Palintest
Water Analysis Technologies

Kemio
Test Instructions

About us

Palintest
Water Analysis Technologies

A Rich History of Innovation

Palintest are committed to making water analysis technologies simple and accessible.
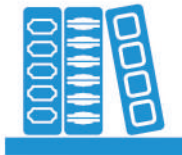
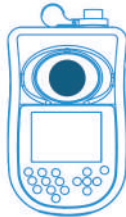## A Global Company with a Local Approach

•USA •UK •China •Australia

75 Years of Research

We have built up an extensive online library, with research and insights about our products and the applications they serve.

Product Range

From multiparameter photometer kits to visual test Palintest has an instrument solution for every application.

Contents

Kemio Disinfection is a multiparameter instrument. It can test for chlorine, chlorine dioxide, chlorite and peracetic acid. These instructions explain the methodology and care points in detail for each of these test types.

General Guidelines

• Do not touch the sensor surface.

• Keep the instrument clean and dry during use.

• Keep the instrument on a level surface free from vibrations.

• Sensors perform within a specified temperature range. If the sample temperature is outside of the specified temperature range for the sensor, the measurement will proceed as normal but a note will be attached to the test result.

• Store sensors at < 4° C (39° F) for over 1 year, < 20° C (68° F) for less than 1 year.
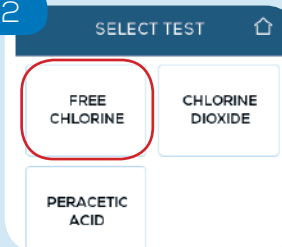
Every test on Kemio begins with the same steps. These are used to enrich test results with application information, enable decision-making with pass/fail results, and ensure traceability.

1   PERFORM TEST

On the home page, press PERFORM TEST or open the lid.

2   SELECT TEST ⌂
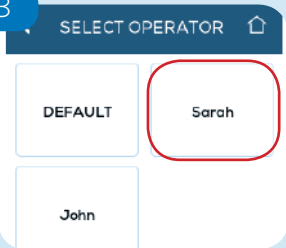
FREE CHLORINE   CHLORINE DIOXIDE

PERACETIC ACID

Select the test type.

This screen does not appear if only one test type is selected, see p. 25 of the Kemio manual for details about selecting tests
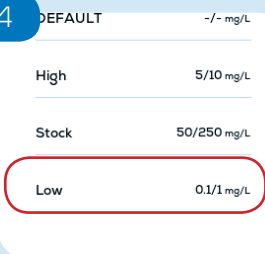
3

SELECT OPERATOR

DEFAULT   Sarah

John

Select the user.

This screen does not appear if only one user is defined or tagging users is disabled, see p. 19 of the Kemio manual for details about users

4

DEFAULT   -/- mg/L

High   5/10 mg/L

Stock   50/250 mg/L

Low   0.1/1 mg/L

Select the label.

This screen does not appear if only one label is defined for this test type or if tagging labels is disabled, see p.15 of the Kemio manual for details about labels and limits

5a. Scan Barcode

Scan the sensor barcode using the barcode scanner when prompted. Hold the barcode about 10cm (4in) from the instrument. Align the red dot with the center of the barcode. When the scan is complete, the instrument proceeds to the next screen.

Scanning errors

If the barcode is out of date, a warning will flag. Choose to scan a different sensor or continue anyway. The warning flag will be attached to the test results.

If the barcode refers to a new batch that has not yet been entered into the system, the instrument will prompt the user to add that batch using the QR code, see p.20 of the Kemio Manual. After the batch is added, restart the test from the home screen.

If the barcode is from the wrong sensor type or is not a sensor barcode, or if there is a problem reading the barcode, the instrument prompts the user to use a suitable sensor.

The scanner times out after 5 seconds. If this happens, press TRY AGAIN to restart the scan or press SELECT to select the batch code from a list.

5b. Select batch code

Select the correct batch code number from the list. See p. 30 of the Kemio manual for details about sensor batch codes.

