



**PIPELINE INSPECTION
CHEMICAL/BACTERIA KIT – FLUIDS**

USER INSTRUCTIONS – CHEMICAL TESTING

SPECIAL Before using this Chemical Test Kit, **READ ALL INSTRUCTIONS.** This kit only

NOTE: contains enough materials for one (1) test.

CHEMICAL PARAMETERS

This kit will test for the following parameters:

pH	Iron	Sulfide	Nitrite	Chloride
Carbonate	Calcium	Nitrate	Manganese	Sulfate

CHEMICAL TESTING

The testing is performed by using the tubes, test strips, and droppers displayed in the foam block. Note that extra items (i.e., test strips) are furnished - it is not necessary to use all of these, but they are provided if you should have a problem with a sample collection or testing procedure, or if you should desire to repeat the analysis for pH, carbonate, iron, calcium, nitrate, nitrite, manganese, chloride or sulfate. An additional lead-acetate paper strip is also provided. The following instructions provide the procedures for the testing of fluids, where the pH is between 4 and 8.

SAMPLE COLLECTION

The fluid to be tested should be drained or captured in the supplied cube container. Fill the cube container no more than half full. Place the cube container with the collected sample on a stable surface. Place the spigot cap on the cube container, making sure the spigot is closed. With the spigot cap in place and closed, invert the cube container, placing the spigot on the bottom. Allow to remain undisturbed until the fluids separate. The fluids to be tested should be as free as possible of hydrocarbons, compressor oils, etc. With the cube container inverted and the spigot on the bottom, the lighter fluids will rise to the top and the heavier fluids will collect on the bottom of the container. These are the fluids to be tested.

INSTRUCTIONS

- Step 1. The fluid to be tested is to be drained from the collected fluid in the cube container into the 30 ml sample cup.
- Step 2. Immerse the water finding test paper strip into the fluid in the sample cup.
- Step 3. If the water finding test paper strip **DOES NOT** change color, then the fluids are hydrocarbons. Record this information on the enclosed Chemical Testing Reporting Form. No further testing can be performed upon this fluid sample.
- Step 4. If the water finding test paper strip **DOES** change immediately to a lavender color upon immersion in the fluid, then proceed to Step 5.

Step 5. **pH Test.** Remove a pH strip from the plastic bag and fold the strip in half. Place the folded edge only of the pH strip into the liquid in the sample cup, making sure to wet only the tip of this folded area (will be the wide, non-numbered, yellow color bar of the pH strip). Remove the pH strip from the liquid and compare the color in the fold of the strip to the color chart on the pH strip. Record the pH reading that matches the wet area. If there is not an exact color match with this scale, then estimate an intermediate value.

pH _____ (Standard Units)

Step 6. **The next test is for the presence of carbonate.** To test for carbonate, take a test strip from the tube marked “Carbonate” and dip the yellow portion of the strip into the sample cup. Stir for 5 seconds. Remove the strip, do not shake off the excess liquid. After 10 seconds compare the color change on the test strip to the color chart below. Record the result of the carbonate test below. If there is not an exact match with this color scale, then estimate an intermediate value. If the color indicated is darker than the highest value below, then record your result as “180 plus”.

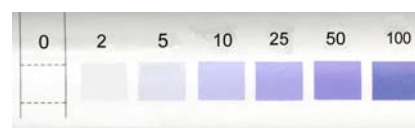


Carbonate _____ mg/l

Step 7. **The next test is for the presence of sulfide.** To test for sulfide, use one of the supplied 1 ml droppers to add 1 ml of test fluid (from the sample cup) into the yellow cap tube. Do so by grabbing the large bulb end of the dropper between the thumb and forefinger and squeeze until the thumb and forefinger touch. Place the dropper into the test fluid (sample cup) and allow liquid to flow into the dropper by opening the thumb and forefinger. The test fluid should fill the large bulb end ½ to ¾ full. Leave the yellow cap tube containing hydrochloric acid in the foam holder, but remove its cap and set it aside. Do not pour the acid out. Add the contents of the dropper directly into this tube by squeezing the dropper tightly between your thumb and forefinger. Dispose of the dropper - do not re-use. Take the test cap (gray cap, with the lead-acetate paper) and a single strip of the (white) lead-acetate paper from the sealed plastic bag. Drape the paper strip over the opening of the yellow capped tube containing the acid and the test fluid, then loosely cover the paper and the tube with the gray test cap (see inset). Allow the tube, cap, and paper to remain undisturbed in the foam holder during Steps 8 and 9.



