eXact® MICRO 20

Smart Photometer System®

Bluetooth® SMART

Dual Wavelength Advanced Photometer System

Instruction Manual

IDEAL FOR DRINKING WATER, POOLS & SPAS, ENVIRONMENTAL, AND EDUCATIONAL TESTING

U.S. Patent No. 7,333,194, U.S. Patent No. 7,491,546, South African Patent No. 2007/0628, EU Patent #1,725,864, and International Patent Appln. No. PCT/US2005/033985

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Industrial Test Systems, Inc.
Innovators of Water Quality Testing

eXact® Micro 20 with Bluetooth® SMART Photometer Overview

Your new eXact® Micro 20 is ideal for testing Drinking Water, Pools, Spas, Ponds, Aquariums, Food Process Water, Environmental Waters, and more!

Technical Specifications		eXact® Micro 20 with Blutooth® SMART (486700BT)	
Measurement method	Photometric	Cell chamber	Custom–molded, proprietary, PET plastic fused into chamber, non–removable
Light source	Light Emitting Diode (LED) with precision filter	Sample required	4mL (0.13oz)
Wavelength	Dual—525nm & 638nm	Operating temp range	0°—50°C (32°—122°F)
Transmission range	100 — 0.00%T	Power supply	(4) AAA alkaline batteries
Photometric precision	+/– 0.1/0.01 %T	Battery life	>2000 tests
Automatic range selection	See specifications below	Electromagnetic compliance (EMC)	Emitted interference – EN61326 Immunity to interference – EN61326
Display	3–digit customized liquid crystal display with annunciators	Waterproof rating	Exceeds IP67
Cell path–length	20 nm	Weight	181g (6.4oz) with batteries
Reagent system	Utilizes patented eXact® strip micro reagent delivery system with our EZ–3™ method	Dimensions	5 x 3.5 x 16.5 cm (2 x 1.4 x 6.5) in W x D x H
Wireless	Bluetooth® SMART (requires Bluetooth® 4.0 and Android 4.3 and up or Apple iOS 6.1 and up)		

About your eXact® Micro 20 photometer

In order to save power, the meter is designed to turn off after 5 minutes (timed from the last button pressed). Should the meter turn off in the middle of a test, the last stored zero in the meter will remain valid when the meter is turned on again. Also, the test result is stored in memory for easy retrieval.

The eXact® Micro 20 meter is controlled by four buttons:

When first pressed, the **ZERO/ON** button powers the meter. When the meter is on and this button is pressed, it zeros the sample in the cell. It is recommended that each new water sample analyzed is zeroed before testing, to maximize sensitivity and accuracy.

With each press, the **SELECT** button advances through the Select Group 1 through 7. The current Select Group will appear as a small digit to the right of the selected **MENU** (example: E1 1).

With each press, the **MENU** button advances through the tests available in the current Select Group. Each test menu can store up to 20 results. To retrieve the stored results, go to the desired test using the **MENU** key. When the desired test is displayed, press and hold down the **MENU** key. Continue holding down the **MENU** key to scroll the stored results for that test, starting with the most recent result. The meter will display, from memory, the last 20 readings in sequence beginning with –20, which is the latest result, followed by 19, which is the 2nd latest result, etc; and finally –01, which is the oldest result retained. Only the last 20 readings are stored in each menu.

When **READ** is pressed once, this button starts the timer for the parameter being tested. When pressed a second time the meter exits the timer and immediately prepares to measure the sample. The meter will simultaneously store the measurement in memory.

If the parameter being measured is below or above the detection range, the display will show "**LO**" (Under Range) or "**HI**" (Over Range), respectively. This feature is menu specific and does not apply to all parameters.

Micro 20 Version

Version	Serial Numbers	Instruction Manual
v2.0	M20BTA00001 – M20BTA00483	sensafe.com/instruction-manuals/
v3.1	M20BTA00484 and up	This manual

About Bluetooth® SMART

Bluetooth® SMART is a low–power wireless networking standard which uses short radio waves to allow electronic devices to communicate with each other. The eXact® Micro 20 with Bluetooth® SMART comes standard with the latest Bluetooth® 4.0 technology (www.bluetooth.com/Pages/Bluetooth–Smart.aspx), a class 2 device with a wireless working distance of up to 30 feet (10 meters) and a 2.1 Mbps data transfer rate. This allows a seamless transfer of data between a smart device and the eXact® Micro 20 with Bluetooth® SMART.

About eXact® Strip Micro

The eXact® Micro 20 with Bluetooth® SMART is designed to work with our line of eXact® Micro Strips. This type of reagent delivery method is designed to give the most precise accuracy reading for testing various water quality parameters.

eXact® Strip Micro has been designed to offer the user a more “Green” and cost–effective alternative to testing. Instead of using a 10 mL water sample, eXact® Strip Micro uses a 4mL water sample, which uses up to 60% less chemical per test. The accuracy of the meter is maintained by designing the photo cell with a 20 mm path–length.

For a complete list of eXact® Strip Micro reagent strips we offer, please see **page 31.**

Compliance Verification

This DPD test system is accepted by most health departments because this test is USEPA (DIN Standard 38 408 G4, ISO 7393/2) accepted for testing requirements for Free and Total Chlorine. The eXact® Micro 20 meter uses a wavelength of 525 nm; and the compliance requirement is that the colorimeter wavelength is between 490 nm to 530 nm. The eXact® Strip Micro CL (DPD–1) uses the same reagents and proportions, and the resulting solution pH is maintained between 6.2 and 6.5 as specified by AWWA (American Water Works Association) method 4500–Cl G. It should be understood that the USEPA does not “approve” commercial DPD delivery systems such as reagent powder pillows, tablets, dispensers, or eXact® Strip DPD delivery devices. The eXact® Strip Micro CL (DPD–1) for Free Chlorine, and the eXact® Strip Micro CL (DPD–3), the eXact® Strip Micro CL (DPD–4) for Total Chlorine, and the eXact® Strip Micro Cd (DPD–1) for Chlorine Dioxide meet your reportable testing requirements because the eXact® Strip Micro strips deliver the same chemicals in identical proportions (see table below). Likewise, AWWA proportions are followed as required for Total Chlorine measurements using Potassium Iodide. The eXact® Strip Micro Chromium is compliant because it uses the same wavelength and delivers the same chemicals in the same proportions as AWWA method 3500–Cr B. This is also true for Phosphate (Ascorbic Acid method, AWWA 4500–P E.) and Sulfide (Methylene Blue method, AWWA 4500–S_{-2} D). Our Ammonia tests are based on the Nitroprusside/phenate method found in Standard Methods. Interferences are controlled by EDTA and sodium potassium tartrate. Standard Methods requires an instrument reading in the range of 630 to 660nm. The Micro 20 reads the reacted sample at 638nm.

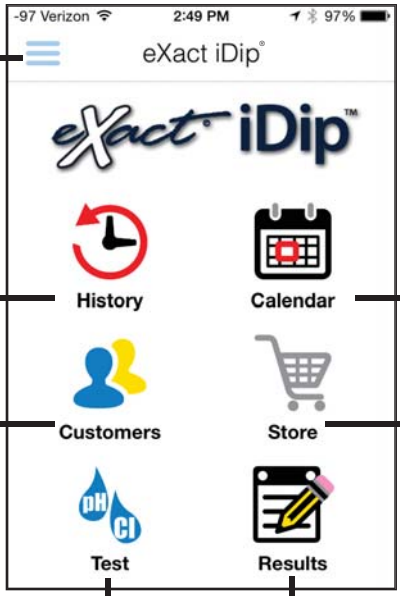
Component (Free Chlorine)	AWWA 4500–Cl G	eXact® DPD–1
Anhydrous DPD sulfate	1.5%	1.5%
Anhydrous Na_2HPO_4	33.4%	33.4%
Anhydrous $KH_2PO_4Na_2$	64.0%	64.0%
EDTA	1.1%	1.1%

eXact iDip® app overview

Download on the App Store

GET IT ON Google play

HOME SCREEN



MENU: *Opens slide-out for easy access to all app features*

HISTORY: *Accesses saved results which can be sorted, edited, and emailed. Also accesses History Map*

CALENDAR: *Displays your schedule/ appointments*

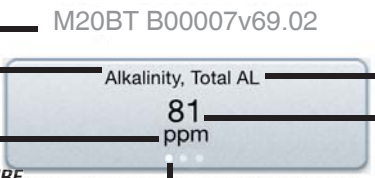
CUSTOMERS: *Attaches results to people and/or locations from your smart device contacts*

STORE: *Opens store to unlock additional tests*

TEST: *Initiates water testing*

RESULTS: *Accesses temporary results that have not been saved to history*

TEST RESULT SCREEN



BLUETOOTH DEVICE

TESTING PARAMETER

TEST ABBREVIATION

TEST RESULT

PARAMETER UNIT OF MEASURE
Scroll unit of measure values. Some tests offer results in multiple units of measure.

DOTS INDICATE MULTIPLE UNITS OF MEASURE
(Available for some tests)

Download the App

Using your smart device, download the eXact iDip® app. To see if your smart device is compatible, please see our compatibility list at sensafe.com/compatible-devices/.

