

## WATER TESTING KITS FOR FIELD USE

Water is tested in laboratories to find out the minerals present in it along with parameters like pH, conductivity, colour and turbidity. The tests help establish the presence of any parameter and the extent to which it is present in a particular water. Most of the tests are done using the time tested method of titration, using laboratory glassware like burettes, pipettes, conical flasks and beakers. This method still prevails although modern instruments like spectrophotometers, chromatographs, etc have started making their presence felt for testing parameters where the titration method cannot be used.

Since it is not possible to carry delicate glassware out into the field for field tests, several companies/agencies/NGOs/Government laboratories have done a lot of work to bring out kits which use the titration principles but are light, can stand up to rough 'travel' and still give fairly accurate results. These are field test kits which can be used anywhere and by anyone who can read the instructions. Titration involves using a chemical solution of a known strength in a burette to be added to a sample of water to be tested in a beaker/conical flask. A chemical indicator solution is also added to the water before titration. The solution from the burette is added to the sample in carefully controlled drops with the sample being continuously stirred. This addition is stopped when the colour of the sample changes. The burette reading taken after colour change is multiplied by a specific numerical factor. This gives the quantity of the parameter tested for in the water in terms of mg/litre or parts per million (ppm). All titration tests are colorimetric tests where a change in colour is an indication that the presence/absence of the parameter being tested had been ascertained.

Most of the field test kits operate on the same principle. The kit consists of a sample bottle with a marking on it to indicate that the sample to be tested must be filled up to that mark. Another bottle contains the required chemical solution (which in a lab would be in the burette). This bottle would have a dropper fitted on it. Depending on the parameter to be tested, there would be a small dropper bottle containing the indicator solution (tests for certain parameters may not need such an indicator). To use this kind of a kit, the sample bottle is first rinsed with the water to be tested and then filled up to the mark. The solution from the dropper bottle is added to this sample after adding the recommended drops of indicator solution, a drop at a time, counting each drop. When the colour of the sample changes, the addition of the solution is stopped, number of drops added is multiplied by a factor given in the instruction manual to arrive at the quantity of the parameter in mg/litre of water or ppm.

Test kits used for testing the bacteriological content in water are slightly different. Some have a bottle in which the sample of water to be tested is put and into which another solution is added. It is then shut and kept for a period of several hours or overnight. If, at the end of this period, the sample has acquired a colour as given in the instructions, it indicates that the sample is bacteriologically contaminated, otherwise not. Another kit used for such tests is called a 'dip slide'. It consists of a slide made of an inert plastic material coated with a nutrient which is kept inside a sealed container. This slide is taken out of the container by breaking the seal of the container, dipped into the sample of water to be tested and then kept aside for several hours or overnight. If, at the end of this period, the slide has acquired or changed colour it is an indication that the sample is contaminated. Tests for

bacteriological contamination using such kits only indicate the presence or absence of contamination (also called a GO/NO GO result) and not its extent.

It is important to remember that all such kits have a shelf life. Once this has expired, the kits must not be used as results will be wrong or inconsistent. Given below is a table of the kits available in the market indicating the parameter, name and manufacturer/supplier from whom they can be procured. The accuracy of the results may not be as accurate as those done in a laboratory. It may be in the range of +/- 5. In the table below, where a multiparameter kit is indicated but not the parameters, it is usually for the parameters which determine the potability of water.

List of Kits (Contact details of the manufacturers are provided in the end):

Type / Name of Kit	Parameter	Cost (Rs.)
Kits made / sold by Development Alternatives		
Jal TARA WTK-14	14 parameters	7913.00*
Jal TARA WTK-11	11 parameters	7238.00*
Jal TARA Mini Kit-I	Fluoride	1220.00*
Jal TARA Mini Kit-II	Nitrate	1474.00*
Jal TARA Mini Kit-III	Iron	1475.00*
Jal TARA Mini Kit-IV	Free chlorine	1138.00*
Jal TARA Mini Kit-V	Arsenic	3073.00*
Jal TARA - Set of 10 tests	Coliform bacteria	290.00* per set
* The cost is inclusive of Basic price, Applicable tax (VAT/CST) and Freight charges.		
Kits made / sold by Rakiro Biotech Systems Pvt Ltd.		
Aquasol test Kits (drop titration kit)	Fluoride	625.00
Aquasol test Kits (drop titration kit)	Free Chlorine	240.00
Aquasol test Kits (color comparison)	Nitrate	700.00
Aquasol test Kits (color comparison)	Iron up to 1.0ppm	825.00
Aquasol test Kits (color comparison)	Iron up to 10.0ppm	800.00

