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Chloromat Model 9184

data sheet

Applications

On-line monitoring of active and free chlorine for :

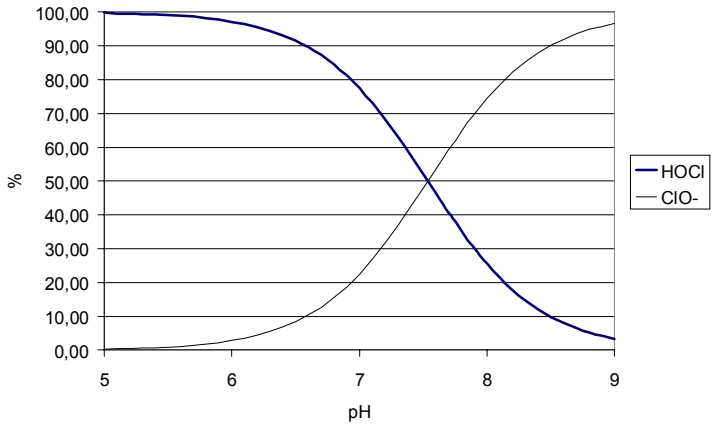
- Drinking water treatment plants
- Drinking water distribution networks
- Cooling water

Features

- Analysis of active chlorine (HOCl) or total free chlorine ($HOCl+ClO^-$) depending on the product version
- No interference from chloramines
- Minimal maintenance requirement
- Quick response time
- Low detection limit for efficient residual chlorine monitoring
- User-friendly menu-based programming
- Two smart analog outputs with automatic recognition of the analyser status

Chlorine dissociation

When chlorine (apart from chlorine dioxyde) is injected into water, it automatically dissociates into two different species : the hypochorous acid, HOCl, and the hypochlorite ions, ClO^-.

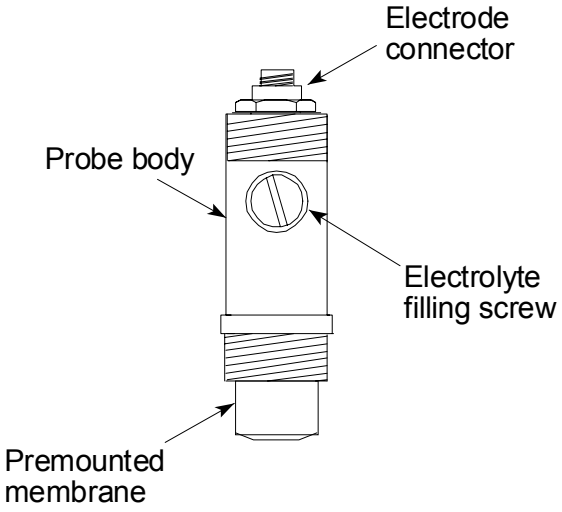


At a pH of 7.5 and a temperature of 25°C, i.e, chlorine is present as HOCl at 52% and ClO^- at 48%.

The sum of the two species represents the total free chlorine (TFC).

The hypochlorous acid, HOCl, is by far the most bactericide form of chlorine. That is why it is also called active chlorine.

The sensor



The 9184 Chloromat uses an amperometric probe with an HOCl selective membrane.

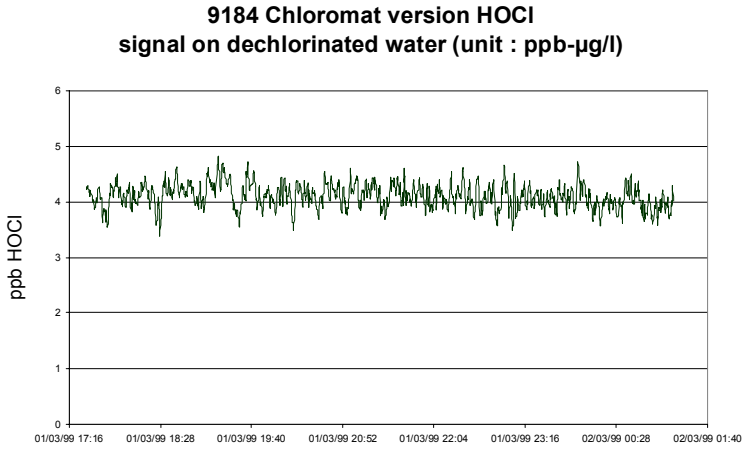
Hypochlorous freely diffuses through this membrane while neither ClO^- nor chloramine can pass through.