Step 8. **The next test is for the presence of iron.** To test for iron, use one of the supplied test strips from the tube marked “Iron” and dip the white portion of the strip in the sample cup for 5 seconds. Remove, shake the excess liquid off, wait 20 seconds, then compare the indicator patch to the color chart below and record the result below. If there is not an exact color match with this scale, then estimate an intermediate value. If the color indicated is darker than the highest value below, then record your result as “100 plus”.



Iron _____ mg/l

Step 9. **The next test is for the presence of calcium.** To test for calcium, take a test strip from the tube marked “Calcium” and dip the green portion of the strip into the sample cup for 5 seconds. Remove, shake the excess fluid off, wait 15 seconds, then compare the color change to the color chart below and record the result below. If there is not an exact color match with this scale, then estimate an intermediate value. If the color indicated is lighter than the highest value below, then record your result as “425 plus”.



Calcium _____ mg/l

Step 10. **Complete test for presence of sulfide.** Remove the test cap and lead acetate paper (from Step 7) from the top of the yellow cap tube. Turn the paper over. If the underside of the paper has turned black/brown, than sulfide is present at greater than or equal to 5 mg/l. If there is no color change, then sulfide is less than 5 mg/l. Securely fix the yellow cap back on the tube, then record the sulfide result below.

Sulfide _____ mg/l

Step 11. **The next test is for the presence of nitrate.** Remove the test strip from the tube marked “Nitrate” and dip the white portion of the strip into the sample cup for 30 seconds. Remove, shake the excess liquid off, let set for 30 seconds, then compare the color change to the color chart below and record the results below. If there is not an exact color match with this scale, then estimate an intermediate value. If the color indicated is darker than the highest value below, then record your result as “500 plus”.



Nitrate _____ mg/l

Step 12. **The next test is for the presence of nitrite.** Remove the test strip from the tube marked “Nitrite” and dip the white portion of the strip into the sample cup for 30 seconds. Remove, shake the excess liquid off, let set for 30 seconds, then compare the color change to the color chart below and record the results below. If there is not an exact color match with this scale, then estimate an intermediate value. If the color indicated is darker than the highest value below, then record your result as “80 plus”.



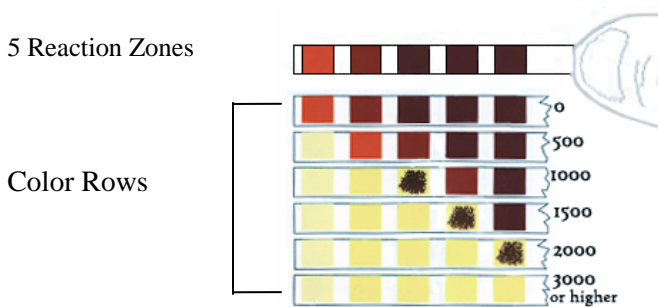
Nitrite _____ mg/l

Step 13. **The next test is for the presence of manganese.** Remove a test strip from the tube marked “Manganese”. Dip the yellow portion of the strip in the sample cup. Remove, shake off the excess liquid, then dip the strip in the white top tube (“Reagent No. 1”). Remove, shake off the excess liquid, wait for 15 seconds, then dip into the red top tube (“Reagent No. 2”). Remove, shake off the excess liquid, wait for 60 seconds, then compare the color change to the color chart below and record the result below. If there is not an exact color match with this scale, then estimate an intermediate value. If the color indicated is darker than the highest value below, then record your result as “100 plus”.



