

# As<sup>+3</sup> QUICK As<sup>+5</sup>™

## Rapid Arsenic Test Kit

**Kit Part #481396**  
**100 Tests**

**FOR WATER, SOIL,  
 AND WOOD ANALYSIS**

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Information on the performance characteristics of this kit can be found at <https://archive.epa.gov/nrmrl/archive-etv/web/html/>, or call ITS at 803-329-9712 for a copy of the ETV verification report. The use of the ETV® Name or Logo does not imply approval or certification of this product nor does it make any explicit or implied warranties or guarantees as to product performance.

**FOR BEST RESULTS, FOLLOW KIT INSTRUCTIONS.**



**WARNING:**  
 Hydrogen and Arsine gases are generated during the test. Work in a well-ventilated area away from open flames and other sources of ignition. Review the Material Safety Data Sheet before handling any chemicals.

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**481396-INST**  
 Revision: 12/08/20

## ABOUT KIT #481396:



**Part Number: 481396, 100 Tests**

This test detects soluble inorganic Arsenic ( $As^{+3}$  and  $As^{+5}$ )

This Arsenic Test Kit provides a safe, simple, and reliable way to test for Arsenic from 10 to 200 $\mu$ g/L (up to 1000 $\mu$ g/L when using 1:5 Dilution Method). Follow the instructions carefully to get reliable results. All components are supplied in the kit except for a timer and thermometer. This test tolerates up to 2mg/L Hydrogen Sulfide without interference. No interference was found for this test kit for Antimony up to 0.5mg/L. No interference from Iron or Sulfate was found. It is recommended that the water sample be 22°C - 28°C / 72°F - 84°F. The color chart was standardized at 24°C / 75°F. For reference purposes, record the temperature at which the sample was run. Use all reagents and test strips within the allowed shelf life as marked on each container.

### Kit Components:

- 2 Reaction Bottles, clear PVC, with 20mL (lower), 50mL (middle), and 100mL (upper) lines
- 2 White Caps, with white turret, for holding test strip
- 3 Plastic Spoons (one large pink spoon for First Reagent; one small red spoon for Second Reagent; and one small white spoon for Third Reagent)
- 1 Large Bottle of First Reagent (395gm)
- 1 Small Bottle of Second Reagent (78gm ea.)
- 1 Small Bottle of Third Reagent (140gm ea.)
- 1 Bottle of Arsenic Strips with waterproof color chart label (100 total) - **Caution:** Each testing pad contains about 1mg Mercuric Bromide ( $HgBr_2$ )
- This Instruction Booklet with SDS
- Instruction Sticker
- Plastic Bag for Used Test Strips (*Not pictured*)
- 2 Yellow Caps for mixing
- Plastic Case for Components

### About the Patented Reaction (Modified Gutzeit method):

Inorganic Arsenic compounds in the water sample are converted to Arsine ( $AsH_3$ ) gas by the reaction of Zinc and Tartaric Acid. Ferrous and Nickel salts have been added to accelerate this reaction. The Arsine reacts with the Mercuric Bromide on the test strip to form mixed Mercury halogens (such as  $AsH_2HgBr$ ) that appear with a color change from white to yellow or brown. Potassium Peroxymonosulfate (second reagent) is added to oxidize Hydrogen Sulfide to Sulfate.

**PRECAUTIONS:** Hydrogen gas and Arsine gas are generated during the reaction. Work in a well-ventilated area away from fire and other sources of ignition. All reagents are unsuitable for human consumption and must be kept away from children and pets.

**US Patent # 6696300**

## **SUGGESTIONS FOR BEST ACCURACY**

1. To gain confidence in using this test kit for unknown samples, it is highly recommended that you use the kit on a sample with a known inorganic Arsenic concentration value, or with a sample that has been prepared using an Arsenic standard. By making a “practice run” of the test, you will familiarize yourself with all of the procedures necessary to ensure accurate testing results. Additionally, you will have the opportunity to become familiar with the process of color matching, which will help to ensure accurate test results. ITS suggests the test be run in duplicate for better accuracy.
2. The water sample must not be preserved with Nitric Acid or any other preservation method. Small amounts of strong acids will interfere with the test results; and therefore it is best that the water sample be freshly drawn and run within 24 hours. Some water samples held for over 24 hours may read low. The water sample should not contain any significant amount of buffers. If you are planning to send a duplicate sample for ICP laboratory verification, follow preservation requirements for that sample only.
3. The water and ambient temperature are very important to ensure accurate results. As an example, a water temperature of 15°C / 59°F can result in the color development on the testing pad to be lighter than the actual Arsenic concentration in the tested sample (a false low reading occurs). When the water is cold, warm water sample to 22°C to 28°C / 72°F - 84°F before testing (using a microwave is acceptable). If the water temperature is above 28°C / 84°F your result may read low (accelerator chemistry reacts too fast). Consideration must also be made for the air temperature when running the test. Best results are from 22°C to 28°C / 72°F - 84°F (water and air). The color chart is calibrated at 24°C / 75°F.
4. After the test has been run, try to rinse out the reaction bottle with clean tap water as soon as possible. When the reaction chemicals are allowed to sit in the reaction bottle after the reaction time, the zinc may begin to adhere to the bottom of the bottle. When this occurs, you may need to clean the reaction bottle with a bottlebrush. Another method for zinc removal is to use a 20% Hydrochloric Acid (reusable) rinse. Be sure to rinse the reaction bottle with clean tap water before running the next test.
5. When matching your test strip pad with the colors on the color chart label, it may be helpful to find a color that is clearly lighter than the test strip pad and make note of it (as an example, we will use a value of 10 ppb). Next, find a color that is clearly darker than the test strip pad (as an example, we will use a value of 30 ppb). By defining a lowest and highest possible value range we can assume that the correct color match is 20 ppb. If the 20 ppb color matches, then you have determined your Arsenic level. In some cases, however, an exact color match will not be available. As an example, if your test strip pad is slightly darker than 20 ppb and slightly lighter than 30 ppb, you can estimate a value of 25 ppb as your result. Following these easy steps can make color matching more precise. Careful color matching will assure the best possible result.
6. Levels of hydrogen sulfide above 2 ppm (mg/L) can interfere with this test, resulting in elevated Arsenic readings. Our test kit will eliminate up to 2 mg/L of sulfide interference. To overcome hydrogen sulfide levels above 2 mg/L, allow the water sample to sit at room temperature, uncovered and exposed to air for 8 hours (about 50% of the H<sub>2</sub>S gas dissipates for every 8 hours).  
Industrial Test Systems, Inc. sells hydrogen sulfide detection kits (part # 481167) for quick, accurate verification of this interfering ion. The test kit detects levels of 0.3, 0.5, 1.0, and 2.0 mg/L (ppm). The hydrogen sulfide test kit contains all components necessary to run the test, and is economically priced at \$16.99 for 30 tests.
7. It has been determined that irrigation of crops with arsenic water increases the soil arsenic levels which can increase the arsenic content in the crop. This Arsenic kit can be used for screening of Arsenic levels in soil. **See procedure on Page 8.**
8. If you have any questions or comments, please feel free to contact our R&D Department at 1-803-329-0162 ext 0 or by email at: [its@sensafe.com](mailto:its@sensafe.com).

