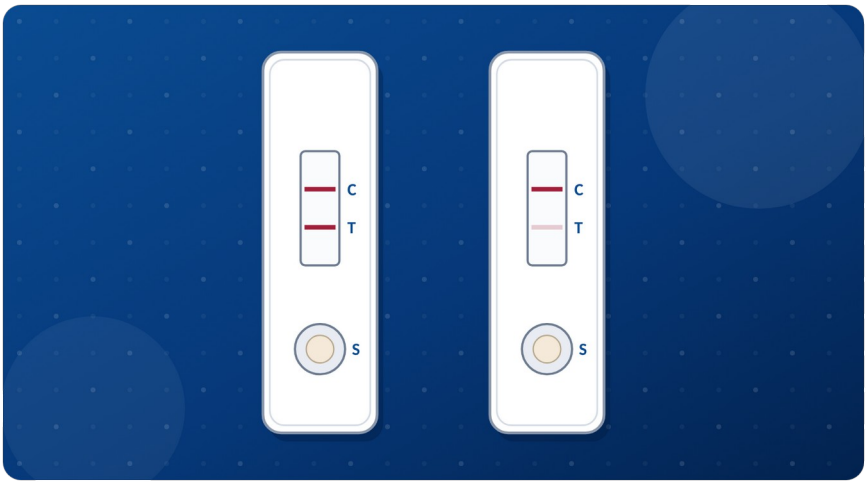


Mercury Lateral Flow Kit

Water · Laboratory Use

Catalog Number: **AU2029-01**

For Research Use Only. Not for use in Diagnostic Procedures.

1. Introduction

Attogene's Mercury Lateral Flow Kit is a rapid, single-use cassette test that screens water for mercury ions (Hg^{2+}) at 10 ppb (10 µg/L) and above. Results are read at 15 minutes, by eye or with a lateral flow reader, against a negative control cassette run at the same time. This version is made for the laboratory: 200 µL of each sample is pipetted into a tube of 10X Sample Dilution Buffer, mixed and added to a cassette with a pipettor.

The test is a competitive immunoassay (Figure 1). As the sample flows along the strip it picks up colloidal gold coated with a mouse monoclonal anti-mercury antibody. The test line (T) carries mercury bound to BSA. If the sample contains no mercury, the gold binds the test line and a red test line forms. Mercury in the sample fills the antibody binding sites, so less gold binds the test line: the more mercury in the sample, the weaker the test line. The control line (C), goat anti-mouse IgG, captures the gold that passes the test line and shows that the cassette ran correctly.

Important: a weaker test line means MORE mercury. Always read each sample against a negative control cassette run at the same time (Section 9).

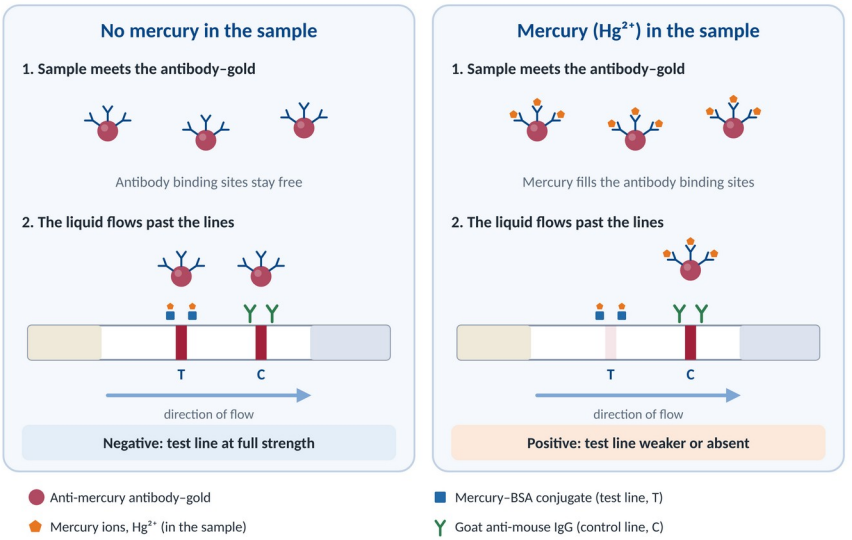


Figure 1. *Test principle. Left: with no mercury, the antibody–gold binds the mercury–BSA test line (T) and the excess binds the control line (C). Right: mercury in the sample blocks the antibody, so the test line is weaker or absent; the control line still forms.*