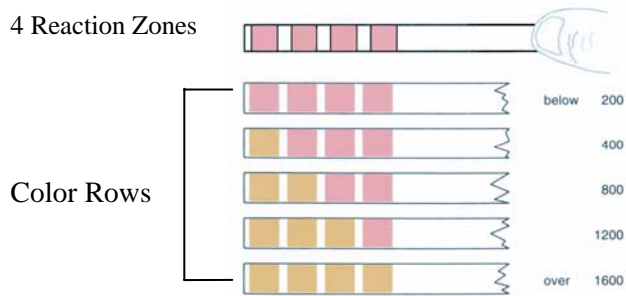
Manganese _____ mg/l

Step 14. **The next test is for the presence of Chloride.** Remove the test strip from the tube marked “Chloride”. Immerse the test strip with all five (5) reaction zones in the Sample cup. Make sure that all five (5) reaction zones are immersed in the fluid in the Sample cup for one (1) second. Remove the test strip and shake off any excess liquid from the test strip. Wait for sixty (60) seconds, then compare the color pattern of the five (5) reaction zones with the color rows on the chart below. Determine which row the five (5) reaction zones color pattern matches most exactly and record the value for that row listed on the right side of the chart and record this value below. If an exact color match cannot be made with the rows in the chart, then estimate an intermediate value. If the five (5) reaction zones match the color pattern of the last row of the chart below, record the result as “3000 plus”.



Chloride _____ mg/l

Step 15. **The next test is for the presence of Sulfate.** Remove the test strip from the tube marked “Sulfate”. Immerse the test strip with all four (4) reaction zones in the Sample cup. Make sure that all four (4) reaction zones are immersed in the fluid in the Sample cup for one (1) second. Remove the test strip and shake off any excess liquid from the test strip. Wait for two (2) minutes then compare the color pattern of the four (4) reaction zones with the color rows on the chart below. Determine which row the four (4) reaction zones color pattern matches most exactly and record the value for that row listed on the right side of the chart and record this value below. If an exact color match cannot be made with the rows in the chart, then estimate an intermediate value. If the four (4) reaction zones match the color pattern of the last row of the chart below, record the result as “1600 plus”.



Sulfate _____ mg/l

Step 16. After completing all the tests, fill out the enclosed Chemical Testing Reporting Form by transferring the results recorded for each of the above steps onto the appropriate spaces of the Form. Also fill out all other appropriate information as indicated on the Reporting Form. Alternately, you may elect to transfer your results onto your own company’s reporting form.

Step 17. After the completion of the chemical testing, the testing materials can be discarded in the trash. No toxic or hazardous chemicals exist.

(Company)

(Location)

CHEMICAL TESTING REPORTING FORM

Storage Field	Line Number	
Bell Hole Number	Well Number	Drip Name and Number
Township/District	County	State
Comments		
Sample Location	Sample Number	
Sample Collection Date	Sample Collection Time <input type="checkbox"/> - AM <input type="checkbox"/> - PM	Sampler
SAMPLE DESCRIPTION		
Color _____ Odor _____		
Comment _____		
Fluid Test Hydrocarbons _____ Water _____	Fluid Test pH _____	WEATHER CONDITIONS Air Temperature _____ Conditions _____ _____
Comments		
CHEMICAL TESTING - FLUID RESULTS		
Test	mg/l	
Carbonate		
Iron		
Calcium		
Sulfide		
Nitrate		
Nitrite		
Manganese		
Chloride		
Sulfate		
TESTED BY	DATE	
COMMENTS		



PIPELINE INSPECTION CHEMICAL/BACTERIA KIT - FLUIDS

USER INSTRUCTIONS – MICROBIOLOGY TESTING

SPECIAL NOTE: Before using this Fluids-Microbiology Testing Kit, **READ ALL INSTRUCTIONS.**
This kit only contains enough materials for one (1) test.

MICROBIOLOGY PARAMETERS

This kit will test for the following parameters:

APBs - Acid Producing Bacteria (Red Cap Bottles)

SRBs - Sulfate Reducing Bacteria (Green Cap Bottles)

MICROBIOLOGY TESTING - FLUIDS

The testing is performed by the bottles and syringes in this kit. The following instructions provide the procedures for the testing of fluids.

The testing for the presence or absence of hydrocarbons will be performed as part of the chemical testing portion of this total kit and does not need to be repeated for this microbiology testing.

The testing of the pH will be performed as part of the chemical testing portion of this total kit and does not need to be repeated for this microbiology testing.