6

PERFORM 10 X DILUTION

1 PART SAMPLE
9 PARTS WATER

If dilution is required for the test and programmed into the label, perform the dilution with the volumes on the screen.

7

Follow the on-screen test instructions below specific to this test type.

Palintest's chlorine sensors can be used to measure free and total chlorine simultaneously. On Kemio, select either free chlorine or total chlorine to display a single result, or "free & total" to measure and display both parameters.

When using labels with the free & total test, labels set for both free chlorine and total chlorine are listed. The selected label limits apply only to the parameter they were set for in the configuration menu.

Two different sensor types can be used to measure chlorine:

CLO sensors are used for lower concentrations of chlorine.
- 0.02 mg/L – 10 mg/L of free chlorine
- 0.02 mg/L – 75 mg/L of total chlorine

CHR sensors are used for higher concentrations of chlorine.
- 0.1 mg/L – 25 mg/L of free chlorine
- 1 mg/L – 500 mg/L of total chlorine

Care Points

If chlorine dioxide is present in solution, it may interfere with the chlorine reading. Use the degassing step from the chlorite test to produce a chlorine dioxide-free solution.

Results

Free chlorine and total chlorine tests display one parameter each. The free & total test result screen displays both results. The data log stores one entry for each test, requiring twice as much space in memory.

The chlorine test methods display the concentration of free and total chlorine in units of mg/L or ppm Cl⁻.

Test Method

1

Lift the arm. If the arm is already open, the screen is skipped.

2

Tear each side of the packet, then twist and tear the short side from the packet, revealing the sensor tracks. Do not touch the dosed half of the sensor.

3

Hold the sensor through the foil packet only, with the white side facing up. Slide it all the way in, until the end stops against the back of the slot.

If the sensor is not fully inserted, push it in all the way using the edges of the sensor only. Do not touch the dosed chemicals on the electrode surface.

4

Fill the right side of the vessel to the line. If there is excess sample, it will pour into the left side of the vessel. Do not overfill both sides or water can splash onto the sensor contacts and interfere with the test.

5

Pull the foil off the sensor. Close the arm. The test will start automatically.

Wait one minute while the instrument performs the electrochemical measurement.

Peracetic acid (Peroxyacetic acid or PAA) is measured using Palintest's PAA sensors for concentrations of peracetic acid ranging from 5 mg/L to 2000 mg/L.

Hydrogen peroxide is found in solution with peracetic acid. Palintest's electrochemical method for peracetic acid is not strongly affected by the presence of hydrogen peroxide.

Care Points

• Certain fungicides are known to interfere with the PAA sensor. Contact your Palintest representative when measuring water samples with fungicides.
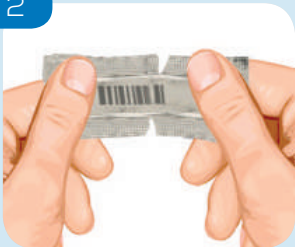
Results

The peracetic acid test method displays the concentration of peracetic acid in units of mg/L PAA.

Test Method

1

Lift the arm. If the arm is already open, the screen is skipped.

2

Tear each side of the packet, then twist and tear the short side from the packet, revealing the sensor tracks. Do not touch the dosed half of the sensor.

3

Hold the sensor through the foil packet only, with the white side facing up. Slide it all the way in, until the end stops against the back of the slot.

If the sensor is not fully inserted, push it in all the way using the edges of the sensor only. Do not touch the dosed chemicals on the electrode surface.

4

Fill the right side of the vessel to the line. If there is excess sample, it will pour into the left side of the vessel. Do not overfill both sides or water can splash onto the sensor contacts and interfere with the test.

5

Pull the foil off the sensor. Close the arm. The test will start automatically.

Wait one minute while the instrument performs the electrochemical measurement.

Chlorine dioxide is measured using Palintest's CDX sensors, for concentrations of chlorine dioxide ranging from 0.02 mg/L to 50 mg/L.

Care Points

• If there is chlorine present in the sample, use Glycine reagent. If there is no chlorine present, skip the glycine step on p. 16
• Chlorine dioxide is a volatile chemical that leaves a sample very easily. Perform a test quickly after taking a sample. Do not agitate the sample.