We are constantly improving the eXact iDip® app and welcome your suggestions to help make our product even better. Visit www.sensafe.com/idip or e-mail your feedback to exactidip@sensafe.com.

Menu

The **Menu slide-out** is available from any screen within the app. The **Menu** allows you to access any of the app's features with ease.

HOW TO VIEW YOUR GPS LOCATION

In the **Settings** screen you can view your current GPS coordinates.

ABOUT

Access the End-User License Agreement and contact information to reach our offices in the USA and Europe from the **About** section located in the **Menu** slide-out.

Located in the About section you can find which version of the app you are running. Be sure to check for updates and install the latest version before running a test as we are constantly updating and adding more features to the app!

Test

You can utilize two different testing methods under **Test**; Manual Entry or Bluetooth Device.

BLUETOOTH TEST

Tests will be performed with your eXact® Micro 20.

MANUAL TEST

This feature allows you to utilize other testing methods and manually enter your results into the app. Begin by selecting **'Test'**, **'Manual entry',** then **'Change value'** to enter.

History

The **History** stores all your saved test result information and allows you to sort by date, customer name, or test type.

HOW TO SORT BY CUSTOMER

To sort by **Customer** begin by clicking **'RESULTS'**, then **'Sort by'**, **'Customer'**. You can then scroll through your list of customers, by name, to find a specific test result.

HOW TO SORT BY DATE

To sort by **Date** begin by clicking **'RESULTS'** then **'Sort by'**, **'Date'**. You can then scroll through a list of tests performed by date. You can also set a specific date range period by selecting **'Date range'**. Then set your **From** and **To** date ranges.

HOW TO SORT BY TESTS

To sort by **Test** begin by clicking **'RESULTS'** then **'Sort by'**, **'Test'**. You can then scroll through a list of tests sorted in alphabetical order.

HOW TO ACCESS HISTORY MAP

The History Map stores GPS locations of testing sites. See page 9 for instructions on utilizing this feature.

eXact iDip® app for eXact® Micro 20 with Bluetooth® SMART

The benefits of purchasing an eXact Micro 20 with Bluetooth® SMART are the ability to connect your photometer to a smartphone or tablet and use our specially designed app to easily save, send, and share your test results. First, select your test using the menu selections on your Micro 20 then run the test and the results will simultaniously display on the app and on your Micro 20 with Bluetooth® SMART. From the app, you can save, send, and share the results directly linked to your customers information and GPS location to include date/time stamp. The eXact iDip® app is available for use on both Apple and Android devices. The app is compatable with Bluetooth 4.0 devices (Android 4.4 and up and Apple iOS 7.0 and up) For a full list of compatible devices please visit **sensafe.com/compatible–devices/.**

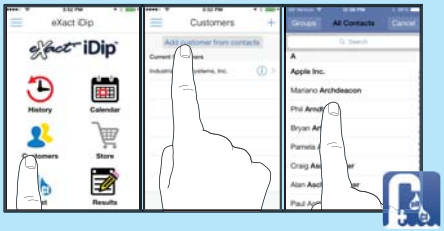
Download on the App Store

GET IT ON Google play

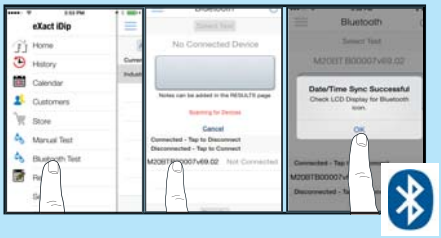
When using your eXact® Micro 20 with Bluetooth® SMART and the eXact iDip® app. You will need to complete the following steps after you have rinsed and filled your cell with the water sample and prior to zeroing your meter and dipping your strip.

HOW TO SELECT A CUSTOMER

From your smartphone/tablet, launch the eXact iDip® app. Select **'Customers'** from the home screen. From the Customers list **'Add customer from contacts'** or create a new contact by selecting the **'+'** in the upper right hand corner.



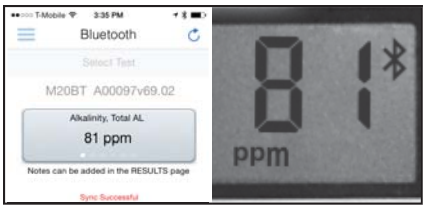
Please Note: When you select a new customer, this customer will not appear in the list until you have run and saved a test using the app and your eXact® Micro 20 with Bluetooth® SMART photometer.



HOW TO CONNECT VIA BLUETOOTH

Tap the menu slide out screen '☰' and select **'Bluetooth Test'**. Select your eXact® Micro 20 from the list located at the bottom of the screen. Verify it has connected and tap **'OK'**.

The serial number is located on the back of your device, this will display in the app. Refer to the serial number to ensure you are connected to the correct device.



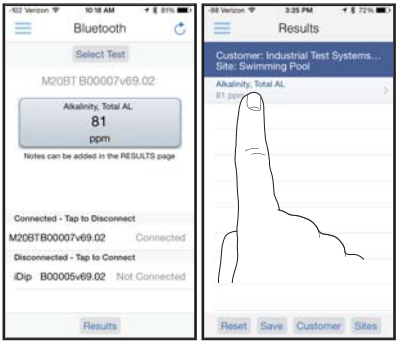
READ RESULTS

Results will display simultaneously on the Micro 20 photometer and app.

Please note that batch uploading tests saved on your eXact Micro 20 to a smartphone/tablet is not yet available. If you want to save a test result from your Micro 20 to the app, you will need to run the test while connected to the app or enter the result manually.

Managing data with the eXact® iDip app

After you have run your test, you can save, send, and share your results, by following the steps below.

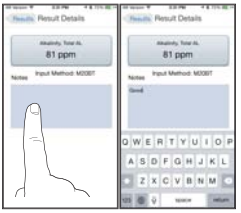


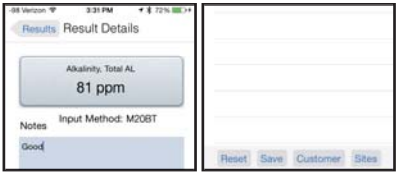
MANAGING DATA (SAVE/SEND/SHARE)

When all tests have been performed, select 'Results' at the bottom of the screen. To add notes tap the desired test result.

TYPE NOTES

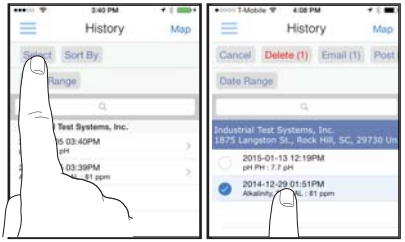
Add any notes you wish into the 'Notes' box. The additions will be automatically saved.





MANAGING DATA (SAVE/SEND/SHARE)

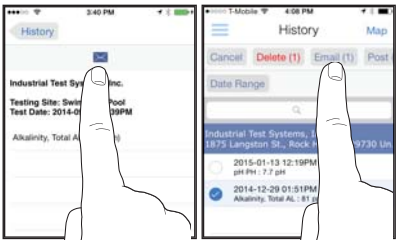
Go back to **'Results'** and select **'Save'** to store the test results with notes into **'RESULTS'**



HOW TO MANAGE DATA IN HISTORY

In History, you can edit, select, and email your results.

To email, you can either tap an individual result, or use the **'Select'** button to access multiple data points.



HOW TO EMAIL RESULTS FROM HISTORY

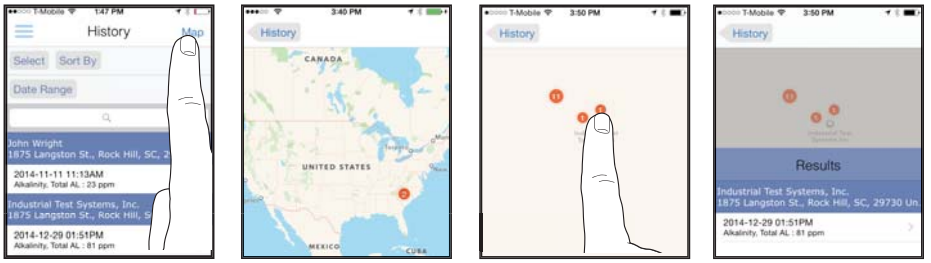
(1) Press the blue envelope icon from a single result selection.

(2) To select multiple test results, tap 'select', choose results, and then'email' to send the result information for all selected results. **The app will automatically attach your test result information and a .csv file to the email.**

Add recipients and tap send to complete.

