

Saxitoxin Lateral Flow Kit

Freshwater · Field Use

Catalog Number: **AU2057**

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

1. Introduction

Attogene's Saxitoxin Lateral Flow Kit is a rapid, single-use cassette test that screens freshwater for saxitoxin at a screening level of 100 ppt (0.1 µg/L). It works with all freshwater samples, including streams, lakes, reservoirs, source water and recreational water. This version is made for use in the field: each sample is taken up with a fixed-volume transfer pipette, added to a tube of 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 an anti-saxitoxin antibody. The test line (T) carries a saxitoxin–BSA conjugate. If the sample contains no saxitoxin, the gold binds the test line and a red test line forms. Saxitoxin in the sample fills the antibody binding sites, so less gold binds the test line: the more saxitoxin in the sample, the weaker the test line. The control line (C) carries goat anti-mouse IgG and biotin–BSA. It captures the antibody–gold that passes the test line, together with streptavidin–gold that binds only to the control line. The control line is therefore faint when the test line is strong, and becomes stronger as the saxitoxin concentration increases.

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

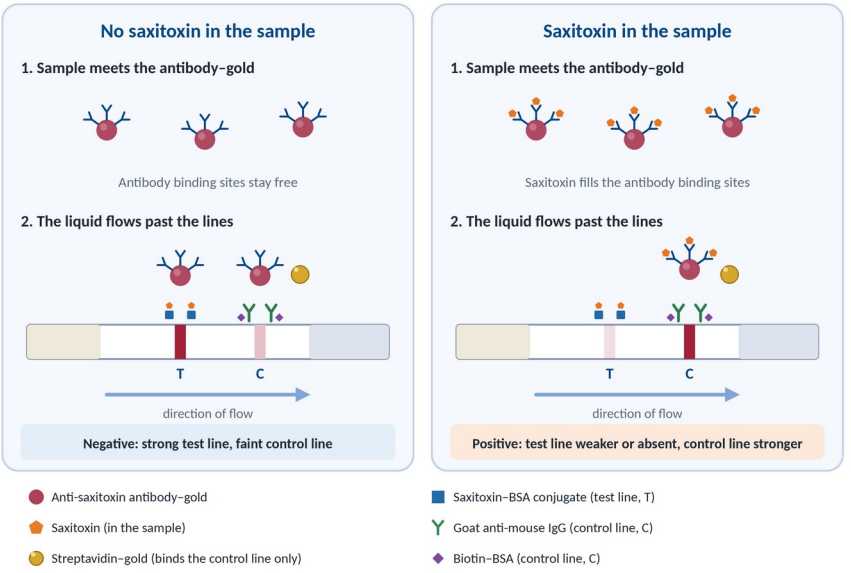


Figure 1. *Test principle. Left: with no saxitoxin, most antibody–gold binds the saxitoxin–BSA test line (T), so the test line is strong and the control line (C) is faint. Right: saxitoxin in the sample blocks the antibody, so the antibody–gold passes the test line and is captured at the control line; the test line is weaker or absent and the control line is stronger. Streptavidin–gold binds only the control line, so a control line forms on every cassette that ran correctly.*

About Saxitoxin

Saxitoxins (STXs) are naturally occurring alkaloids produced by some marine dinoflagellates and by strains of several species of freshwater cyanobacteria. Saxitoxin is one of the most prevalent paralytic shellfish toxins (PSTs). It belongs to a family of potent neurotoxins with a molecular weight of about 300 Da, built on a tetrahydropurine ring system with a highly polar guanidinium group. In freshwater, saxitoxins are monitored in drinking-water sources and recreational waters during cyanobacterial harmful algal blooms (HABs). The World Health Organization guideline values for saxitoxins are 3 µg/L (3 ppb) in drinking water and 30 µg/L (30 ppb) in recreational water (WHO, 2020). Some US states use lower drinking-water advisories, for example Washington State's provisional 0.2 µg/L (200 ppt). The kit's screening level of 100 ppt (0.1 µg/L) is below all of these values.

