

# Water

The Elixir of life



For easy detection of pathogens from

- Drinking Water Sources
- Bottling Plants
- Water Treatment Plants
- Rural Water Supply Tanks
- Lakes and Wells
- Rivers and Streams
- Housing Societies
- Hotels and Hospitals
- Office Complexes
- Swimming Pools

Trust it's pure !!

**Test 'N' B-Sure™**  
Water Testing Kits

• Microbiology

• Animal Cell Culture

• Plant Tissue Culture

• Molecular Biology

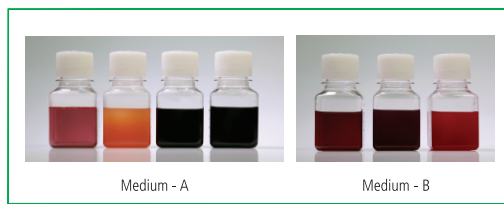
• Chemical & Biochemicals

• Lab Aids & Instrumentation

## Microbial Examination of Water made easy



PA Coliform Kit – MS1186



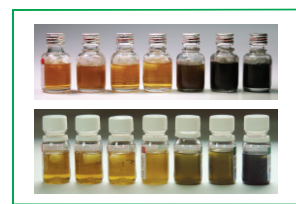
HiWater™ Test Kit – K015



Rapid Hicoliform™ Test Kit – K016



Rapid HiEnterococci™ Test Kit – K017



HiWater™ Testing Kit – K055/K056



H<sub>2</sub>S Test Medium (powder) – K019



HiH<sub>2</sub>STM Test Strip, Modified – K020



HiSelective™ H<sub>2</sub>S Medium Kit – K022 (powder form)



HiSelective™ E. coli Test Kit – K023



Typical Aqua Check  
Test Kit Reagent Bottles



HiE. coli Test Kit – K092



HiFast™ Coli-nella Water Testing Kit – K096

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*Water sustains all life on earth. We are all water creatures. Yes, 60% human body is simply water. Water plays a paramount role in shaping human life and destiny. Hence purity of water is an important factor in a healthy human life. Purity of potable water, cooking water, cleansing water and recreational water are critical factors.*

One of the basic elements of the natural environment, water is a consumable item for humans and animals, a primary component for industry and a vector for domestic and industrial pollution. The form in which water exists is greatly affected by presence of dissolved or suspended solid, liquid and gaseous substances, organic matter and micro-organisms. These characteristics of water are an important factor to man who uses the water for drinking or for technical purposes.

The quality and amount of the various constituents actually form the basis for the definition of the quality of water, upon which the adequacy for various uses are determined. In this view testing of the available water is of ultimate importance. To determine potability of water, bacteriological and hygienic chemical analysis is necessary. Microbiological examinations of water samples determine its potability and sanitary quality. These methods indicate the degree of contamination with wastes.

HiMedia Laboratories provide ready to use Water Testing Kits - Microbial as well as chemical for the speed and accuracy in detection of drinking water potability.

Test & B-Sure range of Microbial Testing Kits enable the easy detection of microbes in potable water. The present literature also includes a brief overview of chemical analysis using Aqua Kits along with list of conventional bacteriological media available for various pathogen testing in different water samples using HiMedia's Culture Media.

## Complete Water Testing

### Sample Sources

Water Treatment Plants  
Rural Water Supply Tanks  
Lakes and Wells  
Rivers and Streams  
Housing Societies  
Hotels and Hospitals  
Office Complexes  
Swimming Pools  
Bottling Plants



Water

### Tests for Microbes

*E. coli*  
*Citrobacter*  
*Salmonella*  
*Vibrio*  
*Shigella*  
Enterococci  
*Klebsiella*  
*Pseudomonas*  
*Enterobacter*

### Physical

Turbidity  
pH

### Chemical

Total Hardness  
TDS  
Alkalinity  
Arsenic  
Ammonia  
Chloride  
Residual chlorine  
Sulphite  
Silica  
Iron  
Fluoride  
Nitrate  
Nitrite  
Hydrazine  
Free Chlorine  
Orthophosphate  
Calcium Hardness



## Water Sampling Procedure

- The source from where water is collected should be in regular use.
- For Hand Pump sources, before collecting the water, the water should be pumped and wasted for at least 3-5 minutes to clear all dirt, turbidity and slime.
- Water from the wells should be taken in the middle at mid-depth. For lakes, rivers and dams the water should be collected near the off-take point.
- The water should be collected after clearing the suspended and floating matter.
- Before collection of the sample, the container should be washed/rinsed with the water to be sampled for at least 2-3 times.
- Note the sample identification number (ID) on the container.
- The testing of the sample should be completed within 12 hours from the time of collection.
- Collected water sample to be tested and interpreted for potability of water.

## PA Coliform Kit

**MS1186**

### Intended use :

PA Coliform Kit is recommended for the detection of presence or absence of Coliform bacteria from drinking water, recreational water, water from distribution or treatment plants, water from domestic water tanks.

### Direction :

Collect 100 ml water to be tested in sterile disposable bottle. Add entire quantity of powder medium (PA Broth) slowly to water by swirling to dissolve the powder completely. After dissolution, incubate the bottles at 35 - 37°C for 24 - 48 hours. Observe the colour change of the medium from reddish-purple to yellow, indicating the presence of coliform bacteria.

### Type of specimen :

Water samples.

### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (1). After use, contaminated materials must be sterilized by autoclaving before discarding.

### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per

- PA Coliform Kit, from HiMedia, provides an easy, yet reliable method to ensure, whether water is free from coliform group of bacteria. Bacterial contamination, especially by the coliform group, cause the major water-borne diseases in humans.
- An exhausting list of enteric diseases like bloody diarrhoea, dysentery, typhoid, gastroenteritis, paratyphoid and many more are caused by these invisible and harmful coliform bacteria.
- The kit can be used anywhere and requires no training or laboratory. The ease to test at an affordable cost makes the kit a handy tool; to be safe from enteric pathogens.



1. Control

2. Total coliform

established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control :

##### Appearance :

Light yellow to greenish yellow coloured, homogeneous, free flowing powder.

##### Colour and clarity of solution :

Reddish purple coloured, clear solution, without any precipitate.

##### Cultural Response :

Cultural characteristics observed after an incubation at 35 – 37°C for 24 – 48 hours.

Organism (ATCC)	Growth	Colour of Medium
# <i>Klebsiella aerogenes</i> (13048) (00175*)	good-luxuriant	light yellow
<i>Escherichia coli</i>	turbid	
	good-luxuriant	yellow

(25922) (00013*)	turbid	
<i>Enterococcus faecalis</i> (29212) (00087*)	inhibited	–
<i>Klebsiella pneumoniae</i> (13883) (00097*)	good-luxuriant	yellow
<i>Salmonella</i> Typhimurium (23564)	good-luxuriant	turbid purple
<i>Salmonella</i> Typhimurium (14028) (00031*)	good-luxuriant	turbid purple

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References :

1. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.

## HiWater™ Test Kit

**K015**

#### Intended use :

HiWater™ Test Kit is devised for rapid and simultaneous detection of *Salmonella* species, *E. coli*, *Citrobacter* species and *Vibrio* species.

#### Composition

**Medium A :** (for detection of *Salmonella* species, *E. coli*, *Citrobacter* species)

Ingredients	Gms/pack
Peptone, special	2.00
Lactose	0.50
Dipotassium hydrogen phosphate	0.15
Ferric ammonium citrate	0.075
Sodium thiosulphate	0.10
Sodium lauryl sulphate	0.01
Bromo cresol purple	0.0005

**Medium B :** (for detection of *Vibrio* species)

Ingredients	Gms/pack
Peptone, special	1.20
Sucrose	2.00
Sodium thiosulphate	0.65
Sodium citrate	1.00
Bile salt	0.60
Sodium chloride	1.00
Indicator mix	0.06

#### Direction :

Collect 100 ml water in each sterile disposable bottles. Add entire quantity of medium A powder slowly to one bottle with 100 ml water. Swirl to dissolve the powder completely. Similarly add entire quantity of medium B powder to another bottle with 100 ml water. Repeat the same procedure for



Medium A : 1. Control 2. *E. coli* 3. *C. freundii* 4. *S. Typhimurium*



Medium B : 1. Control 2. *V. cholerae* 3. *V. parahaemolyticus*

dissolution of powder as specified for medium A. After dissolution, incubate both the bottles at 35-37°C for 24-48 hours.

#### Principle and interpretation :

Medium A : For *Salmonella*, *E. coli*, *Citrobacter* species :  
HiWater™ test kit which is a modification of Manja *et al.* (2), allows the simultaneous detection of *Salmonella*, *E. coli* and *Citrobacter* species. Differentiation is based on production of H<sub>2</sub>S whereas *E. coli* is identified on the basis of colour change in the medium.

The medium contains peptone special as a source of nitrogen, carbon, long chain amino acids and other essential nutrients. Ferric ammonium citrate and sodium thiosulphate are reduced by certain species of enteric organisms to produce H<sub>2</sub>S. Dipotassium hydrogen phosphate provides buffering action and sodium lauryl sulphate inhibits the growth of accompanying gram positive organisms. Bromo cresol purple indicates change in the pH of the medium by colour change from light-purple to yellow. Lactose is the fermentable carbohydrate. Lactose fermentors induce acid production leading to lowering of pH and hence the colour change.

Medium B : For *Vibrio* species :

*Vibrio* broth is a selective medium for *Vibrio cholerae*, *V. parahaemolyticus* and other *Vibrios*.

Peptone, special provides nitrogen, carbon, sulphur, vitamin B complex and other essential nutrients.

Sodium citrate and bile salt inhibit gram positive organisms and coliforms. Sucrose is the fermentable carbohydrate. Thiosulphate acts as a source of sulphur. The alkaline pH of the medium aids in the recovery of *Vibrio cholerae*.

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (1). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling

specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control :

##### Appearance :

Medium A and B : Light yellow to yellow coloured, homogeneous, free flowing powder.

##### Colour and clarity of solution:

Medium A : Light purple coloured, clear solution.

Medium B : Purple coloured, clear solution.

##### Cultural Response :

Cultural characteristics observed after an incubation at 24 – 48 hours at 35 - 37°C.

Medium A - for *Salmonella*, *E. coli*, *Citrobacter* species

Organism (ATCC)	Colour change	H <sub>2</sub> S production
<i>Escherichia coli</i> (25922) (00013*)	Yellow	—
<i>Salmonella</i> Typhimurium (14028) (00031*)	Black	+
<i>Citrobacter freundii</i> (8090)	Black	+
<i>Salmonella</i> Enteritidis (13076) (00030*)	Black	+

Medium B - For *Vibrio* species

Organism (ATCC)	Colour change
<i>Vibrio cholerae</i> (15748)	dark burgundy
<i>Vibrio parahaemolyticus</i> (17802) (00037*)	red

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References :

1. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.
2. Manja K.S., Maurya M.S., and Rao, K.M. (1982) Bulletin of World Health Organization 60(5): 797-801

## Rapid Hicoliform™ Test Kit

**K016**

### Intended use :

The Rapid Hicoliform™ Test Kit is used for detection and confirmation of *Escherichia coli* and total coliforms on the basis of enzyme substrate reaction from water samples, using a combination of chromogenic and fluorogenic substrate.

### Composition :

Ingredients	Gms/pack
Peptone, special	0.50
Sodium chloride	0.50
Sorbitol	0.10
Dipotassium hydrogen phosphate	0.27
Potassium dihydrogen phosphate	0.20
Sodium lauryl sulphate (SLS)	0.01
Chromogenic substrate	0.008
Fluorogenic substrate	0.005
Isopropyl-β-D-thiogalactopyranoside (IPTG)	0.01

### Direction :

Collect 100 ml water to be tested in sterile disposable bottle. Add entire quantity of medium by swirling to dissolve the powder completely. After dissolution, incubate the bottle at 35-37°C for 24-48 hours. Observe the colour change of the medium from light yellow to blue green indicating the presence of coliforms and light yellow to fluorescent blue green (under uv) indicating presence of *Escherichia coli*.

### Principle and Interpretation :

The Rapid Hicoliform™ Test Kit is used for the simultaneous detection of total coliforms and *E. coli*. Peptone, special which is rich in tryptophan content, provides nitrogen and carbon source, long chain amino acids and other essential growth nutrients and is useful for the simultaneous detection of indole production. The presence of indole can be detected by addition of p-dimethylaminobenzaldehyde (Kovac's Indole Reagent – R008) indicated by formation of red coloured ring. Sorbitol is the fermentable carbohydrate. The phosphate salts provide buffering action for rapid growth of coliforms. Sodium lauryl sulphate makes the medium selective by inhibiting accompanying microflora, especially the gram-

positive organisms. The fluorogenic substrate, is split by enzyme β-D-glucuronidase, which is specifically found in *E. coli*. The reaction is indicated by a blue fluorescence under UV light. Due to the presence of enzyme β-D-galactosidase, total coliforms is indicated by a blue-green colour of the broth by cleavage of chromogenic substrate. IPTG amplifies enzyme synthesis and increases the activity of β-D-galactosidase (1-6).