ACCESSING RESULTS FROM HISTORY MAP

Tap **'Map'** on **'RESULTS'** page to access the History Map. Double tap or use fingers to zoom into an area. Select a pin by tapping to bring up results. From the specific location you can bring up the test results details page.



eXact® Micro 20 Test Specifications

#	Parameter / Test	Part No.	Pg	MENU & SELECT Group						
				1	2	3	4	5	6	7
1	Alkalinity, Total (fresh)	486641	14	AL 1			AL 4			
2	Alkalinity, Total (pool)	486641	14			AL 3				
3	Alkalinity, Total (marine)	486641	14					AL 5		
4	Aluminum (Al^{3+})[1]	486821	20		Al 2					
5	Ammonia (NH_3)	486654	20				NH 4	NH 5		
6	Biguanide	486810	14			bG 3				
7	Bromine, Total (DPD–4)	486644	14						bR 6	
8	Calcium (as $CaCO_3$)	486629	14			CA 3	CA 4			
9	Calcium, Ultra High (marine)	486668-K	20					CAH 5		
10	Chloride (as NaCL)	486757	14	CH 1						
11	Chloride, HR (as NaCL)	486757	23			CHH 3				
12	Chlorine Dioxide (DPD–1)	486633	25						Cd 6	
13	Chlorine, Combined	486637 & 486638	19	CL 1		CL 3			CL 6	
14	Chlorine, Free (DPD–1)	486637	18	CL 1		CL 3			CL 6	
16	Chlorine, Total (DPD–4)	486670	18	CL 1		CL 3			CL 6	
15	Chlorine, Total High	486672	14						CLH 6	
17	Chromium (VI)	486614	14		CR 2					
18	Copper (Cu^{2+})	486632	14		CU 2	CU 3				
19	Cyanide	486812	21							CN 7
20	Cyanuric Acid (III)	481652–III	16			CY 3				
21	Fluoride	486643	16	F 1						
22	Hardness, Total HR (as $CaCo_3$)	486656	14	THH 1			THH 4			
23	Hardness, Total LR (as $CaCo_3$)	486630	14	THL 1						
24	Hardness, Total Ultra High Marine	486669-K	20					THU 5		
25	Hydrogen Peroxide	486648	14						HP 6	
26	Iron, Total	486650	22		FE 2					
27	Manganese (Mn^{2+})	486606	24		MN 2					
28	Metals	486604	16		Mt 2					
29	Molybdate	486653	20		Mo 2					
30	Nitrate (NO_3) (fresh)	486655	14				NO3 4			
31	Nitrate (NO_3) (marine)	486655	26					NO3 5		
32	Nitrite (NO_2)	486623	14				NO2 4	NO2 5		
33	Ozone (DPD–4)	486634	14						O 6	
34	Peracetic Acid	486675	14						PA 6	
35	Permanganate (DPD–1)	486626	14						PM 6	
36	pH (fresh)	486639	14	PH 1						
37	pH (salt/pool)	486639	14			PH 3				
38	pH-BT (fresh)	486657	16				PPH 4			
39	pH-BT (marine)	486657	16					PPH 5		
40	pH, Acid	486624	14							PHA 7
41	Phosphate (PO_4)	486814	14			PO4 3	PO4 4	PO4 5		
42	Quaternary Ammonia Compound QAC	486823	14						QA 6	
43	Sulfate (SO_4)	486608	14							SO4 7
44	Sulfide (S^{2-})	486818	20							S 7

For select group & menu overview, **see page 12**.

† *Value provided represents best possible accuracy under laboratory conditions, but may vary throughout the detection range. For a complete list of accuracies throughout all ranges please visit sensafe.com/micro20/specifications.*

#	Count–up Time	Reagents Used	Range (ppm)	Resolution | Best Accuracy †	
1	Immediate	AL Strip	10 – 210	0.1(10.0–50.0), 1(51–210)	7.5
2	Immediate	AL Strip	8 – 200	0.1(8.0–50.0), 1(51–200)	7.5
3	Immediate	AL Strip	25 – 200	1	7.5
4	80 seconds	5 Drops AL Buffer & AL Strip	0.01 – 1.20	0.01	13
5	500 seconds	3 Drops NH (fresh) or 10 Drops NH (salt), & NH Strip	0.02 – 2.40	0.01	5
6	Immediate	BG Strip	1.6 – 210	0.1(1.6–20.0), 1(21–210)	7.5
7	Immediate	bR (DPD–1) Strip	0.01 – 12.0	0.01(0.01–2.00), 0.1(2.1–12)	5
8	Immediate	CA Strip	20 – 400	1	6
9	Immediate	CAH Strip and 2 drops CAH	710 – 1500	1(710–999), 10(1000-1500)	10
10	Immediate	CH Strip	3 – 270	1	8
11	Immediate	1:20 Dilution of sample & CH Strip	60 – 5400	20	15
12	Immediate	Glycine Srip & Cd (DPD–1) Strip	0.04 – 7.00	0.01(0.04–2.00), 0.1(2.1–7)	5
13	Immediate	CL (DPD–1) Strip & CL (DPD–3) Strip	0.01 – 6.20	0.01	3
14	Immediate	CL (DPD–1) Strip	0.01 – 6.20	0.01	3
16	Immediate	CL (DPD–4) Strip	0.01 – 6.20	0.01	3
15	120 seconds	CLH Strip	1 – 270	0.1(1–20.0), 1(21–270)	5
17	240 seconds	Cr Strip	0.01 – 1.80	0.01	5
18	120 seconds	CU Strip	0.01 – 10.0	0.01(0.01–4.09), 0.1(4.1–10)	2
19	600 seconds	CN–1 Strip & CN–2 Strip	0.01 – 1.10	0.01	13
20	60 seconds	8 Drops CY	1 – 110	1	8
21	Immediate	10 Drops F	0.04 – 1.50	0.01	15
22	Immediate	THH Strip	60 – 600	1	12
23	Immediate	THL Strip	1 – 80	1	10
24	Immediate	THU Strip and 10 drops THU	4000 – 8100	10	8
25	100 seconds	HP Strip	0.3 – 100	0.1(0.3–10.9), 1(11–100)	8
26	40 seconds	EZ Open Reducer (Powder) & FE Strip	0.03 – 6.0	0.01(0.03–2.59), 0.1(2.6–6.0)	3
27	120 seconds	MN#1 Strip, MN#2 Strip, & 3 Drops MN	0.01 – 1.50	0.01	6
28	120 seconds	2 drops Mt	0.05 – 2.50	0.01	6
29	120 seconds	MO Strip, 5 drops MO	0.01 – 3.00	0.01	5
30	600 seconds	NO3 Strip	0.12 – 30.0	0.01(0.12–5.00), 0.1(5.1–30)	15
31	580 seconds	NO3 Strip	1.00 – 20	0.01(1.00–20)	15
32	360 seconds	NO2 Strip	0.01 – 1.80	0.01	5
33	Immediate	O3 (DPD–4) Strip	0.01 – 2.00	0.01	4
34	Immediate	PA Strip	0.01 – 430	0.01(0.01–9.99), 1(10–430)	7
35	Immediate	PM (DPD–1) Strip	0.01 – 5	0.01	2
36	Immediate	PH Strip	6.4 – 8.4 pH	0.1	0.2
37	Immediate	PH Strip	6.4 – 8.4 pH	0.1	0.2
38	Immediate	2 Drops P-pH	5.1 – 9.2	0.1	0.2
39	Immediate	2 Drops P-pH	5.1 – 9.2	0.1	0.2
40	Immediate	Acid PH Strip	3.2 – 6 pH	0.1	0.3
41	120 seconds	PO4 Strip	0.03 – 4.0	0.01(0.03–2.50, 0.1(2.6–4.0)	4
42	Immediate	QA Strip	2 – 80	1	6
43	Immediate	SO4 Strip	2 – 210	1	10
44	180 seconds	4 Drops S & S2 Strip	0.01 – 1.6	0.01	6

[1] Performance verified with various salt systems and water samples with optimal water temperature at 10°–40°C / 50°–104°F. Optimal water temperature for Total Alkalinity test is 15°–35°C /59°–95°F.

[2] For example: If the sample has 1 ppm of Free Chlorine, the meter may read 0.97 ppm or 1.03 ppm. Contact sales department for detailed meter accuracy values.

Select group overview

Below is a list of Menu and selection choices with abbreviations. (MENU) (SELECT)

1 Drinking Water	2 Metals	3 Pool & Spa	4 Pond/Aquarium (Fresh)
AL — Alkalinity, Total (fresh) CH — Chloride CL — Free/Combined/Total Chlorine F — Fluoride PH — pH THH — Total Hardness High THL — Total Hardness Low	Al — Aluminum CU — Copper CR — Chromium FE — Iron, Total MN — Manganese Mo — Molybdate Mt — Metals +2	AL — Total Alkalinity bG — Biguanide CA — Calcium Hardness CHH — Chloride High Range CL — Free/Combined/Total Chlorine CU — Copper Cy — Cyanuric Acid (III) PH — pH PO4 — Phosphate	AL — Total Alkalinity (fresh) CA — Calcium NH — Ammonia NO2 — Nitrite NO3 — Nitrate (fresh) PO4 — Phosphate PPH — pH-BT (fresh) THH — Total Hardness High

5 Marine	6 Sanitizers	7 Miscellaneous	8 Transmission
AL — Total Alkalinity (marine) CAH — Calcium UH (marine) NH — Ammonia NO2 — Nitrite NO3 — Nitrate (marine) PO4 — Phosphate PPH — pH-BT (marine) THU — Total Hardness UH (marine)	bR — Bromine Cd — Chlorine Dioxide CL — Free/Combined/Total Chlorine CLH — Total Chlorine High HP — Hydrogen Peroxide O — Ozone PA — Peracetic Acid PM — Permanganate qA — Quaternary Ammonia	CN — Cyanide PHA — pH, Acid S — Sulfide SO4 — Sulfate	TR1 — Transmission (525nm) TR2 — Transmission (638nm)

eXact® Micro 20 meter messages

The following are some of the common messages that may display on your photometer, including error messages. If an error message other than those listed below is displayed, please contact technical support in the USA at (803) 329–0162 (ext. 0).