Results

The chlorine dioxide test method displays the concentration of chlorine dioxide in units of mg/L or ppm of ClO_2^-.

Test Method

If the sensor is not fully inserted, push it in all the way using the edges of the sensor only. Do not touch the dosed chemicals on the electrode surface.

1

Lift the arm. If the arm is already open, the screen is skipped.

4

Fill the right side of the vessel to the line. If there is excess sample, it will pour into the left side of the vessel. Do not overfill both sides or water can splash onto the sensor contacts and interfere with the test.

2

Tear each side of the packet, then twist and tear the short side from the packet, revealing the sensor tracks. Do not touch the dosed half of the sensor.

5

If chlorine or copper is present in the solution, add 3 drops of Glycine reagent to prevent them from interfering with the measurement. Use the stir rod to mix the sample. If no chlorine or copper are present, skip this step.

3

Hold the sensor through the foil packet only, with the white side facing up. Slide it all the way in, until the end stops against the back of the slot.

6

Pull the foil off the sensor. Close the arm. The test will start automatically.

Wait one minute while the instrument performs the electrochemical measurement.

The chlorite test method involves three separate measurements of various chemical combinations in the sample, followed by some calculations to determine the total chlorite concentration. The test procedure must be followed carefully to ensure the chemical reactions and measurements occur correctly.

A chlorine dioxide measurement forms a part of the chlorite test. However, in the chlorite test type, only labels and limits for chlorite can be selected.

Care Points

• The chlorite test uses three CDX sensors. These must all be from the same batch of sensors. If sensors from different batches are used, it may produce inaccurate results.
• If there is chlorine present in the sample, use Glycine reagent during the first CDX measurement. If there is no chlorine present, skip the glycine step on p. 20.
• Chlorine dioxide is a volatile chemical that leaves a sample very easily. Perform the first test quickly after taking a sample for an accurate measurement. Do not agitate the sample.
• If the chlorite test method is interrupted, or if an error occurs partway through the test procedure, the entire test must restart from the beginning to ensure accurate results.
• Use separate vessels for the first CDX test before the degassing step, and the 2nd and 3rd tests with CR-1 and CR-2. Do not mix up the two vessels.
• Do not let the kit stay wet. Trapped humidity could damage the kit components.

Results

The chlorite results screen displays two readings: the calculated chlorite result and the chlorine dioxide result measured by the first sensor.

The chlorite test method displays the concentration of chlorine dioxide in units of mg/L or ppm ClO$_2$, and the concentration of chlorite in units of mg/L or ppm ClO$_2^-$.

Test Method

1 Lift the arm. If the arm is already open, the screen is skipped.

2 Tear each side of the packet, then twist and tear the short side from the packet, revealing the sensor tracks. Do not touch the dosed half of the sensor.

3 Hold the sensor through the foil packet only, with the white side facing up. Slide it all the way in, until the end stops against the back of the slot.

If the sensor is not fully inserted, push it in all the way using the edges of the sensor only. Do not touch the dosed chemicals on the electrode surface.

4 Fill the right side of the vessel to the line. If there is excess sample, it will pour into the left side of the vessel. Do not overfill both sides or water can splash onto the sensor contacts and interfere with the test.

5 If chlorine or copper is present in the solution, add 3 drops of Glycine reagent to prevent them from interfering with the measurement. Use the stir rod to mix the sample. If no chlorine or copper are present, skip this step.
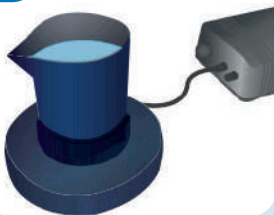
6 Pull the foil off the sensor. Close the arm. The test will start automatically.

Wait one minute while the instrument performs the electrochemical measurement

7 During the one minute electrochemical measurement period, set up the degasser as shown. Ensure the two plastic halves of the degasser are properly connected. Ensure the filter is installed correctly.

