

# Biopure

INTEGRAL SOLUTION



**ClO<sub>2</sub>**  
**CHLORINE**  
**DIOXIDE**

[www.biopure.es](http://www.biopure.es)



# Biopure®

## Safe and effective disinfection

### Full range for all types of consumptions and applications

#### Description

Biopure® is a range of equipment and products mainly designed for water treatments with in-situ-generated chlorine dioxide as the active substance. The manual and automatic systems for the preparation of the product guarantee a chlorine dioxide purity of 99% or higher, with varying concentrations according to the products of the range.

Chlorine dioxide is also used in agriculture or aquaculture, among other sectors, as well as for the sterilization of medical and laboratory material and the disinfection of surfaces or tools.

The main features of Biopure® are:

- it is a broad spectrum disinfectant (bacteria, fungi, viruses, etc.);
- it destroys biofilms;
- it is highly effective, even in the presence of organic material;
- fast-acting, allowing for short contact times;
- it does not transfer odor or taste to water;
- no by-products from the disinfection are formed, such as THMs or chloramines;
- it can be used in a wide array of areas, regardless of the pH;
- high residual persistence.

#### Why disinfect with Biopure®?

Decades of experience and research have revealed that much better disinfection can be achieved with chlorine dioxide, as it offers the necessary solutions for effective and safe disinfection.

The systems currently provided by Tashia for the generation of ClO<sub>2</sub> from products from the Biopure® range are easy to handle, operate and control, and they guarantee proper disinfection in different applications, including:

- drinking-water treatment;
- waste and process water;
- water refrigeration systems;
- agriculture;
- the food industry.

The use of chlorine dioxide is increasingly replacing most of the disinfectants used up to now.

#### Disinfection characteristics

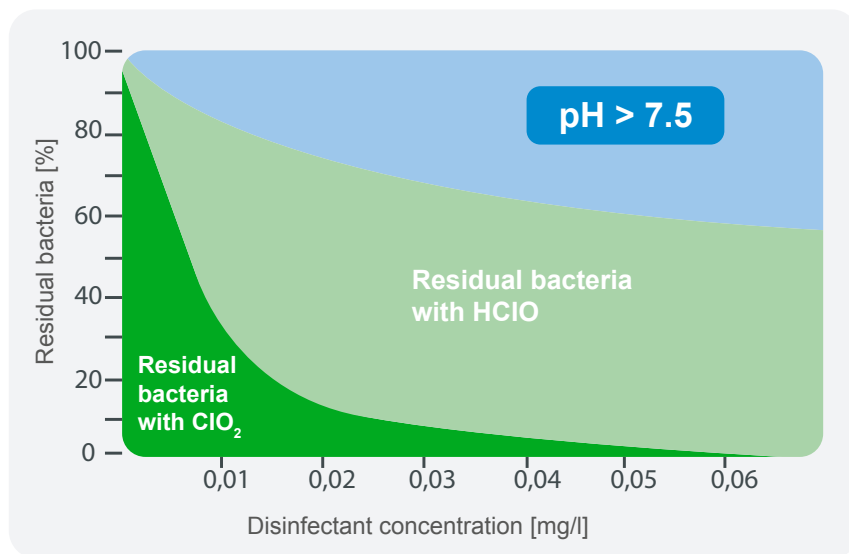
Chlorine dioxide is the most effective of the known chlorine derivatives and it has a greater oxidation capacity than others.

AGENT	AVAILABLE CHLORINE (%)
Chlorine (Cl <sub>2</sub> )	100
Bleaching powder	35-37
Calcium hypochlorite (Ca(OCl) <sub>2</sub> )	9.2
Commercial calcium hypochlorite	70-74
Sodium hypochlorite (NaOCl)	95.2
Industrial bleach	12-15
Domestic bleach	3-5
Chlorine dioxide (ClO <sub>2</sub> )	263.0
Monochloramine	137.9
Dichloramine	165.0
Trichloramine	176.7

**Table 1.** Availability of chlorine per mole.

The table shows that chlorine dioxide (ClO<sub>2</sub>), for example, has an oxidation level 2.5 times higher than the oxidation level of chlorine.

