EACP Committee

From: Denny Orr <twinoxidehawaii@gmail.com>
Sent: Monday, November 04, 2019 12:13 PM
To: EACP Committee
Subject: EACP-17(5) presentation for the 11/5 EACP Committee meeting
Attachments: attachment 1.pptx

Sent from my iPhone

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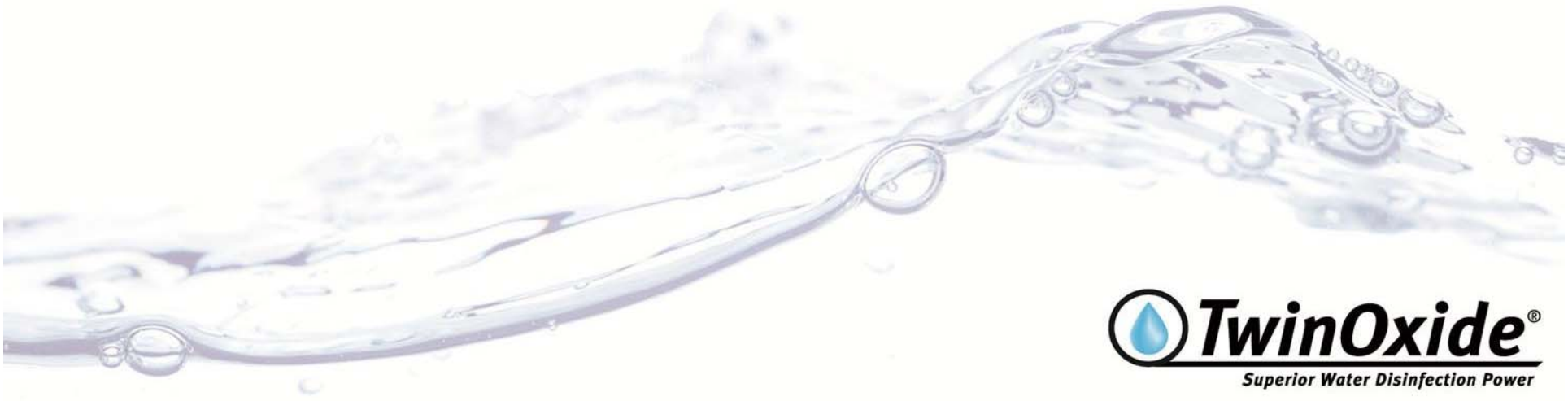
Total Water Treatment



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Superior Water Disinfection Power

21st century water disinfection

Water disinfectant requirements:

- with a fast, long lasting and full spectrum disinfection capacity against *all* known microorganisms common in water
- without carcinogenic by-products
- which performs without side-effects
- which is safe for health and eco-friendly
- which is easy to store and transport
- which is safe to handle and simple to apply
- which meets or supersedes the most stringent quality standards and laws in the world
- which is cost effective

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21st century water disinfection

- None of the conventional water disinfectants meets the aforementioned wishes and demands
- Governments and the water industry have been looking for a long time for a sustainable, eco-friendly alternative to overcome the limitations and problems they are facing with current disinfectants
- Many chemical and mechanical concepts have been tested and evaluated but with only limited results or new problems to be tackled
- The most commonly used disinfectant is chlorine. For more than a century, the addition of chlorine to drinking water has been saving millions of lives by destroying the germs in unsafe water sources
- Despite substantial progress made, the use and application of chlorine still implies a number of generally acknowledged disadvantages and hazards
- The hazards of chlorine involve safety, environmental and health related risks and effects

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Chlorine health risks

The use of chlorine causes a wide range of carcinogen and mutagen's in drinking water, e.g.

- TriHaloMethanes (THM) e.g. chloroform, bromodichloromethane, debromochloromethane and bromoform
- Haloacetic acids (HAA) e.g. mono-, di, and trichloroacetic acids and mono- and bromoacetic acids
- Mutagen X (MX)
- THM, HAA and MX are linked to cancer, miscarriages, stillbirths and birth defects
- Mutagen X cancer potency is 170 times greater than chloroform

