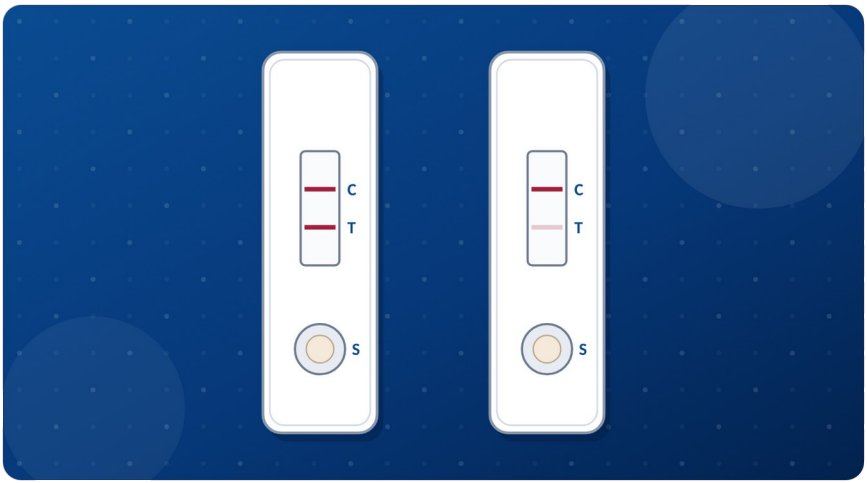


Lead Lateral Flow Kit

Water · Field Use

Catalog Number: **AU2027**

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

1. Introduction

Attogene's Lead Lateral Flow Kit is a rapid, single-use cassette test that screens water for lead ions (Pb^{2+}) at 5–10 ppb (5–10 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 use in the field: each sample is collected in the Water Sample Bottle, transferred with a 75 µL fixed-volume transfer pipette into a tube of 10X Sample Dilution Buffer, mixed and added to a cassette. No pipettor or power is needed.

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-lead antibody. The test line (T) carries lead bound to BSA. If the sample contains no lead, the gold binds the test line and a red test line forms. Lead in the sample fills the antibody binding sites, so less gold binds the test line: the more lead 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 lead. Always read each sample against a negative control cassette run at the same time (Section 9).

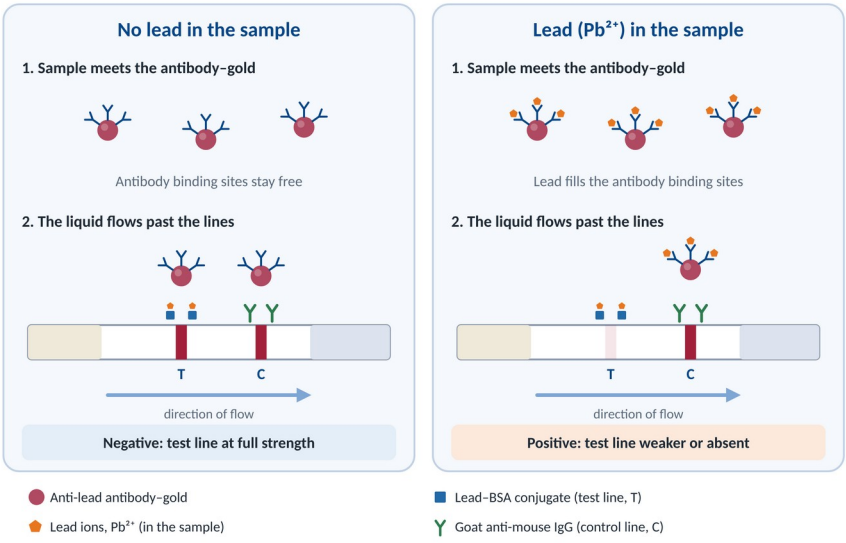


Figure 1. *Test principle. Left: with no lead, the antibody–gold binds the lead–BSA test line (T) and the excess binds the control line (C). Right: lead in the sample blocks the antibody, so the test line is weaker or absent; the control line still forms.*

About lead

Lead enters drinking water mainly from lead service lines, lead solder and brass plumbing fittings, especially when water sits in the pipes for hours. Lead accumulates in the body. In adults, long-term exposure is linked to kidney disease, high blood pressure and reproductive problems. Infants and children are the most vulnerable: lead can impair growth, learning and hearing, often with no immediate symptoms. The US EPA maximum contaminant level goal for lead in drinking water is zero. The current action level is 15 ppb (0.015 mg/L); under the Lead and Copper Rule Improvements it falls to 10 ppb (0.010 mg/L) from November 1, 2027.