- The disinfectant effect of chlorine dioxide is perceptibly better than chlorine in the same concentration.
- Selective effect: no chloramines or trihalomethanes (THMs) are formed.
- No odor or taste transfer to water.
- Higher oxidation potential than chlorine. Highly effective, even in the presence of organic material.
- Compared to other biocide products, chlorine dioxide is considerably more effective and faster in eliminating pathogens, including viruses, bacteria, spores, algae, fungi, etc. (Chart 1 and Table 2)



**Chart 1.** Comparison of the disinfectant effect of chlorine dioxide and hypochlorous acid.

Ref.: HOFF, J. C.; GELDERICH, E. E. (1981). Comparison of the Biocidal Efficiency of Alternative Disinfectants.

### Comparison of various disinfectants for water purification

**Table 2.** Table score values: · 0 (worst) - 5 (best) · ○ optimal results

	BIOCIDAL EFFECTIVENESS	ODOR AND TASTE ISSUES	PERSISTENCE	EFFECTIVENESS ACCORDING TO PH	HANDLING AND STORAGE RISKS	SPEED OF ACTION	EFFECTIVENESS IN PRESENCE OF ORGANIC MATERIAL	REDOX POTENTIAL
<b>Biopure®</b>	4	no	4	effective	minimum	high	effective	4
<b>Hydrogen peroxide</b>	2	no	3	conditional	medium	medium	requires pretreatment	2
<b>Sodium hypochlorite</b>	2	yes	2	conditional	medium	slow	requires pretreatment	2
<b>Ozone</b>	5	no	0	effective	high	high	requires pretreatment	4
<b>Chlorine gas</b>	3	yes	3	conditional	high	medium	requires pretreatment	3

#### Preparation of chlorine dioxide

Chlorine dioxide can be generated through various methods.

The Biopure® range is obtained through the acid method. The reaction is stated below.

This method can be obtained with the diluted or concentrated reagents.

#### Acid method



# Products

## Range for small applications

### Biopure® Clean

This is a product with a stabilized chlorine dioxide base, specially designed to effectively, quickly and safely eliminate the biofilm in the water pipes.

Special equipment is not required, but it should be applied in the correct manner.

### Biopure® Ready

The product is supplied in two components: reagent in stabilized solution in a 25 kg container and activating reagent in a 750 g container.

The ClO<sub>2</sub> is generated by pouring the product into the original 25 kg container, mixing, and following the protocol attached to each container.

### Biopure® Pro

ClO<sub>2</sub> is generated by means of two precursors, Biopure Pro A and Biopure Pro B, exclusively formulated to be used in the Dioxer and Oxiperm automatic equipment, designed for the generation and dispensing of ClO<sub>2</sub>.