Warning : ozone interferes on the measurement, it is therefore not recommended to install the analyser just downstream from an ozonation contact tower. Chlorine dioxyde does also interfere.

Membranes are premounted on retaining caps to suppress any delicate membrane handling.

Changing them requires a few seconds only.

Active chlorine measurement means traces measurement...



In fact, on drinking water distribution networks, total free chlorine (HOCl + ClO-) is generally close to 0.1mg/l.

In case of quite alkaline waters (>7.5), fraction of HOCl does not exceed 50% of the available chlorine and therefore is at a concentration lower than 50µg/l.

Therefore, to reliably monitor the active chlorine concentration on a network, it is mandatory to use an analyser with a low detection limit and an excellent stability at those ppb levels.

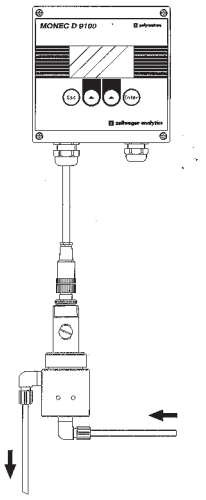
Zellweger Analytics Polymetron division has a long experience in measuring traces in ultrapure water. This know-how allowed to develop a unique sensor totally adapted to the low level active chlorine measurement constraints.

On the left: *an analyser signal recorded while measuring active chlorine in dechlorinated water.*

Chloromat 9184 HOCl

Composed simply of a transmitter, a cable, a probe and a flow-through cell, the HOCl version of the analyser allows to selectively measure active chlorine whatever water's pH value.

Thanks to a detection limit less than10 ppb, a resolution of 1 ppb and very limited maintenance requirements, this analyser is particularly well adapted for drinking water distribution network monitoring applications.



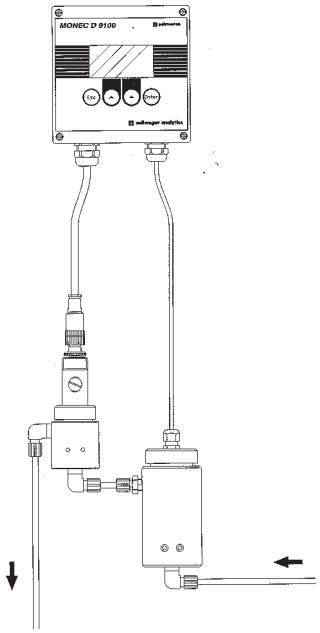
9184 HOCl	Display	0/4-20mA	Relays
[HOCl]	●	●	●
[Free chlorine]			
Temp.	●	●	●
pH			
I nA	●		
Alarm system	●	●	●

Chloromat 9184 TFC/pH

By simply connecting a pH electrode to the transmitter, the analyser is now able to measure total free chlorine (HOCl+ClO-).

From the pH, the temperature and the amperometric sensor signals, the free chlorine concentration is calculated thanks to the dissociation curves stored in the transmitter memory.

Installed at a rechlorination point, the 9184 TFC/pH version measures the active chlorine, an excellent indicator of the bactericide potential, as well as free chlorine with sufficient precision to ensure control of the chlorine injection systems.



9184 pH	Display	0/4-20mA	Relays
[HOCl]	●	●	
[Free chlorine]	●	●	●
Temp.	●	●	●
I nA	●		
pH	●	●	●
Alarm system	●	●	●

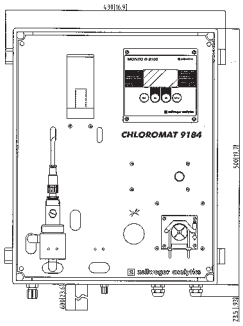
Chloromat 9184 TFC/Acid

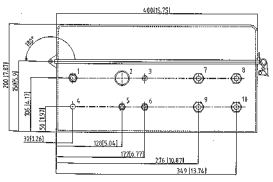
The sample is acidified to pH approx. 6.0 by addition of a buffer solution.