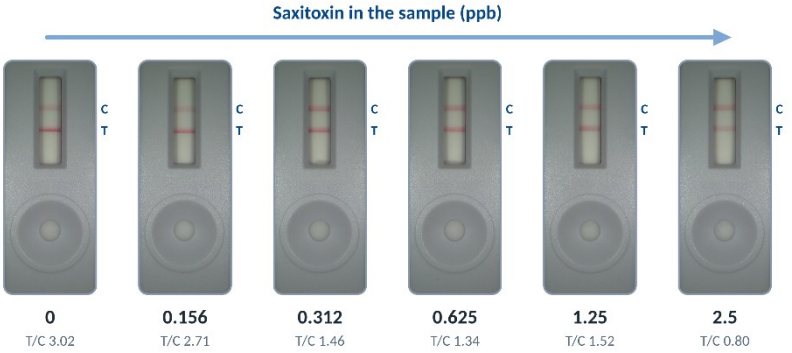


Figure 2. *Freshwater spiked with saxitoxin (0–2.5 ppb), tested with AU2057 kit lot 202606058 (QC, June 2026). The cassette images are redrawn from the lateral flow reader values (T/C = test line value ÷ control line value). The image is for illustration only and does not represent the performance of any particular lot.*

Features & Benefits

- Screens freshwater for saxitoxin at a screening level of 100 ppt (0.1 µg/L).
- Results in 30 minutes; no instrument is needed for the visual result. A lateral flow reader can be used for numerical (T/C) readings.
- Every sample is read against its own negative control cassette.
- Everything needed to test on site is in the kit, apart from a timer, gloves and a marker (Section 5).

2. Kit Contents

The kit contains the components listed in Table 1.

Component	Quantity	Storage
Saxitoxin Cassette, in a foil pouch with desiccant	10	Room temp.
Sample Dilution Buffer (10X), 22 µL per tube	5 tubes	Room temp.
Negative Control, 200 µL per tube	5 tubes	Room temp.
Fixed-Volume Transfer Pipette, 200 µL	5	Room temp.
Water Sample Collection Bottle, 125 mL	5	Room temp.
Manual	1	—

Table 1. *Kit contents.*

Kit size: 5 samples. Each sample uses two cassettes: one for the sample and one for its negative control. Each cassette is sealed in its own foil pouch with a desiccant. The kit is supplied in a resealable foil pouch. Extra Sample Dilution Buffer is available as an add-on (Section 13).

3. Product Specifications

Key specifications for experienced users and for setting up a lateral flow reader (Table 2).

Parameter	Specification
Format	Single-use lateral flow cassette: sample port (S) and reading window, with C and T printed to the right of the window (Figure 3)
Assay principle	Competitive immunoassay: the test line weakens, and the control line strengthens, as the saxitoxin concentration in the sample increases.
Reporter	40 nm colloidal gold conjugated to an anti-saxitoxin monoclonal antibody (mAb)
Test line (T)	Saxitoxin–BSA conjugate
Control line (C)	Goat anti-mouse IgG (GAM) and biotin–BSA. The GAM captures anti-saxitoxin mAb–gold that passes the test line; streptavidin–gold binds only to the control line.
Samples	Freshwater: streams, lakes, reservoirs, source water and recreational water
Screening level	100 ppt (0.1 µg/L; 100 ng/L) saxitoxin in the sample
Visual detection	Sample test line lighter than the negative control test line: 100 ppt or above. No visible test line: 50 ppb or above.
Reader detection	100 ppt (0.1 µg/L), the same as the visual screening level
Sample preparation	200 µL of sample added to 22 µL of Sample Dilution Buffer (10X)
Volume to cassette	200 µL of the buffered sample; 200 µL of Negative Control
Time to result	Read at 30 minutes
Controls	Negative Control supplied, 5 tubes per kit. Positive control not supplied.
Cross-reactivity	Strong response to saxitoxin (STX); moderate to gonyautoxins GTX2/3; weak to GTX1/4; little or none to neosaxitoxin (neoSTX), GTX5 and GTX6 (Table 4).
Storage	Cassettes in their sealed foil pouches, Sample Dilution Buffer and Negative Control at room temperature. Shelf life 18 months from the date of manufacture.