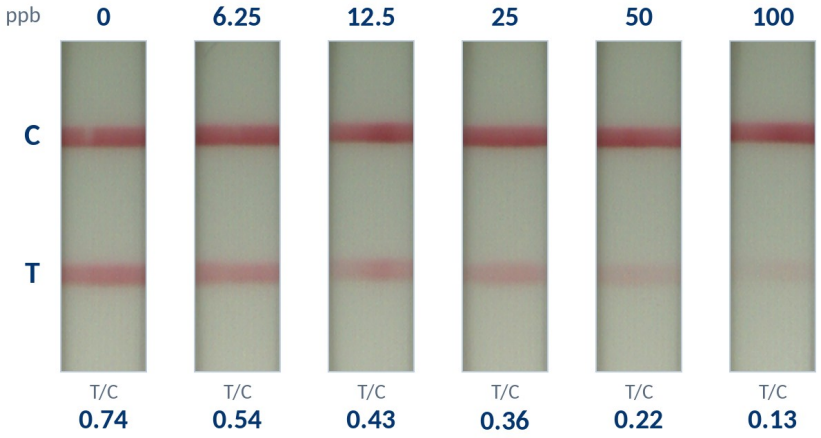


Figure 2. *Reader images of AU2027 kit QC strips run with lead added to the kit buffer (gold lot 202603069, 3/25/2026; read at 15 minutes). T/C = test line value ÷ control line value. The test line weakens as lead increases. The images are for illustration only; results may vary from batch to batch to some extent.*

Features & Benefits

- Screens water for lead ions at 5–10 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.
- Everything needed to collect and test 5 samples in the field, including sample bottles and fixed-volume transfer pipettes.

2. Kit Contents

Component	Quantity	Storage
Lead Cassette, in a foil pouch with desiccant	10	Room temperature or 2–8 °C
10X Sample Dilution Buffer: 15 µL per tube	10 tubes	Room temperature or 2–8 °C
Ultrapure Water, for the negative control: 150 µL per vial	5 vials	Room temperature or 2–8 °C
Transfer pipette, fixed volume, 75 µL	10	Room temperature
Water Sample Bottle, 125 mL, HDPE	5	Room temperature
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 lead increases
Reporter	Colloidal gold conjugated to a mouse monoclonal anti-lead antibody
Test line (T)	Lead–BSA conjugate
Control line (C)	Goat anti-mouse IgG; captures gold that passes the test line
Analyte	Lead ions (Pb^{2+})
Samples	Water
Screening level	5–10 ppb (5–10 µg/L). By eye, the test line is clearly weaker than on the negative control from about 10 ppb; a lateral flow reader detects 5 ppb
Reader reading	T/C (test line ÷ control line). Kit QC with freshly diluted buffer: T/C 1.28 at 0 ppb, 0.74 at 5 ppb and 0.62 at 10 ppb
Sample preparation	150 µL of sample into one tube of 10X Sample Dilution Buffer (15 µL); mix 3 times
Volume to cassette	150 µL of the mixed sample; 150 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 (lead standard) is supplied
Storage	All components at room temperature; storage at 2–8 °C is also acceptable. Cassettes in their sealed foil pouches

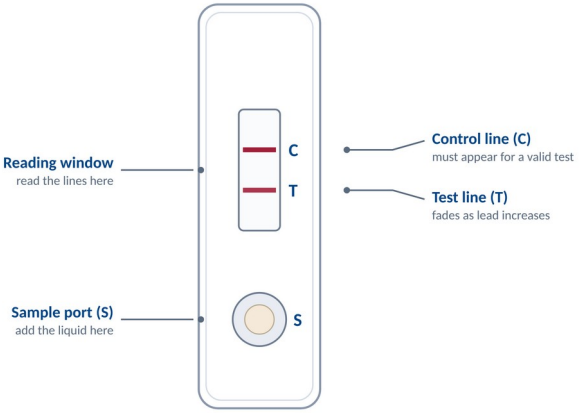


Figure 3. *Parts of the cassette. Add the liquid to the sample port (S) and read the lines through the window. The test line (T) is nearer the sample port than the control line (C).*

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 tubes and the Ultrapure Water vials 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
- **Lead 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 certified laboratory (Section 12).

- Before use, check that the date of use is before the expiration date on the label.
- Lead is toxic. Wear gloves when handling samples that may contain lead, 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 transfer pipette for each sample and for each negative control to avoid carrying lead 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 Water Sample Bottle. Do not rinse the bottle.
- For tap water, lead is usually highest in the first water drawn after the water has stood in the pipes for at least 6 hours (for example, first thing in the morning). Collect this first-draw water to find the highest lead level; collect a second sample after running the tap for 1–2 minutes to see how much flushing lowers it.
- 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: lead can stick to the walls of plastic bottles. 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.
- 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

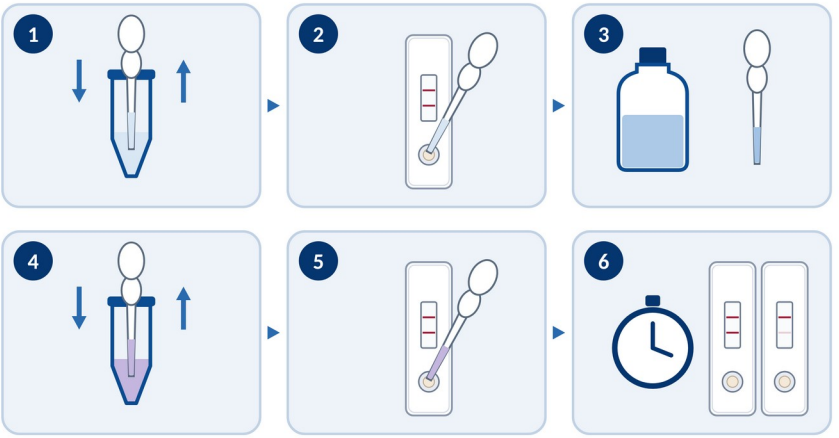


Figure 4. *Procedure overview. The panel numbers match the numbered steps below.*

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 a hard surface so that the buffer collects at the bottom, then open it.
- 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.