### Type of specimen :

Water samples.

### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (7). After use, contaminated materials must be sterilized by autoclaving before discarding.

### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

### Quality Control :

#### Appearance :

Light yellow to yellowish brown coloured, homogeneous, free flowing powder.

#### Colour and clarity of solution:

Light yellow coloured, clear solution.

#### Cultural Response :

Cultural characteristics observed after an incubation at 35 - 37°C for 24 – 48 hours.



1. Control 2. *S. Typhimurium* 3. Total coliforms 4. *E. coli* 5. *E. coli* Fluorescence under UV  
(Negative reaction) (Positive reaction) (Positive reaction) (Positive reaction with fluorescence)



Organism	Colour change in medium	Fluorescence	Indole reaction
Total coliforms	blue-green#	—	—
<i>Escherichia coli</i> (25922) (00013*)	blue-green#	+	+
<i>Salmonella</i> Typhimurium (23564)	yellow**	—	—
<i>Salmonella</i> Typhimurium (14028) (00031*)	yellow**	—	—

Key: # = Positive reaction – colour change to blue green  
\*\* = Negative reaction – no colour change (pale yellow)

#### Storage and Shelf Life :

On receipt store between 2-8°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and

discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References :

1. Hahn, G., and Wittrock E. 1991, *Acta Microbiologica Hungarica* 38(3-4):265-271.
2. Manafi, M., and Kneifel, W. 1989. *Zbl. Hygiene and Umweltmedizin* 189:225-234.
3. Manafi, M. 1990. *Forum Stadte-Hygiene* 41:181-184.
4. Manafi, M. 1991. *Ernahrung/Nutrition*, 15, Nr. 10.
5. Manafi, M., and Kneifel, W. 1991, *Acta Microbiologica Hungarica* 38(3-4):293-304.
6. Manafi, M., Kneifel B., and Bascon, S. 1991. *Microbiol. Rev.* 55:335-348.
7. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, *Standard Methods for the Examination of Water and Wastewater*, 23rd ed., APHA, Washington, D.C.

## Rapid HiEnterococci™ Test Kit

**K017**

#### Intended use :

The Rapid HiEnterococci™ Test Kit is used for rapid and easy identification and differentiation of *Enterococci* from water sample. It contains chromogenic substrate, which aids in the detection of *Enterococci* from water sample.

#### Composition :

Ingredients	Gms/pack
Peptone, special	1.00
Sodium chloride	0.50
Sodium azide	0.03
Chromogenic substrate	0.004
Polysorbate 80	0.20
Disodium dihydrogen phosphate	0.125

#### Direction :

Collect 100 ml water to be tested in sterile disposable bottle. Add entire quantity of medium by swirling to dissolve the powder completely. After dissolution, incubate the bottle at 35-37°C for 24-48 hours. Observe the colour change of the medium from light yellow to blue green indicating the presence of *Enterococci*.

#### Principle and Interpretation :

The Rapid HiEnterococci™ Test Kit allows for rapid identification and differentiation of *Enterococci* from water samples.

The peptone special supplies nitrogenous and carbonaceous compounds, long chain amino acids, vitamins & other essential nutrients. Sodium chloride provides the osmotic balance for rapid growth of *Enterococci*. Sodium azide inhibits the accompanying microflora, especially the gram negative organisms.

The enzyme  $\beta$ -D-Glucosidase present in *Enterococci* cleaves the chromogenic substrate, resulting in an intensive colour change in the broth to blue green (1).

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (2). After use, contaminated materials must be sterilized by autoclaving before discarding.



1. Control      2. *E. coli* (Negative reaction)      3. *E. faecalis* (Positive reaction)

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control :

##### Appearance:

Cream to yellow coloured, homogeneous, free flowing powder.

##### Colour and clarity of solution:

Yellow coloured, clear solution.

##### Cultural Response :

Cultural characteristics observed after an incubation at 35 - 37°C for 24 – 48 hours.

#### Organism (ATCC)

*Escherichia coli*  
(25922) (00013#)

*Enterococcus faecalis*  
(29212) (00087#)

#### Growth

inhibited

luxuriant

#### Colour change in medium

slightly (pale) yellow\*\*

blue green\*

Key : \* = Positive – colour change to blue green

\*\* = Negative – no colour change (yellow)

#### Storage and Shelf Life :

On receipt store between 2-8°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References :

1. Manafi M., and Sommer R, 1993, *Wat. Sci. Tech.* 27:271-274.
2. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, *Standard Methods for the Examination of Water and Wastewater*, 23rd ed., APHA, Washington, D.C.

## H<sub>2</sub>S Test Medium (powder)

**K019**

#### Intended use :

Bacteriological field-testing kit for drinking water using H<sub>2</sub>S test medium.

H<sub>2</sub>S Test Medium is recommended for the detection of *Salmonella* species and *Citrobacter* species from water samples.

#### Direction:

Fill the bottle with water up to arrow level (20 ml). Allow to dissolve the powder and if required shake gently. Keep at room temperature (preferably at 32-35°C) for 24-48 hours. After incubation if color turns black, water is not fit for drinking.

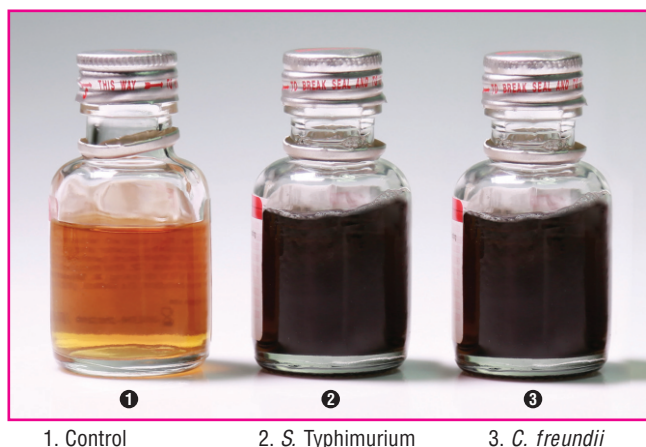
Note: Add few drops of some disinfectant (i.e. dettol, phenyl etc.) and discard the bottle. Preferable to use the autoclave wherever the facility is available.

#### Principle and Interpretation:

The importance of clean water for Health has long been

recognised. Yet it is still a problem around the world. Human faecal contamination is one of the major reason for water born diseases, global health problem. In 1993, WHO (1) recommended regular monitoring of drinking water for complete absence of thermotolerant coliform and *Salmonella* species. Coliform bacteria may not be adequate as sole indicator of recent faecal contamination. It is studied that there is no co-relation between coliform and presence of *Salmonella* species in water, in tropics (2, 3).

The analysis of *Salmonella* by routine culture method is lengthy process. However K019 – H<sub>2</sub>S Test Medium Kit is rapid, portable and reliable field testing kit for drinking water. This kit can detect *Salmonella* Typhimurium and *Citrobacter freundii* based on detection of Hydrogen sulphide (4) even in absence of coliform. It is rich in growth factors and nitrogen source. Addition of cysteine makes the medium more sensitive and the test less time consuming for detection of



*Salmonella* Typhimurium and *Citrobacter freundii* (5). H<sub>2</sub>S test medium is having ferric salts which are reduced by certain species of enteric organisms to H<sub>2</sub>S. This medium is having sufficient buffering action and inhibitory effect for growth of gram-positive organisms.

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (6). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control:

##### Appearance:

Light yellow to yellowish brown coloured, homogeneous powder in glass bottles.

##### Colour and clarity of solution:

Dark amber coloured clear solution obtained on addition of water up to mark.

##### Cultural Response :

Cultural characteristics observed after an incubation at ambient temperature between 25°C to 44°C for 24 - 48 hours.

#### Organism (ATCC)

*Citrobacter freundii* (8090)  
*Salmonella* Typhimurium (23564)  
*Salmonella* Typhimurium (14028) (00031\*)

#### Growth

luxuriant  
luxuriant  
luxuriant

#### H<sub>2</sub>S production

+

+

+

Key : + = positive, blackening of the medium

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References:

1. WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
2. Townsend S.A., 1992, The relationships between *Salmonellas* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Appl. Bacteriol. 73:182-188.
3. Peterson D.J., and Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor.2 (June). 7-11.
4. Manja K.S., Maurya M.S. and Rao K.M., 1982, A simple field test for the detection of faecal pollution in drinking water. Bulletin of the World Health Organisation, 60:797-801.
5. Sobsey M.D. and Pfaender F.K. Evaluation of the H<sub>2</sub>S Method for Detection of Faecal contamination of Drinking water, Geneva.
6. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.

## HiH<sub>2</sub>S™ Test Strip, Modified

**K020**

#### Intended use :

H<sub>2</sub>S Test Strip, Modified is devised for simultaneous detection of *Salmonella*, *Citrobacter* species and *Escherichia coli*.

#### Proprietary Formula :

The medium is for detection of hydrogen sulphide producers is soaked on rolled filter paper.

#### Direction :

Fill the bottle with water upto arrow level. Allow to soak the rolled filter paper strip and shake gently. Keep at room temperature (30°C) or preferably at 35-37°C for 16-48 hours. If required to further verify the presence of *E.coli*, it is recommended to add 5-10 drops of Kovac's Indole Reagent (R008) to the bottles, after incubation.

#### Principle and Interpretation :

It has been reported that human faecal contamination is one

of the main causes of water-borne diseases. In 1993, WHO (2) therefore recommended regular testing of drinking water for thermotolerant coliforms and *Salmonella* species to ensure its complete absence. The frequent testing of drinking water in remote areas, as well as in developing countries, is rather difficult to achieve. Townsend, 1992 (3) has demonstrated the lack of correlation between coliform bacteria and the presence of *Salmonella* species in water, particularly in the tropics and subtropics. In Western Australia 30% of all *Salmonella* isolations from water have occurred in the absence of indicator bacteria (4). Iveson and Fleay 1991 (5), found that 3% of tropical waters tested were contaminated with *Salmonellae* in the absence of *Escherichia coli*. They suggested that the origin of *Salmonellae* may be from faeces of birds and reptiles which did not contain coliform bacteria. The absence of *Escherichia coli* in *Salmonella* contaminated

water is more often in the tropics. However, analysis of *Salmonella* using the culture methods is a four stage process involving pre-enrichment, selective enrichment, biochemical identification and confirmation by serological method. Thus, it is a very lengthy process which requires four days for completion. Therefore Manja's (1) method is most suitable for the detection of *Salmonella* species which uses H<sub>2</sub>S Strip. Ferric salts in the medium is reduced by certain species of enteric organisms to produce H<sub>2</sub>S. In presence of oxygen, some bacteria are able to split tryptophan into indole and alpha amino propionic acid. Indole reaction can be detected by adding p-dimethylaminobenzaldehyde (Kovac's Indole Reagent – R008) indicated by formation of a red coloured ring.

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (6). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control:

##### Appearance:

Yellowish brown coloured, filter paper bud\*\* containing medium.

##### Colour and clarity of solution:

Amber coloured, clear solution obtained on addition of water.

#### Cultural Response :

Cultural characteristics observed after an incubation at 35-37°C for 16 - 48 hours.

Organism (ATCC)	Growth	Colour of Medium	H <sub>2</sub> S production	Indole production
<i>Escherichia coli</i> (25922) (00013*)	luxuriant	yellow with haze	–	+
<i>Salmonella</i> Typhimurium (23564)	luxuriant	black	+	–
<i>Citrobacter freundii</i> (8090)	luxuriant	black	+	–
<i>Salmonella</i> Enteritidis (13076) (00030*)	luxuriant	black	+	–

Key : + = positive reaction – = negative reaction

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### Reference :

1. Manja K.S., Maurya M.S. and Rao K.M., 1982, A simple field test for the detection of faecal pollution in drinking water. Bulletin of the World Health Organization, 60:797-801.
2. WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
3. Townsend S.A., 1992, The relationships between *Salmonellas* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Appl. Bacteriol. 73:182-188.
4. Peterson D.J., and Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor. 2 (June). 7-11.
5. Iveson J.B. and Fleay B.J., 1991, Serovars of *Salmonella* isolated from humans, animals, waters and effluents in natural and disturbed environments in Western Australia. Proceedings of the 14<sup>th</sup> Federal Convention, Australian Water and Wastewater, 2:435-441.
6. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.



1. Control      2. *Salmonella* species / *C. freundii*      3. *E. coli*



## HiSelective™ H<sub>2</sub>S Medium Kit (powder form)

**K022**

### Intended use :

HiSelective™ H<sub>2</sub>S Test Medium is recommended for the simultaneous detection of *Salmonella*, *Vibrio*, *Citrobacter* species and *Escherichia coli* from water samples.

### Introduction :

Supplies of drinking water contaminated with sewage or other excreted matter from man and animals may cause diseases like typhoid fever, cholera, campylobacteriosis, amoebiasis and helminthiasis. In the interests of public health, drinking water supplies should be tested to confirm the absence of contamination. Trying to detect the presence of all the different types of water-borne pathogens is laborious and impractical. A practical approach is to test the supply for the presence of faecal indicator bacteria.