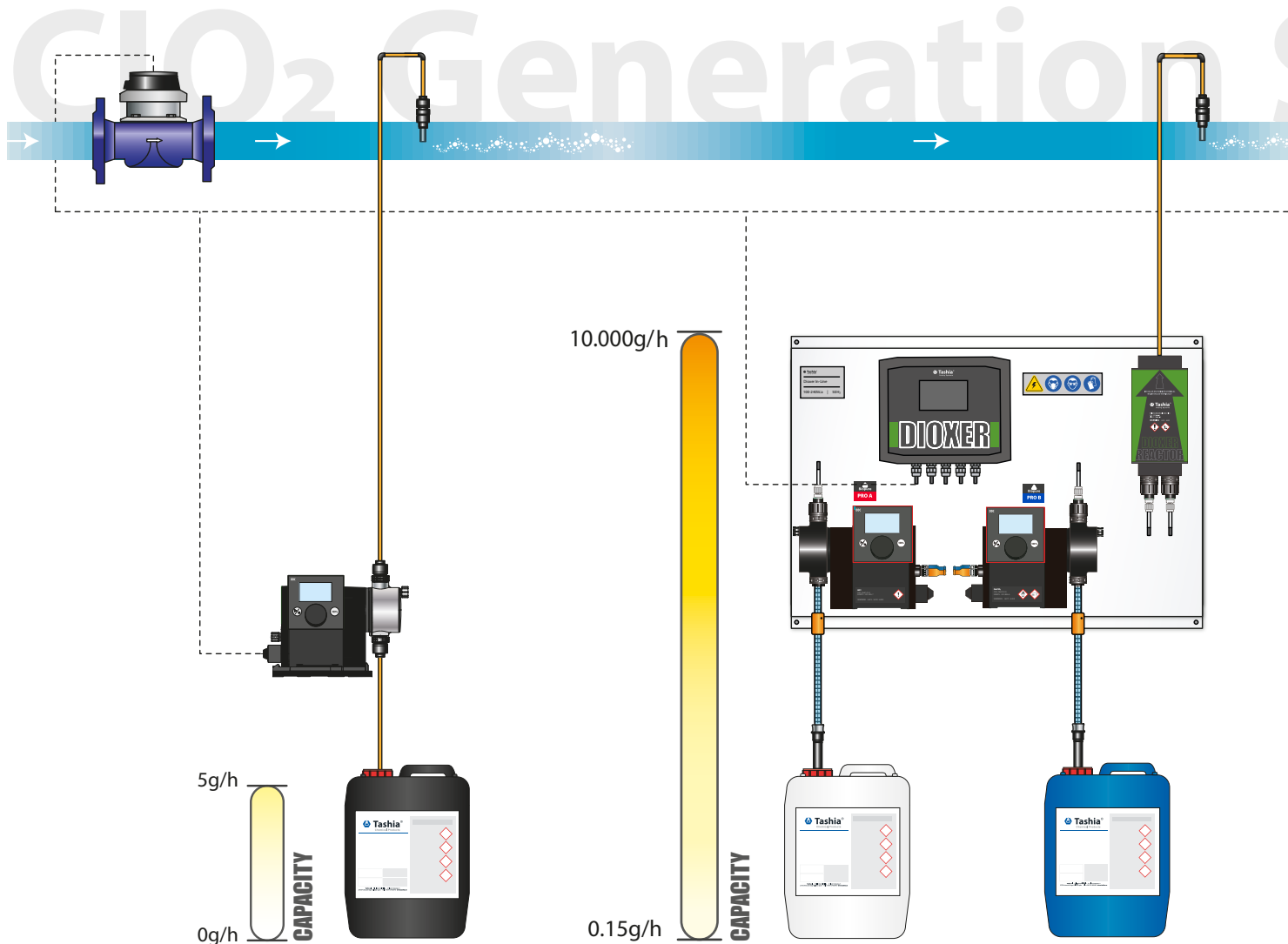
The Biopure Pro systems are divided into two groups:

#### In-Line:

An in-Line generation and dispensing system for chlorine dioxide.

#### Batch:

The chlorine dioxide is generated in a reactor and, once complete, it is transferred to a storage tank for subsequent dispensing.



## Biopure® Ready & Clean

Highly economical system that allows for a good application with minimal investment. This product is designed for small applications, with low volumes of water to be treated.

## Biopure® Pro In-Line

The In-Line systems allow us to treat large volumes of water, maintaining a very good quality-price-efficiency ratio.

Available models: Dioxer and Oxiperm.

## How to select the ideal equipment

### Basic equation for equipment selection:

Water flow volume (m<sup>3</sup>/h) · [concentration of ClO<sub>2</sub> required (ppm)] = minimum system production.