Sample No.	1	2	3	4	5
Location					
Date					
Result					

# WATER TEST PROCEDURE:

FOLLOW KIT INSTRUCTIONS CLOSELY.  
Part Number: 481396, 100 Tests

(See Instruction Sticker in plastic case cover for visual help.)

**WARNING:** Hydrogen and Arsine gases are generated during the test. Work in a well-ventilated area away from open flames and other sources of ignition. Review the Material Safety Data Sheet before handling any chemicals.

For better accuracy, we recommend running the test in duplicate for each water sample.

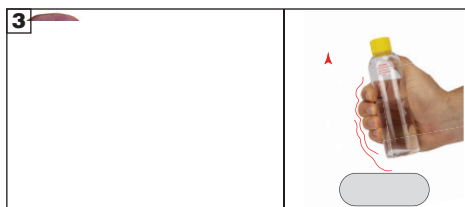
1. For best results, the water temperature should be between 22°C to 28°C / 72°F - 84°F. Use a thermometer to verify the temperature of the sample.



2. To the Reaction Bottle, slowly add the water sample to the 100mL (upper) scored line on the bottle.



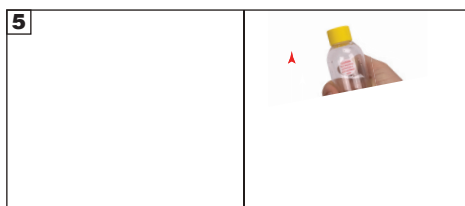
3. Add **3 level** pink spoonfuls of First Reagent **1** to the Reaction Bottle. Cap the bottle securely with yellow mixing cap and shake vigorously for **15 seconds**.



4. Uncap the Reaction Bottle; add **3 level** red spoonfuls of Second Reagent **2**. Cap the bottle securely with yellow mixing cap and shake vigorously with bottle upright for **15 seconds**. Allow the sample to sit for **2 minutes** to minimize Sulfide interference.



5. Uncap the Reaction Bottle and add **3 level** white spoonfuls of Third Reagent **3**. Cap the bottle securely with yellow mixing cap and shake vigorously for **5 seconds**.



## **WATER TEST PROCEDURE CONTINUED:**

6. Remove yellow mixing cap. Recap the bottle with white turret cap (**must be dry** and open) immediately and securely.



7. Remove one Arsenic test strip from the test strip bottle and immediately recap the test strip bottle. In order for the results to be accurate, the test strip must be oriented correctly, and inserted to the correct depth. Insert the test strip into the turret as illustrated at right:



- Position the strip so that the test pad and red line are facing the back of the white cap.
  - Insert the strip into the turret until the red line is even with the top of the turret, and close (flip down) the turret. This will hold the test strip in place. (**Note: Steps 6 & 7 should be completed within 30 seconds.**)
8. Using a timer, allow the reaction to occur in an undisturbed, well-ventilated area for **10 minutes**. Reaction generates small hydrogen gas bubbles.



9. After the 10 minute wait (but before 12 minutes), pull up the turret and carefully remove the test strip. Do not touch the reaction pad. Use the Arsenic Test Kit Color Chart label to match the test strip pad color **within the next 30 seconds** (colors oxidize when exposed to light). For best color matching, use natural daylight, but not direct sunlight.



10. Record your result. For even more precise results, purchase the Quick™ Arsenic Scan (Part Number 481305) on our website ([sensafe.com/quick-arsenic-scan/](http://sensafe.com/quick-arsenic-scan/)).



***(Mercuric Bromide strips (Arsenic test strips) will not react with arsine gas if they are wet)***

### **1:5 Dilution Method**

If your Arsenic level is 200 ppb or above, you can confirm the elevated levels by diluting the water sample 1 to 5. Fill the Reaction Bottle to the 20mL (lower) scored line with water sample and add Arsenic-free water to the 100mL (upper) scored line. Now run steps 3 thru 10. For your true Arsenic value, multiply the result by 5 to correct for dilution and record the value.

**ATTENTION:** Soon after testing is completed, decant liquid from the bottle down a drain that is not used for food preparation and flush with water. Wet Zinc should be collected and disposed of according to local regulations. Rinse the bottle, white cap, and yellow cap with clean water. Shake off any excess water and dry the white cap with turret with a soft tissue. Drying the white turret cap is especially important if you plan to run the next test immediately. Store the used strips in the plastic bag marked "Used Mercuric Bromide (HgBr<sub>2</sub>) Test Strips". Keep the used strips inaccessible to children and pets, and dispose according to local environmental regulations.