The significance of various coliform organisms in water has been and is a subject of considerable study. Collectively, the coliforms are referred to as indicator organisms. The genera *Enterobacter*, *Klebsiella*, *Citrobacter* and *Escherichia* usually are represented in the majority of isolations made from raw and treated municipal water supplies.

One purpose of drinking water and wastewater treatment is to reduce the numbers of viable organisms to acceptable levels and to remove or inactivate all pathogens causing human disease. Water contamination and disease transmission may result from over-loaded sanitary waste disposal and potable water treatment systems. Outbreaks of gastroenteritis, pharyngo-conjunctivitis, folliculitis, otitis and pneumonia are associated with recreational activities like swimming, boating etc. Environmental Microbiological examinations are conducted to monitor compliance of the environment, to trouble shoot problems in treatment plants and distribution systems and in support of epidemiological investigations of disease outbreaks.

### Directions :

- ◆ Fill vial with water upto arrow level. Swirl to dissolve the powder completely. Incubate at 35-37°C for 24- 48 hours.
- ◆ Observe for turbidity with or without change of colour of the medium.
- ◆ If medium shows turbidity with blue / bluish purple or black colour, water is not fit for drinking. Black colour with turbidity of medium indicates presence of *Salmonella* or *Citrobacter* species, bluish green colour of medium with turbidity indicates *Escherichia coli*, bluish purple colour with turbidity indicates *Vibrio* species and dark purple colour with turbidity indicate presence of *Klebsiella* species.
- ◆ Add few drops of some disinfectant (i.e. Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility is available.

### Principle and Interpretation :

HiSelective™ H<sub>2</sub>S Medium is a modification of the medium developed by Manja et al (1) for the simultaneous detection of *Salmonella*, *Vibrio*, *Citrobacter* species and *Escherichia coli* from water samples.

It has been reported that human faecal contamination is one of the main causes of water-borne diseases. In 1993, WHO (2) has therefore recommended regular testing of drinking water for thermotolerant coliforms and *Salmonella* species to ensure its complete absence. The frequent testing of drinking water in remote areas, as well as in developing countries, is rather difficult to achieve. *Salmonella* species associated with enteric fevers and other diseases are usually present in small numbers, compared to coliforms. *Vibrio cholerae* is the causative agent of cholera which is potentially a fatal diarrheal disease. *Citrobacter freundii* is often confused with *Escherichia* and *Salmonella*, however it is hydrogen sulphide

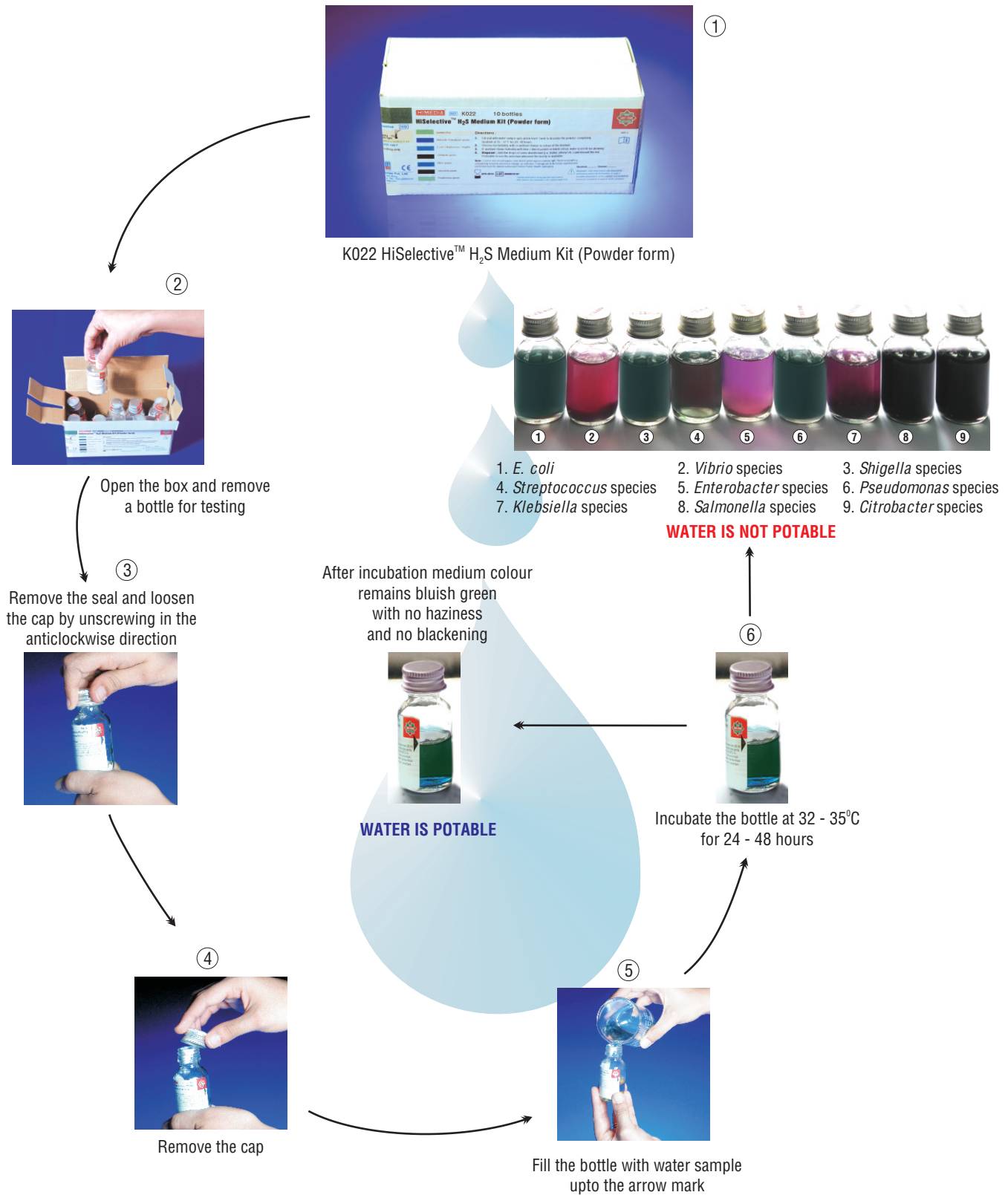
Kit contains sterile bottles with powder medium. Fill 20 ml of test water sample in the bottle, and incubate.



- |                                |                               |                              |                              |                                 |
|--------------------------------|-------------------------------|------------------------------|------------------------------|---------------------------------|
| 1. Control                     | 2. <i>E. coli</i>             | 3. <i>Vibrio</i> species     | 4. <i>Shigella</i> species   | 5. <i>Streptococcus</i> species |
| 6. <i>Enterobacter</i> species | 7. <i>Pseudomonas</i> species | 8. <i>Klebsiella</i> species | 9. <i>Salmonella</i> species | 10. <i>Citrobacter</i> species  |

# HiSelective™ H<sub>2</sub>S Medium Kit (powder form) – K022

## Systematic Diagram



positive unlike *Escherichia* and lacks the pathogenicity of *Salmonella*. Townsend, 1992 (3) has demonstrated the lack of correlation between coliform bacteria and the presence of *Salmonella* species in water, particularly in the tropics and subtropics. In Western Australia, 30% of all *Salmonella* isolations from water have occurred in the absence of indicator bacteria (4). The absence of *Escherichia coli* in *Salmonella* contaminated water is more often in the tropics. However, analysis of *Salmonella* using the culture methods is a four stage process involving pre-enrichment, selective enrichment, biochemical identification and confirmation by serological method. Thus, it is a very lengthy process which requires at least four days for completion. This kit provides faster results, in just 24 hours. Incubation upto 48 hours may be required before discarding negative bottles.

The medium contains tryptone which is a source of nitrogen, carbon, long chain amino acids, vitamins and other essential nutrients. Ferric ammonium citrate and sodium thiosulphate are reduced by certain species of enteric organisms to produce H<sub>2</sub>S, which turns medium black. The indicator mix in the medium is very sensitive to pH changes caused due to fermentation of sucrose. Bile salt inhibits the growth of accompanying microflora.

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (5). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control :

##### Appearance of powder :

Light yellow to pink coloured, homogeneous, free flowing powder.










##### Colour and clarity of solution :

Bluish green coloured, clear solution.

##### Cultural response :

Cultural response is observed after an incubation at 32 - 35°C for 24 - 48 hours .

Control vial : Bluish green coloured, clear solution.

Organisms (ATCC)	Appearance of Medium following incubation	Colour appearance after growth
<i>Klebsiella</i> species	dark purple with turbidity	
<i>Escherichia coli</i> (25922) (00013*)	bluish green with turbidity	
<i>Enterobacter</i> species	dark purple with turbidity	
<i>Shigella</i> species	bluish green with turbidity	
<i>Citrobacter</i> species	black with turbidity	
<i>Streptococcus</i> species	bluish green with turbidity	
<i>Vibrio</i> species	bluish purple with turbidity	
<i>Pseudomonas</i> species	bluish green with turbidity	
<i>Salmonella</i> species	black with turbidity	

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References :

- Manja K.S., Maurya M.S. and Rao K.M., 1982, A simple field test for the detection of faecal pollution in drinking water. Bulletin of the World Health Organisation, 60:797-801.
- WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
- Townsend S.A., 1992, The relationships between *Salmonella* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Appl. Bacteriol. 73:182-188.
- Peterson D.J., and Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor. 2 (June), 7-11.
- Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.

## HiSelective™ E. coli Test Kit

K023

### Intended use :

HiSelective™ E. coli Test Kit is recommended for the rapid detection and confirmation of *Escherichia coli* based on enzyme-substrate reaction from water samples.

### Introduction :

The procedures for microbiological examinations of water samples to determine sanitary quality includes test for detection and enumeration of indicator organisms. The coliform group of bacteria, especially *Escherichia coli* is the principle indicator. Various methods for the differentiation of the coliform group are included in standard procedures. Such differentiation however is of limited value in assessing drinking water quality because the presence of any coliform bacteria renders the water potentially unsatisfactory and unsafe. Thus the detection of *Escherichia coli* in water samples provide qualitative appraising of the sanitary quality of water and the effectiveness of treatment process.

Tests for *Escherichia coli* are applicable for the analysis of drinking water, surface and ground water and waste water. *Escherichia coli* is a member of the indigenous faecal flora of warm-blooded animals. The occurrence of *Escherichia coli* is considered a specific indicator of faecal contamination and the possible presence of enteric pathogens.

### Directions :

- ◆ Collect 100 ml water to be tested in sterile disposable bottle.
- ◆ Add entire quantity of medium by swirling to dissolve the powder completely.
- ◆ After dissolution, incubate the bottle at 35-37°C for 24-48 hours.
- ◆ Observe the colour change of the medium from light yellow to blue indicating the presence of *Escherichia coli*. Coliforms other than *Escherichia coli* give red colour due to presence of indicator.

### Principle and Interpretation :

HiSelective™ E.coli Test Kit is used for detection and differentiation of *Escherichia coli*. It is based on principle of Tryptone Bile Agar used for detection of *Escherichia coli* in foods (1) where recovery of *Escherichia coli* is faster, more reliable and accurate.

The medium contains chromogenic mixture which helps to detect glucuronidase activity of *Escherichia coli* (2). This specific enzyme differentiates *Escherichia coli* from other coliforms. *Escherichia coli* cells split the chromogenic mixture with the help of  $\beta$ -D-glucuronidase enzyme to give blue colour to the medium. Coliforms other than *Escherichia coli* turns media red due to presence of indicator. Thus, the resulting colour distinction allows simple interpretation of test without further confirmation. Tryptone provide the essential growth nutrients to the organisms. Bile salts inhibit gram-positive organisms.

### Type of specimen :

Water samples.

### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (3). After use, contaminated materials must be sterilized by autoclaving before discarding.

### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.



1. Control

2. *Escherichia coli*

3. *Klebsiella pneumoniae*



#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control :

##### Appearance of powder :

Light yellow to pink coloured, homogeneous, free flowing powder.

##### Colour and clarity of solution :

Light yellow coloured, clear solution.

##### Cultural response :

Cultural characteristics observed after an incubation at 35 - 37°C for 24 - 48 hours.

Organisms (ATCC)	Growth	Colour of medium
<i>Escherichia coli</i> (25922) (00013*)	luxuriant	blue
<i>Klebsiella aerogenes</i> (13048) (00175*)	luxuriant	red
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> (25923) (00034*)	inhibited	—

#### Storage and Shelf Life :

On receipt store between 2-8°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### References :

1. Anderson J. M. and Baird Parker A.C., 1975, J. Appl. Bact., 39:111.
2. Hansen W. and Yourassawsky E., 1984, J. Clin. Microbiol., 20:1177.
3. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.

## Test 'N B-Sure Water Testing Kit

**K051**

#### Intended use :

Test 'N B - Sure Water Testing Kit is recommended for simultaneous detection of *Escherichia coli*, Coliforms, *Salmonella* species, and *Citrobacter* species from water sample.