### Example to follow for choosing equipment in drinking water:

Flow volume of water to be treated = 20 m<sup>3</sup>/h, concentration of ClO<sub>2</sub> = 0.5 ppm

This equation gives: 20 (m<sup>3</sup>/h) · 0.5 (ppm) = 10 (g/h)

It follows that the equipment to be selected must be capable of producing at least 10 g/h.

### Dosage in probe control tank:

$$\frac{\text{Daily consumption (m}^3\text{)} \cdot \text{concentration of ClO}_2\text{ required (ppm)}}{\text{hours of consumption}} = \text{minimum system production}$$

### Example:

Water consumption: 100 m<sup>3</sup>/day

Dioxide concentration in water = 0.5 ppm

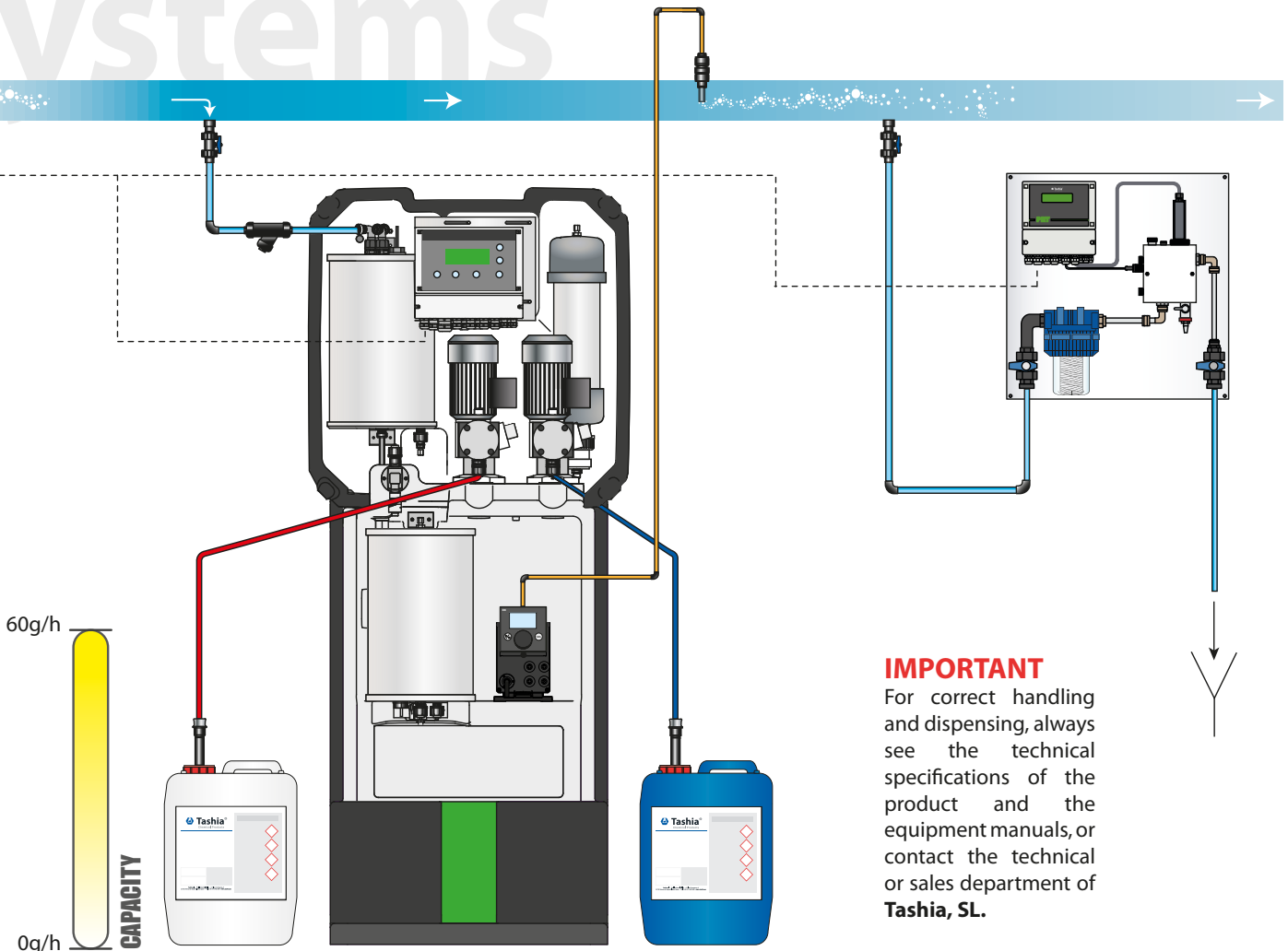
Hours of consumption: 8

The system must produce at least 6.25 g/h.

$$\frac{100}{8} \cdot 0.5 = 6.25 \text{ g/h}$$

## Some advantages of the equipment

- Compact and robust systems.
- Low maintenance cost.
- For the production of chlorine dioxide, an intelligent method is used that makes it possible to save 40% of chemical substances, compared to other systems.
- Use of stable substances.
- Production of chlorine dioxide at the time of application. Chlorine dioxide solutions in water are not stable, and they degrade faster or slower depending on the concentrations and precursors used.
- Possible connection to new devices (pH, Redox...) for system automation.
- Easy and safe installation.
