

# DULCOTEST sensors for bromine

Reliable online measurement of bromine – with DULCOTEST sensors



**Bromine measurement with DULCOTEST sensors: Safe metering in disinfection processes with bromine. The robustness of the sensors makes them suitable for a very wide range of water qualities.**

## Technical Details

Measurement of all common bromine reagents used for disinfection possible:

- inorganic free bromine, e.g. using the ACTI bromine process: HOBr, or inorganically bound bromine (proprietary names include Stabrex®)
- DBDMH (1,3-dibromo-5,5-dimethylhydantoin), proprietary names include Albrom 100®
- BCDMH (1-bromo-3-chloro-5,5-dimethylhydantoin), proprietary names include Brom-Sticks®



# DULCOTEST sensors for bromine

## Reliable online measurement of bromine – with DULCOTEST sensors

### Sensor for Total Available Bromine BCR 1-mA (Replaces Earlier Type BRE 1)

Sensor for the disinfectant BCDMH and other oxidative-acting bromine-organic disinfectants and total chlorine even in contaminated water and/or for high pH values of up to 9.5. For use on controllers with mA input

#### Your Benefits

- Measured variable: total available bromine from BCDMH (1-bromo-3-chloro-5,5-dimethylhydantoin)
- Diaphragm-covered sensor minimises faults caused by changing flow or ingredients in the water, N-bromamide sulfonate
- Resistance to blocking is achieved by the use of an electrolyte with an antimicrobial effect (less blocking by biofilms) and by a large-pored diaphragm (less blocking by solid particles/dirt)
- Use with high pH values by optimisation of the electrolyte diaphragm system

Measured variable	Total available bromine from <b>BCDMH</b> (1-bromo-3-chloro-5,5-dimethylhydantoin) and <b>N-bromamido-sulphonate, total chlorine</b>
Reference method	DPD4
pH-range	5.0...9.5
Temperature	5...45 °C
Max. pressure	1.0 bar
Flow	DGMa, DLG III: 60...80 l/h BAMa: 5...100 l/h (depending on design)
Supply voltage	16...24 V DC (2-wire)
Output signal	4-20 mA ≈ measuring range, temperature-compensated, uncalibrated, not electrically isolated
Selectivity	Non-selective, cross-sensitive towards many oxidation agents
Disinfection process	BCDMH (1-bromo-3-chloro-5,5-dimethyl-hydantoin), N-bromamide sulfonate
Process integration	Bypass: open sample water outlet
Sensor fitting	BAMa, DGMa, DLG III
Controllers	D1C, DAC, AEGIS II, AEGIS X
Typical applications	Cooling water, process water, wastewater, swimming pool water, water with higher pH values (stable pH).
Resistance to	Dirt films, biofilms, surfactants
Measuring principle, technology	Amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Order no.
BCR 1-mA-0.5 ppm	0.01...0.5 mg/l	1041697
BCR 1-mA-2 ppm	0.02...2.0 mg/l	1040115
BCR 1-mA-10 ppm	0.10...10.0 mg/l	1041698

# DULCOTEST sensors for bromine

## Reliable online measurement of bromine – with DULCOTEST sensors

### Sensor for total available bromine BRE 3-CAN

Sensor for free and combined bromine, also for use with slightly contaminated water. For use on controllers with CAN-bus connection

#### Your Benefits

- Measured variable: total available bromine from BCDMH and other oxidative-acting bromine organic disinfectants
- Diaphragm-covered sensor minimises faults caused by changing flow or ingredients in the water
- Use with high pH values by optimisation of the electrolyte diaphragm system
- Operation on the CAN-bus with all the associated benefits

Measured variable	Total available bromine
Reference method	For DBDMH, free bromine: DPD1. For BCDMH: DPD4
pH dependence	If the pH changes from pH 7 to pH 8, the sensor sensitivity changes a) for DBDMH and free bromine by around 10 % b) for BCDMH by around 25 %
Temperature	5...45 °C
Max. pressure	3.0 bar
Flow	DGMa, DLG III: 30...60 l/h BAMa: 5...100 l/h (depending on design)
Supply voltage	Via CAN-interface (11 – 30 V)
Output signal	Uncalibrated, temperature compensated, electrically isolated
Selectivity	Non-selective, cross-sensitive towards many oxidation agents
Disinfection process	DBDMH (1,3-dibromo-5,5-dimethyl-hydantoin), BCDMH (1-bromo-3-chloro-5,5-dimethyl-hydantoin), free bromine (HOBr, OBr)
Process integration	Bypass: open sample water outlet
Sensor fitting	BAMa, DGMa, DLG III
Controllers	DULCOMARIN
Typical applications	swimming pools/whirlpools.
Resistance to	surfactants
Measuring principle, technology	Amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Order no.
BRE 3-CAN-10 ppm	0.02...10.0 mg/l	1029660

**Note:** a mounting kit (order no. 815079) is required for initial fitting of the bromine sensors in the in-line probe housing DLG III.