#### Composition\*\*:

Ingredients	Grams/Litre
Tryptone	5.00
BHI powder	5.00
HiVeg™ infusion	5.00
Yeast extract	2.00
Sodium thiosulphate	1.00
Dipotassium hydrogen phosphate	1.50
Ferrous sulphate	0.30
Lactose	5.00
Bromocresol purple	0.02
Magnesium sulphate	1.00
Sodium chloride	5.00
Trehalose	5.00
Final pH (at 25°C) 7.0 ± 0.2	

\*\*Formula adjusted, standardized to suit performance parameters

#### Direction:

Add 100 ml water sample to be tested in bottle. Allow to dissolve the powder and if required shake gently. Incubate at 35-37°C for 24 - 48 hours. After incubation add 1 ml of Kovac's Indole Reagent (R008).

#### Principle and Interpretation:

It has been reported that human faecal contamination is one of the main causes of water-borne diseases. In 1993, WHO (1) therefore recommends regular testing of drinking water for thermotolerant coliforms and *Salmonella* species to ensure their complete absence. The frequent testing of drinking water in remote areas, as well as in developing countries, is rather difficult to achieve. Townsend, 1992 (2) has demonstrated the lack of correlation between coliform bacteria and the presence of *Salmonella* species in water, particularly in the tropics and subtropics. In Western Australia 30% of all *Salmonella* isolations from water have occurred in the absence of indicator bacteria (3). Iveson and Fleay 1991 (4), found that 3% of tropical waters tested contaminated *Salmonellae* in the absence of *Escherichia coli*. *Escherichia coli* is a member of faecal coliform group of bacteria. It is a member of the indigenous faecal flora of warm-blooded animals. *E.coli* is considered a specific indicator of faecal contamination and the possible presence of enteric pathogens. Indole is produced in this

medium by organisms that possess the enzyme tryptophanase. Tryptophanase degrades tryptophan present in tryptone, yielding indole. It can be detected in the medium by adding Kovac's reagent. Indole combines with the *p*-dimethylaminobenzaldehyde of Kovac's reagent and produces a red complex (Red ring at the top).

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (5). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control:

##### Appearance:

Yellow to yellowish brown coloured, homogeneous free flowing powder.

##### Colour and clarity of solution:

Purple coloured, clear solution obtained on addition of water.

##### Cultural response:

Cultural characteristics observed after an incubation at 35-37°C for 24-48 hours.

Organism (ATCC)	Growth	Colour of medium	H <sub>2</sub> S production	Indole# production
<i>Escherichia coli</i> (25922) (00013*)	good-luxuriant	yellow w/haze	—	+
<i>Salmonella</i> Typhimurium (14028) (00031*)	good-luxuriant	purple w/black precipitate	+	—
<i>Citrobacter freundii</i> (8090)	good-luxuriant	black colour throughout the medium	+	—
<i>Vibrio cholerae</i> (15748)	good-luxuriant	purple w/haze	—	—
<i>Shigella flexneri</i> (12022) (00126*)	good-luxuriant	purple w/haze	—	—

Key : + = positive reaction

— = negative reaction

# = On addition of Kovac's Indole Reagent (R008)

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

#### Reference :

1. WHO, 1993, Guidelines for drinking water quality, Vol. 1 Recommendations, Second edition.
2. Townsend S.A., 1992, The relationships between *Salmonellas* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Application Bacteriol. 73:182-188.
3. Peterson D.J., And Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor. 2 (June). 7-11.
4. Iveson J.B. and Fleay B.J., (1991). Serovars of *Salmonella* isolated from humans, animals, waters and effluents in natural and disturbed environments in Western Australia. Proceedings of the 14<sup>th</sup> Federal Convention, Australian Water and Wastewater, 2, 435-441.
5. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.



1. Control    2. *Escherichia coli*    3. *Salmonella* Typhimurium    4. *Citrobacter freundii*    5. *Vibrio cholerae*

## HiWater™ Testing Kit

**K055 / K056**

**(Recommended for primary detection of *Salmonella*, *Citrobacter* and *E. coli* based on H<sub>2</sub>S production)**

### Intended use :

HiMedia has developed ready to use kit for testing potability of drinking water. This kit involves rapid detection of H<sub>2</sub>S producers in single step. The kit is easy to handle, reliable and more stable though it matches on similar principle for the detection of hydrogen sulphide enterobacteria by paper strip method initially developed by Dr. Manja et al (1) for water testing method.

### Formula :

Required quantity of medium is soaked in rolled filter bud, dried and transferred to glass / plastic bottle and sterilized.

### Directions :

1. Fill vial with water upto arrow level. Allow to soak the rolled filter bud and if required shake gently. On release of medium from bud, colour of water will change from yellow to brown. Keep at room temperature (30°C)/closed room/ pocket or preferably at 35-37°C for 24 to 48 hours.
2. Observe for blackening of contents after specified period.
3. If colour turns black, water is not fit for drinking.

### Principle and Interpretation :

It has been reported that human faecal contamination is one of the main causes of water-borne diseases. In 1993, WHO (2) therefore recommended regular testing of drinking water for thermotolerant coliforms and *Salmonella* species to ensure its complete absence. The frequent testing of drinking water in remote areas, as well as in developing countries, is rather difficult to achieve. Townsend, 1992 (3) has demonstrated the lack of correlation between coliform bacteria and the presence of *Salmonella* species in water, particularly in the tropics and subtropics. In Western Australia, 30% of all

*Salmonella* isolations from water have occurred in the absence of indicator bacteria (4). Iveson and Fleay 1991 (5), found that 3% of tropical waters tested were contaminated with *Salmonellae* in the absence of *Escherichia coli*. They suggested that the origin of *Salmonellae* may be from faeces of birds and reptiles which did not contain coliform bacteria. The absence of *Escherichia coli* in *Salmonella* contaminated water is more often in the tropics. However, analysis of *Salmonella* using the culture methods is a four stage process involving pre-enrichment, selective enrichment, biochemical identification and confirmation by serological method. Thus, it is a very lengthy process which requires four days for completion. Therefore Manja's (1) method was found most suitable for the detection of *Salmonella* species which uses H<sub>2</sub>S Strip. K055/K056, HiWater Testing Kit is based on similar lines for detection of hydrogen sulphide producers.

### Type of specimen :

Water samples.

### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (6). After use, contaminated materials must be sterilized by autoclaving before discarding.

### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.



**K055 – HiWater™ Testing Kit (with glass bottles)**

- |                                  |                                |                                 |                                 |                                  |
|----------------------------------|--------------------------------|---------------------------------|---------------------------------|----------------------------------|
| 1. Control                       | 2. <i>Escherichia coli</i>     | 3. <i>Enterococcus faecalis</i> | 4. <i>Staphylococcus aureus</i> | 5. <i>Salmonella</i> Enteritidis |
| 6. <i>Salmonella</i> Typhimurium | 7. <i>Citrobacter freundii</i> |                                 |                                 |                                  |

K055 – Available in Glass bottles

K056 – Available in Plastic bottles



### Performance and Evaluation

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

### Quality Control :

#### Appearance:

Yellowish brown coloured, rolled filter paper bud\*\*, containing H<sub>2</sub>S Medium.

#### Colour and clarity of solution :

Amber coloured, clear solution obtained on addition of water.

#### Cultural response :

Cultural characteristics observed after an incubation at 35 - 37°C for 24 - 48 hours. If colour of the medium changes to black it indicates the presence of *Salmonella* or *Citrobacter* in water, hence indicating that the water is not safe for drinking purpose.

Organisms (ATCC)	Growth	Colour change in medium	H <sub>2</sub> S production
<i>Escherichia coli</i> (25922) (00013*)	good-luxuriant	yellow with haze	—
<i>Salmonella</i> Typhimurium (23564)	good-luxuriant	black	+
<i>Citrobacter freundii</i> (8090)	good-luxuriant	black	+
<i>Salmonella</i> Enteritidis (13076) (00030*)	good-luxuriant	black	+
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> (25923) (00034*)	inhibited	clear yellowish brown	—
<i>Enterococcus faecalis</i> (29212) (00087*)	inhibited	clear yellowish brown	—

Key : + = positive reaction — = no reaction

### Storage and Shelf Life :

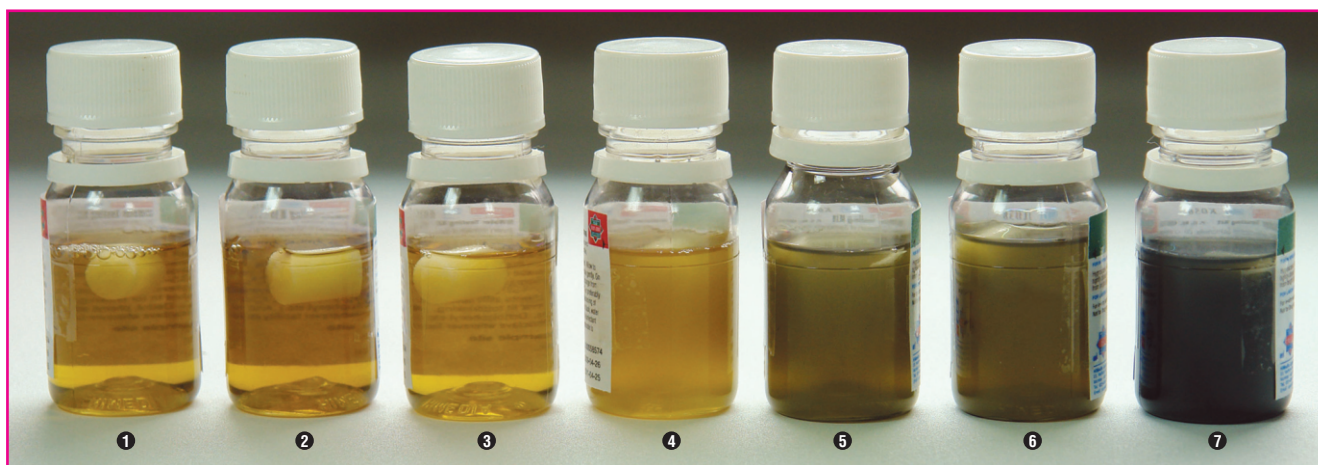
On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

### References :

1. Manja K.S., Maurya M.S. and Rao K.M., 1982, Bulletin of the World Health Organisation, 60:797-801.
2. WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
3. Townsend S.A., 1992, Journal of Appl. Bacteriol. 73:182-188.
4. Peterson D.J., and Schorsch I., 1980, WA Health Surveyor.2 (June). 7-11.
5. Iveson J.B. and Fleay B.J., 1991. Proceedings of the 14th Federal Convention, Australian Water and Wastewater, 2:435-441.
6. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.



**KO56 – HiWater™ Testing Kit (with Plastic bottles)**

1. Control                      2. *Staphylococcus aureus*                      3. *Enterococcus faecalis*                      4. *Escherichia coli*                      5. *Salmonella* Enteritidis  
6. *Salmonella* Typhimurium                      7. *Citrobacter freundii*

KO55 – Available in Glass bottles.

KO56 – Available in Plastic bottles.



## HiSurba™ Test Kit

K060 / K060L

### (Bacteriological field-testing kit for Sulphate Reducing Bacteria)

#### Intended use :

Sulphate Reducing Medium is recommended for the detection of Sulphate Reducing Bacteria such as *Desulfovibrio*.

#### Directions :

1. Fill the bottle with water upto arrow level (20 ml). Allow to dissolve the powder completely by gentle shaking.
2. Keep at room temperature, (preferably at 20-30°C) upto 6 days & observed for complete blackening of the medium after every 24 hours and further upto 6 days to confirm negative results.
3. After incubation if colour turns black, it indicates presence of SRB (Sulphate Reducing Bacteria).

#### Principle and Interpretation :

*Desulfovibrio* is usually the predominant genus in mixed culture of sulfate reducing bacteria. They play most important role in the water and wastewater field. *Desulfuricans* reduces sulfates and other sulfur compounds to hydrogen sulphide. These organisms are a major problem to the petroleum industry as they cause corrosion to iron pipes leading to perforations in the oil well system pipes. They are widely distributed in nature and are present in most soils and waters but other types of bacteria except in special environment bacteria out number them.

The detection and estimation of these bacteria is done on the basis of their ability to grow and produce sulphide in this medium. For the estimation, dilutions of water samples are inoculated. Sulphate reducing bacteria convert sulphate to sulphide, which with the ferrous ion gives black colour.

Microbial analysis of water or deposit sample collected from the system may be performed either by laboratory analysis or by field analysis. The basic procedure for both of these techniques involves the addition of water or deposit sample into a container to which nutrients have been added and incubation of the sample.

The field test is relatively simpler and substantially cheaper as it does not require great deal of training or expertise.

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (1). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control

##### Appearance:

Light yellow to yellowish brown, homogeneous, free flowing powder.

##### Colour and clarity of solution:

Dark amber, clear solution obtained on addition of water up to the mark (20ml).