Bactaslyde test kit ( bacterial slide)	Total Bact.count & e coli	810.00
Kits made / sold by Ion Exchange (I) Ltd.		
Easy Test Kit	Iron	2840.00
Easy Test Kit	Free Chlorine	1120.00
Easy Test Kit	Fluoride	1120.00
Easy Test Kit	Nitrate	1245.00
Easy Test Kit for potability of Water	8 parameters	13000.00
Easy Test Kit	E coli	500.00
Kits made / sold by Sumeet Instruments & Chemicals		
Arsenic Test Kit	Arsenic	2500.00
Nitrate Test Kit	Nitrate	3000.00
Fluoride Test Kit	Fluoride	3200.00
Iron Test Kit	Iron	3200.00
Multi Parameter Test Kit	10 parameters	11500.00
Kits made / sold by M/s Innoventure, L-Tek Systems		
Fluoride Test Kit (devpd.by NEERI)	Fluoride	Not Available
Fluoride Test Kit (devpd.by BARC)	Fluoride	Not Available
Fluoride Test Kit (devpd.by NCL)	Fluoride	Not Available
Residual Chlorine Test Kit	Residual Chlorine	Not Available
Iron Test Kit	Iron	Not Available
Nitrate Test Kit (devpd.by NCL)	Nitrate	Not Available
Kits made / sold by IIT, Mumbai & Media Lab Asia		
Polysensor (electronic Instrument)	Multiparameter-pH, conductivity, chloride, nitrate	Prototype Stage
Kits made / sold by Merck		

Merckoquant - Low Range	Arsenic (low range)	Not Available
Merckoquant - High Range	Arsenic (high range)	Not Available
Merckoquant	Nitrate	Not Available
Aquaquant	Iron	Not Available
Aquaquant	Residual Chlorine	Not Available
Aquaquant	Aluminium	Not Available
Kits made / sold by CPCB, Min. of Environment		
CPCB-WTK	Multi parameter	Not Available
Test Kit	Fluoride	Not Available
Test Kit	Arsenic	Not Available
Test Kit	Nitrate	Not Available
Kits made / sold by Techno-ad Systems Inc.		
Test Kit	Fluoride(AIIH&PH)*	Not Available
Test Kit	Fluoride(ICS)*	Not Available
Test Kit	Fluoride(DRL)*	Not Available
Test Kit	Arsenic (AIIH&PH)	Not Available
Test Kit	Arsenic (DRDO)	Not Available
Test Kit	Nitrate (AIIH &PH)	Not Available
Test Kit	Iron (AIIH &PH)	Not Available
Test Kit	Iron (DRL)	Not Available
Test Kit	Iron (ICS)	Not Available
Kits made / sold by Mathbin Scientific		
Aqua Qual Test Kit	Fluoride	Not Available
Aqua Qual Test Kit	Chloride	Not Available
Aqua Qual Test Kit	Hardness	Not Available
Aqua Qual Test Kit	Nitrate	Not Available
Aqua Qual Test Kit	Iron	Not Available
Aqua Qual Test Kit	Residual Chlorine	Not Available

Aqua Qual Test Kit	Arsenic	Not Available
Aqua Qual Test Kit	Alkalinity	Not Available
Aqua Gage Multi WTKit	Multiple parameters	Not Available
CHLOROSCOPE CS-10/20	Residual Chlorine	Not Available
Kits made / sold by IEHS-Chine (UNICEF)		
Polysensor (electronic Instrument)	Arsenic	Not Available

**Important:**

Except for the prices of Jaltara kits from Development Alternatives, all Kit prices are basic prices where sale tax and freight will be charged extra at actuals. All prices for Jal Tara Kits are inclusive of tax and freight.

**Manufacturer Details:**

Development Alternatives,  
 Technology and Action for Rural Advancement (TARA)  
 B-32 Tara Crescent, Qutab Institutional Area,  
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 Website: <http://www.devalt.org>  
 References: <http://www.cleanindia.org/jaltarakit.htm>

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