# **QUICK™ ARSENIC TEST KIT TROUBLESHOOTING**



<b>Problem</b>	<b>Possible Causes/Solutions</b>
<p>Low or no color development on reaction pad after 10 minute reaction time.</p>	<ol style="list-style-type: none"> <li>1. Temperature of the sample may be below 20°C / 68°F</li> <li>2. The strip may not have been inserted correctly. Run test again and verify strip pad is exposed to arsine gas.</li> <li>3. Correct amount of reagents may not have been added. Run test again.</li> <li>4. The reaction cap may have been loose. Run test again.</li> <li>5. The sample may contain organic arsenic or the arsenic is bound. Kit only tests for soluble inorganic arsenic.</li> <li>6. pH of the sample during 10 minute incubation is incorrect. pH should be between 1.5 to 1.7 at step 5, page 4.</li> <li>7. Test strip pad is very wet, which inhibits colorimetric reaction. Moist pad at end of test is normal.</li> </ol>
<p>Only part of the strip reaction pad has color.</p>	<ol style="list-style-type: none"> <li>1. Strip pad may not be facing proper direction. Run test again.</li> <li>2. Reaction cap may have leaked. Run test again.</li> </ol>
<p>Little or no Hydrogen gas bubbles occur after Reagent 3 addition.</p>	<ol style="list-style-type: none"> <li>1. Addition of Reagent 1 could have been omitted, run test again.</li> <li>2. Excess oil and grease will hinder or suppress rate of gassing, dilute sample and run test again.</li> <li>3. Strong acid may be present in sample as a preservative or from sample source because of where and how the sample was collected. Strong acids interfere with test.</li> <li>4. pH of water sample is too alkali. For proper Hydrogen gas reaction the water sample with all three reagents added should be around a pH of 1.5 to 1.7 at step 5, page 4.</li> </ol>
<p>Color on the pad suggests more arsenic is present than is expected.</p>	<ol style="list-style-type: none"> <li>1. Possible interference, check for sulfide.</li> <li>2. Dilute sample 1:5 and run test again.</li> </ol>
<p>Interference due to elevated Sulfide.</p>	<ol style="list-style-type: none"> <li>1. Allow sample to sit at room temperature, exposed to air for up to 8 hours (typically 50% of the hydrogen sulfide gas is dissipated every 8 hours).</li> <li>2. Run test again, using double the amount of Second Reagent</li> </ol>
<p>Color on the pad is darker than the highest concentration on the chart.</p>	<ol style="list-style-type: none"> <li>1. Dilute the sample with arsenic/sulfide free water, run test again.</li> </ol>
<p>Color on the Arsenic test pad suggests arsenic recovery is below arsenic level expected.</p>	<ol style="list-style-type: none"> <li>1. Cap may have leaked, run test again.</li> <li>2. Arsenic may be bound, insoluble, or organic. This kit only tests for soluble inorganic arsenic.</li> <li>3. Interference due to elevated nitrate, nitrite, hydrogen sulfide or lead (Pb<sup>+2</sup>) in water sample.</li> <li>4. Temperature may be too low. Run test again.</li> <li>5. The strip pad may be very wet. Be sure water temperature is below 28°C / 84°F.</li> <li>6. Sample was preserved with strong acids. Run test again without preservative acids.</li> </ol>

## **ADDITIONAL TROUBLESHOOTING IDEAS**

If the “Quick™ Arsenic Test Kit Troubleshooting at a Glance” section does not resolve the questionable result, then proceed as follows (in order given):

### **1. Initial Verification Check**

- a. Verify against the parts list that the correct kit and components were received.
- b. Verify that the storage time for the sample is within the recommended 8- hour window. Clean glass or plastic containers are acceptable for storage. Longer storage time is possible only when microbiological activity is not present.
- c. Verify that the sample is not preserved by acidification, with strong acids (especially nitric acid). Strong acids will interfere with the chemistry of the test kit.

### **2. Standard Solution Check**

- a. Run a known standard solution (such as a dilution of LabChem Cat# LC115007, 1000 ppm Arsenic standard), through the test procedure.  
*The result of the standard solution check should meet kit specification (+/- 18 ppb or +/-30%).*

### **3. Test Procedure and Test Kit Check**

- a. Verify that the correct test procedure matches the kit being used.
- b. Verify that the color chart is correct for the kit in use.
- c. Verify that the correct reaction vessel and volume are being used.
- d. Verify that the amount of reagents are correct for the sample size and kit being used.
- e. Verify that the dilution factor, if used, is correct.
- f. If using the optional Quick™ Arsenic Scan, verify that the density value is set to “Y”.

*If any part of the test kit and/or procedure is incorrect, correct the problem and repeat the test.*

### **4. Test Kit Reagents and Analytical Technique Check**

**If the standard solution check still does not match the expected results, check the reagents used in the test and the analytical technique as follows:**

- a. Verify that the reagents have not expired. While most reagents have a reasonable shelf life, storage temperature and storage conditions may affect it. Replace suspect reagents and run the standard solution check (see #2 above) again.
- b. Examine the test strip. Verify that the pads on the strips are white and dry.
- c. If the strips are out of date or do not pass the visual check above, obtain fresh strips and repeat the test.

### **5. Reagent Contamination Check**

- a. Run a water blank (arsenic and sulfide-free) through the entire process, using the correct test procedure for your kit; include sampling, storage, digestion, and colorimetric determination when applicable. Color development on the test pad may indicate a contaminated reagent. Substitute the reagents one by one with new reagents until the reacted pad is white (shows no arsenic).

### **6. Unexplained differences to Reference Arsenic Test**

If you run ITS's Arsenic kit and find an unexplained difference when compared to a reference arsenic test method take the following steps:

- a. Confirm that you are running the test according to the correct procedure.
- b. Make sure your questionable sample is within the range of the test. (A sample out of range for the method may give erroneous results because of overdeveloped color.)
- c. Try a 1:5 dilution of the sample with distilled or deionized water and retest the sample.
- d. Test a known standard, that is not preserved by acidification (see #1c above) to see if it is within specifications.
- e. Confirm that organic arsenic is not the cause of the difference in results.

If the test with a known standard solution gives the correct value in comparison with the reference method, then the sample with questionable results may have an interfering substance. The issue may possibly be resolved by a common analytical technique known as the **Spiked Recovery Test Method for Interferences** outlined below. (Note: Because this method is somewhat technical you should have already performed the easier steps listed above.)