##### Sterility testings:

Sterility of powder medium was checked by adding 20ml of sterile distilled water in the bottle containing H<sub>2</sub>S medium powder. Incubate at 30-35°C for 48-72 hours.



HiSurba Test Kit – K060



Remove the cap



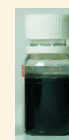
Fill the bottle with sample upto the arrow mark



Incubate the bottle at 20-30°C upto 6 days



Medium colour changes to yellowish brown with haze.



Medium colour changes to black.

## HiSurba™ Test Kit – K060 / K060L

**APPEARANCE :** Light yellow to yellow coloured, homogeneous powder in bottles, forming Yellow to medium amber coloured clear to slightly opalescent solution on addition of water sample up to mark.

**INTERPRETATION :** The detection and estimation of *Desulfovibrio desulphuricans* ATCC 29577 is done on the basis of their ability to grow and produce sulphide in this medium. For estimations of *Desulfovibrio desulphuricans* dilutions of water samples are inoculated. The diagram shows how progressive dilution of test sample results in corresponding delay in the blackening of the medium.

Dilution of (Sulphate Reducing Bacteria per 100ml)	Organisms (ATCC) <i>Desulfovibrio desulphuricans</i> (29577)	Observation of 1 <sup>st</sup> Day Result	Observation of 2 <sup>nd</sup> Day Result	Observation of 3 <sup>rd</sup> Day Result	Observation of 4 <sup>th</sup> Day Result	Observation of 5 <sup>th</sup> Day Result	Observation of 6 <sup>th</sup> Day Result
10 <sup>5</sup>							
10 <sup>4</sup>							
10 <sup>3</sup>							
10 <sup>2</sup>							
10 <sup>1</sup>							
<10							

**Negative Control**

**Positive Control**

**Disposal** – Add few drops of any disinfectant (i.e. Dettol, phenol etc.) and after 15 minutes discard the bottle by pouring contents of tube into the toilet and flush preferable to use the autoclave wherever the facility is available.

**Note:** if blackening observed within 18 hours the SRB levels is higher than  $10^5$  per 100 ml.

### Cultural Response:

Cultural characteristics observed after an incubation at ambient temperature between 25°C - 44°C for up to 6 days.

Organism (ATCC)	Growth	H <sub>2</sub> S Production
<i>Desulfovibrio desulfuricans</i> (29577)	luxuriant	Positive reaction, blackening of the medium

### Note :

1. After testing sample turns black within 2 hours is not to be considered as positive. This might be because of sulphide ion present in test sample and not due to presence of bacteria.
2. No blackening observed in bottles after 6 days interpreted as sulphate reducing bacteria is < 2 / 100ml of sample.

### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.

### References :

1. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.

## HiE.coli™ Test Kit

**K092**

### Intended use :

HiE.coli™ Test kit is recommended for easy detection of *E.coli* from water sample (1 PK sufficient for 10 test). Compartment Bag Test for detection and enumeration of *E.coli* from water samples (replaces MPN tube method) in compartment plastic bag using a chromogenic medium.

### Kit contents :

1. Sterile bottles containing 10-20 mg of sodium thiosulphate - 10 Nos.
2. Sterile pouches containing sterile HiE.coli™ test bud\*\* - 10 Nos.
3. Compartment bags for MPN detection - 10 Nos.
4. U-shaped clip - 1 No.
5. Chlorine tablets (NADCC tablets - 150 mg) for disinfection - 30 Nos.
6. Insert with MPN interpretation chart.

### Directions :

**Sample collection:** Collect 100 ml of the sample in sterile container containing sodium thiosulphate with the lid, taking care to avoid touching inside of the sample container or the lid or the water sample.

### Sample testing:

1. Cut open the pouch and add the bud in the water sample to be tested.
2. Mix the sample well by swirling the bottle periodically for 15 minutes so that the contents of the bud are dispersed into the water sample.
3. Carefully open the compartment bag and transfer the contents of container to the compartment bag.
4. Adjust the water sample to fill the compartment bag in all the five compartments to the fill mark.
5. Seal the bag with the U-shaped clip above the water level such that individual compartment is sealed.
6. Incubate the compartment bag in an incubator or ambient temperature (25- 44.5°C) for 20-24 hours.

7. Record the results as colour change from pale yellow to blue- green as positive for each compartment.
8. Interpret as per the MPN interpretation chart.

### Principle and Interpretation:

Examination of water for the presence of marker groups such as coliforms is one of the most common tests in food microbiology laboratory, partly because of the relative ease and speed with which these tests can be accomplished. Where it is claimed that water has been processed for safety, the finding of such organism demonstrates a failure of the process (1). The Compartment Bag Test is meant for detection - enumeration test for *E.coli*, using a chromogenic culture in plastic compartment bag. The use of bag eliminates using a series of bottles or tubes to culture bacteria. The plastic bag contains internal compartments of different volumes. The concentration of bacteria in the sample is estimated from the combination of positive/negative compartments, giving a Most Probable Number (MPN) of *E.coli* per 100ml. HiE.coli™ Test Kit is used for easy detection of *Escherichia coli* from water sample. Most of the *Escherichia coli* strains can be differentiated from other coliforms by the presence of enzyme  $\beta$ -glucuronidase, which is highly specific for *Escherichia coli* (2). The chromogenic agent X-glucuronide used in this medium helps to detect glucuronidase activity of *Escherichia coli*. *Escherichia coli* cells absorb X-glucuronide and the intracellular glucuronidase enzyme splits the bond between the chromophore and the glucuronide. The released chromophore gives blue colouration to *Escherichia coli*.

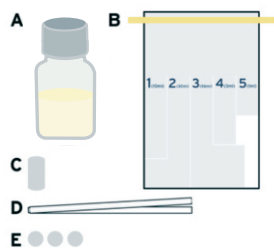
### Type of specimen :

Water samples.

### Specimen collection and Handling :

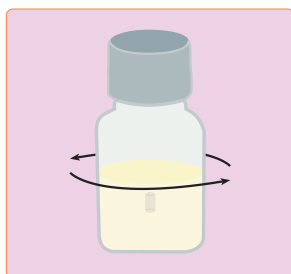
For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (3). After use, contaminated materials must be sterilized by autoclaving before discarding.

## Compartment Bag Test (Instruction for use)

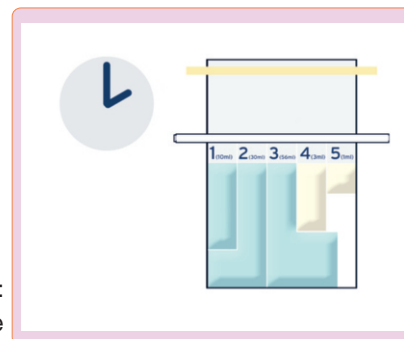


A: Sample  
B: CBT (Compartment Bag for Test)  
C: Hi E. coli Test Bud  
(Growth Medium + Carrier)  
D: Spring clip seal  
E: Chlorine tablets (x3)

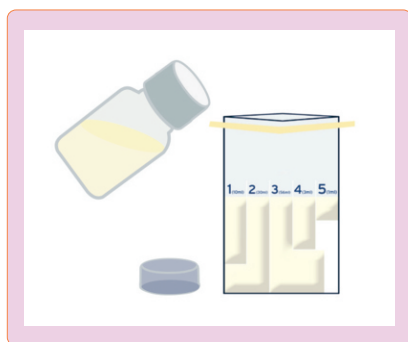
Step 1: Collect and record  
Step 2: Prepare



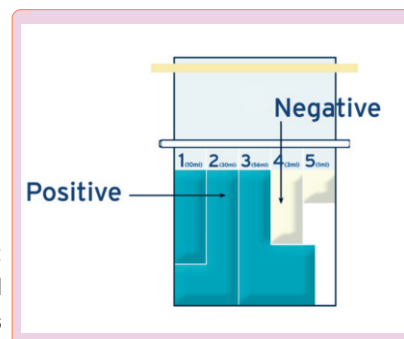
Step 3: Mix water sample with growth medium



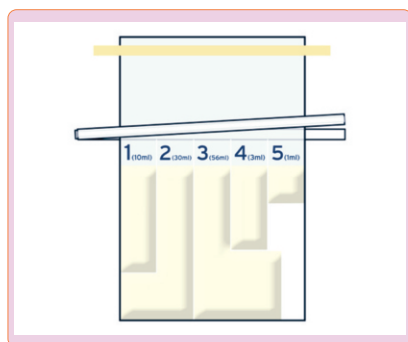
Step 6:  
Incubate



Step 4: Open and fill the CBT



Step 7:  
Score and record results



Step 5: Seal



Step 8:  
Decontaminate

### Health risk based on WHO Guidelines for Drinking Water Quality WHO Guidelines, 2011

Health Risk Category	E. coli CFU* per 100 mL
Low Risk/Safe	0
Intermediate Risk/Probably Safe	1-9
High Risk/Probably Unsafe	10-99
Very High Risk/Unsafe	> 100

\* CFU: Colony Forming Units; CFU and MPN are equivalent, but CFU is obtained in colony-based tests while MPN is obtained quantal tests such as the CBT.



### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

### Performance and Evaluation :

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

### Quality Control

#### Appearance:

- 1) 10 sterile bottles containing sodium thiosulphate
- 2) 10 aluminum pouch containing sterile test buds
- 3) 30 chlorine tablets for disinfection
- 4) 10 compartment bags for MPN detection

#### Colour and clarity of solution:

Light yellow coloured, clear solution is obtained when the bud is added to 100 ml sterile distilled water.

#### Sterility testings:

No growth is observed after 14 days for Bacteria at 30-35°C and for fungi at 20-25°C.

#### Cultural Response:

Cultural response observed after an incubation at 30 - 35°C / 35 - 37°C for 24 - 30 hours.

Organism (ATCC)	Inoculum (CFU)	Growth	Colour of colony
<i>Escherichia coli</i> (25922) (00013*)	50-100	luxuriant	Light blue to blue
<i>Salmonella</i> Enteritidis (13076) (00030*)	50-100	luxuriant	colourless
<i>Citrobacter freundii</i> (8090)	50-100	luxuriant	colourless
<i>Klebsiella pneumoniae</i> (13883) (00097*)	50-100	luxuriant	colourless
<i>Shigella flexneri</i> (12022) (00126*)	50-100	luxuriant	colourless
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> (25923) (00034*)	$\geq 10^3$	inhibited	—
<i>Enterococcus faecalis</i> (29212) (00087*)	$\geq 10^3$	inhibited	—

### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

### Decontamination & Disposal:

Unseal the bag and add three chlorine tablets in each bag to decontaminate. Mix well and allow to stand for 30 minutes and then pour contents into sink drain, toilet or hole in the ground. Safely dispose the bag. Retain plastic clip for reuse.

### References :

1. Corry J. E. L., Curtis G. D. W., and Baird R. M., Culture Media For Food Microbiology, Vol. 34, Progress in Industrial Microbiology, 1995, Elsevier, Amsterdam.
2. Hansen W. and Yourassawsky E., 1984, J. Clin. Microbiol., 20:1177.
3. Baird R.B., Eaton A.D., and Rice E.W., (Eds.), 2015, Standard Methods for the Examination of Water and Wastewater, 23rd ed., APHA, Washington, D.C.

## HiFast™ Coli-nella Water Testing Kit

**K096**

### Intended use :

For rapid detection of water pathogens such as *E.coli*, *Salmonella*, *Klebsiella*, *Citrobacter*, *Vibrio* and *Pseudomonas*.

### Directions:

#### Part A: Differential medium for water testing

1. Fill the bottle with water upto arrow level.
2. Allow the powder medium to dissolve completely by gentle shaking.
3. Incubate at 35-37°C for 4 to 6 hours.
4. Observe for colour change and turbidity of the medium visually.

#### Part B: Pseudomonas identification medium

1. Add the water sample to be tested upto arrow mark.
2. Allow the powder medium to dissolve completely by gentle shaking.
3. Incubate at 35-37°C for 4 to 6 hours.
4. Observe for turbidity and pigment production of the medium visually.

5. Add few drops of some disinfectant (i.e Dettol, phenyl etc.) and discard the vial. Preferable to use autoclave wherever the facility is available.

### Principle and Interpretation :

Water is basic requirement which is contaminated with chemical and microbial pollutants. The test for chemical pollutants is instant but microbial contamination takes a period of 24 - 48 hours for confirmation. The constant urge to search a rapid method for the detection has led to the development of HiFast™ Coli-nella Water Testing Kit. The major microbial water contaminants are coliforms-*Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella*, *Citrobacter*, *Vibrio* and *Pseudomonas*. So this test was designed for the rapid detection and differentiation of these organisms. Recovery of these pathogens is faster and reliable.