Source: Harvard Medical Dental & Public Health School – 25 January 2002

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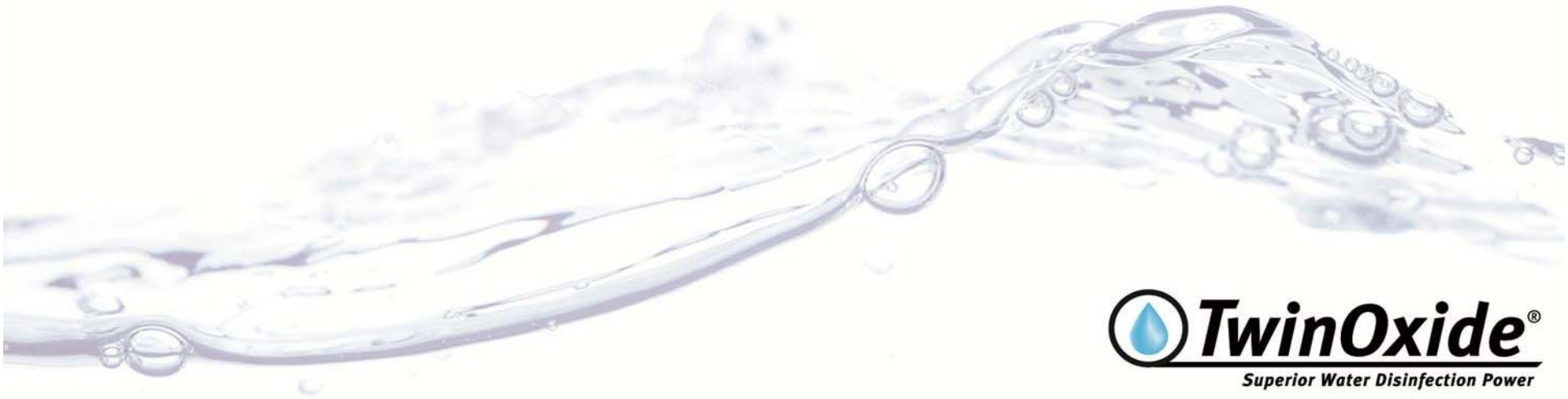
Why Chlorine Dioxide?

- Present biocides have limited capabilities
- 20th century water disinfectants are under increasing regulatory scrutiny
- Safety, quality control and health play an increasingly important role in potable drinking water & the food chain that includes clean water
- Increased consumer and political awareness of water in combination with growing health and environment conscience requires a 21st century answer
- The answer is TwinOxide



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TwinOxide ClO_2 Solution

- Chlorine dioxide was first discovered in the late 1800s. Since then, the superior disinfection of ClO_2 has been well researched and documented
- It is a proven and superior sterilant to ALL microorganisms.
- Safe, reliable and consistent batch process
- Chlorine dioxide is EU and US EPA / NSF approved and listed in the WHO Guidelines for Drinking Water Quality
- Chlorine dioxide is recommended by the Building Services Research and Information Association (BSRIA) as the best available technology for control of Legionella in hot and cold water systems (UK)

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TwinOxide ClO_2 Solution (cont.)

- Broad spectrum antimicrobial efficacy
- Better C x T record over a wider pH range (4-11 pH)
- No immunity building by microorganisms
- Highly selective oxidizer, does not hydrolyze in water (free radical), no building of toxic or carcinogenic halogenated disinfection by-products (THM's, HAA's)
- Superb oxidant for iron, manganese, nitrite, phenols and hydrogen sulfide
- Favorable environmental footprint, green chemistry
- Non-corrosive
- Improved aesthetics (i.e. taste, odor and color control

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TwinOxide solved the production issues of on-site generated ClO_2

- Safe, simple consistent batch process
- Reliable results from consistent quality and quantity ingredients. ISO 14001
- Unique formulation developed over 10 years producing 99.9% pure and stable solution for 30 days
- This has resulted in a cost effective, safe, simple and reliable solution

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TwinOxide is the ONLY ClO_2 product being used in the USA…..

- As the sole disinfectant from water plant to point-of-use
- That produced ZERO (0) TTHM's and HAA's (2 years of continuous data)
- Has been demonstrated to effectively remove biofilm in drinking water systems

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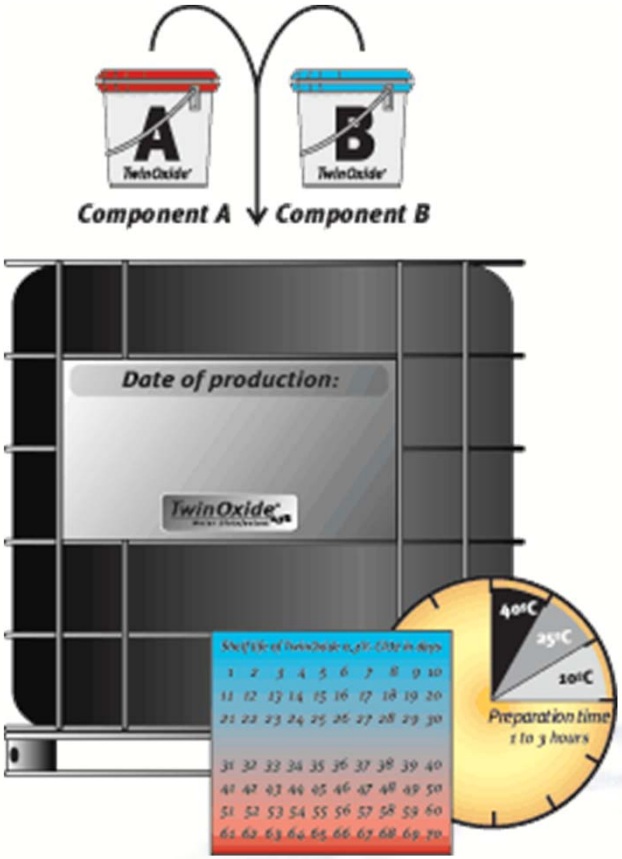
How does it work?