## **ADDITIONAL TROUBLESHOOTING IDEAS - CONTINUED**

### **7. Spiked Recovery Test Method for Interferences:**

- a. Add a known amount of Standard Solution to the questionable sample. This is now the "spiked sample." To avoid test results being underdeveloped, it is recommended to add the Standard Solution amount that is at least equivalent to three times the minimum detectable limit of the test ( $3 \times 5 \text{ ppb} = 15 \text{ ppb}$ ).
- b. Test the spiked and un-spiked (original) sample using the same reagents, instruments, and technique or test method. The spiked sample should show an increase equal to the amount of standard added. The value received is called the **Recovery**. Ideally the % recovery is 100%. Results are acceptable if % recovery is in the range of +/- 30%. The formula for **Calculating Percent Recovery** is below.
- c. If the percent recovery is not in the acceptable range there may be interferences. If it is not possible to dilute the sample past the point of interference, and still be within the detection limit of the test kit, a different test kit with a different detection specification may be needed.

### **Calculating percent recovery :**

The percent recovery formula is as follows:

$$\% \text{Recovery} = \frac{100(C_s - C_u)}{K}$$

Where:

$C_s$  = concentration found when testing the spiked sample

$C_u$  = concentration found when testing the unspiked sample (NOTE: result should be adjusted for the dilution of the spike volume if volume change is more than 5%)

K = concentration of the spike added to the sample

### **Example 1:**

An unspiked sample measures 30 ppb Arsenic. A separate 1000mL portion of the questionable sample was spiked by adding 0.1mL or 100 $\mu$ L of a 1000 ppm Arsenic Standard Solution. This is the equivalent of adding 100 ppb Arsenic to the water sample. The spiked solution was measured by the same method as the original sample. The Spiked result was 150 ppb ( $C_s$ )

$C_s$  = 150 ppb

$C_u$  = 30 ppb

K = 100 ppb

$$\% \text{Recovery} = \frac{100(150-30)}{100} = 120\% \text{ (Recovery result acceptable)}$$

Acceptable percent recovery values are 70-130% (+/- 30%)

### **Example 2:**

In another water sample using a similar spiked method as in Example 1 the results were

$C_s$  = 75 ppb

$C_u$  = 50 ppb

K = 100 ppb

$$\% \text{Recovery} = \frac{100(75-50)}{100} = 25\% \text{ (Recovery result unacceptable)}$$

This percent recovery value is low and would suggest that the water sample using this test is about 75 % below expected value for Arsenic. So in this example, you can calculate the Arsenic in this sample to be 200 ppb. This is determined as follows: multiply the correction interference factor (for this example the 100 divided by 25 equals 4.0) Then multiply the 4.0 X 50 (As concentration found in this sample or  $C_u$ ).

**Note:** This example has never been known to occur; but is included as a theoretical possibility.



## SOIL TEST PROCEDURE

### (Non-Digestion Method)

#### Scope and Application:

1. This method is valid for detection of Inorganic Arsenic in soil.
2. The minimum Arsenic detection with 0.5 g of soil is 1.0 mg/kg.

#### Sample Handling and Preparation (Recommended but not required):

3. Dry soil for at least 1 hour at 60°C or until completely dry.
4. Remove visible debris/stones from dried soil.
5. Grind the dried soil into a fine powder and mix until homogenous using a coffee grinder or a mortar and pestle.  
(a Coffee Grinder works well)

#### Interferences:

6. Test tolerates up to 2 mg/kg of Hydrogen Sulfide, 9000 mg/kg of Iron, and 1500 mg/kg of Lead.

#### Test Procedure:

7. Weigh out **0.5 g** of the dried soil and transfer to the Reaction Bottle supplied in the Arsenic Quick™ Kit (Part # 481396). Note: If the Sample Handling and Preparation steps are omitted, then use 1g of soil. One gram is used on assumption that soil is 50% moisture by weight.)
8. Fill the bottle to the **100mL** (upper) scored line on the Reaction Bottle with Arsenic-free tap water or Distilled water.
9. Follow the standard test procedure for the Arsenic Quick™ Kit starting with Step 3 on page 4.

#### Calculation:

10. **Multiply the test result by 300** (correction multiplier) to get the Arsenic concentration in the soil as mg Arsenic/kg Soil. (Example: 40 µg/L x 300 = 12 mg Arsenic/kg Soil)

**NOTE:** Because when compared to Acid Digestion/ICP-MS Arsenic analysis, this soil screening method gives typically 50% lower value; a correction multiplier of 300 is used (use 200 as a multiplier if you desire actual measured level).

**NOTE:** Advanced users can access the Acid Digestion/ICP-MS Arsenic analysis method at [sensaflow.com/quick-arsenic/](http://sensaflow.com/quick-arsenic/).

## WOOD TEST PROCEDURE

Ordinarily you could cut small wood splinters with a sharp knife from non-weathered wood to test for arsenic; however, since weathered wood will have the arsenic leached out from the surface, this technique would not get a representative wood sample. The older and more weathered the wood the deeper sample core of the wood is required. We recommend that you use a ¼" drill bit and a portable drill. Sampling the wood: Using a ¼" drill bit, drill a wood sample from an intact location on the wood. Usually a sample drilled ½" deep is adequate. If wood is older than 20 years you should drill about ¾" into the wood to get a good wood sample. Drill slowly into the wood, and simultaneously you should have a small, stiff cardboard (or any other convenient collector) below the drilling area to catch the drill dust generated by the drilling. Additional wood material will be generated as you pull out the drill from the core. This material must be added to the sample for testing. Carefully add all the wood drilled dust generated to the Reaction Bottle. You are ready to **do the Arsenic Test**.

1. Add wood chips (see procedure above) to the Reaction Bottle.
2. To the Reaction Bottle, slowly add the water sample to the **50mL** (middle) scored line on the bottle.
3. Add **3 level** spoonfuls of First Reagent **1** to the Reaction Bottle.
4. Add **3 level** red spoonfuls of Second Reagent **2** to the Reaction Bottle.
5. Cap bottle with yellow mixing cap and shake vigorously for 15 seconds to dissolve the reagents in the water.
6. Let the solution sit for **2 minutes**, which extracts arsenic from wood.
7. Add **3 level** white spoonfuls of Third Reagent **3** to the reaction bottle.  
Cap securely with the yellow mixing cap and shake vigorously for **5 seconds**.  
For best results, complete Steps 8 and 9 within the next 30 seconds.
8. Remove yellow mixing cap. Recap bottle securely using the white cap (must be dry) with turret up (open).
9. Remove one Arsenic test strip from the test strip bottle. In order for the results to be accurate, the test strip must be oriented correctly, and inserted to the correct depth. Insert the test strip into the turret as illustrated in step 7, on page 4. Position the strip so that the test pad and red line are facing the back of the white cap. Insert the strip into the turret until the red line is even with the top of the turret, and close (flip down) the turret. This will hold the test strip in place.
10. Using a timer, allow the reaction to occur in an undisturbed, well ventilated area for **5 minutes**. Reaction generates small hydrogen gas bubbles and arsine gas if arsenic is present.
11. After the 5 minute wait, pull up the turret and carefully remove the test strip. Do not touch the reaction pad. Observe the color of the test strip and determine arsenic concentration:

**White** indicates absence of arsenic (no arsenic).

**Yellow** indicates moderate amount of arsenic present (arsenic present).

**Brown** indicates high amount of arsenic present (arsenic present).

Complete color observation immediately (within 30 seconds).