- The system can be manipulated while it is in operation, without interrupting the water supply.



### IMPORTANT

For correct handling and dispensing, always see the technical specifications of the product and the equipment manuals, or contact the technical or sales department of **Tashia, SL**.

## Biopure® Pro Batch

The Batch systems are capable of producing a dioxide with a purity of 99% or higher, thereby optimizing the use of substances. Its high accuracy allows us to treat very low volumes of water.

Available models: Dioxa Pro and Oxiper Pro.

### MEASURING & CONTROL

All systems can include measuring and control equipment to improve effectiveness, with the possibility to perform external controls, record data, etc.

# Biopure® PRO IN-LINE

Simple, efficient, and safe In-line generation systems, for ongoing treatments and for all types of consumption.



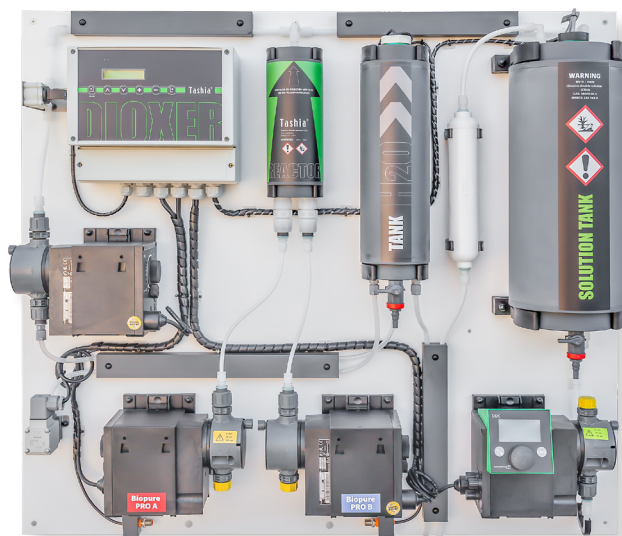
## Dioxer & Oxiperm

- ▶ Large volumes of water to be treated.
- ▶ Good quality-price-efficiency ratio.
- ▶ Pumps with stepper motor for low-volume applications with In-Line equipment.
- ▶ Clear and intuitive interface for easy handling.
- ▶ Multiple external control options: tank control, management with in line analyzers, gas detectors...
- ▶ Remote control through different communication protocols depending on the model.

