Bello Zon®
Chlorine Dioxide Generation and Metering Systems

ProMinent®

Chlorine Dioxide: An effective oxidant and disinfectant

There are numerous advantages of chlorine dioxide over disinfectants, notably chlorine, including:

- Chlorine dioxide (ClO_2) has a higher disinfection potential than chlorine.
- *No pH dependence* - Chlorine dioxide is an effective disinfectant, even at high pH levels where chlorine loses much of its disinfection potential.
- *No THM formation* - Unlike chlorine, chlorine dioxide does not combine with humic or fulvic acids in water to form trihalomethanes, suspected carcinogens.
- *No combination with ammonia* - Chlorine dioxide does not combine with ammonia in water, like chlorine, requiring smaller doses to achieve disinfection.
- *No chlorophenol formation* - Chlorine combines with phenols to form chlorophenols, causing taste and odor problems. Chlorine dioxide destroys phenols, eliminating many taste and odor problems.
- *Oxidization of iron and manganese* - Chlorine dioxide rapidly oxidizes soluble iron and manganese to an insoluble state for flocculation and filtration. Chlorine alone takes days to oxide manganese, and cannot oxidize chelated iron.
- *Oxidizes sulfides without high pH* - Sulfide oxidation using chlorine requires high pH to prevent formation of colloidal sulfur, which can plug up equipment. Chlorine dioxide may be used over a broad pH range (5-9) without colloidal sulfur formation.
- *No loss due to storage* - Chlorine concentration in a tank of 12.5% sodium hypochlorite solution is subject to varying decay rates based on ambient conditions. Sodium chlorite and hydrochloric acid may be stored for more than a year without significant decay.

Unstable in nature, it must be generated on-site and used immediately, as it is not suited for transport or storage.

Bello Zon® Process

ProMinent's Bello Zon® chlorine dioxide generators have been used worldwide for more than two decades in thousands of food, beverage, bleaching, water and wastewater treatment applications. The Bello Zon® process activates sodium chlorite with hydrochloric acid to generate chlorine dioxide using the reaction: $5\ NaClO_2 + 4\ HCl = 4\ ClO_2 + 5\ NaCl + 2\ H_2O$.

The Bello Zon® CDVa series generators use dilute components sodium chlorite ($NaClO_2$), 7.5%, and hydrochloric acid (HCl), 9%, in a 1:1 ratio for extremely safe chemical handling for small to medium capacity applications.

The Bello Zon CDKa series generators use the commercial standard 25% sodium chlorite and 30%-33% hydrochloric acid and water in a 1:1:5.4 ratio, for medium to large capacity applications.

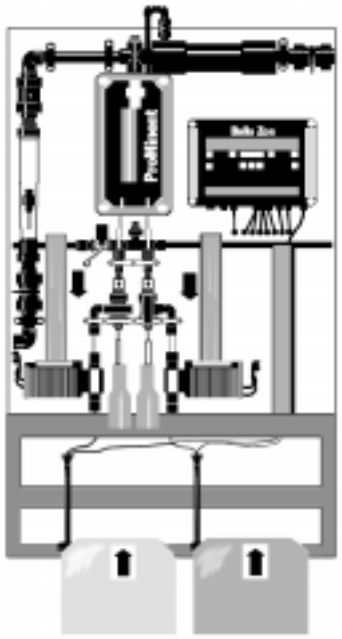
The components are injected into a packed reactor vessel sized for the required reaction time to generate a 2% (20,000 ppm) solution, immediately injected into water for the end use concentration.

Bello Zon® Process Comparison

Most other chlorine dioxide generation systems mix chlorine gas and sodium chlorite, or they use acid mixed with sodium hypochlorite (to release chlorine gas) and sodium chlorite.

White's Handbook of Chlorination and Alternative Disinfectants, Third Edition, Van Nostrand Reinhold, c.1992, lists the advantages of the Bello Zon (acid) system compared to other processes:

> The amount of free chlorine found in chlorine dioxide solution is negligible in the acid systems. This is an important factor in three ways: (1) the absence of free chlorine prevents the formation of the chlorate ion - an objectionable disinfection byproduct; (2) the absence of free chlorine means that THMs will not be formed in the treated water; and (3) no free chlorine means that none of the usual chlorine residual species will be formed in the chlorine dioxide solution. This eliminates the necessity of identifying these species as part of the chlorine residual analysis - a great time saver. This overcomes one of the major difficulties in the use of chlorine dioxide.



CDVa

Purity is defined as the ratio of chlorine dioxide to the total of all oxidative chlorine compounds produced. Because the Bello Zon® process has virtually no excess chlorine or sodium chlorite (due to a 375% excess of acid), it generates chlorine dioxide of much higher purity than either chlorine/chlorite or acid/hypochlorite/chlorite processes.