Table 2. *Product specifications.*

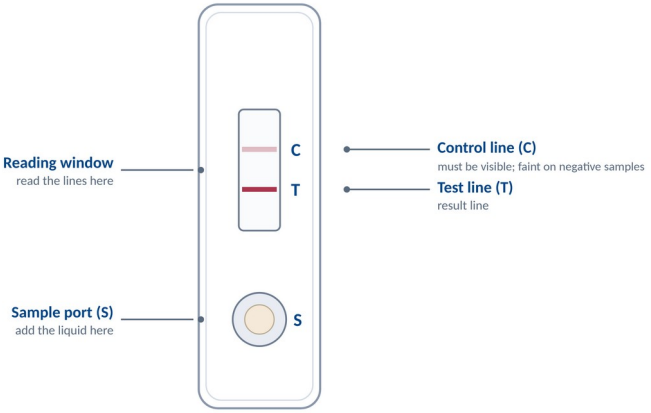


Figure 3. *Parts of the cassette. Add the liquid to the sample port (S) and read the lines through the window. The test line (T) is nearer the sample port than the control line (C).*

4. Storage and Stability

- Store the cassettes in their sealed foil pouches at room temperature. Open a pouch only when you are ready to run the test.
- Store the Sample Dilution Buffer and the Negative Control at room temperature.
- The kit is guaranteed for 18 months from the date of manufacture.
- 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 bottles and cassettes

6. Precautions

- This kit gives screening results. Confirm positive results, and any result used for a regulatory decision, by ELISA, HPLC, LC-MS/MS or another conventional analytical method.
- Before use, check that the date of use is before the expiration date on the label.
- Saxitoxin is a potent neurotoxin. Wear gloves when you collect and handle samples, and wash your hands after testing.

- The Sample Dilution Buffer and the Negative Control contain sodium azide as a preservative. Do not swallow them, and rinse any skin or eye contact with water.
- Use a new transfer pipette, a new Sample Dilution Buffer tube and a new sample bottle for each sample to avoid cross-contamination.
- 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.
- Good laboratory practice: test a sample of known saxitoxin concentration (positive control, not supplied) with each kit lot to see the line intensity to expect.

7. Sample Collection and Storage

- Wearing gloves, collect the sample into a 125 mL Water Sample Collection Bottle and label the bottle.
- Test samples as soon as possible. Samples can be stored refrigerated (2–8 °C) for up to 5 days; freeze samples that must be held longer than 5 days.
- Bring the cassettes, the Sample Dilution Buffer, the Negative Control and the samples to room temperature, and mix the samples, before testing.

8. Procedure

Before you start

- Bring the cassettes, Sample Dilution Buffer, Negative Control and samples to room temperature.
- Each sample needs two cassettes: one for the Negative Control and one for the sample.
- Wearing gloves, 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.