At this pH, all free chlorine is present as HOCl and is therefore detected by the amperometric sensor.

This product configuration allows precise measurement of free chlorine concentration.

This gives the ideal solution for chlorination pump control and residual chlorine monitoring at the treatment plant outlet.





1) Drain : 6x8 mm PE tubing
2) Overflow unit drain : 20x24 mm PVC tubing
3) Inlet for acid conditioning : 1.6 mm connector
4) Drain hole
5) Overflow unit ND 4/6
6) Sample inlet ND 4/6
7) 8) 9) 10) : Cable glands PG 11

9184 Acid	Display	0/4-20mA	Relays
[HOCl]			
[Free chlorine]	●	●	●
Temp.	●	●	●
I nA	●		
pH			
Alarm system	●	●	●

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Specifications

	9184 HOCl (active chlorine)	9184 TFC/pH (active/free chlorine)	9184 TFC/Acid (free chlorine)
Sample			
Temperature	+0...+45 °C , +32...113 °F		
Particulates	No suspended solids		
Pressure/Flow	Cell outlet at atmospheric pressure / 10-30 l/h (ideal 12 to 15 l/h)		
Connections			
Sample	4 x 6 mm P.E tubing		
Drain	6 x 8 mm P.E tubing		
Power supply	90...265VAC, 50/60Hz, ~25VA	90...265VAC, 50/60Hz, ~25VA	110 ou 240VAC, 50/60Hz, ~50VA
Mounting	Transmitter + HOCl probe (10m cable)	Transmitter + HOCl probe + pH probe (10m cables)	Cabinet ~20kg (44lbs)
Analysis			
Measuring range	0..5mg/l HOCl	0..5mg/l free chlorine	0..5mg/l free chlorine
Repeatability	< ± 2 % of measure or < ± 5 ppb	HOCl : < ± 2% of measure or <± 5ppb. Free chlorine : If pH<7,5 : <±5% of measure or <+10ppb. If pH<8,0 : <±10% of measure or <±20ppb. If pH>8,0 : <±15% of measure or <±30ppb.	< ± 2% of measure or ± 5ppb
Detection limit	< 10 ppb HOCl	< 10 ppb HOCl ~20 ppb free chlorine	~10 ppb free chlorine
Response time	< 90 seconds (t90%)		
Conditioning	None	None	Buffer to pH ~ 5.0
Interferences	No interference from chloramines Chlorine dioxyde and Ozone interfere on measurement		
Ambient temperature	0...+45 °C, +32...+113 °F		
Calibration	Zero : electrically or with dechlorinated water Slope : process using a reference method		
Transmitter			
Protection	IP65 / NEMA 4 (NEMA 4X optional)		
CE regulations	EN50081, EN50082 (EMC) and IEC61010 (low voltage)		
Analog outputs	2 x 0/4... 20 mA isolated, 800 Ohms max. load : - for la measure (linear or bi-linear) and/or for temperature (linear)		
Analyser status information	4/20 mA outputs programmable to a value between 0 and 21mA during calibration or when system alarm is activated		
Relays	4 dry contacts NO/NC (250VAC, 3A / 30VDC, 0.5A ohmic load max.) for : - high/low limits (programmable delay and hysteresis), - system alarm with manual or automatic acknoledgement, - timer (programmable frequency and sequence)		
Temperature compensation	Automatic between 0 and 45 °C (32 – 113 °F)		
Options			
RS 485	300..9600 bauds, 32 stations max., JBUS/MODBUS.		
Profibus DP	9.6 Kbit/s to 12Mbit/s, 127 stations max. (with repeater)		
Zero cartridge	To perform on-line chemical zero calibration		
Overflow vessel	To maintain a constant sample flow		
Materials			
Electrodes	Gold cathode / Silver anode		
Measuring Cell	PVC		
Maintenance			
Every 1 to 2 months	Calibrate		
Every 3 to 6 months	Change membrane and electrolyte		
Every 25 days	Fill-up acid buffer canister and change pump tubing (Only on Chloromat TFC/Acid. version)		

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