ProMinent®

Bello Zon®
Chlorine Dioxide Generation and Metering Systems

Bello Zon® Feature Comparison

The Bello Zon® process uses repeatable diaphragm metering pumps, with flow monitoring, to deliver the components through a reactor vessel, directly into the water stream. Easy output control is accomplished without a batch tank because the stroke frequencies of the component pumps automatically speed up or slow down in unison, based on external control signals. The output may be automatically controlled in proportion to water flow (from a flow meter signal).

The Bello Zon® process allows for exact monitoring, unlike the less precise chlorine/chlorite and acid/hypochlorite/chlorite generators, which utilize venturis to pull the components into a water stream. The output must be tested and adjusted to balance yield vs. purity. Balanced yield and purity are operated at a constant flow rate, and usually discharge to a level-controlled batch tank for later metering into water, allowing off-gassing (reducing claimed yields), and conversion to byproduct species such as chlorite and chlorate.

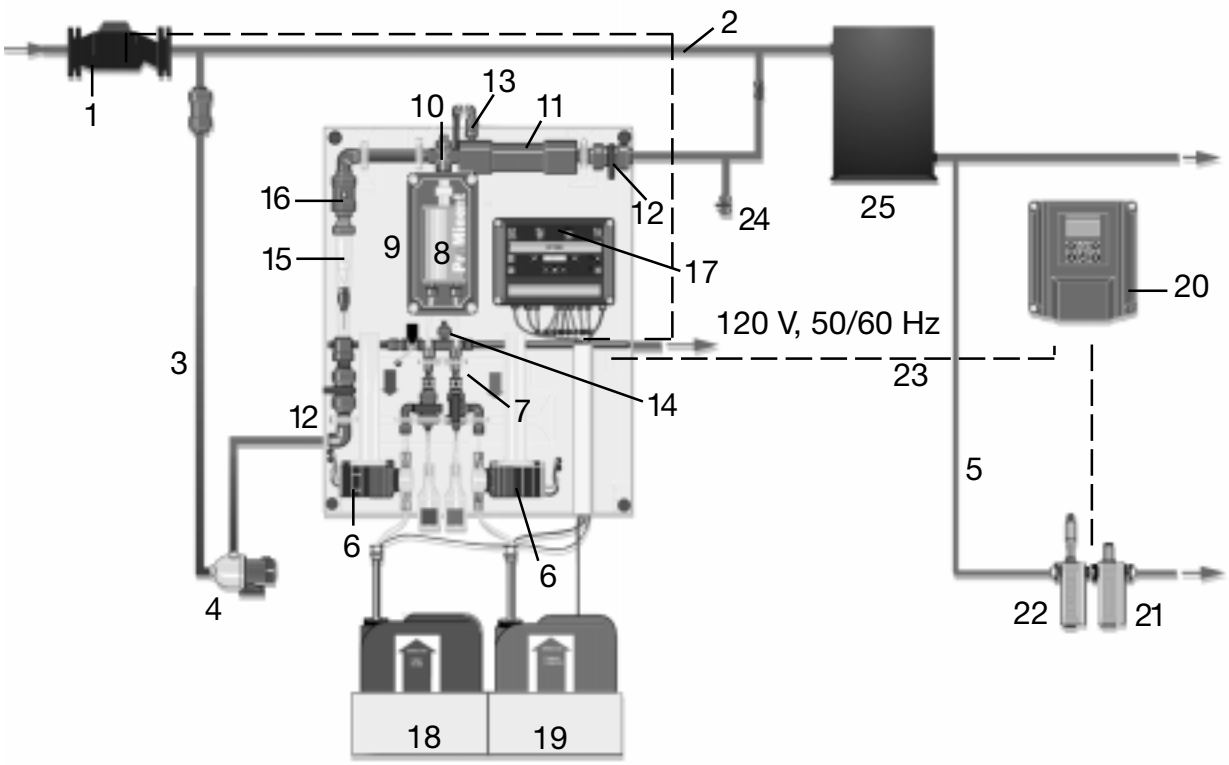
Bello Zon® Type CDVa for generating chlorine dioxide from 9% HCl and 7.5% $NaClO_2$

The CDVa systems are wall-mounted systems with microprocessor-based controllers that simplify all aspects of chlorine dioxide generation and metering. In flow-proportional applications, the operator simply programs the desired dosing concentration (e.g. 1.5 ppm), and the controller automatically adjusts feed rate to maintain the setpoint regardless of changes in water flow. Calibration is simplified because the controller automatically compensates for any differences in flow rates between the two pumps. Various options are selectable by identity code.

Bello Zon® Type CDKa for generating chlorine dioxide from 30%-33% HCl, 25% $NaClO_2$ and water

The CDKa systems allow use of industry standard concentrated precursor chemicals for lower chemical cost and reduced source tank capacity. A third pump for water safely dilutes the final product to a 2% (20,000 ppm) concentration. The microprocessor controller automatically compensates for output differences between the pumps regardless of total system output. Various options are selectable by identity code.