About mercury

Mercury is a toxic heavy metal that enters water from industrial discharge, mining, coal burning, old pesticides and natural deposits. Inorganic mercury is hard to remove by chemical or biological treatment and accumulates in the body. Long-term exposure through contaminated water and food can harm the brain, kidneys, heart, lungs and immune system in adults, and can delay physical and mental development in infants and children. The US EPA maximum contaminant level (MCL) for inorganic mercury in drinking water is 2 ppb (0.002 mg/L), and the World Health Organization guideline value for inorganic mercury is 6 ppb (6 µg/L; WHO Guidelines for Drinking-water Quality, 4th edition incorporating the 1st and 2nd addenda, 2022).

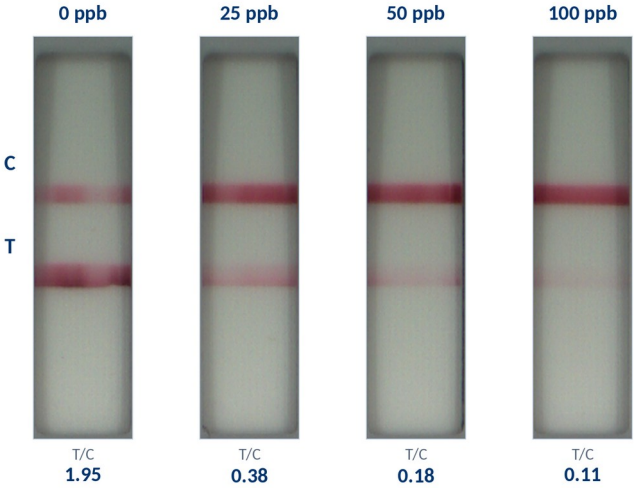


Figure 2. *Reader images of an AU2029 kit lot run with water spiked with mercury (kit QC, lot 202609062, 9/26/2026). T/C = test line value ÷ control line value. The test line weakens as mercury increases. The images are for illustration only and do not represent the performance of any particular lot.*

Features & Benefits

- Screens water for mercury ions at 10 ppb; visual results by eye, or numerical (T/C) results with a lateral flow reader.
- Results in 15 minutes.
- Every sample is read against its own negative control cassette.
- Simple pipetting procedure; 5 samples per kit, each with its own negative control.

2. Kit Contents

Component	Quantity	Storage
Mercury Cassette, in a foil pouch with desiccant	10	Room temperature or 2–8 °C
10X Sample Dilution Buffer: 22 µL per tube	10 tubes	Room temperature or 2–8 °C
Ultrapure Water, for the negative control: 200 µL per tube	5 tubes	Room temperature or 2–8 °C
Manual	1	Room temperature

Kit size: 5 samples. Each sample uses two cassettes: one for the sample and one for its negative control, and two tubes of 10X Sample Dilution Buffer. Each cassette is sealed in its own foil pouch with a desiccant.

3. Product Specifications

Key specifications for experienced users and for setting up a lateral flow reader.

Parameter	Specification
Format	Single-use lateral flow cassette: sample port (S) and reading window, with C and T printed beside the window (Figure 3)
Assay principle	Competitive immunoassay: the test line weakens as mercury increases
Reporter	40 nm colloidal gold conjugated to a mouse monoclonal anti-mercury antibody
Test line (T)	Mercury–BSA conjugate
Control line (C)	Goat anti-mouse IgG; captures gold that passes the test line
Analyte	Mercury ions (Hg^{2+})
Samples	Water
Screening level	10 ppb (10 µg/L): the test line is visibly weaker than on the negative control
Reader reading	T/C (test line ÷ control line). Kit QC: T/C 1.95 at 0 ppb, 0.38 at 25 ppb, 0.18 at 50 ppb and 0.11 at 100 ppb (Figure 2)
Sample preparation	200 µL of sample into one tube of 10X Sample Dilution Buffer (22 µL); mix 3 times
Volume to cassette	200 µL of the mixed sample; 200 µL of the mixed negative control
Time to result	Read at 15 minutes
Controls	Negative control (Ultrapure Water in 10X Sample Dilution Buffer), one per sample. No positive control (mercury standard) is supplied
Storage	All components at room temperature; storage at 2–8 °C is also acceptable. Cassettes in their sealed foil pouches