The differential growth medium (Part A) contains enriched nutritive medium which is a source of nitrogen, vitamins and other growth requirements. Selective compounds results in the inhibition of gram positive microorganisms. The

chromogenic mix incorporated in the medium is cleaved specifically cleaved by *E.coli* and hence green colour indicates the presence of *E.coli*. The detection of H<sub>2</sub>S production is enhanced by the presence of specific H<sub>2</sub>S detectors. The medium turns black in case of H<sub>2</sub>S producers such as *Salmonella*, *Citrobacter* etc. The presence of a pH indicator helps in the detection and differentiation of lactose fermenters and lactose non-fermenters. The medium turns yellow in presence of lactose fermenters and pink to reddish in case of non-fermenters. *Pseudomonas* enrichment medium (Part B) is a selective medium which eliminates the accompanying flora and imparts greenish pigment to the broth in presence of *Pseudomonas*. The tubes are incubated further for upto 24 hours before reporting the results as negative.

#### Kit contents:

- Part A: 1. Differential medium sufficient for 20ml media  
Part B: 2. *Pseudomonas* identification medium - 5ml quantity  
3. Product Insert

#### Type of specimen :

Water samples.

#### Specimen collection and Handling :

For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards (1). After use, contaminated materials must be sterilized by autoclaving before discarding.

#### Warning and Precautions :

Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

#### Performance and Evaluation

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at the recommended temperature.

#### Quality Control:

##### Appearance:

Part A: Light yellow to pink coloured, homogeneous free flowing powder.

Part B: Cream to yellow coloured, homogeneous free flowing powder.

##### Colour and clarity of solution:

Part A: Red coloured clear solution obtained on addition of water.

Part B: Colourless clear solution obtained on addition of water.

##### Cultural Response:

Further incubation upto 24 hours is recommended before considering as negative. Cultural characteristics observed after an incubation at 35-37°C for 4-6 hours.

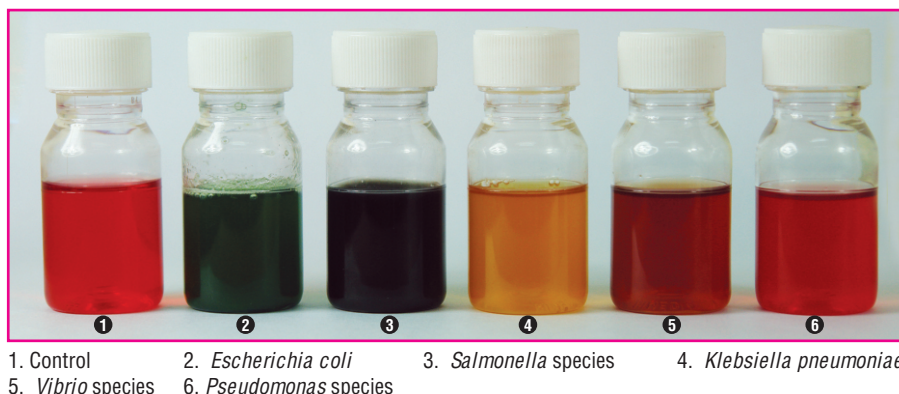
Organisms (ATCC)	Colour of medium Part A	Colour of medium Part B
<i>Escherichia coli</i> (25922) (00013*)	Green with turbidity	Inhibited
<i>Salmonella</i> species	Black with turbidity	Inhibited
<i>Klebsiella pneumoniae</i> (13883) (00097*)	Yellow with turbidity	Inhibited
<i>Vibrio</i> species	Brownish red with turbidity	Inhibited
<i>Pseudomonas</i> species	Dark red with turbidity	Greenish pigment with turbidity

#### Storage and Shelf Life :

On receipt store between 10-30°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

#### Disposal :

Add few drops of disinfectant (Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility exists.



## Chemical Analysis of Water

Conventional water analysis necessitates need for a full - fledged analytical laboratory which may not be available in the vicinity. Also Laboratory analysis is time consuming and expensive. Hence to ease these problems HiMedia introduces AquaCheck Water Analysis System. AquaCheck System includes readymade, user-friendly analytical test systems for extended chemical analysis of waters. AquaCheck System includes specific reagents for volumetric and colorimetric analysis. These reagents are substitutes for colorimetric methods, which are costly and are not portable and hence cannot be used on site. AquaCheck System provides visual colour standards for comparison of the developed colour.

AquaCheck system is simple, accurate and saves time, labour and costs. Salient features of AquaCheck System are :

- ▶ Less More accurate, reliable and rapid test System.
- ▶ Less expensive, no instrumentation required.
- ▶ Easily handled and interpreted by non-technical personnel.
- ▶ Packing made sturdy for field use.
- ▶ Reagents are reliable and stable with long shelf life.
- ▶ Refill packs of reagents available.

The following are different tests which can be conducted by the AquaCheck System range and their salient features.

Tests available	
Total Hardness	Orthophosphate
Calcium Hardness	Silica
Arsenic	Iron
Alkalinity	Hydrazine
Ammonia	Fluoride
Chloride	Nitrate
Sulphite	Total dissolved solids(TDS)
Free Chlorine	Electrical Conductivity (EC)
Nitrite	

### Total Hardness

Total hardness of water in current practice is defined as the sum of calcium and magnesium concentrations both expressed as calcium carbonate, in mg/liter. These salts precipitate to form scale on pipes in boilers, cooling tower, heat exchange equipment and form poor lather with soap.

Hardness is especially undesirable in the machine tool industry, poultry and in boilers, as it interferes with the working of essential additives required for the process. e.g. the oral chick vaccine in poultry, cutting oils/ coolants in the machine tool industry. Hardness is monitored in industrial waters to check scaling potential of water, determine cycles of concentration and the efficacy of the treatment program.

Titrimetric methods are commonly used in the laboratory for the estimation of total hardness. The test sample is titrated with a standard chelate in the presence of an indicator. The hardness end point is signalled by a colour change from red to blue. Calcium hardness is estimated by a different test. Magnesium hardness is derived by the difference between the total and calcium hardness. The Aquacheck Total Hardness System is a quick and easy test for measuring hardness in water. This test is useful for boiler and cooling waters, softeners, building industries, poultry, aquaculture etc.

The system contains dispenser bottles, precisely calibrated which give consistent and accurate results for the estimation of total hardness.

### Calcium Hardness

The calcium hardness in water determines the scaling potential of water. The difference between Total Hardness and Calcium Hardness gives the Magnesium Hardness. Calcium analysis is usually carried out for boiler water, cooling water, softener water (Inlet and Outlet), distilled water, demineralized water and potable water.

### Arsenic

Arsenic is a natural element of earth's crust. It occurs naturally in sulphide minerals such as pyrite.

Arsenic is predominantly of two types : Arsenic III and Arsenic V. At ambient water pH 6 to 9, the predominant forms are As-III (Arsenite) present as Arsenous acid  $H_3AsO_3$  (no charge) and As-V (Arsenate) present as anions  $H_2AsO_4^-$  and  $HAsO_4^{2-}$ .

Arsenic levels may fluctuate over time. It harms the central and peripheral nervous systems, heart and blood vessels and causes serious skin problems. Therefore Potable water can be checked to control arsenic levels in water.

### Total Alkalinity

Total alkalinity of a water is its acid-neutralizing capacity. It is the sum of all the titrable bases. The alkalinity in water is generally imparted by the salts of carbonates, bicarbonates, and hydroxyl ions in free state. This again determines the scaling potential of water. Alkalinity is significant in determining the suitability of water for irrigation. Alkalinity measurements are used in the interpretation and control of water and waste water treatment processes.

### Chloride

Chloride, in the form of chloride (Cl) ion, is one of the major inorganic anions in water and waste water. The chloride content in water is estimated to ascertain the corrosion in the system. The cycles of concentration are also calculated by analyzing chloride.

### Free Chlorine

Chlorine is not a natural constituent of water. It is universally used for the disinfection of water especially for large volumes. Chlorine being an oxidizing biocide eliminates almost all microbial species. It controls slime, disease causing bacteria and algae in water. It is used for all kinds of waters

e.g. drinking, cooling water, swimming, effluent treated water, etc. For effective disinfecting, a residual level of chlorine is to be maintained in water systems.

The "AquaCheck Chlorine Test System" is a quick and an easy test for free chlorine in water. Since chlorine residuals are required to be monitored regularly, this easy test helps to monitor chlorine quickly and accurately, especially at site.

#### Sulphite

Oxygen present in water leads to corrosion of the boiler metal. Sodium sulphite is added to low pressure boilers to remove dissolved oxygen. The residual sulphite content in water is generally determined in low pressure boilers to ensure oxygen scavenging which indirectly controls corrosion.

#### Nitrite

Nitrite is good corrosion inhibitor for closed systems. Nitrite levels in close recirculating cooling systems and cooling engines are estimated by this Aqua Check System.

#### Reactive Silica

Silica is the natural constituent of water. Silica forms glassy deposits/ scale over heating surfaces. These deposits are hard and hamper heat transfer. Silica levels are monitored in the water to minimize scaling.

#### Iron

Some ground water and acid surface drainage contain considerable amount of iron. This analysis of the iron content in the water gives the idea about corrosive nature of water. Soluble iron present in waters of boilers and cooling systems can be analysed to monitor corrosion inhibitor treatment programme. Potable water can be checked to control iron level in water. Iron in water can cause staining of laundry and porcelain.

#### Orthophosphate

Phosphate is externally added to water to control scale and corrosion during treatment. Monitoring of phosphate levels in water helps to maintain water quality.

#### Hydrazine

Oxygen present in water, leads to corrosion of the boiler metal. Hydrazine hydrate is added to high pressure boilers to remove dissolved oxygen. The residual Hydrazine level in water is generally determined in high pressure boiler to ensure oxygen scavenging.

#### Fluoride

Fluoride is frequently encountered in minerals and in geochemical deposits and is generally released into subsoil water sources by slow natural degradation of fluorine contained in rocks. A higher concentration of fluoride causes serious health hazards such as dental, skeletal and nonskeletal fluorosis. Potable water can be checked to control fluoride level in water.

#### Nitrate

The concentration of nitrates is commonly expressed as  $\text{NO}_3^-$ . The term 'nitrate nitrogen' is used to refer to the nitrogen present which is combined in the nitrate ion. Nitrate nitrogen can result from the seepage of water through soil containing nitrate bearing minerals. It may also occur as a result of using certain fertilizers in the soil, however nitrates are one of the products of decomposition of animal and human wastes. Thus the presence of minerals in water supply indicates possible pollution of the water.

#### Electrical Conductivity (EC)

It is a measure of ability to conduct electricity. Its units are Siemens per meter (s/m) in SI and milli mhos per centimeter (mmhos/cm) in U.S.

#### Total Dissolved Solids (TDS)

It is a measure of the total ions in solution. The unit is parts per million (ppm). The values for EC and TDS are related to each other and can be converted with an accuracy of about 10% using the following equation.  $\text{TDS (mg/l) OR ppm} = 640 \times \text{EC (ds/m)}$ . EC and TDS can be measured by using Electrical conductivity meter and TDS meter (pocket size) by simply dipping into water sample.

## Chemical Testing

### AquaCheck Water Analysis System

### Comprehensive Lab-Free Qualitative and Quantitative Chemical Water Testing in Separate Kits

WT001A to 1F	: Total Hardness Testing Kit
WT002, 2A	: Calcium Hardness Testing Kit
WT003, 3A	: Alkalinity Testing Kit
WT004, 4A	: Chloride Testing Kit
WT005, 5A	: Sulphite Testing Kit
WT006A to 6D	: Free Chlorine Testing Kit
WT007, 7A	: Nitrite Testing Kit

WT008A, 8B	: Orthophosphate Testing Kit
WT009	: Silica Testing Kit
WT010	: Iron Testing Kit
WT011	: Hydrazine Testing Kit
WT012	: Fluoride Testing Kit
WT013	: Nitrate Testing Kit
WT025	: Arsenic Testing Kit





## Water Analysis System

### Total Hardness Test

Kit contains 4 reagent bottles and 1 test jar with spoon. Least Count of one drop : 2, 5 & 25 mg/L

Code	Product	Type	Range	No. of Tests
WT001D-1NO WT001A-1NO	AQUAcheck Total Hardness Testing Kit (Calcium and Magnesium Content)	Drop titration	2-40 mg/L, 5-100 mg/L as CaCO <sub>3</sub>	100 Tests 300 Tests
WT001E-1NO WT001B-1NO	AQUAcheck Total Hardness Testing Kit (Calcium and Magnesium Content)	Drop titration	2-40 mg/L, 25-500 mg/L as CaCO <sub>3</sub>	100 Tests 300 Tests
WT001F-1NO WT001C-1NO	AQUAcheck Total Hardness Testing Kit (Calcium and Magnesium Content)	Drop titration	5-100 mg/L, 25-500 mg/L as CaCO <sub>3</sub>	100 Tests 300 Tests

### Calcium Hardness Test

Code	Product	Type	Range	No. of Tests
WT002A-1NO WT002-1NO	AQUAcheck Calcium Hardness Testing Kit Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	5 - 100 mg/L as CaCO <sub>3</sub>	100 Tests 250 Tests