Bello Zon®
Chlorine Dioxide Generator



Bello Zon® Chlorine Dioxide Plant with Flow-Dependant Control

1 water meter (contact, analog)
2 main water pipe
3 bypass pipe 1-2 m^3/h
4 bypass pump
5 sample line
6 solenoid dosing pump
7 flow sensor
8 reactor
9 reactor housing
10 dosing valve (pressure sensitive)
11 mixer
12 stop valve
13 ventilation valve
14 suction device, reactor vessel gas evacuation
15 bypass monitor
16 non-return-valve
17 control with production level display
18 Bello Zon® acid in safety vessel
19 Bello Zon® chlorite in safety vessel
20 D1C - chlorine dioxide controller
21 chlorine dioxide sensor
22 water reading monitor (sample flow switch
23 interlocking contact
24 rinsing connector
25 holding tank (reaction time 10-15 min.)

Bello Zon® CDVa
Continuous generation and metering of chlorine dioxide from pre-diluted chemicals

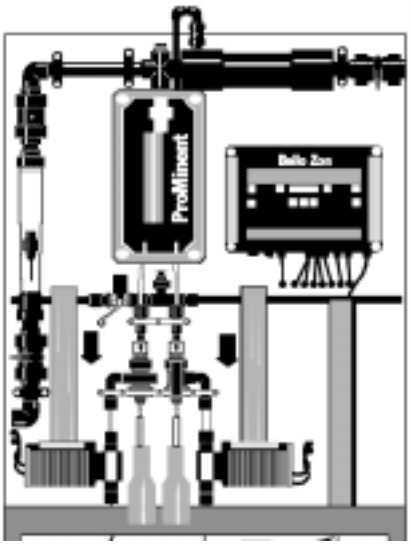
Bello Zon® CDVa Capacity

Bello Zon® systems type CDVa run with a capacity of 35 - 2000 grams chlorine dioxide per hour, are completely preassembled and made up of the following components:

- Reactor housing with air evacuation system
- Three-way priming valves with bleeder bottles
- Pressure-loaded backpressure/ antisiphon valve
- Bypass line in various versions (see identity code)
- Metering pumps with flow monitors
- Microprocessor control with various options (see identity code)
- Calibration cylinders

The required suction lances must be ordered as a necessary accessory for each system.

The suction lances include a level switch with initial low tank level warning capability.



Technical Data

Model	ClO_2 * Output gr/hr	lb/day	Maximum Pressure psig	bar	Max. Stroke Freq. spm	Maximum Output per Component US gpd	L/h	Max.** Suction lift ft.	Operation Temperature °F	°C	Metering Pump Type	Max. Current Draw (amps) 115V	230V
CDVa 35	46	2.43	145	10	120	7.29	1.15	5.41	40-104	10-40	G/4 - 1601	3A	1.8A
CDVa 60	66	3.49	116	8	120	10.46	1.65	7.71	40-104	10-40	G/4 - 1201	3A	1.8A
CDVa 120	130	6.87	116	8	120	20.61	3.25	3.05	60-104	15-40	G/4 - 1002	3A	1.8A
CDVa 220	225	11.89	145	10	100	35.67	5.63	4.26	40-104	10-40	G/5 - 1605	12.2A	6.9A
CDVa 400	400	21.15	145	10	100	63.41	10	6.23	40-104	10-40	G/5 - 1310	12.2A	6.9A
CDVa 600	600	31.72	116	8	77	95.11	15	22.96	60-104	15-40	Vario 12017	3.4A	1.7A
CDVa 2000	2000	105.72	102	7	73	317.0	50	22.96	60-104	15-40	Sica 12050	6.8A	3.4A

* Capacities rated at 72.5 psig (5 bar) backpressure and ambient temperature of 70° F (20° C).
** Suction lift at 100% stroke length

Model	Dimensions Width*** in.	mm	Height in.	mm	Depth in.	mm	Weight lbs.	kg
CDVa 35	35.43	900	44.29	1125	7.87	200	41.4	18.8
CDVa 60	35.43	900	44.29	1125	7.87	200	41.4	18.8
CDVa 120	35.43	900	44.29	1125	7.87	200	42.3	19.2
CDVa 220	37.40	950	53.15	1350	14.96	380	121.3	55.0
CDVa 400	37.40	950	53.15	1350	14.96	380	123.0	55.8
CDVa 600	37.40	950	53.15	1350	14.96	380	125.7	57.0
CDVa 2000	51.18	1300	72.83	1850	16.93	430	297.6	135.0

*** Width for models CDVa 220/400/600/2000, does not include static mixer.

Identity Code ordering system for ProMinent® Bello Zon® CDVa

Series:

CDVa Bello Zon® CDV
Version a

		Grams/hr	System version:
1A	CDVa 35	46 g/h	
2A	CDVa 60	66 g/h	
3A	CDVa 120	130 g/h	
4A	CDVa 220	225 g/h	
5A	CDVa 400	400 g/h	
6A	CDVa 600	600 g/h	
8A	CDVa 2000	2000 g/h	For version 8A, use bypass versions 0,1, 2 and 3 only.