# DULCOTEST sensors for bromine

## Reliable online measurement of bromine – with DULCOTEST sensors

### Sensor for Free and Combined Bromine CBR 1-mA (Replaces Earlier Type BRE 2)

Sensor for free chlorine and bromine in contaminated water, also suitable for high pH values of up to 9.5. For use with controllers with 4-20 mA input

#### Your Benefits

- Measured variable: free chlorine, as well as free and combined bromine (bromamines)
- Diaphragm-covered sensor minimises faults caused by changing flow or ingredients in the water
- Resistance to films of dirt and biofilms by electrolyte with antimicrobial effect and large-pore diaphragm
- Use at high pH value of up to 9.5 by optimisation of the electrolyte diaphragm system

Measured variable	free chlorine, free bromine, combined bromine, DBDMH (1,3-dibrom-5,5-dimethyl-hydantoin)
Reference method	DPD1
pH-range	5...9.5
Temperature	1...40 °C
Max. pressure	1.0 bar
Flow	DGMa: 20...80 l/h DLG III: 40...100 l/h BAMa: 5...100 l/h (depending on design)
Supply voltage	16...24 V DC (2-wire)
Output signal	4-20 mA ≈ measuring range, temperature-compensated, uncalibrated, not electrically isolated
Selectivity	Free chlorine as against combined chlorine
Disinfection process	Chlorine gas, hypochlorite, electrolysis with diaphragm, bromide + hypochlorite, DBDMH
Process integration	Bypass: open sample water outlet
Sensor fitting	BAMa, DGMa, DLG III
Controllers	D1C, DAC, AEGIS II, AEGIS X
Typical applications	Cooling water, process water, wastewater, water with higher pH values (stable pH), contaminated swimming pool water. In swimming pools to determine the combined chlorine from the difference: Total chlorine minus free chlorine. Raw water for drinking water treatment.
Resistance to	Salts, acids, alkalis, surfactants, dirt films
Measuring principle, technology	Amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Order no.
CBR 1-mA-0.5 ppm	0.01...0.5 mg/l *	1038016
CBR 1-mA-2 ppm	0.02...2.0 mg/l *	1038015
CBR 1-mA-5 ppm	0.05...5.0 mg/l *	1052138
CBR 1-mA-10 ppm	0.10...10.0 mg/l *	1038014

\* Measuring range based on chlorine. When measuring bromine, the lower and upper limit of the measuring range are increased by the factor 2.25, therefore for example CBR 1-mA-0.5ppm: 0.02 ...1.1 ppm.

# DULCOTEST sensors for bromine

## Reliable online measurement of bromine – with DULCOTEST sensors

### Sensor for free and combined bromine CBR 1-CAN

Sensor for free chlorine and bromine in contaminated water, also suitable for high pH values of up to 9.5. For use on controllers with CAN-bus connection.

#### Your Benefits

- Measured variable: free chlorine as well as free and combined bromine (bromamines)
- Diaphragm-covered sensor minimises faults caused by changing flow or ingredients in the water
- Resistance to films of dirt and biofilms by electrolyte with antimicrobial effect and large-pore diaphragm
- Use at high pH value of up to 9.5 by optimisation of the electrolyte diaphragm system

Measured variable	free chlorine, free bromine, combined bromine, DBDMH (1,3-dibrom-5,5-dimethyl-hydantoin)
Reference method	DPD1
pH-range	5...9.5
Temperature	1...40 °C
Max. pressure	1.0 bar
Flow	DGMa: 20...80 l/h DLG III: 40...100 l/h BAMa: 5...100 l/h (depending on design)
Supply voltage	11...30 V DC (via CAN interface)
Output signal	Digital (CANopen), uncalibrated, temperature-compensated, electrically isolated
Selectivity	Free chlorine as against combined chlorine
Disinfection process	Chlorine gas, hypochlorite, electrolysis with diaphragm, bromide + hypochlorite, DBDMH
Process integration	Bypass: open sample water outlet
Sensor fitting	BAMa, DGMa, DLG III
Controllers	DULCOMARIN 3, DULCOMARIN II only with hardware after 06.02.2014 from software version 3035 or later
Typical applications	Cooling water, process water, wastewater, water with higher pH values (stable pH), contaminated swimming pool water. In swimming pools to determine the combined chlorine from the difference: Total chlorine minus free chlorine. Raw water for drinking water treatment.
Resistance to	Dirt films, biofilms, surfactants
Measuring principle, technology	Amperometric, 2 electrodes, diaphragm-covered

	Measuring range	Order no.
CBR 1-CAN-10 ppm	0.01...10.0 mg/l	1122056