**SDS 1**  
**Safety Data Sheet**

**Section 1 Product and Company Information**

**Product Name:** First Reagent **Product Number:** 481196-D  
**Recommended use:** Used to detect arsenic in water  
**Restricted use:** Not applicable  
**Mfg. name:** Industrial Test Systems, Inc.  
**Mfg. address:** 1875 Langston Street, Rock Hill, SC  
**Emergency Telephone (poison control):** 1-800-222-1222  
**Mfg. Telephone:** 1-803-329-9712

**Section 2 Hazard Identification**

**Hazard(s):** Not hazardous: food grade tartaric acid, less than 1% of other ingredients.  
**Required labeling:** Not applicable

**Section 3 Composition/Information on Ingredients**

Reagent	CAS	TSCA#	RTECS#	%	Hazard
L-Tartaric Acid	87-69-4	N/A	N/A	98.9	Food grade, N/A

**Section 4 First-Aid Measures**

Contact Area	First-aid
Eyes	Flush with large amounts of cold water for 15 minutes. Call a physician immediately.
Skin	Rinse with large amounts of water for 15 minutes. Remove contaminated clothing.
Ingestion	If swallowed, wash out mouth with water. Do not induce vomiting. Call a physician.
Inhalation	If inhaled, remove person to fresh air source. Call a physician.
Most likely effect	Irritation of skin and nose.

**Section 5 Fire Fighting Measures**

**Extinguishing media:** Use that which is appropriate for the surrounding fire.  
**Explosion Hazard:** Not flammable or combustible.  
**Flash Point:** N/A **Special fire fighting procedures:** N/A

**Section 6 Accidental Release Measures**

Sweep up and dispose in normal trash. Do not breathe dust. Wash hands.

**Section 7 Handling and Storage**

Use standard hygienic practices (no eating, drinking, or smoking) around the product. Wash hands after use. Keep away from children and pets. Keep container tightly closed. Use in well ventilated area. Handle carefully to limit dust.

**Section 8 Exposures Controls/Personal Protection**

**OSHA Permissible Limits:** No data  
**Engineering controls:** Adequate ventilation. Use dust mask if there is a large spill.  
**Personal Protective Equipment (PPE):** Use PPE appropriate for the surroundings.  
**Other:** Use gloves to prevent contact irritation. Use eye protection to prevent droplets from entering the eye. Ensure an eyewash station is available.

**Section 9 Physical and Chemical Properties**

**Appearance:** White, granular free-flowing solid **Melting/Freezing point:** N/A  
**Decomposition temperature:** No data **Upper/Lower flammability limit:** No data  
**Solubility:** Water soluble **Viscosity:** N/A **Odor:** odorless  
**Initial boiling point/range:** N/A **Vapor Pressure:** Not volatile  
**Flash point:** No data **Odor threshold:** N/A **Evaporation rate:** N/A  
**Vapor density:** N/A **Flammability:** flammable **pH:** Acidic  
**Partition coefficient:** N/A **Relative density:** No data  
**Auto-ignition temperature:** No data

**Section 10 Stability and Reactivity**

Product is stable under normal conditions. Hazardous polymerization will not occur. Reacts with zinc, silver, and/or aluminum in the presence of water or moisture to rapidly release explosive hydrogen gas.

**Section 11 Toxicological Information**

No data. Do not breathe dust.

**Section 12 Ecological Information**

Data not available.

**Section 13 Disposal Considerations**

Dispose in normal trash. Do not breathe dust. At no time should First Reagent, Second Reagent, and Third Reagent be mixed together in dry (powder) form!

**Section 14 Transport Considerations**

Not applicable - material is not hazardous

**Section 15 Regulatory Information**

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Keep away from children and pets. Store in a dry, cool place. Keep container tightly closed.

**Section 16 Other Information**

**Preparer:** H. R.  
**Date Prepared:** 5-3-17  
**Supersedes Revision:** 10-10-16  
**Disclaimer:** The information in this Safety Data Sheet is accurate to the best of our knowledge. It is designed only as a guidance for safe use, handling, storage, and disposal. This information is not considered to be a warranty or a quality specification.

**SDS 1**  
**Safety Data Sheet**

**Section 1 Product and Company Information**

**Product Name:** Second Reagent **Product Number:** 481196-E  
**Recommended use:** Used to detect arsenic in water  
**Restricted use:** Not applicable  
**Mfg. name:** Industrial Test Systems, Inc.  
**Mfg. address:** 1875 Langston Street, Rock Hill, SC  
**Emergency Telephone (poison control):** 1-800-222-1222  
**Mfg. Telephone:** 1-803-329-9712

**Section 2 Hazard Identification**

**Hazard(s):** DANGER: CORROSIVE. Causes skin and eye damage. May be fatal if swallowed. Irritation to nose and throat.

**Required labeling:** N/A

**Section 3 Composition/Information on Ingredients**

Reagent	CAS	TSCA#	RTECS#	%	Hazard
Potassium Peroxymonosulfate	10058-23-8	N/A	N/A	N/A	%: 43 Hazard: N/A
Potassium Bisulfate	7646-93-7	N/A	N/A	N/A	%: 23 Hazard: N/A
Potassium Sulfate	7778-80-5	N/A	N/A	N/A	%: 29 Hazard: N/A
Potassium Peroxydisulfate	7727-21-1	N/A	N/A	N/A	%: 3 Hazard: N/A
Magnesium Carbonate	546-93-0	N/A	N/A	N/A	%: 2 Hazard: N/A

**Section 4 First-Aid Measures**

Contact Area	First-aid
Eyes	Flush with large amounts of cold water for 15 minutes.
Skin	Rinse with large amounts of water for 15 minutes. Remove contaminated clothing.
Ingestion	If swallowed, do not induce vomiting. Drink 1-2 glasses of water to dilute the stomach contents. Do not give water to the victim if they are unconscious. Call a physician immediately.
Inhalation	If inhaled, remove person to fresh air source. If breathing is still difficult, have a trained person administer oxygen. If not breathing, give artificial respiration. Call a physician immediately.