Operating voltage:

0	230 V	50/60 Hz
1	115 V	50/60 Hz

Bypass version:

0	Without bypass and without premixer
1	Without bypass and with premixer (select bypass monitor option 0 only)
2	With bypass and premixer (select bypass monitor option 1 or 2)
3	With bypass and without premixer
4	With bypass, premixer and stainless steel bypass pump
5	With bypass, without premixer and with stainless steel bypass pump
6	With bypass, premixer and cast bypass pump
7	With bypass, without premixer, with cast bypass pump (select bypass monitor option 1 or 2)

Bypass monitoring:

0	Not included
1	Turbine flowmeter (For once-through systems)
2	Variable-area flowmeter (For recirculating systems)
3	Variable-area flowmeter and solenoid valve PVC/PVDF

Control variable input:

0	None
1	Contact (Pulse 0-4 Hz)
2	Analog (0/4-20 mA) + contact selectable

Flow input:

0	None
1	Contact (Pulse 0-4 Hz) (Watermeter)
2	Frequency (0-10 Hz) (Turbine flowmeter) contact, selectable
3	Analog (0/4-20 mA) + contact, selectable

Language presetting:

D	German
E	English
F	French
I	Italian
S	Spanish

Analog outputs/interface:

0	None
1	Analog (0/4-20 mA) for recorder (3 analog output signals)

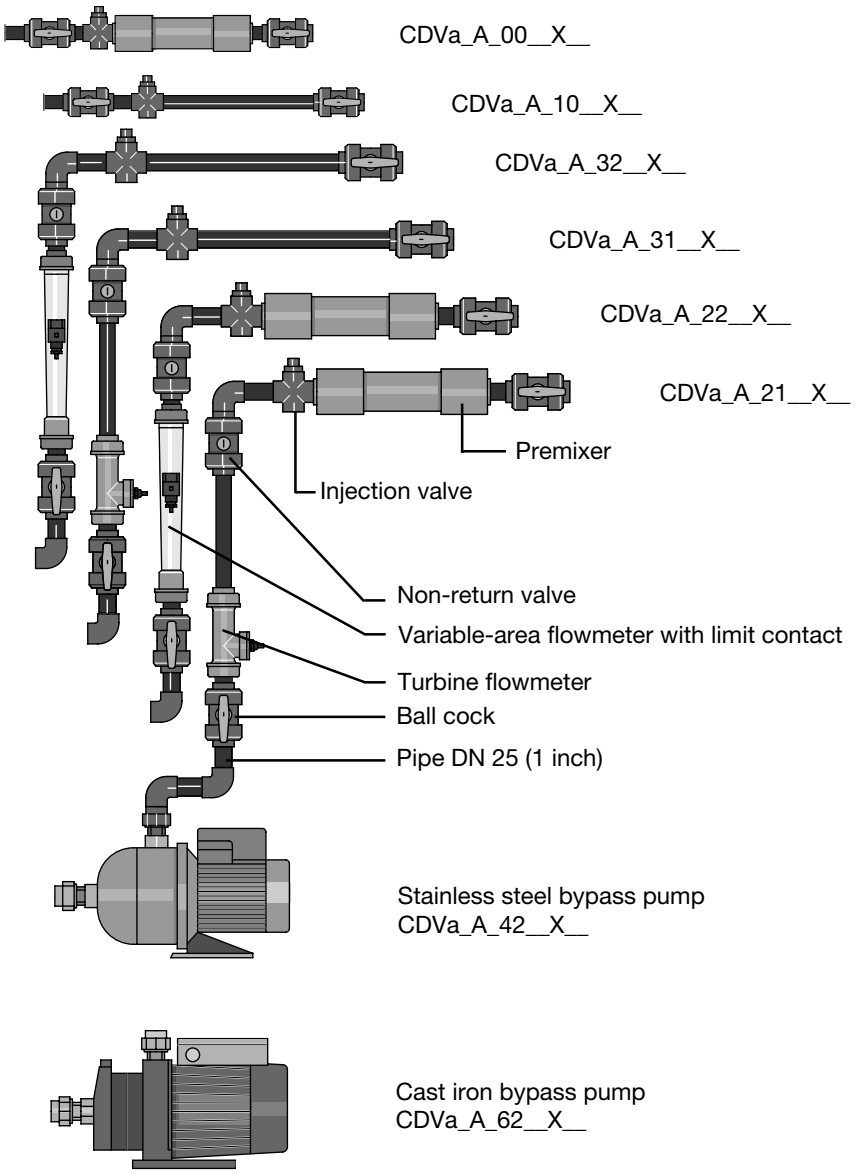
Remote control input:

0	None
1	Contact (Pause function)
2	Analog (0/4-20 mA)
3	Contact and analog (0/4-20 mA)

CDVa 2A 1 2 2 1 3 E 1 1

Bello Zon® Chlorine Dioxide Systems Type CDVa

Bypass Line Variants Dependent on Identity Code



pk_7_0 ~1
pk_7_007

Unit Model	Pre-mixing	Part no. P.N.	Volume US gal	(L)	Net length ft.	(mm)	Weight lbs.	(kg)
CDVa 35/60/120	already pre-assembled							
CDVa 220	separate	740649	0.40	1.5	1.88	572	5.29	2.4
CDVa 400	separate	740650	1.19	4.5	3.13	954	12.13	5.5
CDVa 600	separate	740832	1.85	7.0	3.46	1054	15.43	7.0
CDVa 2000	separate	1001000	3.54	13.4	4.59/ 9.18	1400/ 2800	33.06	15.0

Bello Zon® CDVa
Accessories and Spare Parts Kits

Accessories and Spare Parts Kits

Description			Part no.	
Suction Lances - not included in the standard scope of delivery of the system. Please specify the required part number separately when ordering the system.				
Tank volume			**CDVa 35-120**	**CDVa 220-400**
8 US gal	(30 L)	} Not adjustable	790650	791237
53 US gal	(200 L)		791563	791567
132 US gal	(500 L)	(adjustable 2.2 - 3.4 ft. (660 - 1040 mm)	791612	791613
Special cover for mounting on 500 L tank			792197	

Tank volume	**CDVa 600**	**CDVa 2000**
53 - 264 US gal (200 - 1000 L) (adjustable on site max. 4.4 ft. (1340 mm))	790387	790391
Two stage float switch	790321	790318

Suction Assembly (for CDVa 35/60/120)

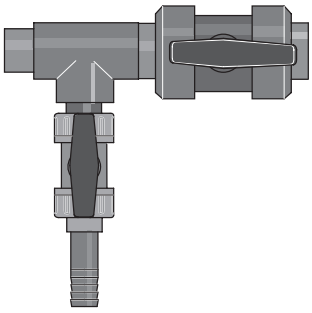
Flexible suction line, PVC with foot valve and two-stage float switch, 15 ft (5 m)	792195

Safety Trays (chemical tank spill containment)

Volume	Without leak monitor	With leak monitor
10.5 US gal (40 L)	791726	791728
66 US gal (250 L)	791727	791729
Scope of delivery	one tray	Two trays + PG gland PC-board for Bello Zon control

Suction Air Accumulator (to vent gas bubbles forming in chemical suction pipes)

(Suction air accumulator with fixings)	
Acid side	1001820
Chlorite side	1001821



pk_7_013

Backpressure Valves

A backpressure valve must be installed in installations with long bypass lines, particularly when these run downward and the metering station is located below the Bello Zon® system.

DHV-RM	1" (DN 25)	PC 1	1000050
DHV-RM	1-1/2" (DN 32)	PC 1	1000051
DHV-RM	1-1/2" (DN 40)	PC 1	1000052

Bello Zon® CDVa
Accessories and Spare Parts Kits (cont.)

Accessories and Spare Parts Kits

Description	Part no.
Venting valve for reaction cabinet (required if no vent to outdoors is available)	791801
Vent valve for bypass pipe (to avoid uncontrolled siphoning of the chemical into the bypass line, recommended for long bypass lines, or in case of positive sucton pressure)	1001260
Angle seat valve, 1" (DN 25) (for adjusting bypass flow when using a bypass pump)	1001877
Flushing device (for installation in the bypass pipe, used to empty the reactor prior to maintenance work)	1000525
PVC chlorine dioxide injection pipe	
Immersible to 3" (DN 80)	1001823
Immersible to 4" (DN 100)	1001822
Chemical feed pipe heater	
for suction hose diameter 1/4" x 3/16" (6 x 4mm)	1001636
for suction hose diameter 1/2" x 3/8" (12 x 9mm)	1001638
Manual chlorine dioxide measuring photometer (DT 1)	1003473
Line filter DULCOFILT 94/KW 1" Recommended for use with turbine-type flow meter	791547

Spare Parts Kits for CDV Systems
(Complete replacement kit, recommended after 1 year in service, including fuses)

Type	Operating voltage	Part no.	Operating voltage	Part no.
CDVa 35	230V	791842	115V	791860
CDVa 60	230V	791913	115V	791914
CDVa 120	230V	791915	115V	791916
CDVa 220	230V	740824	115V	740825
CDVa 400	230V	740765	115V	740819
CDVa 600	230V	740826	115V	740827
CDVa 2000	230V	1005333	115V	1005344

Liquid end kit
(Complete replacement kit, recommended after 1 year in service, including fuses)

CDVa 35	791659
CDVa 60	791660
CDVa 120	791661
CDVa 220	740738
CDVa 400	740820
CDVa 600	740742
CDVa 2000	1000854