Using the transfer pipette: the pipette has two bulbs. Squeeze the top bulb, put the tip in the liquid and release the bulb slowly until the straight stem is full. That is 75 µL. Do not let liquid enter the lower (overflow) bulb. To dispense, squeeze the top bulb. 150 µL is two full stems.

A. Negative control

1. With a new transfer pipette, transfer the Ultrapure Water into a 10X Sample Dilution Buffer tube: two full stems (150 µL). Mix by drawing the liquid up and dispensing it back 3 times.
2. With the same transfer pipette, add two full stems (150 µL) of the mix to the sample port (S) of the negative control cassette. Start the timer.

B. Sample

3. With a new transfer pipette, draw up two full stems (150 µL) of the water sample from the Water Sample Bottle and dispense them into a new 10X Sample Dilution Buffer tube.
4. Mix by drawing the liquid up and dispensing it back 3 times.
5. Add two full stems (150 µL) of the mix to the sample port (S) of the sample cassette. 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 lead detected: below the screening level
Positive	T line visibly lighter than the T line of the negative control	Lead detected at or above the screening level (about 10 ppb by eye)
Strong positive	T line very faint or absent; C line present	Lead well above the screening level, about 50 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.

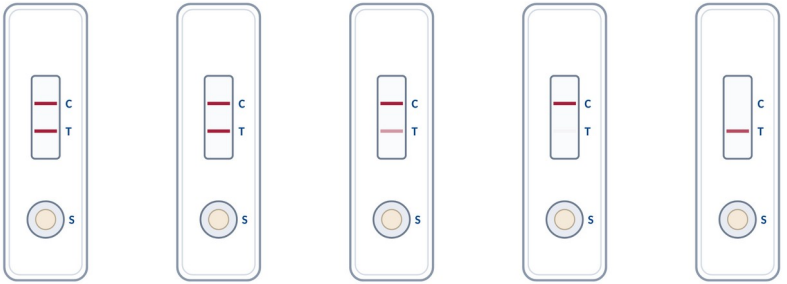


Figure 5. *Reading the result by eye, against the negative control (NC, left). Negative: T as dark as on the NC. Positive: T visibly lighter. Strong positive: T very faint or absent. Invalid (right): no C line.*

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 60% of the negative control T/C shows lead at or above 5 ppb. In kit QC with freshly diluted buffer, T/C was 1.28 at 0 ppb, 0.74 at 5 ppb and 0.62 at 10 ppb; results may vary from batch to batch to some extent.

Approximate concentrations (semi-quantitative)

To estimate concentration, test lead 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 lead; it does not give an exact concentration. Confirm results by a certified laboratory (Section 12).
- The test detects dissolved lead ions (Pb^{2+}). Lead in particles from pipes and fittings may not be detected, so the result can be lower than a laboratory total-lead result for the same water.
- The US EPA has no safe level for lead in drinking water (its health goal is zero). A negative result does not show that water is free of lead or meets drinking-water standards.
- Cross-reactivity with other metals has not been evaluated.
- The test has been evaluated with water only. Juice, soil extracts and other sample types have not been validated with this kit.

- 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 150 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, lead carried over from a sample, or cassette damaged or expired	Use the supplied Ultrapure Water and a new transfer pipette; 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 with a certified drinking-water laboratory (for example ICP-MS or graphite-furnace atomic absorption), or quantify them with the Attogene Lead Ion ELISA Kit (EL2068). 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
AU2027	Lead Lateral Flow Kit, Field Use (water): 10 cassettes, 10X Sample Dilution Buffer tubes, Ultrapure Water vials, transfer pipettes and sample bottles	5 samples
AU2027-01	Lead Lateral Flow Kit, Laboratory Use (water): 10 cassettes, 10X Sample Dilution Buffer tubes and Ultrapure Water vials	5 samples
EL2068	Lead 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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Web: www.attogene.com

14. Quick Reference

Procedure at a glance

Step	Action
1	Negative control: two full stems (150 µL) of Ultrapure Water into a 10X buffer tube; mix 3 times.
2	Two full stems (150 µL) of the mix into port S of the “NC” cassette. Start the timer.
3	With a new transfer pipette, two full stems (150 µL) of the water sample into a new 10X buffer tube.
4	Mix 3 times.
5	Two full stems (150 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 the screening level
Positive	T visibly lighter than the NC T line: about 10 ppb or more
Strong positive	T very faint or absent: about 50 ppb or more
Reader	Sample T/C at or below about 60% of the NC T/C: 5 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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CONFIRM

Lead Ion ELISA Kit

EL2068

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CONFIRM

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