**Most likely effect** Irritation

**Section 5 Fire Fighting Measures**

**Extinguishing media:** Water **Explosion Hazard:** Not flammable or combustible. Will release oxygen when heated, acidic mist may be present **Flash Point:** N/A  
**Special fire fighting procedures:** N/A

**Section 6 Accidental Release Measures**

Sweep up and dispose in normal trash. Do not breathe dust. Wash hands.

**Section 7 Handling and Storage**

Use standard hygienic practices (no eating, drinking, or smoking) around the product. Wash hands after use. Keep away from children and pets. Keep container tightly closed. Mixing with compounds containing halides or active halogens can cause release of the respective halogen in the presence of moisture. Mixing with cyanides can cause release of hydrogen gas. Mixing with heavy metal salts such as those of cobalt, nickel, copper, or manganese can cause decomposition with release of oxygen and heat.

**Section 8 Exposures Controls/Personal Protection**

**OSHA Permissible Limits:** No data **Engineering controls:** Adequate ventilation. Use dust mask if there is a large spill. **Personal Protective Equipment (PPE):** Use PPE appropriate for the surroundings. **Other:** Use gloves to prevent contact irritation. Use eye protection to prevent droplets from entering the eye. Ensure an eyewash station is available.

**Section 9 Physical and Chemical Properties**

**Appearance:** White, granular free-flowing solid **Melting/Freezing point:** N/A  
**Decomposition temperature:** No data **Upper/Lower flammability limit:** No data  
**Solubility:** N/A **Viscosity:** N/A **Odor:** odorless **Initial boiling point/range:** N/A  
**Vapor Pressure:** Not volatile **Flash point:** No data **Odor threshold:** N/A  
**Evaporation rate:** N/A **Vapor density:** N/A **Flammability:** flammable  
**pH:** 2.3 (1% in water) **Partition coefficient:** N/A **Relative density:** 1.1 – 1.4  
**Auto-ignition temperature:** No data

**Section 10 Stability and Reactivity**

Product is stable under normal conditions. Hazardous polymerization will not occur. Reacts with zinc, silver, and/or aluminum in the presence of water or moisture to rapidly release explosive hydrogen gas.

**Section 11 Toxicological Information**

**Acute Effects:**

- Skin Absorption: >11,000 mg/kg (rabbits)
- Oral LD<sub>50</sub>: 2,000 mg/kg (rats)
- Inhalation LC<sub>50</sub>: >5 mg/L (rats) (4 hour)

**Section 12 Ecological Information**

Data not available.

**Section 13 Disposal Considerations**

Dispose in normal trash. Do not breathe dust. At no time should First Reagent, Second Reagent, and Third Reagent be mixed together in dry (powder) form!

**Section 14 Transport Considerations**

Not applicable - material is not hazardous

**Section 15 Regulatory Information**

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Keep away from children and pets. Store in a dry, cool place. Keep container tightly closed.

**Section 16 Other Information**

**Preparer:** H. R. **Date Prepared:** 5-3-17 **Supersedes Revision:** 12-16-15  
**Disclaimer:** The information in this Safety Data Sheet is accurate to the best of our knowledge. It is designed only as a guidance for safe use, handling, storage, and disposal. This information is not considered to be a warranty or a quality specification.

**SDS 1**  
**Safety Data Sheet**

**Section 1 Product and Company Information**

**Product Name:** Third Reagent **Product Number:** 481196-F  
**Recommended use:** Used to detect arsenic in water  
**Restricted use:** Not applicable  
**Mfg. name:** Industrial Test Systems, Inc.  
**Mfg. address:** 1875 Langston Street, Rock Hill, SC  
**Emergency Telephone (poison control):** 1-800-222-1222  
**Mfg. Telephone:** 1-803-329-9712

**Section 2 Hazard Identification**

**Hazard(s):** TOXIC: May be fatal if swallowed. IRRITANT: Irritation to nose and throat.  
**Required labeling:** Not applicable

**Section 3 Composition/Information on Ingredients**

Reagent	CAS	TSCA#	RTECS#	%	Hazard
Zinc	7440-66-6	N/A	N/A	>99	Toxic, irritant

**Section 4 First-Aid Measures**

**Contact Area**  
**First-aid**  
**Eyes** Flush with large amounts of cold water for 15 minutes. Call a physician immediately.  
**Skin** Wash with soap and water for 15 minutes. Remove contaminated clothing.  
**Ingestion** If swallowed, wash out mouth with water. If a large amount is swallowed, call a physician.  
**Inhalation** Antidote: Calcium disodium edetate/dextrose, intravenous; Calcium disodium edetate/procaine, intramuscular.  
**Most likely effect** If inhaled, remove person to fresh air source. Call a physician. Irritation of skin and nose.

**Section 5 Fire Fighting Measures**

**Extinguishing media:** Dry chemical, sand, lime, soda ash.  
**Explosion Hazard:** Very fine dust may form explosive mixtures with air.  
**Flash Point:** N/A **Special fire fighting procedures:** Do not use water or foam

**Section 6 Accidental Release Measures**

Do not touch spilled material. Avoid heat, flames, sparks, and other sources of ignition. Remove sources of ignition. Collect material into suitable, loosely covered container for disposal. Do not get water directly on material.

**Section 7 Handling and Storage**

Use standard hygienic practices (no eating, drinking, or smoking) around the product. Wash hands after use. Keep away from children and pets. Keep container tightly closed. Use in well ventilated area. Handle carefully to limit dust. Store in a cool, dry place.