Kit for metering line
(Recommended after 6 months in service)

CDVa 35/60/120	791723
CDVa 220/400/600	740739
CDVa 2000	1005345

Bello Zon® CDKa
Continuous generation and metering of chlorine dioxide from concentrated chemicals

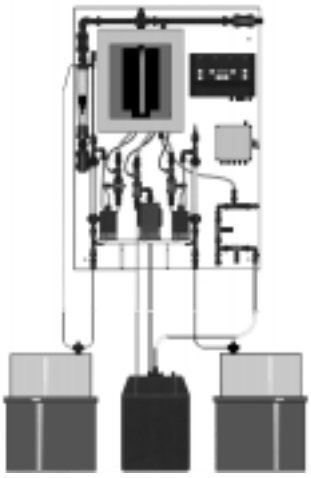
Bello Zon® CDKa Capacity

Bello Zon® systems type CDKa run with a capacity of 150 - 10000 grams chlorine dioxide per hour, are completely preassembled and made up of the following components:

- Reactor housing with air evacuation system
- Three-way priming valves with bleeder bottles
- Pressure-loaded backpressure/ antisiphon valve
- Bypass line in various versions (see identity code)
- Metering pumps with flow monitors
- Microprocessor control with various options (see identity code)
- Calibration cylinders with automatic fill option

The required suction lances must be ordered as a necessary accessory for each system.

The suction lances include a level switch with initial low tank level warning capability.



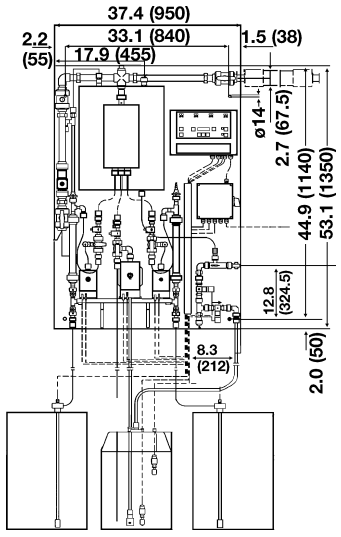
Technical Data

Model	ClO_2 * Output gr/hr	lb/day	Maximum Pressure psig	bar	Acid (A), Chlorite (C), Water (W) Metering Pump	Max. Stroke Freq. spm	Maximum Output per Component US gpd	L/h	Max.** Suction lift ft.	Operation Temperature °F	°C	Metering Pump Type	Max. Current Draw (amps) 115V	230V
CDKa 150	150	7.93	145	10	A,C	120	6.34	1.0	5.6	50-104	10-40	G/4 - 1601	9.5A	5.2A
					W	100	34.87	5.5	4.3			G/4 - 1605		
CDKa 420	428	22.64	116	8	A,C	120	18.39	2.9	3.0	60-104	15-40	G/4 - 1002	5.1A	2.7A
					W	77	99.54	15.7	23.0			Vario 12017		
CDKa 750	750	39.65	116	8	A,C	100	31.70	5.0	4.3	60-104	15-40	G/5 - 1605	13.8A	7.7A
					W	72	177.52	28.0	23.0			Vario 12026		
CDKa 1500	1500	79.34	102	7	A,C	100	63.40	10.0	6.2	60-104	15-40	G/5 - 1310	12.8A	6.8A
					W	73	348.71	55.0	23.0			SIC - 12090		
CDKa 6000	5900	312.23	72.5	5	A,C	122	247.26	39.0	13.0	60-104	15-40	Vario 09039	6.7A	3.5A
					W	128	1363.13	215.0	16.0			SIC - 07220		
CDKa 10000	9800	518.62	29	2	A,C	107	418.44	66.0	9.9	60-104	15-40	Vario 05075	6.7A	3.5A
					W	198	2282.44	360.0	16.0			SIC - 04350		

* Capacities rated at 72.5 psig (5 bar) backpressure and ambient temperature of 70° F (20° C)
** Suction lift at 100% stroke length

Model	Dimensions Width*** in.	mm	Height in.	mm	Depth in.	mm	Weight lbs.	kg
CDKa 150	37.4	950	53.1	1350	15.0	380	121.3	55
CDKa 420	37.4	950	53.1	1350	15.0	380	125.7	57
CDKa 750	43.3	1100	63.4	1610	15.7	400	181.0	82
CDKa 1500	51.2	1300	72.8	1850	16.9	430	297.6	135
CDKa 6000	59.0	1500	120.4	3060	18.5	470	661.3	300
CDKa 10000	59.0	1500	120.4	3060	18.5	470	705.4	320

*** Width does not include static mixer



Dimensions in. (mm)