LCD Message	Description	Corrective Action
HI	In READ mode: test sample concentration is above the measurement range (test specific).	Dilute and retest. Dilution kit available (Part No. 487200)
LO	In READ mode: test sample concentration is below the measurement range (test specific).	Sample value is below measurement range.
LO	In ZERO mode: sample absorbency (due to a cloudy or colored sample or a dirty cell) is too high to zero, the meter will read “LO” or low battery	Dilute sample, filter sample or clean cell. One of these options should remedy the problem. You may need to replace batteries if low battery indication.
ER	Excessive stray light detected. Normally this does not occur, even when testing in sunlight.	Place the light blocking CAP over the CELL for zeroing and for reading result. Moving to a shaded can also fix this problem.
 in lower left	Low battery indication during testing (meter may not zero)	Replace batteries immediately. Otherwise meter may read LO while testing.
Flashing result on LCD	Lost connection to eXact iDip® app	Press ON/ZERO to stop flashing. Remove and replace the battery cover if flashing continues for future tests.

About the Sample Cell (built–in 4 mL)

The built–in Sample Cell (CELL) is transparent plastic and, when filled to the top, contains 4 mL. The sturdy CELL design will last for over 20,000 readings. Scratches on the CELL will not interfere or compromise the accuracy of the readings because of its fixed position. For best accuracy, rinse cell with clean water immediately after a test is completed. Do not use solvents, such as acetone, to clean the cell. When the CELL becomes stained or cloudy from repeated testing, or when the meter does not blank when you press the ZERO/ON button, the cell needs to be cleaned. Clean as follows: Fill cell with clean water and move the Cell cleaning brush up–and–down and back–and–forth along the walls of the cell. Afterwards, rinse the cell and the meter is ready for use again. Cleaning the cell regularly is especially recommended after you run a test that is using turbidity or precipitation chemistry for analysis (Calcium Hardness, Sulfate, Chloride, and Cyanuric Acid).

How to install or replace "AAA" batteries

Batteries are not included. The meter requires (4) AAA in order to function.

1. Unscrew the O–ring sealed battery cover counter–clockwise. Use proper sized pliers if necessary. Do not disturb the sealing O–ring.

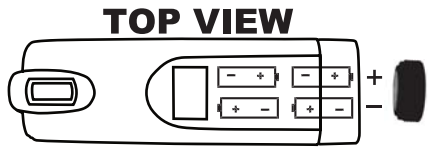
2. Remove the used batteries and install 4 new AAA batteries following the diagram for correct polarity (see diagram). We recommend high quality AAA alkaline batteries be used.

3. Replace the battery cover. Be sure to tighten the cover securely. This is necessary for meter to ensure it is waterproof.

4. Dispose of the used batteries in accordance with your local regulations.

5. Press (ON ZERO) button to confirm the meter turns on. The meter is now ready for operation.

   Meter will not work if battery orientation is incorrect.



2–year limited warranty

Registration of your eXact® photometer must be received within 30 days from date of purchase to activate the warranty. The eXact® photometer is warranted to be free from defects in materials and workmanship for a period of two (2) years from the date of purchase by the customer. ITS will repair or replace any part of the product which is deemed to be faulty or otherwise defective. The non–transferable warranty does not cover product damage caused by abuse (such as crushing a tablet in the cell) or improper use. If the meter is faulty or otherwise defective contact ITS by phone (+1–803–329–9712 Ext. 0) or email (its@sensafe.com) to describe the problem and obtain a return authorization form before returning the photometer to ITS. Damage caused by improper packing of the photometer for return shipment to ITS will not be covered by the warranty. Customer is responsible for shipping charges to ITS. ITS pays postage when photometer is returned to customer. A maximum processing fee of $75 will be charged for repair or replacement of non–registered photometers and damages not covered by this warranty. Registration is available over the phone (+1–803–329–9712 Ext. 0) or on–line at http://www.sensafe.com/micro/warranty/ (Personal data is kept confidential).

Using eXact® Strip Micro Standard strip test procedure

Used for Acid pH, Total Alkalinity[1], Biguanide, Bromine, Calcium Hardness[2], Chloride[3], Chlorine High Range[4], Chromium[5], Copper, Total Hardness High Range[6], Total Hardness Low Range[6], Hydrogen Peroxide, Nitrate[7], Nitrite, Ozone, Peracetic Acid, Permangante, pH, Phosphate[8], Quaternary Ammonia Compound QAC, Sulfate
(SEE PAGE 15 FOR SPECIAL NOTES)

REMOVE STRIP

Remove 1 **eXact® Strip Micro (ex. Total Alkalinity)** from the bottle before beginning the test. Set the strip in a dry, convenient place and recap the bottle immediately.

TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show all annunciators, then the current (MENU) selection, followed by the last reading.

SELECT GROUP AND MENU

Press and re–press the (SELECT) button to Select your group. Then, press and re–press the (MENU) button to select the test parameter *(see chart on page 10–11).*

RINSE CELL AND FILL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing (rinsing minimizes the potential for cross–contamination from a previous test). Finally, fill the **CELL** to capacity with the water sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

ZERO METER*

Press the (ON ZERO) button. The cursor will move across the display followed by a display reading of **0.00 PPM**. This indicates the sample is ready for testing.

DIP STRIP & PRESS READ

Dip the required strip into the **CELL**, and immediately press (READ) This will start a **20 second** countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes per second). **Remove and discard the strip after '1' on the display disappears.***

RECORD RESULT & RINSE CELL

The cursor will move across the display while the meter prepares to measure the sample. Record the value displayed for the respective parameter. This value is automatically stored in its **MENU** and if using the eXact iDip® app, the result will be saved in the app's **'RESULTS'**. After testing, rinse cell immediately and clean with brush.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

[1] **Total Alkalinity** — For water temperatures above 35°C (95°F, hot tubs), remove and discard the strip when the timer displays "10", countdown continues.

[2] **Calcium Hardness** — This test is accurate in water with Chloride < 2,000 ppm as NaCl. Chloride levels from 12,000 to 24,000 ppm as NaCl give 10-15% error. For samples with Chloride levels greater than 25,000 ppm as NaCl, contact ITS for a look-up table.

[3] **Chloride** — If sample pH is high (>9), adjust pH to 5–6 using Vinegar.

[4] **High Range Chlorine** — Use a 10 second dip time if water temperature is above 40°C (113°F). INTERFERENCES: Oxidizers such as Chloramine, Chlorine Dioxide, Bromine, Iodine, Ozone, Bromamines, and Permanganate will give false positive readings.

[5] **Chromium** — The strip needs to be angled in order to fit in the **CELL** because it is too wide.

[6] **Total Hardness, HR & LR**— Positive interferences are observed if the test sample contains Barium. Interferences also observed if the test sample contains Copper, Lead, Cobalt, or Nickel. Below 90ppm of Total Hardness HR, false positive results may occur. For Total Hardness HR, Total Alkalinity must be in the range of 65-220ppm (as CaCO3). ***The pH of the sample for Total Hardness High Range should be between 6.9 and 7.2. If the Total Alkalinity and pH are not in range, they must be adjusted prior to testing the water sample for Total Hardness High.***

[7] **Nitrate** — **A.** Use this procedure if NaCl is less than 400 ppm. Otherwise, use Nitrate (Salt Water) Procedure on page 26. **B**. The **CELL** needs to be cleaned with brush and distilled water after each test. If any zinc dust is adhering to the **CELL** wall, it will affect results.

[8] **Phosphate** — **A.** Clean **CELL** with 0.1N HCl, Distilled Vinegar (5%), or Muriatic Acid (diluted 1:40 with H2O) before testing. **B.** If running multiple tests in a row, using the same water sample, the **CELL** does not have to be rinsed or cleaned with acid between each test. It is recommended that the **CELL** be rinsed three times with the sample water. **C.** The calibration of the meter is based on a water temperature between 15°C (59°F) and 31°C (88°F). If temperature is below 15°C (59°F), your final Phosphate value may read low. This test can also be used for salt water testing.

The eXact® Micro 20 Dual Wavelength Advanced Photometer System is designed for use with the eXact® Strip Micro reagent delivery system. The eXact® Micro 20 Dual Wavelength Photometer is manufactured and tested in an ISO 9001 Facility.

Using eXact® reagent Standard liquid test procedure

Used for Cyanuric Acid (III)[1], Fluoride[2], Metals, and pH-BT

TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show all annunciators, then the current (MENU) selection, followed by the last reading.

SELECT GROUP AND MENU

Press and re–press the (SELECT) button to Select your group. Then, press and re–press the (MENU) button to select the test parameter *(see chart on page 10–11).*

RINSE CELL AND FILL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing (rinsing minimizes the potential for cross–contamination from a previous test). Finally, fill the **CELL** to capacity with the water sample.