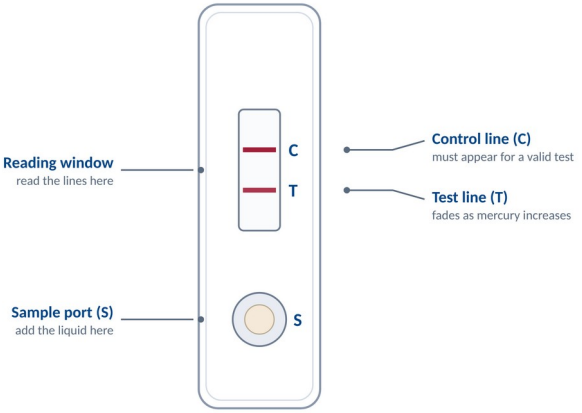


Figure 3. *Parts of the cassette. Add the liquid to the sample port (S) and read the lines through the window. The test line (T) is nearer the sample port than the control line (C).*

4. Storage and Stability

- Store the cassettes in their sealed foil pouches at room temperature. Storage at 2–8 °C is also acceptable. Open a pouch only when you are ready to run the test.
- Store the 10X Sample Dilution Buffer and Ultrapure Water tubes capped, at room temperature or at 2–8 °C.
- If the kit was refrigerated, let all components reach room temperature before testing.
- Use the kit before the expiration date on the label.

5. Required Materials Not Supplied

- **Timer** – to time the run
- **Disposable gloves** – for sample collection and testing
- **Permanent marker** – to label tubes and cassettes
- **Pipettor, 20–200 µL, and tips** – to transfer the sample, the Ultrapure Water and the mixes
- **Clean sample bottles** – to collect the water samples
- **Mercury standard of known concentration (optional)** – as a positive control or to estimate concentration (Section 9)

6. Precautions

- For research use only. Not for use in diagnostic procedures. This kit gives screening results; confirm results used for any decision by a conventional analytical method (Section 12).
- Before use, check that the date of use is before the expiration date on the label.
- Mercury is toxic. Wear gloves when handling samples that may contain mercury, and dispose of samples, tubes and used cassettes as local regulations require.
- The 10X Sample Dilution Buffer contains ProClin 150 as a preservative, which may cause an allergic skin reaction. Avoid contact with skin and eyes; if contact occurs, rinse with plenty of water.
- Use the supplied Ultrapure Water for the negative control. Tap, bottled or distilled water may contain traces of metals and can make the negative control read incorrectly.
- Use a new pipette tip for each sample and for each negative control to avoid carrying mercury from one sample to the next.
- Use only reagents from one kit lot; the components of a lot have been adjusted to work together.
- Do not use a cassette from a damaged pouch. Use each cassette once.
- Lay each cassette flat on a level surface and do not move it while the sample runs.

7. Sample Collection and Storage

- Collect each water sample in a clean sample bottle.
- Fill the bottle to the top so that little air remains, and cap it tightly.
- Test samples as soon as possible, ideally within a few hours of collection: mercury can be lost from water to the walls of plastic bottles and as vapor. If a sample cannot be tested on the day it is collected, keep it capped at 2–8 °C in the dark and test it within 24 hours. Do not add acid or other preservatives; they have not been validated with this test.
- If the sample is cloudy, let particles settle for a few minutes and take the sample from the clear top layer.
- Bring the cassettes, the buffer tubes, the Ultrapure Water and the samples to room temperature, and mix the samples, before testing.