Model	ClO <sub>2</sub> capacity (g/h)	Max p. (bar)	Reagents
Dioxer In-Line 15	0.15 – 15	10	diluted
Dioxer In-Line 40	0.40 – 40	10	
Dioxer In-Line 80	0.80 – 80	10	
Dioxer In-Line 120	1.20 – 120	10	
Dioxer In-Line 220	2.20 – 220	10	
Oxiperm 164D350	17.5 – 350	9	diluted
Oxiperm 164D700	35 – 700	9	
Oxiperm 164D1000	50 – 1000	9	
Oxiperm 164D1500	75 – 1500	9	
Oxiperm 164D2500	125 – 2500	6	
Oxiperm 164C450	22.5 – 450	6	concentrated
Oxiperm 164C750	33.5 – 750	6	
Oxiperm 164C1300	65 – 1300	6	
Oxiperm 164C2500	125 – 2500	6	
Oxiperm 164C4000	200 – 4000	5	
Oxiperm 164C6000	300 – 6000	5	
Oxiperm 164C7500	375 – 7500	5	
Oxiperm 164C10000	500 – 10000	5	

# Biopure® PRO BATCH

Efficient and safe Batch generation systems, for the treatment of small and medium consumptions.

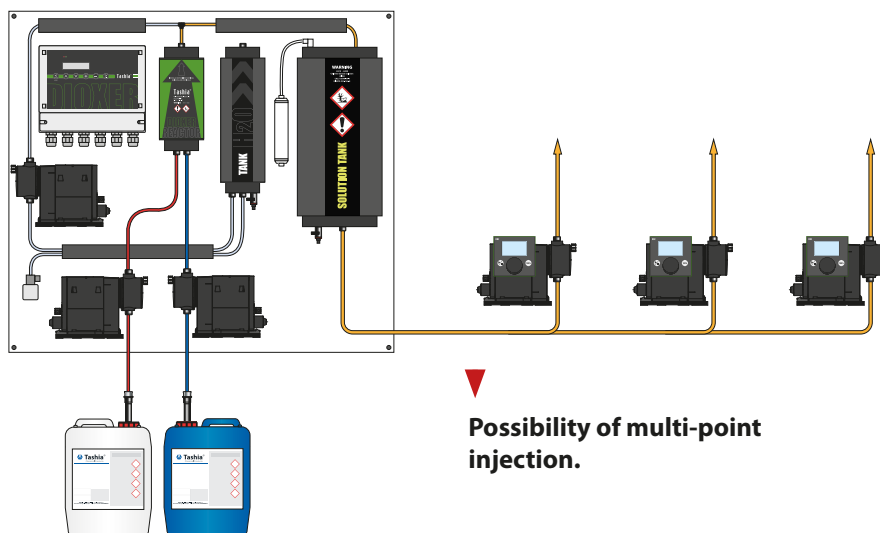


## Dioxer Pro & Oxiperm Pro

- ▶ Excellent price-quality-accuracy ratio.
- ▶ Ideal for very low volumes of water to be treated and for non-continuous applications.
- ▶ The multi-point injection system provides great accuracy and optimizes costs in multiple installations.
- ▶ Clear and intuitive interface for easy handling.
- ▶ Multiple external control options: tank control, management with in line analyzers, gas detectors...
- ▶ Remote control through different communication protocols depending on the model.

Model	Capacity ClO <sub>2</sub> (g/h)	Batch tank capacity (liters)	Max p. (bar)	Reagents
Dioxer Pro 12	0 – 12	6.50	10	diluted
Dioxer Pro 32	0 – 32	6.50	4	
Oxiperm Pro 162/10	0 – 10	1.67	10	diluted
Oxiperm Pro 162/30	0 – 30	6.50	4	
Oxiperm Pro 162/60	0 – 60	13	4	

### ▶ Batch dioxide generator



▶ Possibility of multi-point injection.



**[www.tashia.es](http://www.tashia.es)**

**Tashia s.l.** Pol. Industrial El Pla, C/Lluís Companys 5 · Artesa de Segre 25730 (Lleida) Spain  
customers service · tel. (34) 973 400 840 · [comercial@tashia.es](mailto:comercial@tashia.es)