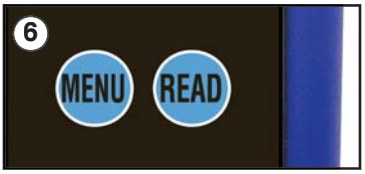
Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

ZERO METER*

Cover the **CELL** with the **CELL** COVER and press the (ON ZERO) button. The cursor will move across the display followed by a display reading of **0.00 PPM**. Tilt the meter to discard about 0.2mL water in order to leave room for liquid reagent. Sample is ready for testing.

ADD DROPS

Remove the **CELL** COVER and, using the selected bottle of reagent, add the required drops (see chart on pages 10–11) and cover the **CELL** with the **CELL** COVER. *Precaution: Ensure that the bottle is straight when dispensing drops.*



PRESS READ & MIX

Press (READ) and a **20 second** countdown begins. During this time, turn the meter upside down repetitively. When the timer displays **'1'**, place the Micro 20 on a flat surface. Wait for count–up time.

RECORD RESULT

The cursor will move across the display while the meter prepares to measure the sample. Record the value displayed for the respective parameter. This value is automatically stored in its **MENU** and if using the eXact iDip® app, the result will be saved in the app's **'RESULTS'**. After testing, rinse cell immediately and clean with brush.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

eXact® reagent liquid drops (SPECIAL NOTES)

[1] **Cyanuric Acid** — Shake the bottle vigorously to mix before adding the drops to the sample

[2] **Fluoride** — The reagent contains acid, a stir bar may be used to mix the reagent.

Some test procedures require the use combination of more than one test strip and/or liquid reagents. Please follow the step–by–step procedures as outlined in the following pages to ensure the best accuracy. For more tips on best accuracy, **see page 28.**

Any deviation from the outlined procedure, could result in inaccurate test results. Please take caution to testing notes. If your required procedure is not listed in this manual or if you have any questions, feel free to contact us at its@sensafe.com

Free or Total Chlorine test procedure

DPD–1 strip used for Free Chlorine detection, DPD–4 strip used for Total Chlorine detection

REMOVE STRIP

Remove 1 **eXact® Strip Micro CL (DPD–1)**, Part No. 486637 or **eXact® Strip Micro CL (DPD–4),** Part No. 486670 from the bottle before beginning the test. Set the strip in a dry, convenient place and recap the bottle immediately.

TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show all annunciators, then the current (MENU) selection, followed by the last reading.

SELECT GROUP AND MENU

Press and re–press the (SELECT) button to Select your group **(Select 1, 3, or 6)**. Then, press and re–press the (MENU) button to select the **CL** test parameter.

RINSE CELL AND FILL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing (rinsing minimizes the potential for cross–contamination from a previous test). Finally, fill the **CELL** to capacity with the water sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

ZERO METER*

Press the (ON ZERO) button. The cursor will move across the display followed by a display reading of **0.00 PPM**. This indicates the sample is ready for testing.

DIP STRIP & PRESS READ

Dip the required strip into the **CELL**, and immediately press (READ) This will start a **20 second** countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes per second). **Remove and discard the strip after '1' on the display disappears.***

RECORD RESULT

The cursor will move across the display while the meter prepares to measure the sample. Record the value displayed for the respective parameter. This value is automatically stored in the **CL MENU** and if using the eXact iDip® app, the result will be saved in the app's **'RESULTS'**. After testing, rinse cell immediately and clean with brush.

IMPORTANT: *DO NOT discard the sample from the Free Chlorine (DPD–1) test if you are planning to run eXact® Strip Micro DPD–3 (Total Chlorine) Procedure. Move directly to steps 8–10 on the next page, otherwise immediately rinse the CELL.*

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Combined Chlorine test procedure

This procedure is only valid when ran as a continuation of the eXact® Strip Micro CL (DPD–1 Free Chlorine). Test procedure located on the previous page.

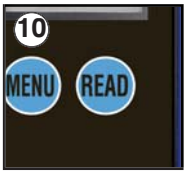
REMOVE STRIP

Remove 1 **eXact® Strip Micro CL (DPD–3)**, Part No. 486638 from the bottle before beginning the test. Set the strip in a dry, convenient place and recap the bottle immediately.

DIP STRIP & PRESS READ

Dip the **eXact® strip micro (DPD–3)** into the **CELL**, and immediately press (READ). This will start a **20 second** countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes per second). **Remove and discard the strip after '1' on the display disappears.*** The cursor will move across the display while the meter prepares to measure the sample. Record the value displayed and this value is automatically stored in the **CL MENU**, the result will be saved in the app's '**RESULTS**'.

(*NOTE: The Iodide added with DPD–3 will, in the presence of Combined Chlorine or Chloramines, convert into Iodine).*



PRESS READ AGAIN

Press (READ) again and the meter will count down and display the next reading. If this reading matches the previous result, then record this as the Total Chlorine result. This value is automatically stored in the **CL MENU**. After testing is completed, rinse **CELL** immediately. Record the highest value the meter displayed as your Total Chlorine result. After testing, rinse cell immediately and clean with brush.

NOTE: *Standard Method (4500–Cl G, procedure for total chlorine) requires the reading to be made after 2 minutes from the time the KI is added. For compliance testing, you must time the 2 minutes and then make your measurement.*

Interfering Substance	Interfering Levels and Treatments
Acidity	If sample has acidity above 150mg/L CaCO3 test may not develop full color. Neutralize to pH 6.0 to 7.0 with 0.5N Sodium hydroxide.
Alkalinity	If sample has alkalinity above 200mg/L CaCO3 test may not develop full color. Neutralize to pH 6.0 to 7.0 with 0.5N Sulfuric acid.
Bromine and Bromamines, Br_2	Color similar to free chlorine reaction at all levels.
Chlorine Dioxide, ClO_2	Color similar to free chlorine reaction at all levels.
Copper, Cu^{2+}	Color development is reduced above 10 ppm (mg/L).
Iodine, I_2	Color similar to free chlorine reaction at all levels.
Manganese, oxidized (Mn^{4+}, Mn^{7+}) or Chromium, oxidized (Cr^{6+})	See AWWA procedure 4500-CL F, 1(d) for removal of interferences.
Monochloramines (NH2Cl) (applies to DPD-1 only)	Monochloramine interferences are known to occur in free chlorine DPD methods. This interference is dependent on temperature and monochloramine concentration.
Ozone, O_3	Color similar to free chlorine reaction at all levels.
Peroxides	Interference is possible.
pH	Typical pH samples of potable water with a pH of 6.0 to 9.0 are OK. If outside this range adjust to pH 6.0 to 7.0 using acid (0.5N Sulfuric acid) or base (0.5N Sodium hydroxide).

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Aluminum[1], Ammonia[2], Molybdate & Sulfide[3] test procedure

1 TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

2 SELECT GROUP & MENU

Press and re–press the (SELECT) button to **Select Group**. Press and re–press the (MENU) button to select the test parameter *(see chart on page 10–11).*

3 RINSE & FILL CELL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing—rinsing minimizes the potential for cross–contamination from a previous test. Finally, fill **CELL** to capacity with the water sample. Tilt meter to discard about 0.2mL water to leave room for liquid reagent.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

4 ADD DROPS

Using the selected bottle of reagent, add the required drops (see chart on page 10–11) and cover the **CELL** with the **CELL** COVER. *Precaution: Ensure that the bottle is straight when dispensing drops.*

5 ZERO METER*

Press the (ON ZERO) button. The cursor will move across the display followed by **0.00 PPM**. This will indicate that the sample is ready for testing.

6 DIP STRIP & PRESS READ

Using the required strip *(see chart on page 10–11),* dip strip into the **CELL**, and immediately press (READ) to initiate a 20 second countdown. Move the strip using a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after "1" on the display disappears**.* The meter will automatically start to count up. The count up time will vary for each parameter. At the end, the cursor will move across the display while the meter prepares to measure the sample. Record the value displayed for the respective parameter. This value is automatically stored in its **MENU** and if using the eXact iDip® app, the result will be saved in the app's **'RESULTS'.** After testing, rinse **CELL** immediately and clean with the brush. After Sulfide testing: rinse **CELL** with Distilled White Vinegar, 0.1N HCl, or Muriatic Acid and clean with brush**.**

Aluminum, Ammonia & Sulfide (SPECIAL NOTES)

[1] **Aluminum** — **A.** First, clean the **CELL** with 0.1N HCl, Distilled Vinegar (5%), or Muriatic Acid (diluted 1:40 with H2O) before testing. **B.** If running multiple tests in a row, using the same water sample, the **CELL** does not have to be rinsed or cleaned with acid between each test. It is recommended that the **CELL** be rinsed 3 times with the sample water.

[2] **Ammonia** — The calibration of the meter is based on a water temperature between 14°C (57°F) and 28°C (82°F). If temperature is below 14°C (57°F), your final Ammonia value may read low.