### Alkalinity Test

Code	Product	Type	Range	No. of Tests
WT003A-1NO WT003-1NO	AQUAcheck Alkalinity Testing Kit Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	10 - 200 mg/L, 100 - 2000 mg/L, Alkalinity as CaCO <sub>3</sub>	100 Tests 300 Tests

### Chloride Test

Code	Product	Type	Range	No. of Tests
WT004A-1NO WT004-1NO	AQUAcheck Chloride Testing Kit Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	10 - 200 mg/L, 50 - 1000 mg/L as chloride (Cl)	100 Tests 300 Tests

### Sulphite Test

Code	Product	Type	Range	No. of Tests
WT005A-1NO WT005-1NO	AQUAcheck Sulphite Testing Kit Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	5 - 100 mg/L as Na <sub>2</sub> SO <sub>3</sub>	100 Tests 250 Tests

### Free Chlorine Test

Code	Product	Type	Range	No. of Tests
WT006A-1NO WT006B-1NO	AQUAcheck Free Chlorine Testing Kit (O-Toluidine method) Kit contains 1 reagent bottles, 1 test jar and colour chart	Colour Comparator	0 - 2 mg/L as Chlorine	100 Tests 300 Tests
WT006C-1NO WT006D-1NO	AQUAcheck Free Chlorine Testing Kit (DPD Method) Kit contains 1 reagent bottles, 1 test jar and colour chart	Colour Comparator	0.5 - 5.0 mg/L as Chlorine	100 Tests 300 Tests

### Nitrite Test

Code	Product	Type	Range	No. of Tests
WT007A-1NO WT007-1NO	AQUAcheck Nitrite Testing Kit Kit contains 3 reagent bottles and 1 test jar	Drop titration	5 - 100 mg/L, 50 - 1000 mg/L as NaNO <sub>2</sub>	100 Tests 250 Tests
WT007B-1NO WT007C-1NO	AQUAcheck Nitrite Testing Kit Kit contains 2 reagent bottles, 1 test jar with spoon and colour chart	Colour Comparator	0.0 - 0.8 mg/L as NaNO <sub>2</sub>	100 Tests 300 Tests

### Orthophosphate Test

Code	Product	Type	Range	No. of Tests
WT008A-1NO	AQUAcheck Orthophosphate Testing Kit (High level) Kit contains 3 reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	0 - 40 mg/L as PO <sub>4</sub>	100 Tests
WT008B-1NO	AQUAcheck Orthophosphate Testing Kit (Low level) Kit contains 3 reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	0.5 - 10 mg/L as PO <sub>4</sub>	100 Tests

\* Available individually

## Silica Test

Code	Product	Type	Range	No. of Tests
WT009-1NO	<b>AQUAcheck Silica Testing Kit</b> Kit contains 3 reagent bottles*, 1 test jar with spoon and colour chart*	Colour Comparator	0 - 80 mg/L as SiO <sub>2</sub>	100 Tests

\* Available individually

## Iron Test

Code	Product	Type	Range	No. of Tests
WT010-1NO	<b>AQUAcheck Iron Testing Kit</b> Kit contains 2 powder reagent bottles*, 1 test jar with spoon and colour chart*	Colour Comparator	0.3 - 2.0 mg/L as Iron (Fe)	100 Tests

\* Available individually

## Hydrazine Test

Code	Product	Type	Range	No. of Tests
WT011-1NO	<b>AQUAcheck Hydrazine Testing Kit</b> Kit contains 1 powder reagent bottle*, 1 test jar with spoon and colour chart*	Colour Comparator	0.1 - 0.75 mg/L as Hydrazine	100 Tests

\* Available individually

## Fluoride Test

Code	Product	Type	Range	No. of Tests
WT012-1NO	<b>AQUAcheck Fluoride Testing Kit</b> Kit contains 2 Reagent Bottles, 1 Test jar & colour comparator chart	Colour Comparator	0.0 - 2.5 mg/L (ppm) as Fluoride (F)	100 Tests

## Nitrate test

Code	Product	Type	Range	No. of Tests
WT013-1NO	<b>AQUAcheck Nitrate Testing Kit</b> Kit contains 3 Reagent Bottles, 1 Test jar with spoon & colour comparator chart	Colour Comparator	0.0 - 100 mg/L (ppm) as Nitrate (NO <sub>3</sub> - N)	100 Tests

## Arsenic Test Kit

Code	Product	Type	Range	No. of Tests
WT025-1NO	<b>Arsenic Test Kit</b> Kit contains 2 Reagent bottles with 2 spoon, 1 Reaction vessel, Container with 50 test strips & colour chart	Colour Comparator	0.05 - 3.0 mg/L (ppm) as Arsenic (As)	50 Tests

## TDS Meter

Code	Product	Type	Range	No. of Tests
WT018-1NO	<b>AQUAcheck TDS meter for Water testing Kit</b> Kit contains TDS meter	Visual	0 - 9990mg/L (ppm)	1 no

## Dissolved Oxygen Test

Code	Product	Type	Range	No. of Tests
WT028A-1NO WT028-1NO	<b>AQUAcheck Dissolved Oxygen Testing Kit</b> (Kit contains 5 reagent bottles, 1 reaction vial and 1 test jar)	Drop Titration	0 -10 mg/L as Oxygen (O)	100 Tests 250 Tests

\* Available individually

## Multi Parameter Water Testing Kits

Code	Product	No. of Tests
<b>WT015-1NO</b>	<b>AQUAcheck Multi Parameter Water Testing Kit and 2 standard Turbidity vials</b> Kit contains 16 Reagent bottles, 1 Test jars with spoon, 2 Empty vials, 2 Turbidity measuring tubes, pH strips, Comparator charts for Iron, Chlorine, Fluoride & Nitrate Tests.	100 Tests
<b>WT023-1NO</b>	<b>Octo Aqua Test Kit (Water Testing Kit for 8 Test parameters)</b> Kit contains 19 Reagent bottles, 1 Test jar with spoon, 4 standard turbidity vials & 1 sample vial, pH strips, colour chart for Fluoride, Iron and Nitrate Tests.	100 Tests

Test & Range	Type	Test & Range	Type
1) pH test : pH test strips of range 2.0 - 10.5	Visual	5) Fluoride : 0.0 - 2.5 mg/L (ppm) as F	Comparator
2) Turbidity : standards of 0, 5, 10 & 25 NTU	Visual	6) Iron : 0.0 - 2.0 mg/L (ppm) as Fe	Comparator
3) Chloride : 10 - 200 mg/L (ppm) and 50-1000mg/L (ppm) as Cl	Drop titration	7) Nitrate : 0.0 - 100 mg/L (ppm) as Nitrate (NO <sub>3</sub> -N)	Comparator
4) Total hardness : 25 - 600 mg/L (ppm) as CaCO <sub>3</sub>	Drop titration	8) Residual (Free) chlorine : 0.0 - 3.0 mg/L (ppm)	Drop titration

## Carbon Dioxide Test

Code	Product	Type	Range	No. of Tests
<b>WT040-1NO</b>	<b>AQUAcheck Carbon Dioxide Testing Kit</b> Kit contains 3 reagent bottles and 1 test jar	Drop Titration	2.0 - 40.0 mg/L, 10 - 200 mg/L as CO <sub>2</sub>	300 Tests
* Available individually				

## Hydrogen Sulphide Test

Code	Product	Type	Range	No. of Tests
<b>WT041A-1NO</b>	<b>AQUAcheck Hydrogen Sulphide Testing Kit</b>	Colour Comparator	0.5 - 5.0 mg/L as H <sub>2</sub> S	100 Tests
<b>WT041-1NO</b>	Kit contains 2 reagent bottles, 1 reaction vial and colour chart			300 Tests
* Available individually				

## Ammonia Test

Code	Product	Type	Range	No. of Tests
<b>WT042A-1NO</b>	<b>AQUAcheck Ammonia Testing Kit</b>	Colour Comparator	0.1 - 2.0 mg/L as NH <sub>3</sub>	100 Tests
<b>WT042-1NO</b>	Kit contains 2 reagent bottles, 1 test jar and colour chart			300 Tests

## Sulphate Test

Code	Product	Type	Range	No. of Tests
<b>WT043A-1NO</b>	<b>AQUAcheck Sulphate Testing Kit</b>	Colour Comparator	0 - 800 mg/L as SO <sub>4</sub>	100 Tests
<b>WT043-1NO</b>	Kit contains 2 reagent bottles, 1 test jar and colour chart			300 Tests

## Zinc Test

Code	Product	Type	Range	No. of Tests
<b>WT044-1NO</b>	<b>Zinc Test Kit</b>	Colour Comparator	0 - 25 mg/L as Zinc (Zn)	100 Tests
	Kit contains 4 reagent bottles, 1 test jar and colour chart			

## Manganese Test

Code	Product	Type	Range	No. of Tests
<b>WT045A-1NO</b>	<b>AQUAcheck Manganese Test Kit</b>	Colour Comparator	0 - 1.0 mg/L as Manganese (Mn)	100 Tests
<b>WT045-1NO</b>	Kit contains 2 reagent bottles, 1 test jar and colour chart			300 Tests

## Copper Test

Code	Product	Type	Range	No. of Tests
<b>WT046A-1NO</b>	<b>AQUAcheck Copper Testing Kit</b>	Colour Comparator	0 - 2.0 mg/L as Copper (Cu)	100 Tests
<b>WT046-1NO</b>	Kit contains 2 reagent bottles, 1 test jar and colour chart			300 Tests

## Chemical Testing

### Multi Parameter Water Testing Kit - WT015

#### Comprehensive Lab-Free Qualitative and Quantitative Chemical Water Testing in a Single Kit

- Fluoride • Nitrate • Iron • Residual (Free) chlorine
- Chloride • Total hardness • Turbidity test • pH test



*Bureau of Indian standards have set the requirements for essential and desirable characteristics to be tested for ascertaining the suitability of water in IS 10500-1991.*

WT015 offered by HiMedia is a Multiparameter water testing kit determining levels of fluoride, nitrate, iron, residual (free) chlorine, chloride and total hardness besides measuring turbidity and pH.

#### Kit contents : Type of test

Fluoride  
Nitrate  
Iron  
Residual (Free) chlorine  
Chloride  
Total hardness  
Turbidity test  
pH test

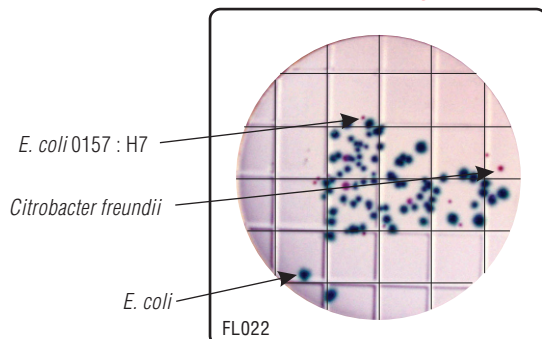
#### Range

0.0-5.0 mg/L (ppm) as Fluoride  
0.0-250 mg/L (ppm) as Nitrate (NO<sub>3</sub>)  
0.0 - 2.0 mg/L (ppm) as Iron  
0.0-2.0 mg/L (ppm) as free chlorine  
10-200 mg/L (ppm) and 50-1000 mg/L (ppm) as Chloride  
25-600 mg/L (ppm) as CaCO<sub>3</sub>  
10-500 NTU, standards of 10 & 25 NTU  
pH test strips of range 6.5 to 9.0.