**Section 8 Exposures Controls/Personal Protection**

**OSHA Permissible Limits:** N/A  
**Engineering controls:** Adequate ventilation. Use dust mask if there is a large spill.  
**Personal Protective Equipment (PPE):** Use PPE appropriate for the surroundings.  
**Other:** Use gloves to prevent contact irritation. Use eye protection to prevent droplets from entering the eye. Ensure an eyewash station is available.

**Section 9 Physical and Chemical Properties**

**Appearance:** Grayish, powdery solid **Melting/Freezing point:** 420°C/N/A  
**Decomposition temperature:** No data **Upper/Lower flammability limit:** No data  
**Solubility:** reacts **Viscosity:** N/A **Odor:** odorless  
**Initial boiling point/range:** N/A **Vapor Pressure:** 1 mmHg @ 487°C  
**Flash point:** No data **Odor threshold:** N/A **Evaporation rate:** N/A  
**Vapor density:** N/A **Flammability:** flammable **pH:** N/A  
**Partition coefficient:** N/A **Relative density:** 7.14  
**Auto-ignition temperature:** No data

**Section 10 Stability and Reactivity**

Product is stable under normal conditions. Hazardous polymerization will not occur. Finely divided powder may react with water. Keep away from acids, bases, metals, oxidizers, reducing agents, combustible materials.

**Section 11 Toxicological Information**

**Eye Contact:** Dust may cause mechanical irritation or injury to the surface of the eye, with discomfort, reddening, and tearing. Direct contact may cause serious corneal burns.  
**Skin Contact:** Dust may cause mechanical irritation and mild dermatitis.  
**Ingestion:** Large oral doses may cause gastrointestinal distress with stomach cramps, dehydration, electrolyte imbalance, abdominal pain, nausea, vomiting, hematemesis, diarrhea, lethargy, immune system effects, fever, dizziness, tightness in the throat, shock, collapse, renal failure, and death.

**Section 12 Ecological Information**

Data not available.

**Section 13 Disposal Considerations**

Dispose in normal trash. Do not breathe dust. At no time should First Reagent, Second Reagent, and Third Reagent be mixed together in dry (powder) form!

**Section 14 Transport Considerations**

Not applicable - packaged as part of a reagent set.

**Section 15 Regulatory Information**

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Keep away from children and pets. Store in a dry, cool place. Keep container tightly closed.

**Section 16 Other Information**

**Preparer:** H. R.  
**Date Prepared:** 10-10-16  
**Supersedes Revision:** 12-16-15  
**Disclaimer:** The information in this Safety Data Sheet is accurate to the best of our knowledge. It is designed only as a guidance for safe use, handling, storage, and disposal. This information is not considered to be a warranty or a quality specification. This company shall not be held liable for any damage resulting from handling or from contact with the above product.

**SDS 1**  
**Safety Data Sheet**

**Section 1 Product and Company Information**

**Product Name:** Arsenic Quick Strip **Product Number:** 481196-G  
**Recommended use:** Used to detect arsenic in water  
**Restricted use:** Not applicable  
**Mfg. name:** Industrial Test Systems, Inc.  
**Mfg. address:** 1875 Langston Street, Rock Hill, SC  
**Emergency Telephone (poison control):** 1-800-222-1222  
**Mfg. Telephone:** 1-803-329-9712

**Section 2 Hazard Identification**

**Hazard(s):** Pad contains Mercury.  
**Required labeling:** N/A

**Section 3 Composition/Information on Ingredients**

Reagent:	Mercuric Bromide	CAS:	7789-47-1	TSCA#:	N/A
RTECS#:	OV7415000	%:	Approx. 1mg	Hazard:	Oral LD <sub>50</sub> (rat) 40mg/kg

**Section 4 First-Aid Measures**

**Contact Area**  
**First-aid**  
**Eyes** Flush with copious amounts of cold water for 5 minutes.  
**Skin** Rinse with large amounts of water for 2 minutes. Remove contaminated clothing.  
**Ingestion** Rinse mouth with water. As a precaution, call a physician or Poison Control.  
**Inhalation** Evacuate to fresh air. If breathing is difficult, give oxygen and seek medical advice.  
**Most likely effect** Irritation  
**Section 5 Fire Fighting Measures**

**Extinguishing media:** Use that which is appropriate for the surrounding fire.  
**Explosion Hazard:** None found **Flash Point:** N/A  
**Special fire fighting procedures:** N/A

**Section 6 Accidental Release Measures**

Sweep up strips and put into a plastic bag labeled "Used Test Strips." Dispose of used strips per local environmental and regulatory requirements. Wash hands after use.

**Section 7 Handling and Storage**

Use standard hygienic practices (no eating, drinking, or smoking) around the product. Wash hands after use. Keep away from children and pets. Keep container tightly closed.

**Section 8 Exposures Controls/Personal Protection**

**OSHA Permissible Limits:** N/A **Engineering controls:** N/A  
**Personal Protective Equipment (PPE):** Use PPE appropriate for the surroundings.  
**Other:** Use gloves to prevent contact irritation. Use eye protection to prevent droplets from entering the eye. Ensure an eyewash station is available.

**Section 9 Physical and Chemical Properties**

**Appearance:** Off-white pad on plastic handle **Melting/Freezing point:** N/A  
**Decomposition temperature:** No data **Upper/Lower flammability limit:** No data  
**Solubility:** N/A **Viscosity:** N/A **Odor:** odorless **Initial boiling point/range:** N/A  
**Vapor Pressure:** N/A **Flash point:** No data **Odor threshold:** N/A  
**Evaporation rate:** N/A **Vapor density:** N/A **Flammability:** flammable  
**pH:** N/A **Partition coefficient:** N/A **Relative density:** N/A  
**Auto-ignition temperature:** No data

**Section 10 Stability and Reactivity**

Product is stable. Hazardous polymerization will not occur. Firefighters should wear full protective clothing and self-contained breathing apparatus when fighting fires involving plastic and PVC materials.

**Section 11 Toxicological Information**

Each strip contains about 1mg Mercuric Bromide so toxicological effects are minimal because of the low exposure. Material, however, is toxic and should be handled carefully to minimize exposure. Place all used test strips into a plastic bag labeled "Used Test Strips." Dispose of used strips per local environmental and regulatory requirements. Wash hands after use.

**Section 12 Ecological Information**

Data not available.