Identity Code ordering system for ProMinent® Bello Zon® CDKa

Series:
CDKa Bello Zon® CDK
Version a

		Grams/hr
1	CDKa 150	150 g/h
3	CDKa 420	420 g/h
4	CDKa 750	750 g/h
5	CDKa 1500	1500 g/h
7	CDKa 6000	6000 g/h
8	CDKa 10000	10000 g/h

Calibration setup:

A	With auto fill calibration column
B	With manual graduated cylinder

Operating voltage:

0	230 V	50/60 Hz
1	115 V	50*/60 Hz

* CDKa 420-6000 is not available with 115 V, 50 Hz

Suction assemblies:

0	None
1	Adjustable suction lance for 15 gal (60 L) tank (rigid)
2	Adjustable suction lance, up to 15 ft (5 m), with 2-stage level switch (flexible)
3	Reservoir tanks for acids and chlorite
4	Reservoir tanks for acids and chlorite with PLC controlled replenishment

Bypass monitoring:

0	Not included
1	Turbine flowmeter (not available for CDKa 6000)
2	Variable-area flowmeter

Control variable input:

0	None
1	Contact (Pulse 0-4 Hz)

Flow input:

0	None
1	Contact (Pulse 0-4 Hz) (Watermeter)
2	Frequency (0-10 Hz), contact, selectable
3	Analog (0/4-20 mA) + contact, selectable

Language presetting:

D	German
E	English
F	French
I	Italian
S	Spanish

Analog outputs/interface:

0	None
1	Analog (0/4-20 mA) for recorder (3 analog output signals)

Remote control input:

0	None
1	Contact (pause function)
2	Analog (0/4-20 mA)
3	Contact and analog (0/4-20 mA)

CDKa	1	A	1	2	2	2	3	E	1	1

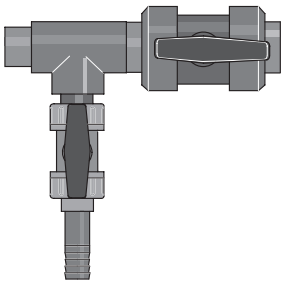
Bello Zon® CDKa
Accessories and Spare Parts Kits

Accessories and Spare Parts Kits

Description		Part no.
Suction Lance – not included in the standard scope of delivery of the system. Please specify the required part number separately when ordering the system.		
Tank volume		
15 US gal (60 L)		740049
Premixer		
CDKa 150		740649
CDKa 420		740650
CDKa 750		740832
CDKa 1500		1001000
Bypass Pump		
Type	**Pump material**	
CDKa 150/420	cast iron	791389
	stainless steel	791535
CDKa 750	cast iron	740829
	stainless steel	740830
CDKa 1500	cast iron	1000842
	stainless steel	1000843
Mounting for bypass pump		791474
Suction Assembly		
Flexible suction line, PVC with foot valve and two-stage level switch, 15 ft (5 m)		
CDKa 150/420		740661
CDKa 750/1500		1000132

Safety Trays (chemical tank spill containment)

Volume	Without leak monitor	With leak monitor
18 US gal (70 L)	740309	740308
Scope of delivery	one tray	Two trays + PG gland PC-board for Bello Zon control



pk_7_013

Backpressure Valves

A backpressure valve must be installed in installations with long bypass lines, particularly when these run downward and the metering station is located below the Bello Zon® system.

DHV-RM	1" (DN 25)	PC 1	1000050
DHV-RM	1-1/2" (DN 32)	PC 1	1000051
DHV-RM	1-1/2" (DN 40)	PC 1	1000052

Bello Zon® CDKa
Accessories and Spare Parts Kits (cont.)

Accessories and Spare Parts Kits

Description	Part no.
Venting valve for reaction cabinet (required if no vent to outdoors is available)	791801
Vent valve for bypass pipe (to avoid uncontrolled siphoning of the chemical into the bypass line, recommended for long bypass lines, or in case of positive sucton pressure)	1001260
Angle seat valve, DN25 (for adjusting bypass flow when bypass pump installed)	1001877
Flushing device (for installation in the bypass pipe, used to empty the reactor prior to maintenance work)	1000525
PVC chlorine dioxide injection pipe	
Immersible to 3" (DN 80)	1001823
Immersible to 4" (DN 100)	1001822
Chemical feed pipe heater	
for suction hose diameter 1/4" x 3/16" (6 x 4mm)	1001636
for suction hose diameter 1/2" x 3/8" (12 x 9mm)	1001638
Manual chlorine dioxide measuring photometer (DT 1)	1003473
Line filter DULCOFILT 94/KW 1" Recommended for use with turbine-type flow meter	911056

Spare Parts Kits for CDK Systems
Complete replacement kit, recommended after 1 year in service, including fuses.