- Designated volume of water
- Add TwinOxide Component B
- Add TwinOxide Component A

- Waiting time depends on temperature as indicated as reaction takes place automatically
- Slightly homogenize the solution
- TwinOxide 0.3% solution ready for application

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Microbiological advantages

- Effective and full elimination of all known in water common microorganisms, i.e. bacteria (incl. Giardia, legionella), viruses (incl. hepatitis, anthrax), protozoan (incl. Crypto and Giardia), yeast, fungi, algae and cysts
- 10X more disinfection power compared to chlorine
- Compatible & synergistic with chlorine
- Long lasting residual disinfection capacity throughout water systems (up to 72 hours, chlorine only 2-6 hours)
- Effective in a broad pH range (pH 4-11)
- No resistance building by microorganisms

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Environmental and health advantages

- Biofilm removal eliminating pathogen (E.coli, Legionella, Listeria, MAC) habitat
- Zero (0) THMs and Zero (0) HAAs
- Low toxicity, water soluble DBPs chlorite & chlorate
- No injury claims in 12 years of significant use
- No adverse taste and odor effects in the disinfected water
- Green Chemistry
- Environmentally friendly
- UV sensitive
- Marine friendly at relevant doses
- Releases to ground permitted

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Economic advantages

- Biofilm removal
  - *Lowered overall disinfectant demand up to 60%
  - *Increased infrastructure life
  - *No flushing needed
  - *Cleaner filters, ion-exchange resin and activated carbon
  - *Increased useful life of water treatment components
- Reducing demand
  - *biofilm removal
  - *algae removal
  - *kills spores
  - *eliminates all Cl_2 resistant strains (eliminates Cl_2 overdose)
- Significantly extends infrastructure life
  - *lowest oxidative potential of all oxidative disinfectants
  - *lowest dose of all disinfectants by 10X
  - *Neutral pH
  - *biofilm removal eliminates acid producing bacteria
- Low safety costs and low personnel risks
- No environmental hazard or disaster insurance required
- Five-year shelf life

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What is needed?

A typical dosing system for TwinOxide features:

•Black PE-HD storage vessel + one spare storage vessel

•Dosing pump

•Injection point (placed appropriately)

The technical equipment to apply TwinOxide is standard. The level of sophistication of the dosing system depends on customer requirements.

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TwinOxide

Flow sensor

Chemical sensors

Dosing pumps (TKM)

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TwinOxide applications

Industry		Applications
Drinking & WW plants		▸ Water disinfection ▸ Biofilm removal ▸ Legionella control ▸ Effective against all microbes ▸ No known resistance buildup to TwinOxide ▸ Algae Fungus Mold Spores Bacteria Viruses ▸ Noncorrosive/extends life of distribution system ▸ Cleaning RO membranes(anti-fouling)
Livestock industry		▸ Drinking water disinfection ▸ Cleaning of drinking water distribution systems ▸ Biofilm removal ▸ Improved feed conversion ▸ Lower mortality/improved animal health
Meat & poultry processing		▸ Carcass spraying ▸ Chilling water disinfection ▸ Cleaning in place ▸ 5-log removal of Listeria & Salmonella
Maritime industry		▸ Drinking water disinfection ▸ Water circuit treatment (biofilm removing and prevention)

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NSF International

RECOGNIZES

TWINOXIDE INTERNATIONAL B.V.

THE NETHERLANDS

AS COMPLYING WITH NSF/ANSI 60.
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE AUTHORIZED TO BEAR THE NSF MARK.

ANSI Accredited Program
PRODUCT CERTIFICATION
Certification Program
Accredited by the
American National
Standards Institute

Certification Program
Accredited by the
Standards Council
of Canada

November 20, 2008
Certificate# C0005873 - 01

David Purkiss, General Manager
Water Distribution Systems

Organic

OMRI Listed®

The following product is OMRI Listed. It may be used in certified organic production or food processing and handling according to the USDA National Organic Program regulations.