INSTRUCTIONS

- Step 1. The fluid to be tested is from that contained in the small cube container and is the same fluid to be tested by the chemical testing portion of this kit.
- Step 2. Drain the fluid sample from the bottom of the cube container into the clean 30 ml sample cup that is contained in the bacteria kit, keeping the fluid in the cup as clean as possible. Prevent fingers and foreign materials (leaves, dirt, etc.) from contaminating the fluid.

Inoculation of APBs Bottles

- Step 3. Number the **red-cap** bottles 1 through 5. (Located in the foam block).
- Step 4. Remove the metal tabs from the centers of all **red-cap** bottles. Do not remove the entire metal seal.
- Step 5. Using one of the enclosed alcohol swabs, wipe the exposed rubber part of the cap on each of the **red-cap** bottles.
- Step 6. Unwrap one of the four syringes. Draw one (1) ml of fluid from the second 30 ml sample cup into the first syringe.
- Step 7. Insert the syringe needle into the top of the first **red-cap** bottle and inject the sample into the bottle (**red-cap** bottle 1). Move the syringe plunger up and down a couple of times to mix the sample in the bottle. Empty the syringe into this bottle prior to removing the syringe.
- Step 8. Remove the empty syringe and set it aside. *You will not use it again.*
- Step 9. Unwrap the second of the four syringes. Insert it into the first **red-cap** bottle.
- Step 10. Now pull up on the syringe plunger to draw up one (1) ml of sample from the first **red-cap** bottle into the syringe.
- Step 11. Pull the syringe out of **red-cap** bottle 1, insert the needle into **red-cap** bottle 2, and inject the liquid into bottle 2. Once again, move the syringe plunger up and down to mix the sample, draw up one (1) ml of liquid, and inject it into **red-cap** bottle 3.
- Step 12. Repeat the above step until all of the **red-cap** bottles have been injected. Note: you do not have to draw any liquid out of the last **red-cap** bottle (bottle 5).
- Step 13. Remove the empty syringe from the last **red-cap** bottle (bottle 5) and set the syringe aside. *You will not use it again.*

Inoculation of SRBs Bottles

- Step 14. Number the **green-cap** bottles 1 through 5. (Located in the foam block).
- Step 15. Remove the metal tabs from the centers of all **green-cap** bottles. Do not remove the entire metal seal.
- Step 16. Using one of the enclosed alcohol swabs, wipe the exposed rubber part of the cap on each of the **green-cap** bottles.
- Step 17. Unwrap the third of the four (4) syringes. Draw one (1) ml of fluid from the second 30 ml sample cup into the syringe.
- Step 18. Insert the syringe needle into the top of the first **green-cap** bottle and inject the sample into the bottle (**green-cap** bottle 1). Move the syringe plunger up and down a couple of times to mix the sample in the bottle. Empty the syringe into this bottle prior to removing the syringe.
- Step 19. Remove the empty syringe and set it aside. *You will not use it again.*
- Step 20. Unwrap the fourth syringe. Insert it into the first **green-cap** bottle.
- Step 21. Now pull up on the syringe plunger to draw up one (1) ml of sample from the first **green-cap** bottle into the syringe.
- Step 22. Pull the syringe out of **green-cap** bottle 1, insert the needle into **green-cap** bottle 2, inject the liquid into bottle 2. Once again, move the syringe plunger up and down to mix the sample, draw up one (1) ml of liquid, and inject into **green-cap** bottle 3.
- Step 23. Repeat the above step until all of the **green-cap** bottles have been injected. Note: you do not have to draw any liquid out of the last **green-cap** bottle (bottle 5).
- Step 24. Remove the empty syringe from the last **green-cap** bottle (bottle 5) and set the syringe aside. *You will not use it again.*

- Step 25. Upon completion of Step 24, the second sample cup, syringes, etc. may be discarded. The syringes are to be discarded per the section entitled “Syringe Disposal”. The sample cups, alcohol swabs, etc. can be disposed of in the trash.