**Section 13 Disposal Considerations**

Dispose of the test strips according to regulatory requirements.

**Section 14 Transport Considerations**

Not applicable - the strips are not hazardous

**Section 15 Regulatory Information**

This strip is considered an article under OSHA rules (CFR29, 1910.1200). \*Article means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees\*.

A Safety Data Sheet (SDS) is not required for articles. This SDS is provided as a courtesy.

**Section 16 Other Information**

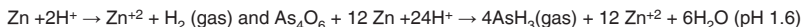
**Preparer:** H. R. **Date Prepared:** 5-3-17 **Supersedes Revision:** 9-21-16  
**Disclaimer:** The information in this Safety Data Sheet is accurate to the best of our knowledge. It is designed only as a guidance for safe use, handling, storage, and disposal. This information is not considered to be a warranty or a quality specification.

# LETTER FROM THE KIT INVENTOR

Thank you for purchasing our U.S. Patented (# 6,696,300) Arsenic Quick™ Kit. Our company has trademarked the kits Quick™ because of the short 14 minute time for analysis.

The Drinking Water standard of the US EPA and the World Health Organization (WHO) allows a maximum contaminant level of 10 ppb (µg/L) for Arsenic. The old US EPA level of 50 ppb (µg/L) remains as the maximum contaminant level for many countries in the world.

For several years, Industrial Test Systems, Inc. (ITS) committed a major research & development effort to provide better and safer arsenic test kits. The goal was achieved. The test was made safer by using tartaric acid, instead of strong acids, for the reduction of inorganic arsenic (As<sup>+3</sup>/As<sup>+5</sup>) to arsine gas. For these efforts a US Patent was granted for the acceleration of the arsenic detection chemistry by the addition of metal enhancers. This permits Arsenic field tests to be completed faster. The Quick™ series of kits use a modified Turret cap which allows detection of arsenic below 10 ppb (µg/L). The reduction reactions utilized in all kits are as follows:



The analysis is performed in a closed reaction bottle (plastic) with an appropriate volume of sample (50 to 500mL). After the 10 minute reduction reaction, the mercuric bromide strip or testing pad is removed and matched to the color chart or color analyzed by the Quick™ Arsenic Scan instrument. A light yellow to brown color change indicates that arsenic is present. The color intensity is proportionately related to the concentration of arsenic in the sample. NOTE: ITS test kits detect free inorganic arsenic only. ICP-MS methods detect inorganic and organic arsenic. If organic arsenic is present, ITS kit results can be expected to give lower values when compared to ICP-MS results.

## Inorganic Arsenic Kits Available:

US Patent # 6696300

PRODUCT NAME (PART NUMBER)	OPTIMUM RANGE* ppb (µg/L)	TYPICAL COLOR CHART DETECTION LEVELS ppb (µg/L)	TYPICAL ACCURACY** USING QUICK™ ARSENIC SCAN	PRICE IN USD	# OF TESTS
Arsenic Quick™ (481396) <small>Can also be used for soil and wood analysis</small>	10 to 200	0, 5, 10, 20, 30, 40, 50, 60, 80, 100, 150, 200, 250, 300, 400, 500, >500	+/-18 ppb or +/-30%	\$175.99	100
Arsenic Quick™ Mini (481396-5) <small>Can also be used for soil and wood analysis</small>				\$29.99	5
Arsenic Quick™ II (481303)	3 to 20	< 1, 2, 3, 4, 5, 6, 7, 8, 10, 13, 20, 25, 30, 40, >50, >80, >120, >160	+/-1.2 ppb or +/-16%	\$229.99	50
Arsenic Quick™ II Mini (481303-5)				\$49.99	5
Arsenic Low Range Quick™ (481297-1)	7 to 80	< 2, 4, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 100, >150, >300	+/-8 ppb or +/-25%	\$185.99	50
Arsenic Low Range Quick™ Mini (481297-5)				\$39.99	5
Arsenic Low Range Quick™ II (481301)	1 to 10	<0.5, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 12, >20, >30, >50	+/-0.8 ppb or +/-14%	\$365.99	50
Arsenic Low Range Quick™ II Mini (481301-5)				\$59.99	5
Arsenic Ultra-Low Quick™ II (481300)	0.3 to 6	0,0,3,0.7, 1.0, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 13, 20, >20	+/-0.4 ppb or +/-12%	\$309.99	25
Arsenic Ultra-Low Quick™ II Mini (481300-5)				\$75.99	5
Quick™ Arsenic Scan Instrument (481305)	—	0.01 to >1.00 color density ppb (µg/L) (as low as 0.2 ppb (µg/L) arsenic)	(see above)	\$1,999.99	—

Information on the performance of Quick™ can be found at <https://archive.epa.gov/nrmrl/archive-etv/web/html/>, or call ITS at 1-800-861-9712 for a copy of the ETV verification report. The use of the ETV™ Name or Logo does not imply approval or certification of this product nor does it make any explicit or implied warranties or guarantees as to product performance.

\*\*Actual results will fall within a range around the actual value. The Typical Accuracy listed is from data generated by a technician in our lab using the Quick™ Arsenic Scan instrument measuring interference-free aqueous arsenic standards. Kit expected accuracy is the larger of the two values. (Example using Quick™: If the mean is 40 ppb, then the typical accuracy is +/-18 ppb larger than +/-12 ppb (40 ppb X 30%))

Where precision is important, ITS recommends that you run the water sample in duplicate, since the typical color matching is within one color block. For best precision consider the purchase of our Quick™ Arsenic Scan instrument. This unit is ideal for use with all test kits. Please contact our sales department at 803-329-9712 for more information or to order the Quick™ Arsenic Scan instrument.

Typical shelf life of kits is over 12 months. The kit includes First Reagent (Tartaric acid); Second Reagent (MPS, an oxidizer); Third Reagent (zinc); and mercuric bromide strips, which contains about 1mg mercury per strip. After use, the strips should be discarded according to local environmental regulations. Valuable safety information about the kit is in the SDS literature. As a safeguard to minimize the operator's exposure to arsine and hydrogen gas, please run all tests in a well-ventilated area away from open flames and other sources of ignition. Arsine gas is highly toxic; and this precaution becomes more urgent if the water sample has high arsenic levels.