Product

TwinOxide 0.3% ClO2 Solution Component A Sodium Chlorite Powder Composition

Company

TwinOxide International B.V.
Mario Alfonso Gaitán Cepeda
Calle uno #17
Col Centro Industrial Tlalnepantla
Tlalnepantla edo. de México 54030 Mexico

Status	Category	Issue date
Allowed with Restrictions	NOP: Chlorine Dioxide	24-May-2018

Product number	Class	Expiration date
gct-10801	Processing Sanitizers and Cleaners	01-Jun-2020

Restrictions

May be used in direct contact with post-harvest crop or food at levels approved by the FDA or the EPA for such a purpose. Such use must include a final rinse and residual chlorine levels in final rinse water shall not exceed the Maximum Residual Disinfectant Limit under the Safe Drinking Water Act, except that a final rinse is not required for use in FSIS inspected egg breaking facilities. When used as disinfectants and sanitizers for food contact surfaces, may be used up to maximum labeled rates and rinsing is not required unless mandated by the label use directions. May be used up to maximum labeled rates for disinfecting and sanitizing equipment or tools. No intervening event is necessary before equipment is used in organic production.

Peggy Miars
Executive Director/CEO

Product review is conducted according to the policies in the current *OMRI Policy Manual*® and based on the standards in the current *OMRI Standards Manual*®. To verify the current status of this or any OMRI Listed® product, view the most current version of the *OMRI Products List*® at OMRI.org. OMRI Listing® is not equivalent to organic certification nor is it a product endorsement. It can, however, be required to show that a product is suitable for use in a certified organic system per the responsibility of a USDA accredited certification agent. It is the operator's responsibility to properly use the product, including following any restrictions.

OMRI LISTED® For Organic Use

Organic Materials Review Institute
P.O. Box 11558, Eugene, OR 97440-3758, USA
541.343.7600 · info@omri.org · OMRI.org

OMRI Listed®

The following product is OMRI Listed. It may be used in certified organic production or food processing and handling according to the USDA National Organic Program regulations.

Product

TwinOxide 0.3% ClO2 Solution Component B Sodium Bisulfate Powder Composition

Company

TwinOxide International B.V.
Mario Alfonso Gaitán Cepeda
Calle uno #17
Col Centro Industrial Tlalnepantla
Tlalnepantla edo. de México 54030 Mexico

Status	Category	Issue date
Allowed with Restrictions	NOP: Acid Activators for Chlorine Dioxide	24-May-2018

Product number	Class	Expiration date
gct-10872	Processing Sanitizers and Cleaners	01-Jun-2020

Restrictions

May be used in direct contact with post-harvest crop or food at levels approved by the FDA or the EPA for such a purpose. Such use must include a final rinse and residual chlorine levels in final rinse water shall not exceed the Maximum Residual Disinfectant Limit under the Safe Drinking Water Act, except that a final rinse is not required for use in FSIS inspected egg breaking facilities. When used as disinfectants and sanitizers for food contact surfaces, may be used up to maximum labeled rates and rinsing is not required unless mandated by the label use directions. May be used up to maximum labeled rates for disinfecting and sanitizing equipment or tools. No intervening event is necessary before equipment is used in organic production.
Must only be used for the generation of chlorine dioxide. Use of resulting chlorine dioxide must comply with 205.605(b).

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Executive Director/CEO

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Approvals and endorsements

Hygiene-Institut des Ruhrgebiets, Gelsenkirchen (Germany)

Federal Institute for Occupational Safety and Health BAUA (Germany)

Various national drinking water regulations in EU Member States

US EPA, United States

Dubai Municipality, UAE

Abu Dhabi Municipality, UAE

Ministry of Health, P.R. China

Ministry of Health, Russian Federation

Ministry of Health, Sultanate of Oman

Kuwait EPA - Environment Public Authority (Kuwait)

FSANZ approval - Australia

Ministry of Health – Tunisia, Morocco, Egypt

National Institute of Health - Islamabad (Pakistan)

South African Bureau of Standards - South Africa

Ministry of Health - Mexico

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Key takeaways

- The 21st century alternative for chlorine, stabilized chlorine dioxide and other 20th century disinfectants
- With TwinOxide, chlorine dioxide is available without a generator
- High purity, enhanced stability
- Very effective against all known microorganisms like bacteria, viruses, protozoan, fungi, yeast and algae
- The best available technology for biofilm eradication and legionella control
- Optimization of your disinfection result with less chemistry
- Easy to transport and stock, safe to use
- Simple dosing, plug and play
- Not corrosive
- Meets or supersedes the world's highest quality standards
- Endorsed by many governments and companies worldwide
- Applicable for potable water, waste water, cooling water, process water, RO membrane cleaning, etc
- One single concept addresses multiple challenges in water disinfection

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