[3] **Sulfide** — **A.** For results as Hydrogen Sulfide (H2S), multiply the resulting value by 1.06. **B.** The calibration of the meter is based on the water sample temperature above 20°C (68°F). If the water sample is below 20°C (68°F), the strip **has to dip in the sample for an additional 10 seconds**.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Calcium Ultra High Marine[1] & Total Hardness Ultra High Marine test procedure

1 TURN METER ON
Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

2 SELECT GROUP & MENU
Press and re–press the (SELECT) button to **Select Group**. Press and re–press the (MENU) button to select the test parameter *(see chart on page 10–11).*

3 RINSE & FILL CELL WITH SAMPLE
Rinse the **CELL** at least 3 times with the water sample you will be testing—rinsing minimizes the potential for cross–contamination from a previous test. Finally, using the supplied syringe, carefully add exactly 3.0mL of water sample to the **CELL**. NOTE: Make sure there are no air bubbles present in the syringe when measuring the 3.0mL sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

4 ADD DROPS
Using the selected bottle of reagent, add the required drops (see chart on page 10–11) and cover the **CELL** with the **CELL** COVER. *Precaution: Ensure that the bottle is straight when dispensing drops.*

5 ZERO METER*
Press the (ON ZERO) button. The cursor will move across the display followed by **0 PPM**. This will indicate that the sample is ready for testing.

6 DIP STRIP & PRESS READ
Using the required strip *(see chart on page 10–11),* dip strip into the **CELL**, and immediately press (READ) to initiate a 20 second countdown. Move the strip using a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after "1" on the display disappears**.* The cursor will move across the display while the meter prepares to measure the sample. Record the value displayed for the respective parameter. This value is automatically stored in its **MENU** and if using the eXact iDip® app, the result will be saved in the app's **'RESULTS'.** After testing, rinse **CELL** immediately and clean with the brush.

Calcium & Total Hardness Ultra High Marine (SPECIAL NOTES)

[1] **Calcium Ultra High Marine & Total Hardness Ultra High Marine — A.** These tests are volume dependent, so do not spill or splash sample out of cell. For optimal accuracy, the proper water sample to reagent ratio must be maintained. **B.** When filling the syringe in step 3, make sure there are no air bubbles present in the syringe. **C.** To obtain optimal accuracy when testing in direct sunlight, use the Mixing Cap/Cell Cover when zeroing and reading the sample. **D.** It is recommended to use the Cell Cleaning Brush with water to clean the CELL after each test to remove reagents which coat the CELL wall. **E.** Be careful while dipping the strip (step 6). Do not spill the sample from the CELL. **F.** The eXact® Reagent CAH color may change to pink over the course of time. This will not affect testing results.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Cyanide test procedure

1 REMOVE STRIPS

Remove 1 **eXact® Strip Micro CN–1** Part No. 486812–A and **eXact® Strip Micro CN–2** Part No. 486812–B from the bottle before beginning the test. Set the strips in a dry, convenient place and recap the bottle immediately.

2 TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

3 SELECT GROUP & MENU

Press and re–press the (SELECT) button to **Select Group 7**. Press and re–press the (MENU) button to select the **CN** test parameter.

4 RINSE & FILL CELL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing—rinsing minimizes the potential for cross–contamination from a previous test. Finally, fill **CELL** to capacity with the water sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

5 ZERO METER*

Press the (ON ZERO) button. The cursor will move across the display followed by **0.00 PPM**. This will indicate that the sample is ready for testing.

6 DIP STRIP & PRESS READ

Dip the **CN–1** strip into the **CELL**, and immediately press (READ). This starts the 30 Second countdown timer. Because the strip is 8 mm wide, the strip will need to be angled to fit in the cell. Be sure that the test pad is fully submerged. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears.*** The cursor will move across the display, at this point have your **CN–2** strip ready to dip into the **CELL**.

When the 30 Second countdown starts, immediately dip the **CN–2** strip into the **CELL**. During this time, with the strip angled slightly, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears**.

The meter will automatically start to count up to 600 seconds. At 600 seconds, the cursor will move across the display while the meter prepares to measure the sample. Record the result displayed. This result is automatically stored in **CN MENU**, and if using the eXact iDip® app, will be stored in the app's **'RESULTS'**.

After testing, rinse **CELL** immediately and clean with the brush.

NOTE: The calibration of the meter is based on a water temperature between 20°C (68°F) and 25°C (77°F). If temperature is below 20°C (68°F), your final Cyanide value may read low.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Total Iron test procedure

To ensure accurate results, do not run this test immediately after a sulfide test

1 **TURN METER ON**
Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

2 **SELECT GROUP & MENU**
Press and re–press the (SELECT) button to **Select Group 2**. Press and re–press the (MENU) button to select the **FE** test parameter.

3 **RINSE & FILL CELL WITH SAMPLE**
Rinse the **CELL** at least 3 times with the water sample you will be testing—rinsing minimizes the potential for cross–contamination from a previous test. Finally, fill **CELL** to capacity with the water sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (for instructions, see page 8).*

4 **ADD REDUCER**
Tilt the meter to discard about 0.2 mL sample in order to leave room for reagent. Add the contents of one **eXact® Reagent EZ Open REDUCER** (Part No. 486601) to the **CELL** and cover the **CELL** with the mixing cap. Press (READ) to start the 20 second countdown timer. Place thumb over **CELL** COVER to secure in place and mix the sample by turning the meter upside–down repetitively. **When countdown displays '1'**, hold the meter upright and the cursor will flash. At this time the meter will begin a 40 second count up. After the count up, a result will be displayed (ignore this result).

5 **ZERO METER***
Press the (ON ZERO) button. The cursor will move across the display followed by **0.00 PPM**. This will indicate that the sample is ready for testing.

6 **DIP STRIP & PRESS READ**
Dip the **eXact® Strip Micro FE** (TPTZ) (Part No. 486631) into the **CELL** and immediately press (READ). This starts the 20 second countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears**.* The meter will automatically start to count up for 40 seconds. At the end, the cursor will move across the display while the meter prepares to measure the sample. Record result displayed (this value is automatically stored in the **FE MENU,** and if using the eXact iDip® app, will be stored in the app's **'RESULTS'**).

After testing is completed, rinse **CELL** immediately and clean with brush.

Total Iron (SPECIAL NOTES)

Total Iron — **A**. First, clean the **CELL** with 0.1N HCl, Distilled Vinegar (5%), or Muriatic Acid (diluted 1:40 with H2O) before testing. **B**. If running multiple tests in a row, using the same water sample, the **CELL** does not have to be rinsed or cleaned with acid between each test. It is recommended that the **CELL** be rinsed 3 times with the sample water.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

High Range Chloride test procedure

This test requires a 1:20 dilution of the salt system sample – Mini Dilution Kit (Part No. 487202)

1 PREPARE SAMPLE FOR TESTING

Using the **Mini Dilution Kit** (Part No. 487202) and **Distilled** or **Deionized** (salt–free water) prepare a 1 to 20 (1:20) dilution of your sample.

PREPARE DILUTION SAMPLE

1. Rinse the syringe 3 times with salt system sample that you want to test by moving the plunger up and down.
2. Rinse 50 mL graduated conical tube with distilled or deionized (salt–free) water.
3. Rinse the 3.0 mL syringe with water sample to be tested. Fill the 3.0 mL syringe to the 2.0 mL line precisely (plunger ring should line up at the 2.0 mL line and little or no air bubble should be present).
4. Add the syringe content (2.0 mL salt system sample) to the clean 50 mL graduated conical tube by pushing the plunger all the way down to expel sample.
5. Fill the graduated conical tube to the 40 mL line with distilled or deionized (salt–free) water and place cap on top.
6. Mix content of graduated conical tube by turning upside down at least 3 times.

Sample is now ready for testing.

2 REMOVE STRIPS

Remove 1 **eXact® Strip Micro Chloride** Part No. 486757 from the bottle before beginning the test. Set the strip in a dry, convenient place and recap the bottle immediately.

3 TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

4 SELECT GROUP & MENU

Press and re–press the (SELECT) button to **Select Group 3**. Press and re–press the (MENU) button to select the **CHH** test parameter.

5 RINSE & FILL CELL WITH SAMPLE

Using the 1:20 Dilution Sample prepared above, rinse the **CELL** 3 times. Then fill the **CELL** to capacity with the 1:20 Dilution Sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

6 ZERO METER*

Press the (ON ZERO) button. The cursor will move across the display followed by **0.00 PPM**. This will indicate that the sample is ready for testing.

7 DIP STRIP & PRESS READ

Dip the **Chloride III** strip into the **CELL**, and immediately press (READ). This starts a 20 second countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears**.* The cursor will move across the display, while the meter measures the sample. Record the result displayed (this result is automatically stored in **CHH MENU** and, if using the eXact iDip® app, will be stored inthe app's **'RESULTS'**). If result is greater than 999ppm (ex. 1250ppm), a small "0" will appear at far right of the display. This "0" represents the one's digit (see image at right). After testing is completed, rinse **CELL** immediately and clean with brush.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Chlorine Dioxide test procedure

1 REMOVE STRIPS

Remove 1 **eXact® Strip Micro Glycine**, Part No. 484014 and 1 **eXact® Strip Micro Cd (DPD-1)**, Part No. 486633 from the bottles before beginning the test. Set the strips in a dry, convenient place and recap the bottles immediately.

2 TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

3 SELECT GROUP & MENU

Press and re–press the (SELECT) button to **Select Group 6**. Press and re–press the (MENU) button to select the test parameter **Cd**.

4 RINSE & FILL CELL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing—rinsing minimizes the potential for cross–contamination from a previous test. Finally, fill **CELL** to capacity with the water sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

5 DIP STRIP & PRESS READ

Dip the **Glycine** strip into the **CELL**, and immediately press (READ). This starts a 20 second countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears***. The meter will auto-zero. Get ready to dip eXact® Strip Micro Cd (DPD-1) strip.