8. Procedure

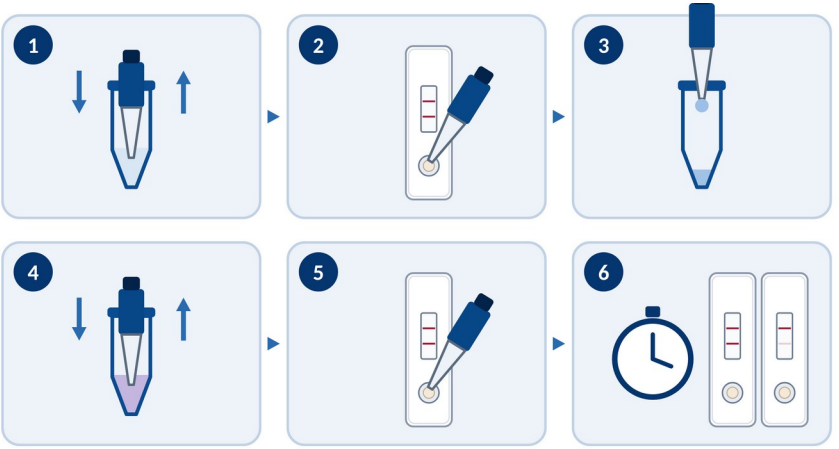


Figure 4. *Procedure overview. The panel numbers match the numbered steps below.*

Before you start

- Bring the cassettes, buffer tubes, Ultrapure Water and samples to room temperature.
- Each sample needs two cassettes (one for the negative control and one for the sample) and two tubes of 10X Sample Dilution Buffer.
- Tap each 10X Sample Dilution Buffer tube on the bench so that the buffer collects at the bottom, then open it. No centrifuge is needed.
- Take the cassettes out of their pouches and lay them flat on a level surface. Label each cassette on the plastic (not on the window), for example “NC” and the sample name.

A. Negative control

1. With a pipettor and a new tip, transfer 200 µL of Ultrapure Water into a 10X Sample Dilution Buffer tube. Mix by pipetting up and down 3 times.
2. With the same tip, transfer 200 µL of the mix into the sample port (S) of the negative control cassette, all at once. Start the timer.

B. Sample

3. With a new tip, add 200 µL of the water sample to a new 10X Sample Dilution Buffer tube.
4. Mix by pipetting up and down 3 times.
5. Transfer 200 µL of the mix into the sample port (S) of the sample cassette, all at once. Note the time.

6. Leave both cassettes flat and undisturbed. Read each cassette 15 minutes after its liquid was added (Section 9).

NOTE: read the sample cassette and its negative control cassette side by side at 15 minutes. Do not add any further liquid to the cassette after the sample.

9. Interpretation of Results

Read the sample cassette and its negative control cassette side by side. First check that both cassettes show a control line (C). Then compare the test line (T) of the sample with the test line of the negative control (Table 1 and Figure 5).

Result	What you see	Meaning
Invalid	No control line (C) on the sample cassette or on the negative control cassette	The test did not run correctly. Repeat with new cassettes (Section 11).
Negative	T line as dark as, or darker than, the T line of the negative control	No mercury detected: below the 10 ppb screening level
Positive	T line visibly lighter than the T line of the negative control	Mercury detected at or above 10 ppb
Strong positive	T line very faint or absent; C line present	Mercury well above the screening level, about 100 ppb or more

Table 1. How to read the result by eye. The intensity of the control line varies between cassettes and does not affect the result, as long as a control line is visible.

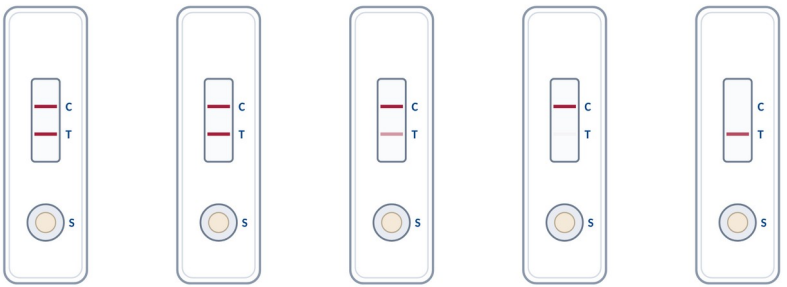


Figure 5. *Reading the result by eye, against the negative control (NC, left). Negative: T as dark as on the NC. Positive: T visibly lighter. Strong positive: T very faint or absent. Invalid (right): no C line.*

Reading with a lateral flow reader

Calculate T/C (test line value ÷ control line value) for the sample and for its negative control, and compare the two. A sample T/C at or below about half of the negative control T/C shows mercury at or above 10 ppb. In kit lot testing, T/C was 1.18 at 0 ppb

and 0.55 at 10 ppb (lot 202508022), and 1.95 at 0 ppb, 0.38 at 25 ppb, 0.18 at 50 ppb and 0.11 at 100 ppb (lot 202609062, Figure 2).