8 Fill the degasser vessel up to the mark with fresh sample.

9 Press the start button on the pump to begin degassing the chlorine dioxide from the sample.

It is not a problem to run the degasser for longer than the timer displayed on the screen.

10 Press the START TIMER button to begin the timer. The displayed time is calculated based on the concentration of chlorine dioxide measured in the previous step.

START TIMER

START PUMP

11 While the degasser is running, prepare for the next sensor test. Open the lid, remove the sensor, and discard the old sample.

At the end of the degassing period, perform a test on the degassed sample.

12

Tear each side of the second CDX sensor packet, then twist and tear the short side from the packet, revealing the sensor tracks. Do not touch the dosed half of the sensor.

Hold the sensor through the foil packet only, with the white side facing up. Slide it all the way in, until the end stops against the back of the slot.

13

Fill the right side of the vessel to the line with degassed water.

14

x3

Add 3 drops of CR-1 reagent.

15

Pull the foil off the sensor. Close the arm. The test will start automatically.

Wait one minute while the instrument performs the electrochemical measurement.

16

Open the arm, discard the sensor. KEEP the sample from the previous test.

17

x3

Add 3 drops of CR-2 reagent.

18 Close the arm with no sensor inserted.

19 Wait two minutes while chlorite reacts with the CR-2 reagents.

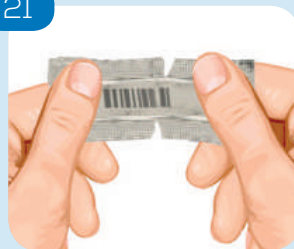At the end of the two minute period perform the final test.

REACTION IN PROGRESS

01 :57

20 Lift the arm. If the arm is already open, the screen is skipped.

21 Open the foil packet.

22 Hold the final CDX sensor through the foil packet only, with the white side facing up. Slide it all the way in, until the end stops against the back of the slot.

23 Pull the foil off the sensor. Close the arm. The test will start automatically.

Wait one minute while the instrument performs the electrochemical measurement

1

FREE CHLORINE

FREE CHLORINE
0.46 mg/L

DETAILS

REPEAT TEST

At the end of the countdown, the test results will display on screen. The number of results displayed depends on the test type.

See the results section of each test type for details...

Dilution

If a label with a dilution factor was used during the test, the factor will have applied to the number on screen. For example, if a 50mg/L solution was diluted 5X and measured by Kemio using a label with a 5X dilution factor, the result displayed on the screen will be 50mg/L.

It is critical that the correct dilution is performed when a label with a dilution factor is used!

No Limits

If no label or a label with no limits was used during testing, the page title will be DETAILS on a blue background.

Limits

If a label with limits was used, either a green PASS or a red FAIL will be displayed at the top of the screen. This is simple traffic light system enables a quick and clear decision by the operator.

2

DETAILS

REPEAT TEST
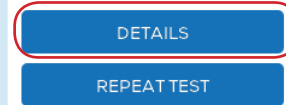
Press DETAILS to view the complete information for the test.

If a warning or flag was raised before or during testing, a note will be added to the test record. The result will still be displayed. A reading that falls within the test limits will still be a pass. However, the note will indicate in the record that the test was not normal.

Details

1

The first line displays the test type and the measured concentration (after dilution if applicable).

Up to three test types and concentrations can be displayed in this way.

Label indicates which label was selected at the start of the test. If no label was selected, DEFAULT is displayed.

Limits indicates the minimum and maximum acceptable concentrations set by the label that was selected. If a limit is not set on the label or if no label was selected, "-" is displayed.

Temperature indicates the temperature of the sample in the vessel. Note: this may differ from the sample temperature.

User indicates which user was selected at the start of the test. If no user was selected, DEFAULT is displayed.

Time indicates the time at which the test was performed.

Date indicates the date on which the test was performed.

Dilution factor indicates the multiplier on the measured result to produce the displayed result. Default is 1.

Press ADD REFERENCE to add information from a barcode (or the information can be typed in manually) to enrich the data record. See p. 9 in the instruction manual for details on producing and using barcodes.