6 DIP STRIP & PRESS READ

About 4 seconds after the meter auto-zeroes, "20" will appear on the display. Immediately dip the **CD (DPD–1)** strip into the **CELL**. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears**.* The meter will begin counting up for 100 seconds, at the end of which, the cursor will move across the display, while the meter prepares to measures the sample. Record the result displayed (this result is automatically stored in **Cd MENU** and, if using the eXact iDip® app, will be stored in the app's **'RESULTS'**). After testing is completed, rinse **CELL** immediately and clean with the brush.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Manganese test procedure

1 REMOVE STRIPS

Remove 1 **eXact® Strip Micro Mn#1**, Part No. 481020–1 and **eXact® Strip Micro Mn#2** Part No. 481020–2 strips from their foil packets before beginning the test. Also shake the bottle of **eXact® Reagent MN** and remove the cap. Set the strip in a dry, convenient place and recap the bottle immediately.

2 TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

3 SELECT GROUP & MENU

Press and re–press the (SELECT) button to **Select Group 2**. Press and re–press the (MENU) button to select the **MN** test parameter.

4 RINSE & FILL CELL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing—rinsing minimizes the potential for cross–contamination from a previous test. Finally, fill **CELL** to capacity with the water sample.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

5 DIP STRIP & PRESS READ

Dip the **Mn#1** strip into the **CELL**, and immediately press (READ). This starts a 20 second countdown timer. During this time, move the strip in a gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears***. The cursor will move across the display, informing you prepare to dip the **Mn#2** strip. When the next 20 second countdown starts, dip the **Mn#2** strip immediately the into the **CELL** using the same gentle back and forth motion (approx. 2 strokes/sec). **Remove and discard the strip after '1' on the display disappears.*** The meter will automatically start to count up to 20 seconds. After 20 seconds, the cursor will move across the display and the display will automatically zero.

6 ADD DROPS

Add 3 drops of **eXact® Reagent MN** to the **CELL** (*Precaution: Ensure the bottle is straight while dispensing drops*) and cover with the **CELL COVER**. When the 20 second countdown starts, place thumb over the cover and mix the sample by turning the meter upside–down repetitively during the countdown. When timer displays '1', place the meter upright and the cursor will flash. The meter will begin a 120 second count up. After 120 seconds, **the cursor will move across the display while the meter measures the sample***. Record the result displayed (this result is automatically stored in **MN MENU** and, if using the eXact iDip® app, will be stored in the app's **'RESULTS'**). After testing is completed, rinse **CELL** immediately and clean with the brush.

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Turbidity test procedure

1 TURN METER ON

Press the (ON ZERO) button to power the meter on; the display will show annunciators, followed by the current selection. It will then display the last reading.

2 SELECT GROUP & MENU

Press and re–press the (SELECT) button to **Select Group 8**. Press and re–press the (MENU) button to select the **TR1** test parameter.

3 RINSE & FILL CELL WITH DISTILLED OR DEIONIZED WATER

Rinse the **CELL** at least 3 times with distilled or deionized water—rinsing minimizes the potential for cross–contamination from a previous test. Finally, fill **CELL** to capacity with the distilled or deionized water.

4 ZERO METER*

Press the (ON ZERO) button. The cursor will move across the display followed by **100 %T**. This will indicate that the sample is ready for testing.

Follow the steps to **'SELECT CUSTOMER'** & **'CONNECT DEVICE VIA BLUETOOTH'** *before proceeding (see page 8).*

5 RINSE & FILL CELL WITH SAMPLE

Rinse the **CELL** at least 3 times with the water sample you will be testing. Finally, fill **CELL** to capacity with the water sample.

6 PRESS READ

Press (READ).

7 RECORD RESULT

The cursor will move across the display while the meter measures the sample. Record the value displayed. This value is automatically stored in **TR1,** and if using the eXact iDip® app, the result will be stored in the app's **'RESULTS'**. After testing, rinse cell immediately and clean with brush.

8 USE TABLE

Find the **TR1** result in the table below to determine the **Turbidity** concentration in NTU.
EXAMPLE: *A TR1 result of 65.3 (round to 65) equals a Turbidity value of 104 NTU).*

Turbidity — for 4 mL samples										
%T	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
90	<7	8	10	14	16	17	21	24	26	27
80	31	35	38	39	41	45	49	52	53	55
70	59	62	66	69	73	76	79	80	83	87
60	90	94	97	101	104	107	111	115	118	125
50	128	132	135	139	142	149	153	156	163	167
40	174	177	183	187	190	198	205	208	215	222
30	226	232	239	246	253	260	267	274	281	288
20	294	305	316	323	333	343	353	364	374	388
10	398	416	430	444	461	479	499	520	545	569
0	597	631	672	718	777	800	>800	>800	>800	>800
										121012 BT

*For best accuracy, when testing outdoors in sunlight, place cap over cell cover

Tips for Best Accuracy

1. Our lab testing with the Micro 20 meter has shown that zeroing and measuring of the sample normally does not require any cell cover for accurate results, except in sunlight. To obtain optimal accuracy when testing with the meter outdoors (sunlight), use the Mixing Cap/Cell Cover when zeroing and reading the sample.
2. Become familiar with the meter and the different tests by reading the instructions carefully.
3. The Free Chlorine, Combined Chlorine, and Total Chlorine reagents are compliant for meeting USEPA (4500–Cl G); ISO 7393/2; and German DIN 38408 G4–2 requirements.
4. Observe the dip time (as required for the test) for accurate results.
5. Test immediately after filling the CELL with water sample when testing for oxidizers such as Chlorine and Bromine (Ozone can be measured in CL3 MENU).
6. Be sure the CELL is filled to capacity, especially for pH and Total Alkalinity.
7. Rinse the CELL with clean water immediately after completing each test. Some reagents may stain the CELL if not rinsed shortly after use. Other reagents including Cyanuric Acid, Chloride, and Calcium Hardness may coat the CELL wall. It is recommended, after these tests, to use the Cell Cleaning Brush with water to clean the CELL.
8. Just before testing, rinse the sample CELL with the sample water several times to get a representative sample. (Use deionized or distilled water for rinsing if you have a limited amount of sample).
9. Store the meter and all test materials out of direct sunlight and away from chemical storage areas.
10. Minimize exposure of meter and test reagents to heat above 100°F (38°C).
11. Dry the outside of the meter when testing is complete or before storage of the meter.
12. When running a DPD–1 Free Chlorine test AFTER a Total Chlorine DPD–3, a Total Chlorine DPD–4, or a HR Chlorine test, rinsing is very important to remove residual KI, which may interfere.
13. Each eXact® Strip Micro is valid for ONLY one test. Discard strip after single use in regular refuse that is inaccessible to children and pets.
14. Each bottle of eXact® Strip Micro contains the quantity of strips notated on the bottle. Due to the strip slitting process, you may find one or two strips that are noticeably smaller or larger in width than the normal strips in the bottle. These should be discarded. Using these strips may give unreliable results.
15. Each table supplied has a unique revision number located in the bottom right corner of the table. We recommended that you visit www.sensafe.com regularly for any updated revisions.
16. The eXact® Micro 20 Meter is not compatible for use with DPD–1, DPD–3, and DPD–4 powder pillows, tablets, and liquids available from other manufacturers. Accurate results can only be guaranteed by using genuine eXact® Micro strips or reagents (reorder information on page 19).
17. Remove batteries when meter is not used for more than a month (Warranty Requirement).
18. It is recommended that Pool and Spa samples for oxidizers (such as Chlorine) be taken 18 inches below the surface as follows: submerge meter with open cell facing down 18 inches, and then turn meter upright at that depth to fill the cell. Remove meter from water with the sample for testing.

About the Accuracy/Calibration of the eXact Micro 20 System

All tests have been calibrated using certified reference standards and standard analytical spectrophotometric methods. The algorithms in the software reflect the best correlation of the eXact® Micro 20 Systems against the AWWA, US EPA , DIN, and ISO reference test methods for chlorine. Studies show that the eXact® Micro 20 System repeatedly agrees with an EPA Compliant reference method greater than 99% (R2= 0.99948, 0 – 5.00 ppm – see below). The eXact® Micro 20 Advanced Photometric System has been factory calibrated for your convenience. You can expect the fixed calibrations in the meter to be valid for the life of the meter because of the quality, Long–Life LED, the photo **cell**, and the software as written into the meter. This is why the meter comes with a 2–Year Warranty.