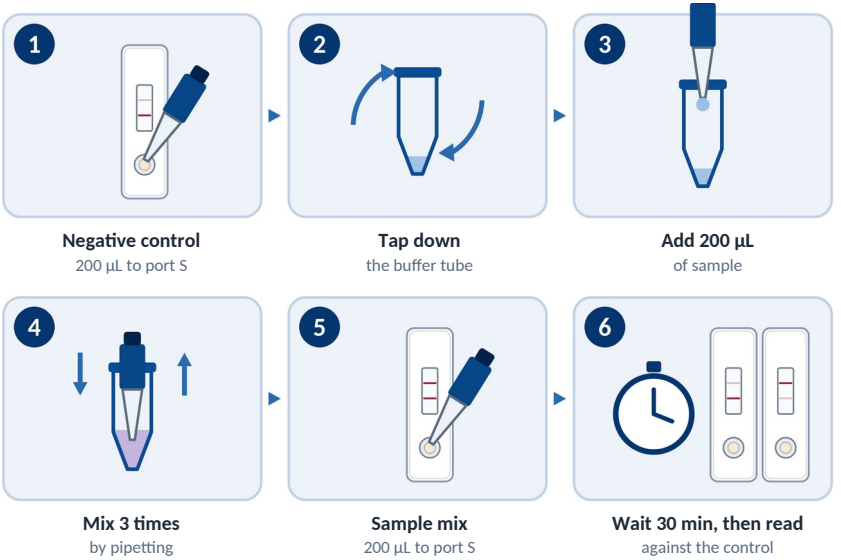


Figure 4. *Procedure overview.*

A. Negative control (run first)

1. Using a fixed-volume transfer pipette, transfer 200 µL of Negative Control into the sample port (S) of the negative control cassette, all at once. Start the timer (Figure 4, step 1).

B. Sample

1. Tap the Sample Dilution Buffer tube gently so that all the buffer is at the bottom of the tube (step 2).
2. Using the same transfer pipette, add 200 µL of sample to the Sample Dilution Buffer tube (step 3).
3. Mix gently by pipetting up and down 3 times (step 4).

4. Transfer 200 µL of the buffered sample into the sample port (S) of the sample cassette, all at once. Note the time (step 5).

C. Run and read

1. Leave both cassettes flat and undisturbed. Read each cassette 30 minutes after its liquid was added (step 6).
2. Read both cassettes by eye or with a lateral flow reader (Section 9).

NOTE: read each cassette 30 minutes after its liquid was added, and no later than 35 minutes. Compare the sample cassette with its negative control cassette side by side.

9. Interpretation of Results

Read the sample cassette and its negative control cassette side by side. First check the control line (C), then compare the test line (T) of the sample with the test line of the negative control (Table 3 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	Sample T line as strong as, or stronger than, the T line of the negative control	No saxitoxin detected (below 100 ppt)
Low positive	Sample T line visible but lighter than the T line of the negative control	Saxitoxin detected: 100 ppt (0.1 µg/L) or above, below about 50 ppb
Positive	Sample T line absent (only the C line is visible)	Saxitoxin at 50 ppb (50 µg/L) or above

Table 3. *How to read the result. The control line is faint on the negative control and on negative samples, and becomes stronger as saxitoxin increases. A faint control line is normal: the result is valid as long as a control line is visible.*

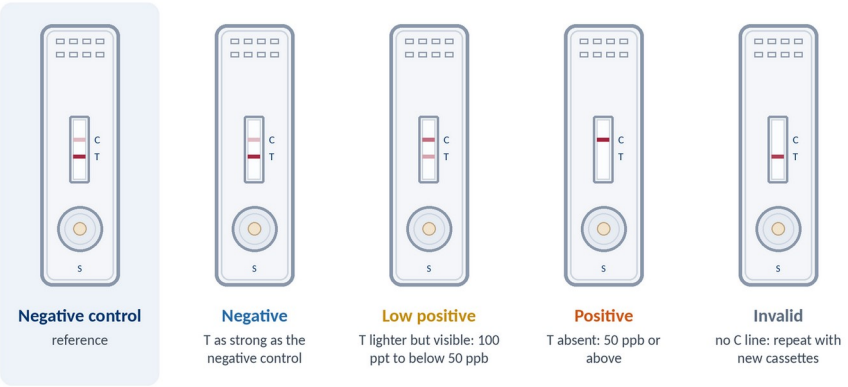


Figure 5. *Reading the result against the negative control.*

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 lower T/C than the negative control shows saxitoxin in the sample. In kit lot testing (Figure 2), T/C was 3.02 for the negative sample and 2.71 at 0.156 ppb. DETEKT RDS-2500 readers supplied by Attogene are set up with a program dedicated to saxitoxin; its cut-offs can be tailored to the customer's requirements (see the STX Quick Reference Guide for the DETEKT Reader).

Approximate concentrations (semi-quantitative)

To estimate concentration, test saxitoxin standards of known concentration (not supplied), prepared in saxitoxin-free freshwater, alongside the samples, and compare the test lines. Do not use cassettes run earlier. The comparison works from 0 to about 20 ppb. To estimate a higher concentration, dilute the sample with saxitoxin-free water, test it again and multiply the result by the dilution factor.