Press ADD NOTES to type information about the test using the on-screen keyboard. Maximum of 48 characters. After a failed test, it is recommended to write an explanatory note or explain the corrective actions taken, as the information will be stored alongside the test in memory.

Error messages are stored in the note field automatically.

Final Steps

After the test results are displayed, the user must complete the test by removing the sensor, disposing of the sample and caring for the instrument. This protects the instrument, prevents microbial growth, prevents spills, and prepares the instrument for the next test. Kemio will prompt the user to complete these actions.

After viewing the results, the user has the choice to:

A   Finish the test and care for the instrument
B   Return to the home screen
C   Perform another test
D   Shut down the instrument

A. Finish The Test

1

Open the lid.

2

Remove the sensor.

3

Discard the sample.

4

If Kemio is wet, wipe it down with a cloth according to the care and maintenance suggestions. Take special care of the electrical contacts. These can be accessed by opening the front lid of the arm.

5

Close the lid. Kemio will return to the results screen.

Kemio does not detect whether the sensor and sample have been removed – only that the lid has been opened to do so. Take care of the instrument and ensure they are properly removed!

B. Return To The Home Screen

If the "Finish the test" instructions have not yet been completed, Kemio will prompt the user to to do these. After the lid is closed, Kemio will return to the home screen.

If the lid has already been opened, Kemio will proceed directly to the home screen

C. Perform Another Test

Press REPEAT TEST

When retesting, Kemio reuses the same label, user and batch information from the previous test.

If testing a sample that should use a different label, if a different user is testing or if the next sensor comes from a new batch, DO NOT press REPEAT TEST. This could lead to an inaccurate result or incorrect information. Instead, press the HOME button and PERFORM TEST.

D. Shut Down The Instrument

Press the power button.

If the user presses and holds the power button before opening the lid, Kemio will display a warning message reminding the user to discard the sensor and sample, and then turn off.

If the lid has already been opened, the regular "Goodbye' screen will display and Kemio will turn off.

Sensor type	Test type	Range (mg/L)	Temp Range (°C)	Resolution (mg/L)	Precision (mg/L)
CLO	Free chlorine	0.02-10	2 - 35	0.01 up to 5 0.1 up to 10	≤ 0.05 @ 1.0, 20°C
	Total chlorine	0.02-75	2 - 35	0.1 up to 10 1 up to 75	≤ 0.5 @ 10, 20°C
CHR	Free chlorine	0.1 - 25	5 - 25	0.01 up to 5 0.1 up to 25	≤ 2.0 @ 20.0, 10°C
	Total chlorine	1 - 500	5 - 30	0.1 up to 20 1 up to 500	≤10.0 @ 200, 10°C
CDX	Chlorine dioxide	0.02 - 50	5 - 40	0.01 up to 10 0.1 up to 50	≤ 0.05 @ 1.0, 20°C
	Chlorite	0.02 - 50	5 - 40	0.01 up to 2.5 0.1 up to 20 1.0 up to 50	≤ 0.05 @ 1.0, 20°C
PAA	Peracetic acid	5 - 2000	5 - 30	0.1 up to 20.0 1 up to 500 5 up to 2000	≤ 2.0 @ 25, 10°C ≤ 10 @ 200, 20°C ≤ 75 @ 1500, 20°C

Consumables

Description	Product Code
Chlorine Mid Range Sensors (CLO) (100 pack)	KEM21CLO
Chlorine Mid Range Sensors (CLO) (500 pack)	KEM25CLO
Chlorine High Range Sensors (CHR) (100 pack)	KEM21CHR
Chlorine High Range Sensors (CHR) (500 pack)	KEM25CHR
Chlorine Dioxide Sensors (CDX) (100 pack)	KEM21CDX
Chlorine Dioxide Sensors (CDX) (500 pack)	KEM25CDX
Peracetic Acid Sensors (PAA) (100 pack)	KEM21PAA
Peracetic Acid Sensors (PAA) (500 pack)	KEM25PAA
Glycine Reagent	PT549
CR-1 Reagent	PT546
CR-2 Reagent	PT547