Assigned Value for Ready Snap® Solution				
Ready Snap™ Lot	**Parameter**	**Desired Value**	**Acceptable Value**	**Menu**
Red Dye #505	Free Chlorine	1.72 ppm	1.70 - 1.74 ppm	$CL1_1$
Red Dye #22515	Free Chlorine	1.01 ppm	0.95 - 1.10 ppm	$CL1_1$
Blue Dye #506	Transmission	22.0 %T	21.0 - 23.0 %T	$TR2_7$
				R031517

NOTE: *Values reflect current concentrations as found at time of manufacture and may change with consecutive lots.*

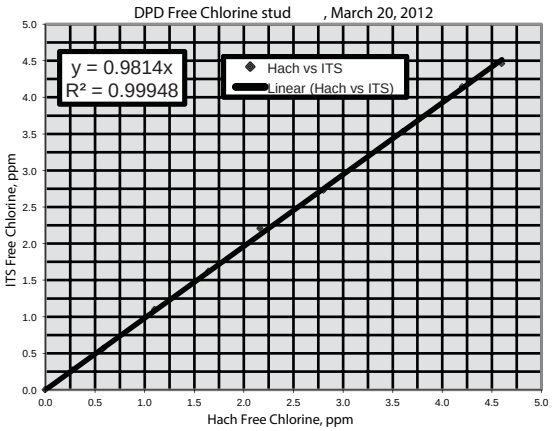
eXact® Strip Micro DPD–1 Accuracy

Free Chlorine results are compared using the eXact® Strip Micro CL (DPD–1) with the eXact® Micro 20 Meter in MENU CL and Hach® DR890 Colorimeter in Program 9 and Program 12 using Hach® powder pillows.

DR890	Micro 20
0.00	0
0.27	0.27
0.58	0.57
1.10	1.10
1.64	1.62
2.16	2.21
2.8	2.73
3.6	3.53
4.2	4.14
4.6	4.46

Meter	Menu	Range (PPM)	Resolution
Micro 20	CL	0 to 5.00	0.01
DR890	Program 9	0.00 to 2.20	0.01
	Program 12	0.0 to 11.0	0.1

Hach® is a registered trademark of Danaher Corporation



eXact Micro Carrying Case with Foam (486001)
Dilution Kit (487200)
Ready Snap® 3 (486903)
Ready Snap® 4 (486904)

Pool Kit (486700–KP)

Kit includes:
- 1 eXact® Micro 20 Meter (486700)
- eXact® Strip Micro DPD–1 (486637–25)
- eXact® Strip Micro DPD–3 (486638–25)
- eXact® Strip Micro pH (486639–25)
- eXact® Strip Micro Total Alkalinity (486641–25)
- eXact® Strip Micro Copper (486632–25)
- eXact® Strip Micro Nitrate (486655–25)
- eXact® Strip Micro Total Iron, TPTZ (486650–25)
- eXact® Strip Micro Calcium Hardness (486629–25)
- eXact® Strip Micro Phosphate (486814–25)
- eXact® Strip Micro Chloride (486757)
- eXact® Reagent Cyanuric Acid (III) (481652–III)
- eXact® Strip Micro Biguanide (486810–25)
- Mini Dilution Kit II (487202)
- 1 Mixing Cap
- 1 Cell Cleaning Brush
- Instruction Booklet
- Plastic Carrying Case
- Plastic Stirrer

Part No. 486700-KP

Standard Kit (486700–K)

Kit includes:
- 1 eXact® Micro 20 Meter (486700)
- eXact® Strip Micro DPD–1 (486637–25)
- eXact® Strip Micro DPD–3 (486638–25)
- Mini Dilution Kit II (487202)
- 1 Mixing Cap
- 1 Cell Cleaning Brush
- Instruction Booklet
- Plastic Carrying Case
- Plastic Stirrer

Well Driller Kit (486700–WD)

Kit includes:
- 1 eXact® Micro 20 Meter (486700)
- eXact® Strip Micro DPD–1 (486637–25)
- eXact® Strip Micro DPD–3 (486638–25)
- eXact® Strip Micro pH (486639–25)
- eXact® Strip Micro Total Alkalinity (486641–25)
- eXact® Strip Micro Copper (486632–25)
- eXact® Strip Micro Nitrate (486655–25)
- eXact® Strip Micro Manganese (486606)
- eXact® Strip Micro Total Hardness, HR (486656–25)
- eXact® Strip Micro High Range Chlorine (486672–25)
- eXact® Strip Micro Total Iron, TPTZ (486650–25)
- Mini Dilution Kit II (487202)
- 1 Mixing Cap
- 1 Cell Cleaning Brush
- Instruction Booklet
- Plastic Carrying Case
- Plastic Stirrer

Mini Dilution Kit II (Part No. 487202) Instructions

HOW TO PREPARE A 1:20 SAMPLE USING THE 3 mL SYRINGE (DILUTION FACTOR OF 20)

1. Rinse the syringe 3 times with water sample that you want to test by moving the plunger up and down.
2. Rinse 50 mL graduated conical tube with distilled or deionized (salt–free) water.
3. Fill the 3 mL syringe to the 2 mL line by pulling up water sample to be tested with an upward motion of the plunger until you get to the 2 mL line. **NOTE:** The plunger ring should line up a the 2 mL line.
4. After adding sample to the cylinder, fill the graduated cylinder to the 40 mL line with distilled or deionized (salt–free water. Securely put the cap on the cylinder.
5. Mix content of graduated conical tube by turning upside down at least 3 times.

Other dilutions possible with the 3 mL syringe

Volume in syringe	Volume filled in cylinder	Dilution factor
1.0 mL	20 mL	20
1.0 mL	30 mL	30
1.0 mL	40 mL	40
0.5 mL	25 mL	50
0.5 mL	50 mL	100
0.5 mL	50 mL	250

CALCULATION:
Test Result x Dilution Factor =
Actual Result

= EPA COMPLIANT

PARAMETER / TEST	PART #	RANGE (ppm)	±% BEST ACCURACY	# OF TESTS
Alkalinity, Total (fresh)	486641	10 – 210	7.5	100
Alkalinity, Total (marine)	486641	25 – 200	7.5	100
Alkalinity, Total (pool)	486641	8 – 200	7.5	100
Aluminum	486821	0.01 – 1.20	13	50
Ammonia	486654	0.02 – 2.40	5	25
Biguanide	486810	1.6 – 210	7.5	50
Bromine (DPD–4)	486644	0.01 – 12.0	5	100
Calcium (as $CaCO_3$)	486629	20 – 400	5	50
Calcium, UH Marine (as $CaCO_3$)	486668-K	710 – 1500	10	50
Chloride (as NaCl)	486757	3 – 270	8	25
Chloride (as NaCl) High Range	486757	50 – 5400	15	25
Chlorine Dioxide (DPD–1)	486633	0.04 – 7.00	5	100
Chlorine, Combined (DPD–3)**	486638	0.01 – 6.20	3	100
Chlorine, Free (DPD–1)	486637	0.01 – 6.20	3	100
Chlorine, Total (DPD–4)	486670	0.01 – 6.20	3	100
Chlorine, Total High	486672	1 – 270	5	100
Chromium (VI)	486614	0.01 – 1.80	5	50
Copper (Cu^{+2})	486632	0.01 – 10.0	2	50
Cyanide	486812	0.01 – 1.10	13	50
Cyanuric Acid (III)	481652–III	1 – 110	8	60
Fluoride	486643	0.04 – 1.50	15	25
Hardness, Tot UH Marine (as $CaCO_3$)	486669-K	4000 – 8100	8	50
Hardness, Total HR (as $CaCO_3$)	486656	80 – 600	12	50
Hardness, Total LR (as $CaCO_3$)	486630	1 – 80	10	100
Hydrogen Peroxide	486648	0.3 – 100	8	100
Iron, Total (TPTZ)	486650	0.03 – 6.0	3	50
Manganese	486606	0.01 – 1.50	6	24
Metals	486604	0.05 – 2.5	6	25
Molybdate	486653	0.01 – 3.00	5	50
Nitrate (as NO_3) (fresh)	486655	0.12 – 30.0	15	50
Nitrate (as NO_3) (marine)	486655	1.00 – 20	15	50
Nitrite (as NO_2)	486623	0.01 – 1.80	5	50
Ozone (DPD–4)	486634	0.01 – 2.00	4	100
Peracetic Acid	486675	0.01 – 430	7	100
Permanganate (DPD–1)	486626	0.01 – 5	2	100
pH (fresh)	486639	6.4 – 8.4 pH	0.2 pH	100
pH (pool/salt)	486639	6.4 – 8.4 pH	0.2 pH	100
pH-BT (fresh)	486657	5.1 – 9.2 pH	0.2 pH	50
pH-BT (marine)	486657	5.1 – 9.2 pH	0.2 pH	50
pH, Acid	486624	3.2 – 6 pH	0.3 pH	50
Phosphate (as PO_4)	486814	0.03 – 4.0	4	50
Quaternary Ammonia Compound QAC	486823	2 – 80	6	50
Sulfate (as SO_4)	486608	2 – 210	10	50
Sulfide (as S^{2-})	486818	0.01 – 1.6	6	50

† Value provided represents best possible accuracy under laboratory conditions, but may vary throughout the detection range. For a complete list of accuracies throughout all ranges please visit sensafe.com/micro20/specifications.

Because most of our products are test strips or use reagents that have little or no hazard in the quantity sold, MSDS sheets are not supplied with the test. The exceptions are the Manganese (486606) test, which comes with 2 strips and one liquid reagent (PAN); Fluoride (486643) test, which is a liquid reagent (SPADNS); and Iron (486650) test, which includes a powder reagent.

Visit us on–line at **sensafe.com/micro20**
for up–to–date product information and NEW tests available

MANUFACTURED BY

M20 Version 3.1
Revision 09/28/2017

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