10. Limitations

- The test screens for saxitoxin; it does not give an exact concentration. Confirm positive results by a conventional analytical method (Section 12).

- The antibody responds most strongly to saxitoxin (STX). It responds partly to gonyautoxins GTX2/3, weakly to GTX1/4, and little or not at all to neosaxitoxin (neoSTX), GTX5 and GTX6 (Table 4). The test therefore does not measure total paralytic shellfish toxins as STX equivalents.

Compound (25 ppb)	T/C	Response
Blank (no toxin)	5.71	Reference
Saxitoxin (STX)	0.12	Strong
Gonyautoxins GTX2/3	1.29	Moderate
Gonyautoxins GTX1/4	4.47	Weak
Neosaxitoxin (neoSTX)	5.54	Little or none
Gonyautoxin GTX5	8.34	None
Gonyautoxin GTX6	5.47	None

Table 4. *Response to related compounds, each at 25 ppb in running buffer (one cassette per level; Attogene R&D data, 11 Aug 2025). At 5 ppb, T/C was 0.39 for STX and 2.20 for GTX2/3. A lower T/C means a stronger response.*

11. Troubleshooting

Table 5 lists common problems and what to do.

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	Repeat with a new cassette from an undamaged pouch; add the full 200 µL at once and keep the cassette flat and still
No test line on the negative control cassette	Cassette damaged or expired, or the Negative Control was not added	Check the expiration date; repeat with new cassettes. If it happens again, contact Attogene
Slow flow, liquid left in the port, or high background	Particles in the sample	Clogging has not been observed, even with algae-rich samples. If the flow is slow, centrifuge the sample or pass it through a syringe filter (not supplied) and test the clear liquid
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 30 minutes

Table 5. *Troubleshooting.*

12. Additional Analysis

If needed, confirm positive samples by ELISA, HPLC, LC-MS/MS or another conventional analytical method. The Attogene Saxitoxin (PSP) ELISA Kit (catalog

number EL2048-02) can be used for this purpose. 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
AU2057	Saxitoxin Lateral Flow Kit, Field Use (Freshwater): 10 cassettes, Sample Dilution Buffer, Negative Control, transfer pipettes, sample bottles	5 samples
AU2057-01	Saxitoxin Lateral Flow Kit, Shellfish: 24 cassettes and extraction materials	12 samples
PN2194-1	Sample Dilution Buffer (10X) add-on for AU2057, 22 µL per tube	5 or 10 tubes

Table 6. *Ordering information.*

Add-ons

Extra Sample Dilution Buffer tubes (10X, 22 µL per tube) for this kit can be bought separately, in a 5-pack or a 10-pack, from www.attogene.com. The AU2057 and AU2057-01 buffers are not interchangeable.

For bulk cassettes, custom formats or other analytes, contact sales@attogene.com.

Contact Us

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Austin, TX 78744
Phone: 512-333-1330
Email: sales@attogene.com
Web: www.attogene.com

14. Quick Reference

Procedure at a glance

Step	Action
1	Bring everything to room temperature. Lay two cassettes flat per sample: “NC” and sample.
2	Negative control: 200 µL of Negative Control into port S of the “NC” cassette; start the timer.
3	Tap the Sample Dilution Buffer tube so the buffer is at the bottom.
4	With the same transfer pipette, add 200 µL of sample to the buffer tube and mix 3 times.
5	Add 200 µL of the buffered sample to port S of the sample cassette; note the time.
6	Leave flat; read each cassette 30 minutes after its liquid was added (no later than 35 minutes).

Reading the result (always against the negative control)

Result	Sample cassette
Invalid	No C line (on either cassette): repeat
Negative	T line as strong as or stronger than the negative control: no saxitoxin detected
Low positive	T line lighter than the negative control but visible: 100 ppt or above, below about 50 ppb
Positive	T line absent: 50 ppb or above

Storage

- Cassettes, Sample Dilution Buffer and Negative Control at room temperature; open a cassette pouch only when ready to test.
- Use the kit before the expiration date on the label.

Notes

Notes

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CONFIRM

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