Type	Operating voltage	Part no.	Operating voltage	Part no.
CDKa 150	230V	740740	115V	740741
CDKa 420	230V	740743	115V	740744
CDKa 750	230V	1000172	115V	1000173
CDKa 1500	230V	1000856	115V	1000855
CDKa 6000	230V	1004814	115V	1004815
CDKa 10000	230V	1006647		

Liquid end kit
Complete replacement kit, recommended after 1 year in service, including fuses
(Recommended after 6 months for acid-chlorite liquid end)

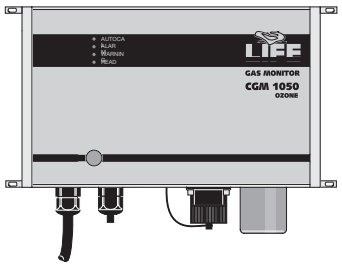
Type	Liquid end	
CDKa 150	acid/chlorite	791659
	water	740738
CDKa 420	acid/chlorite	791661
	water	740742
CDKa 750	acid/chlorite	740738
	water	740742
CDKa 1500	acid/chlorite	740820
	water	1000854
CDKa 6000	acid/chlorite	1004817
	water	1004816
CDKa 10000	acid/chlorite	1006648
	water	1004816

Kit for metering line
(Recommended after 6 months in service)

CDKa 150/420	740739
CDKa 750/1500	1000171
CDKa 6000	1004805
CDKa 10000	1006649

Bello Zon® CDKa
Accessories and Spare Parts Kits (cont.)

Life® CGM Gas Detector



Description		Part no.

The CGM Life Gas Detector is a compact measuring and switching unit which monitors the surrounding air for dangerous concentrations of chlorine and chlorine dioxide.

Technical Data

	Chlorine	
Type Designation	Life CGM 1030	1002837
Alarm limit value	0.5 ppm	
Warning limit value	0.3 ppm	
	Chlorine dioxide	
Type Designation	Life CGM 1040	1002838
Alarm limit value	0.3 ppm	
Warning limit value	0.1 ppm	
	all	
Alarm delay:	30 sec.	
Switch-on delay after power failure:	120 sec.	
Display operation:	green LED	
Display warning:	orange LED	
Display alarm:	red LED	
Display calibration:	yellow LED	

The gas-warning device has 3 output relays:

- output relay for alarm as potential-free normally closed contact, must be manually reset.
- horn relay for alarm as potential-free change over contact, independently acknowledgeable via key button, must be manually reset
- warning relay as potential-free normally closed contact, automatically resets when measured value drops below warning limit value

Maximum contact rating:	230 V, 1 A	
Electrical connection:	230 V, 50/60 Hz, 7 VA	
Type of enclosure:	IP 54, NEMA 3	
Dimensions (without sensor):	length: 8.66 in. (220 mm) height: 5.71 in. (145 mm) width: 3.15 in. (80 mm)	
Safe environmental conditions:		
Temperature:	14° to 113° F (-10° to 45° C)	
Pressure:	atmospheric pressure ±10%	
Air humidity:	20 to 90% rel. humidity	
Sensor operational life:	2 years	
Spare sensor:		1003009

ProMinent®

Worksheet for chlorine dioxide applications

Application: Drinking Water

Company name and address: _____

Contact Person: _____ Phone: _____

Type of industry: _____

1. Intended application of the treated water: _____

   _____

2. Source of the water to be treated (city water, well, spring water or other):

   _____

   _____

3. Disinfection or oxidation method presently used (chemical, concentration, dosing/control method):

   _____

   _____

   - Concerns or problems concerning this method: _____

4. Quantity of water to be treated:
   - Constant flow: _____ gpm _____ (L/h)
   - Fluctuating flow: Min: _____ gpm _____ (L/h)
   - Max: _____ gpm _____ (L/h)
   - Line pressure: _____ psi _____ (bar)
   - Size of water line: _____ in _____ (cm)

5. Temperature:
   - Chemical Storage room: Min: _____ºF_____ (ºC) Max: _____ºF_____ (ºC)
   - Water to be treated: Min: _____ºF_____ (ºC) Max: _____ºF_____ (ºC)

6. How is the chlorine dioxide dosage to be controlled (mark by "X"):
   - Manually ☐ OR Proportional to flow ☐

7. Existing equipment:
   - Contact type water meter: ☐ K factor: _____ Gallons/pulse _____ (L/pulse)
   - Inductive water meter: ☐ 4 mA: _____ gph _____ (L/h)
     20 mA: _____ gph _____ (L/h)
   - Retention tank: ☐ Volume: _____ Gallons _____ (L)

8. Water analysis (provide a complete water analysis if available):
   (A complete analysis would be optimal, however the following parameters are necessary at any rate):
   - Ph _____ Hardness _____ ppm $CaCO_3$
   - Iron (Fe_2^{++}) _____ppm Manganese (Mn^{++}) _____ ppm
   - Nitrite (NO_2^-) _____ppm $KMnO_4$ (permanganate) consumption _____ ppm

   - *ClO_2 dosage targeted: _____ ppm ClO_2 residual targeted: _____ ppm*

9. Sketch of the flow process with possible location of generator and injection point (please attach):

Date: (/ /)