Recording the Microbiology Survey Results

- Step 26. The carton in which the Microbiology Survey APB and SRB bottles, syringes, etc. were originally shipped can be used as an incubator for the completion of the Microbiology Survey. After inoculating all the bacteria bottles, place the foam block containing the inoculated SRB and APB bottles back into the box, and close the lid. All other materials can then be discarded. The Microbiology Survey record found as a label on the lid of the box can be completed, for ease of reference.
- Step 27. Keep the bottles out of direct sunlight and at room temperature for one month (30 days).
- Step 28. Ten (10) days after inoculation, check the APB (**red-cap**) bottles for any color changes. If the liquid has changed from red to yellow, count that bottle as having changed (positive). Record the number of APB (**red-cap**) bottles, starting with Bottle 1, that have changed on the enclosed reporting form. After the ten (10) days, no further observations are needed for the APB (**red-cap**) bottles.
- Step 29. Twenty-eight (28) to thirty (30) days after inoculation, check the SRB (**green-cap**) bottles for any color changes. If the liquid has changed from clear to black, count that bottle as having changed (positive). Record the number of SRB (**green-cap**) bottles, starting with Bottle 1, that have changed on the enclosed reporting form. After the thirty (30) days, no further observations are needed for the SRB (**green-cap**) bottles.
- Step 30. After the results have been recorded on the Microbiology Survey Reporting Form, the APB and SRB bottles can be discarded in the trash. No special handling or disposal requirements are applicable for their disposal.

Syringe Disposal

Needles and syringe barrels are to be destroyed and disposed in accordance with Federal and Local laws. At a minimum, the needles must be destroyed before discarding by cutting the tips off the needle or by bending back the needle tips. Syringes must be destroyed by breaking or shattering the barrel.

(Company)

(Location)

MICROBIOLOGY SURVEY REPORTING FORM

Storage Field	Line Number	
Bell Hole Number	Well Number	Drip Name and Number
Township/District	County	State
Comments		
Sample Location		Sample Number
Sample Type <input type="checkbox"/> - Soil <input type="checkbox"/> - Scale <input type="checkbox"/> - Solids <input type="checkbox"/> - Sludge/Gunk <input type="checkbox"/> - Liquids <input type="checkbox"/> - Slime <input type="checkbox"/> - MIC <input type="checkbox"/> - Pipeline Dust <input type="checkbox"/> - Other _____		
Comments		
Sample Collection Date	Sample Collection Time <input type="checkbox"/> - AM <input type="checkbox"/> - PM	Sampler
SAMPLE DESCRIPTION Color _____ Odor _____ Texture _____		
pH MEASUREMENT pH _____	WEATHER CONDITIONS Air Temperature _____ Conditions _____	
MICROBIOLOGY SURVEY RESULTS		
Positive Culture Bottles Bottle Number (Red Cap) Number of Days	APBs <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> (1) (2) (3) (4) (5)	_____ Bacteria Colonies/ml
	_____ <input checked="" type="checkbox"/> Record color change from red to yellow after 10 days	
Positive Culture Bottles Bottle Number (Green Cap) Number of Days	SRBs <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> (1) (2) (3) (4) (5)	_____ Bacteria Colonies/ml
	_____ <input checked="" type="checkbox"/> Record color change from clear to black after 28-30 days	
TESTED BY		DATE
COMMENTS		

MICROBIOLOGY SURVEY

INTERPRETATION OF RESULTS

1. POSITIVE RESULTS ARE AS FOLLOWS:

<u>BACTERIA</u>	<u>MEDIA</u>	<u>POSITIVE</u>
APBs	Red	Media turns yellow
SRBs	Clear With Nail	Media turns dark gray to black

2. The number of bottles that show positive results in the interval time (10 days APBs and 28 to 30 days SRBs) can be used to calculate the bacteria level in the original sample by the following table:

<u>NUMBER OF POSITIVE BOTTLES</u>	<u>BACTERIA COLONIES/ML</u>	<u>REPORTING VALUE</u>
0	<1 - 10	<10
1	1 - 10	10
2	10 - 100	100
3	100 - 1,000	1,000
4	1,000 - 10,000	10,000
5	≥10,000 - 100,000	100,000

3. When a sample has elevated H₂S levels, the sulfate reducer (SRBs) nutrient bottle no. 1 will often turn “positive” (black) within 15 - 60 seconds of inoculation. This occurrence should be considered “no growth”, if only this bottle is positive after 28 days. If SRB bottle no. 2 turns black immediately, a new sample should be obtained and the H₂S purged from the sample before inoculation. If SRB bottle no. 2 turns black hours or days after inoculation, the bottle should be marked “positive” and the results recorded, per the table in Item 2.