Approximate concentrations (semi-quantitative)

To estimate concentration, test mercury standards of known concentration (not supplied), prepared in Ultrapure Water, alongside the samples and compare the test lines. Do not compare with cassettes run earlier, because line intensities change as a cassette dries.

10. Limitations

- The test screens for mercury; it does not give an exact concentration. Confirm results by a conventional analytical method (Section 12).
- The 10 ppb screening level is above the US EPA drinking-water limit for inorganic mercury (2 ppb). A negative result does not show that water meets drinking-water standards.
- The test detects mercury ions (Hg^{2+}). Organic mercury compounds, such as methylmercury, and cross-reactivity with other metals have not been evaluated.
- The test has been evaluated with water only. Fish, food and other sample types have not been validated.
- Near the screening level the change in the test line is small. Read the sample and its negative control side by side under the same light, or use a lateral flow reader.

11. Troubleshooting

Observation	Likely cause	What to do
No control line	Too little liquid in the sample port, cassette moved or tilted during the run, or cassette exposed to moisture	Add 200 µL to the sample port; keep the cassette flat and still; use a new cassette from an undamaged pouch
Weak or no test line on the negative control	Water other than the supplied Ultrapure Water used, mercury carried over from a sample, or cassette damaged or expired	Use the supplied Ultrapure Water and a new tip; check the expiration date; repeat with new cassettes. If it happens again, contact Attogene
Sample and negative control hard to compare	Cassettes read at different times or under different light	Read both cassettes side by side, under the same light, at 15 minutes, or use a lateral flow reader
Slow flow or liquid left in the port	Particles in the sample	Let particles settle and test the clear top layer

12. Additional Analysis

If needed, confirm results by a conventional analytical method, such as cold-vapor atomic absorption or ICP-MS, or quantify them with the Attogene Mercury Ion ELISA Kit (EL2067). A lateral flow reader can be used to obtain numerical (T/C) readings from the visual result. Contact us with any questions.

13. Ordering Information

Catalog no.	Description	Size
AU2029	Mercury Lateral Flow Kit, Field Use (water): 10 cassettes, 10X Sample Dilution Buffer tubes, Ultrapure Water tubes, transfer pipettes and sample bottles	5 samples
AU2029-01	Mercury Lateral Flow Kit, Laboratory Use (water): 10 cassettes, 10X Sample Dilution Buffer tubes and Ultrapure Water tubes	5 samples
EL2067	Mercury Ion ELISA Kit, for quantitative confirmation	96 wells

Extra Sample Dilution Buffer is available in packs of 5 or 10. For bulk cassettes or custom formats, contact sales@attogene.com.



Contact Us

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Email: sales@attogene.com
Web: www.attogene.com

14. Quick Reference

Procedure at a glance

Step	Action
1	Negative control: pipette 200 µL of Ultrapure Water into a 10X buffer tube; mix 3 times.
2	200 µL of the mix into port S of the “NC” cassette. Start the timer.
3	With a new tip, add 200 µL of the water sample to a new 10X buffer tube.
4	Mix by pipetting up and down 3 times.
5	200 µL of the mix into port S of the sample cassette.
6	Read both cassettes side by side at 15 minutes.

Reading the result (always against the negative control)

Result	Sample cassette
Invalid	No C line on either cassette: repeat
Negative	T as dark as the NC T line: below 10 ppb
Positive	T visibly lighter than the NC T line: 10 ppb or more
Strong positive	T very faint or absent: about 100 ppb or more
Reader	Sample T/C at or below about half the NC T/C: 10 ppb or more

Storage

- All components at room temperature (2–8 °C also acceptable); open a cassette pouch only when ready to test.

Notes

Notes

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Mercury Ion ELISA Kit

EL2067

Quantitative 96-well ELISA for mercury ions, to confirm lateral flow screening results.

CONFIRM

Lead Ion ELISA Kit

EL2068

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