

Application Note


Chlorine Dioxide

Potential industries and applications for gas detection products

- Municipal water treatment plants
- Industrial water treatment plants
- Pulp and paper manufacture
- Flour bleaching
- Building decontamination / disinfection

Chlorine Dioxide is a chemical compound with the formula ClO_2 . This red-yellow gas crystallises as orange crystals at $-59^{\circ}C$. As one of several oxides of Chlorine, it is a potent and useful oxidising agent used in water treatment and in bleaching.

In many countries Chlorine Dioxide gas may not be transported at any concentration and is almost always produced at the application site using a Chlorine Dioxide generator. In some countries, Chlorine Dioxide solution below 3 grams per litre in concentration may be transported by land, but is relatively unstable and deteriorates quickly.

Chlorine Dioxide			
			
General			
Systematic Name	Chlorine Dioxide		
Other Names	Chlorine Oxide Chlorine Peroxide Chlorine(IV) Oxide		
Molecular Formula	ClO_2		
Appearance	Red-yellow gas, with pungent odour		
CAS Number	10049-04-4		
Properties			
Vapour Density	2.3		
Melting Point	$-59^{\circ}C$		
Boiling Point	$10^{\circ}C$		
Toxic Exposure Levels			
EH 40 Workplace Exposure Limit (WEL)			
Long-term exposure limit (8-hour TWA reference period)		Short-term exposure limit (15-minute TWA reference period)	
ppm	$mg.m^{-3}$	ppm	$mg.m^{-3}$
0.1	0.28	0.3	0.84
OSHA Permissible Exposure Limit (PEL)			
Long-term exposure limit (8-hour TWA reference period)			
ppm	$mg.m^{-3}$		
0.1	0.3		
ACGIH Threshold Limit Value			
8-hour TWA workday and a 40-hour workweek		0.1ppm	

Industrial Applications

Chlorine Dioxide is used primarily (>95%) for bleaching of wood pulp, but is also used for the bleaching of flour and for the disinfection of water. The Niagara Falls, New York water treatment plant first used Chlorine Dioxide for drinking water treatment in 1944 for Phenol destruction.

Chlorine Dioxide was introduced as a drinking water disinfectant on a large scale in 1956, when Brussels, Belgium, changed from Chlorine to Chlorine Dioxide. Its most common use in water treatment is as a pre-oxidant prior to chlorination of drinking water to reduce trihalomethanes which are a carcinogenic disinfection by-product associated with chlorination of naturally occurring organics in the raw water.

Chlorine Dioxide is also used in conjunction with Ozone disinfection of water to reduce the formation of bromates which are regulated carcinogens. Chlorine Dioxide is also superior to Chlorine when operating above neutral pH, when Ammonia is present and for the control of biofilms.

Chlorine Dioxide is used in many industrial water treatment applications as a biocide including cooling towers, process water and food processing. Chlorine Dioxide is less corrosive than Chlorine and superior for the control of Legionella bacteria.

It can also be used for air disinfection, and was the principal agent used in the decontamination of buildings in the United States after the 2001 anthrax attacks. Recently, after the disaster of Hurricane Katrina in New Orleans, Louisiana and the surrounding Gulf Coast, Chlorine Dioxide has been used to eradicate dangerous mold from houses inundated by water from massive flooding.

Chlorine Dioxide is used as an oxidant for Phenol destruction in waste water streams, control of zebra mussels in water intakes and for odour control in the air scrubbers of animal by-product (rendering) plants.

Honeywell Analytics' product offering



Series 3000 XPIS



Apex



Midas®



SPM Single Point Monitor



ChemKey™ TLD



CM4



Vertex™

Our Product Range



Fixed Gas Monitoring

Honeywell Analytics offers a wide range of fixed gas detection solutions for a diverse array of industries and applications including: Commercial properties, industrial applications, semiconductor manufacturers, energy plants and petrochemical sites.

- » Detection of flammable, oxygen and toxic gases (including exotics)
- » Innovative use of 4 core sensing technologies – paper tape, electrochemical cell, catalytic bead and infrared
- » Capability to detect down to Parts Per Billion (ppb) or Percent by Volume (%v/v)
- » Cost effective regulatory compliance solutions

Portable Gas Monitoring

When it comes to personal protection from gas hazards, Honeywell Analytics has a wide range of reliable solutions ideally suited for use in confined or enclosed spaces.

These include:

- » Detection of flammable, oxygen and toxic gases
- » Single gas personal monitors – worn by the individual
- » Multi-gas portable gas monitors – used for confined space entry and regulatory compliance
- » Multi-gas transportable monitors – used for temporary protection of area during site construction and maintenance activities

Technical Services

At Honeywell Analytics, we believe in the value of great service and customer care. Our key commitment is providing complete and total customer satisfaction. Here are just a few of the services we can offer:

- » Full technical support
- » Expert team on hand to answer questions and queries
- » Fully equipped workshops to ensure quick turnaround on repairs
- » Comprehensive service engineer network
- » Training on product use and maintenance
- » Mobile calibration service
- » Customised programmes of preventative/corrective maintenance
- » Extended warranties on products

Find out more

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