### Typical Tests Employed for Water Testing

#### Convenient and Easy Touch Plates



HiTouch *E. coli* Coliform Count *Flexi* Plate - FL022



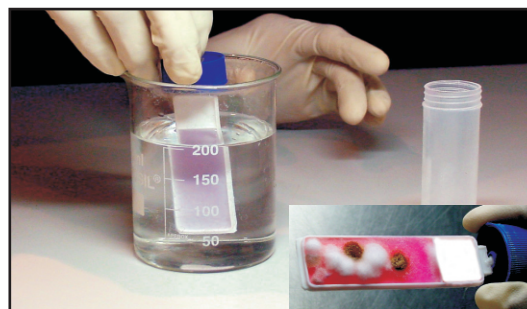
Baird - Parker Agar - M043  
*Staphylococcus aureus* (ATCC 6538)



Mac Conkey Broth - M007

1. Uninoculated control
2. *Escherichia coli* (ATCC 25922)
3. *Enterobacter aerogenes* (ATCC 13048)
4. *Klebsiella pneumoniae* (ATCC 13883)
5. *Staphylococcus aureus* (ATCC 25923)
6. *Enterococcus faecalis* (ATCC 29212)

### Hi-Dip Slides for Lab-Free Testing



Rose Bengal Agar - HD008  
fungal growth observed



# Comparative list of APHA vis a vis HiMedia products for water analysis

APHA Name	HiMedia Code	HiMedia Name
A-1 Medium	M874	A-1 Medium
Acetamide Broth	M1867	Acetamide Agar, Modified (Twin Pack)
Alkaline Peptone Water	M618	Alkaline Peptone Water
Ampicillin Dextrin Agar (ADA)	M1262 FD107A	Ampicillin Dextrin Agar Base Ampicillin Dextrin Selective Supplement
Asparagine Broth	M1903	Asparagine Broth for Pseudomonas
Azide Dextrose Broth	M345	Azide Dextrose Broth
Baird Parker Agar	M043 FD046 FD045 FD047 FD069 FD195	Baird Parker Agar Base Egg Yolk Tellurite Emulsion Egg Yolk Emulsion Potassium Tellurite 3.5% B P Sulpha Supplement Fibrinogen Plasma Trypsin Inhibitor Supplement
Bile Esculin Agar	M972	Bile Esculin Agar
Bile Esculin Azide Agar	M493	Bile Esculin Azide Agar
Bismuth Sulphite Agar (Wilson Blair Medium)	M027	Bismuth Sulphite Agar
BHI Broth w/6.5% NaCl	M1037	Brain Heart Infusion w/ 6.5% NaCl
Brain Heart Infusion Agar	M211	Brain Heart Infusion Agar
Brain Heart Infusion (BHI) Broth	M210	Brain Heart Infusion Broth
Brilliant Green Agar	M016 FD068	Brilliant Green Agar, Modified Sulpha Supplement
	M016A	Brilliant Green Agar 1.2% w/Agar
Brilliant Green Lactose Bile Broth	M121	Brilliant Green Bile Broth 2%
Buffered Glucose Broth	M070	Buffered Glucose Broth
BCYE Agar	M813 FD040 FD041A	Buffered Charcoal Yeast Extract Agar Base Legionella Selective Supplement IV (MWY) Legionella Supplement
Buffered peptone water	M1851	Buffered Peptone Water w/ Pyruvate
Butzler's Medium	M144 FD007	Columbia Blood Agar Base Campylobacter Supplement - II (Butzler)
Campylobacter Enrichment Broth (Prestons Medium)	M899 FD042	Campylobacter Enrichment Broth Base (Preston Enrichment Broth Base) Campylobacter Selective Supplement - IV (Preston Selective Supplement - IV)
Campy-thio medium	M908 FD006	Campylo Thioglycollate Medium Base Campylobacter Selective Supplement - I (Blaser- Wang)
Casitone Glycerol Yeast Autolysate Broth	M381	Casitone Glycerol Yeast Autolysate Broth
Cefsulodin Irgasan Novobiocin (CIN Agar)	M843 FD034	Yersinia Selective Agar Base Yersinia Selective Supplement
Cellobiose Colistin Agar (CC Agar)	M1241F FD298	CPC Agar Base w/1% Cellobiose Colistin Selective Supplement
Chromogenic Agar for Vibrio	M1682	HiCrome™ Vibrio Agar
Chromogenic substrate plating medium for Salmonella (Rambach)	M1078 M1082	Salmonella Differential Agar (Twin pack) (RajHans Medium) Salmonella Differential Agar, Modified (Twin pack)
Cooke Rose Bengal Medium	M499	Cooke Rose Bengal Agar Base
Czapek Dox Agar	M075	Czapek Dox Agar
Decarboxylase Test Media (Falkow)	M912	Decarboxylase Test Medium Base (Falkow)
Decarboxylase Test Media (Moeller)	M393	Decarboxylase Broth Base, Moeller
Deoxycholate Citrate Agar	M065	Deoxycholate Citrate Agar
Diamalt Agar	M438	Diamalt Agar
EC Medium	M127I	EC Broth
EC-MUG Medium	M1042	MUG EC Broth
EE Broth, Mossel	M287	EE Broth, Mossel
EIA Substrate	M1044	Esculin Iron Agar
EMB Agar	M317	EMB Agar
GN Broth, Hajna	M242	GN Broth, Hajna
Gifu Anaerobe-Modified Semisolid Medium	M1801	Gifu Anaerobic Broth (GAM)
Heart Infusion Broth	M170	Heart Infusion Broth
Hektoen Enteric Agar	M467	Hektoen Enteric Agar
Iron Oxidizing Medium (Thiobacillus ferrooxidans)	M615	Iron Oxidizing Medium (Thiobacillus ferrooxidans)
Isolation Medium (Iron Bacteria)	M622	Isolation Medium For Iron Bacteria
KF Streptococcal Agar	M248 FD057 FD093	KF Streptococcal Agar Base TTC Solution 1% Bromo Cresol Purple
Koser Citrate Broth	M069	Koser Citrate Medium
Kovacs Reagent	R008	Kovacs' Indole Reagent
LIA Slants	M1230	Lysine Arginine Iron (LAI) Agar
Lactose Broth	M026	Fluid Lactose Medium
Lauryl Tryptose Broth	M080	Lauryl Sulphate Broth (Lauryl Tryptose Broth)
LES Endo Agar	M1106	M-Endo Agar LES
Levine's EMB Agar	M022	EMB Agar, Levine
Lipovitellin Salt Mannitol Agar	M627	Lipovitellin Salt Mannitol Agar Base
M Broth	M846	M-Broth

# Comparative list of APHA vis a vis HiMedia products for water analysis

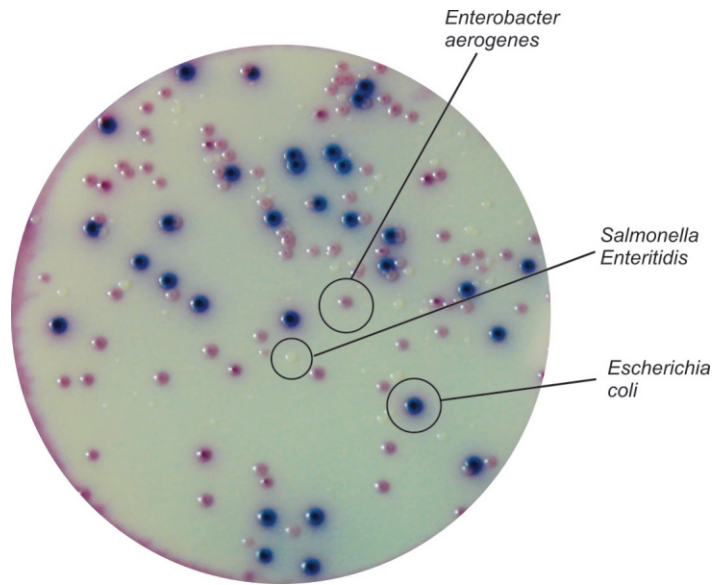
APHA Name	HiMedia Code	HiMedia Name
mE Agar	M1048	M-Enterococcus Agar Base, Modified
MTEC Agar	M1391	M-TEC Agar
Marine Agar	M384	Marine Agar 2216 (Zobell Marine Agar)
Modified Cellobiose Polymyxin Colistin Agar (MCPC )	M1241F FD110F	CPC Agar Base w/ 1% cellobiose Modified CPC Supplement
Mueller Kauffman tetrathionate Broth Base	M876	Mueller Kauffman Tetrathionate Broth Base
M-Bismuth Sulphite Broth	M1101	M-Bismuth Sulphite Broth
M - Endo Medium	M1103	M-Endo Broth MF (MF Endo Medium) (M-Coliform Broth)
M-Enterococcus Agar	M1108	M-Enterococcus Agar Base
M-FC Broth	M1111	M-FC Broth Base
M-FC Medium	M1122 FD058	M-FC Agar Base Rosolic Acid (0.1 gm)
M-HPC Agar	M1123	M-(HPC)Heterotrophic Plate Count Agar Base
M-PA Agar	M1121	M-PA Agar Base
M7HrFC Agar	M635	M7HrFC Agar
M-Staphylococcus Broth	M1120	M-Staphylococcus Broth
M-Tetrathionate Broth	M1115	M-Tetrathionate Broth Base
MacConkey Agar	MH081	MacConkey Agar
MacConkey Broth	M083	MacConkey Broth Purple
Maintenance (SCY) Medium	M777	Maintenance (SCY) Medium
Malonate Broth	M779	Malonate Broth, Ewing Modified
Milk Agar (Brown and Scott-Foster Modification)	M782	Milk Agar (Brown and Scott Modified)(Twin Pack)
Mineral Modified Glutamate Medium	M643	Mineral Modified Glutamate Medium Base (Double Strength) (Twin pack)
Mn Agar	M771	Mn Agar Base
Modified MacConkey Agar (MCIC Agar)	M051	MacConkey Agar,Modified
Modified M-FC Agar	M1124 FD058	M-FC Agar Modified for Klebsiella Rosolic Acid (0.1 gm/vl)
Motility Test Medium	M260 M930	Motility Test Medium Motility Test Medium (Edwards and Ewing )
NWRI Agar (HPCA)	M1910	Heterotrophic Plate Count Agar
Nutrient Agar	M561	Nutrient Agar, pH 6.8
Nutrient Agar with MUG	M1461	MUG Nutrient Agar
PA Broth	M1186	PA Broth
Peptone water	M028	Peptone Water
Pfizer Selective Enterococcus (PSE) Agar	M787	Pfizer Selective Enterococcus Agar
Plate Count Agar (Tryptone Glucose Yeast Agar)	M091	Plate Count Agar (Standard Methods Agar)
R-2A Agar	M962	R-2A Agar
Rappaport Vassiliadis R10 broth	M1530	Rappaport Vassiliadis R10 Medium
Rappaport Vassiliadis Soya peptone broth	M880	Rappaport Vassiliadis Medium
SIM Medium	M181	SIM Medium
SS Agar	M108	SS Agar (Salmonella Shigella Agar)
Selenite Cystine Broth	M025	Fluid Selenite Cystine Medium (Selenite Cystine Medium) (Twin Pack)
Simmons Citrate Agar	M099	Simmons Citrate Agar
Skirrow Medium	M144 FD008	Columbia Blood Agar Base Campylobacter Supplement - III (Skirrow)
Sorbitol -MacConkey Agar	M298 FD147	Sorbitol Agar (MacConkey Sorbitol Agar) Tellurite - Cefixime Supplement
Starch Casein Agar	M801	Starch Casein Agar
Sulphate Reducing Medium (Thiobacillus thioparus)	M800	Sulphate Reducing Medium (Twin Pack)
Sulphate Reducing Medium	M803	Sulphate Reducing Medium (Triple Pack)
Sulphur Medium (Thiobacillus thiooxidans)	M559	Sulphur Medium (Twin Pack)
TCBS Agar (Thiosulphate Citrate Bile Salts Agar)	M189	TCBS Agar
TT Broth Base, Hajna	M327	Tetrathionate Broth Base, Hajna (TT Broth Base)
Tetrathionate Broth	M032	Fluid Tetrathionate Medium w/o Iodine & BG (Tetrathionate Broth Base w/o Iodine & BG)
Trptic Soy Agar	M290	Tryptone Soya Agar (Casein Soyabean Digest Agar) (Soyabean Casein Digest Agar)
Tryptic(ase) Soy Broth	M011	Tryptone Soya Broth (Soyabean Casein Digest Medium)
Tryptone Glucose Extract Agar	M791	Tryptone Glucose Beef Extract Agar (TGB Agar)
Tryptophane Broth	M463	Tryptone Broth (Tryptone Water)(1% Tryptone)
Tryptone Water	M463I	Tryptone Water
TSI Medium	M021	Triple Sugar Iron Agar
V.parahaemolyticus Sucrose Agar (VPSA)	M1153	Vibrio Parahaemolyticus Sucrose Agar
Vibrio vulnificus Agar (VVA)	M1878	Vibrio Vulnificus Agar (VVA)
Violet Red Bile Agar with MUG	M1058	MUG Violet Red Bile Agar
Xylose Lysine Brilliant Green Agar	M336	Xylose Lysine Agar Base
Xylose Lysine Deoxycholate (XLD) Agar	M031	Xylose Lysine Deoxycholate Agar (XLD Agar)
XLT-4 Agar	M1147 FD152	XLT4 Agar Base XLT4 Supplement
Yeast Extract Malt Extract Glucose Agar	M424	Yeast Malt Agar (YM Agar)

*Recommended for  
simultaneous detection of*

**Escherichia coli &  
total coliforms**

*in water samples by*

**Membrane  
Filtration Technique**



- **Formulation is as per the specifications laid down in ISO 9308-1:2014.**
- **Mixture of three chromogens to detect  $\beta$ -galactosidase and  $\beta$ -glucuronidase enzymes. IPTG is added to enhance colour detection.**
- **E.coli - dark blue - violet**
- **L-Tryptophan - improved indole reaction**
- **Other coliforms - pink to red**
- **Pseudomonas - colourless**
- **Tergitol-7 for selectivity - Gram positive bacteria inhibited**

Innovation  
begins  
with the  
right  
choices



HiMedia Laboratories Pvt. Ltd.  
[www.himedialabs.com](http://www.himedialabs.com)

- CORPORATE OFFICE -

A-516, Swastik Disha Business Park, Via Vadhani Indl Est, LBS Marg, Mumbai - 400 086, India.  
Tel : 00-91-22-6147 1919 / 2500 3747 | Fax : 00-91-22-6147 1920 / 2500 5764 | Email : [hdmexpo@himedialabs.com](mailto:hdmexpo@himedialabs.com)