while exercising in water at 30° C (86°F). Hair is washed off the body, mucous is discharged from the nose and bathers involuntarily urinate and sweat, leaving, on average, 750 ml to 1 L (25.3 oz. to 34 oz.) of ‘bather goo’ according to scientific research.

In a 100,000 gal. (400,000 L) indoor swimming pool with 300 to 500 bathers per day, the volume of bather waste is approximately 300 L to 500 L (79 gal. to 132 gal.) of bather waste – typically two drums per day. This includes fecal matter, body lotions, under arm deodorant, skin creams, cosmetics, hair care products, suntan lotions, skin flakes etc.

This is the reason that mandatory showering should be enforced. It is the law in every province in Canada. The

more bathers shower with soap and water, the less costly it is to operate the swimming facility. Less chemicals, less make-up water and less down-time result in more revenue and improved air and water quality. It has been shown that those most at risk from poor air and water quality work in enclosed offices on the pool deck, sit at a desk in the filtration equipment room, and work on the pool deck as aquatic instructors. (i.e.: lifeguards and ‘learn to swim’ teachers).

Answer Is A Two-Fold Process

The answer to the bather waste problem is a two-fold process. The first is agglomeration – the process of forming a mass from all of the invisible suspended particles left behind by the bather and making the particles large enough to be trapped by the filter. The second – and equally as important – is oxidation. This stands alone and is an important step prior to disinfection / sanitation.

Please note that the word ‘oxidation’ is a term reserved for swimming pool and spa contaminates.

The Southland Leisure Centre in Calgary, Alberta, features a 264,172 gal. (1,000,000 L) wave pool that averages up to 2,000 bathers per day.

Photo courtesy of: Southland Leisure Centre



Oxidation is the process of turning organic and non-organic 'things' into a gas. Chlorine dioxide for pool and spa purposes is an oxidizing agent not a disinfectant.

Process Converting $Cl_4O_{10}^2$ Discovered

More than 30 years ago, a process of converting tetrachlorodecaoxide $Cl_4O_{10}^2$ (commonly known as TCDO) was discovered by a scientist. The 'eureka' part of the discovery was that the TCDO converted to chlorine dioxide when free chlorine was in the pool or spa.

Swimming pools and spas were a natural application for the discovery but numerous other applications are in use today, with various forms of TCDO used to wash the walls in drinking water storage tanks, zoos etc. Dentists use it for treating gum diseases, dermatologists use it for skin eruptions, old age homes use it for washing patients, and growers use it for spraying fruit for international shipment. In the swimming pool and spa industry, it is used to clean sand filters on a maintenance basis or after pool foulings as a regular shock and bio-film removal. It is also used in shower rooms, change rooms, hospitals, and daycare facilities as the ultimate cleaner.

Oxidation Without Harmful Byproducts

The true advantage of making chlorine dioxide from TCDO is that at very low levels of chlorine dioxide, oxidation takes place cleanly, producing oxygen and chloride, without producing harmful byproducts.

It is critical at this point to discuss the cleanliness of the process. Where other forms of chlorine dioxide produce chlorites (note the 't'), TCDO and free chlorine do not. Instead, they produce chlorides (note the 'd'). This is the advantage of the TCDO process and an important distinction when investigating the use of chlorine dioxide in swimming pools.

A typical dose is 750 ml (25.3 oz.) of TCDO per 378,541 L (100,000 gal.) of water per day which can be tested with a simple field chlorine dioxide test kit. Typical readings for chlorine dioxide are 0.2 to 0.4 ppm, which is very low considering the volume of bather waste that enters most pools daily. The typical well-programmed pool with swim teams,

masters' swims, moms and tots, aqua-fit, noon swims, private lessons, class lessons and a long 17 hour day of heavy bather use truly does not get much of a chance to recover unless chlorine dioxide is in the pool or spa water.

Most Of Day Spent In Indoor Atmosphere

Lifeguards and swim teachers spend most of their working day in the indoor atmosphere of a swimming pool or spa. Typically, swim teachers working in busy facilities will spend four hours per session in the water completely submerged or up to their waist. Working conditions are improved substantially in those facilities that make chlorine dioxide part of their daily routine. Swim team members notice the difference immediately and consequently the swim coaches notice the difference in their swim times.

Chlorine dioxide is a clean oxidizer that substantially improves the air and water quality for bathers as well as staff working full time within the pool enclosure and TCDO adheres to the FINA guidelines.

Chlorine Dioxide From TCDO Is Accepted Worldwide

Accepted worldwide for use in swimming pools and spas, TCDO/chlorine dioxide is listed in numerous swimming pool operational guidelines. Used worldwide for over 30 years (it has been in use in Canada for approximately 15 years), chlorine dioxide is the oxidizing agent that will reduce the production of THMs (trihalomethanes and chloroforms are a byproduct of chlorination). Chlorine dioxide becomes the oxidizer and the process is continuous when applied by a low dosage metering pump. **PSM**

Author's Note: TCDO/ chlorine dioxide may be used with any form of chlorinating or brominating compound – salt system, sodium hypochlorite, calcium hypochlorite, lithium hypochlorite or stabilized chlorine granular or tablets.

Dennis Ashworth has been a member of the aquatics industry since 1963 treating recreational waters in various capacities. As author, court industry expert witness, speaker, innovator, CPO Instructor and as president of SP&S (www.swimpool.ca) he specializes in water and air quality for all recreational water applications.

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