



# The Institute of Health Systems – Laboratory

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## Water Analysis Report



Sample Id: CB02934

Received date: 26-10-2023, time: 3.30PM.

TC-7658

Report No. CB02934DT31-10-2023

### I. Description of Sample

The IHS Laboratory advises all clients to follow methods of sampling specified in IS3025 part-1:1987 for chemical tests and in IS1622:1981 for bacteriological tests or such other standards as applicable. However, each sample is collected in a specific context, under prevalent feasibility considerations. The following details about source of sample(s) and collection method is based on information gathered from the sample collector and the client, to aid interpretation of test results.

Place & description of source, sampling point & sample container: Sharp Engineering Works, Plot No.6, Lane No.2, Jagdish Nagar Colony, Rasoolpura, Begumpet, Hyderabad-50003. **R.O. Water.** Borewell water is treated using R.O plant. Water sample collected directly from R.O plant storage outlet tap into empty 1L Itava & 1L Tata Copper packaged water bottles(2No.).

Sample collection date: 26-10-2023, time: 1.30PM, by Mr.A.Damodar, M:8885518108.

External temperature of sample container on receipt: 27.9°C.

Other samples from same client: Nil Past tests for same source, if any: Nil

Test Request: Ryan International School: Email: [service.sharpengg@gmail.com](mailto:service.sharpengg@gmail.com).

Client Concerns: *For Drinking purpose. For evaluation of functioning of R.O plant for treatment of Borewell water.*

Desired Test Package & Code: *Basic Chemical Quality Tests [BQT-(NH<sub>3</sub> & NO<sub>2</sub>)+(TDSG &CLD)]*

### II Test Results from Chemical Laboratory (Chem Lab)

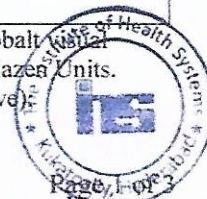
Test Dates: Physical: 26-10-2023 to 27-10-2023; Chemical: 26-10-2023 to 30-10-2023

#### A. Physical & Sensory Characteristics:

Sl	Parameter	Result	Units	IS10500 Ref. Values	
				Acceptable	Permissible
1	Apparent Colour	Colourless	Rating	Colourless	--
	True Colour	<1	PCU (Hazen)	5	15
2	Odour	Agreeable	Rating	Agreeable	Agreeable
3	Turbidity	0.70	NTU	1	5
4	pH at 25°C	6.60	pH Value	6.5 to 8.5	No relaxation
5	Electrical conductivity (EC)	59.5	µ Siemens/cm	≤ 2250 (CPCB, Class-E)	
6	Total dissolved solids (TDSG)	36	mg/L	500	500

<sup>1</sup> Apparent Colour as per IS3025Pt4 2.7.1 & True Colour, as per IS3025 Pt-4 2.7.2 platinum cobalt comparison of filtered (0.45µ) sample. Detection limit: 1 Platinum Cobalt Units (PCU) aka Hazen Units.

<sup>2</sup> Odour rating by lab personnel: Odourless, Agreeable or Disagreeable (Unpleasant or Offensive)



- <sup>3</sup> Turbidity est. as in IS3025Pt10, using HI98703 Nephelo-Turbidimeter. Detection limit: 0.10NTU.  
<sup>4</sup> pH value at 25°C as per IS3025Pt11, by Hanna HI2002-02Edge (pH) instrument. Detection limit: 4 pH value.  
<sup>5</sup> EC at 25°C as per IS3025Pt14, by Hanna HI2003-02EdgeEC. Detection limit: 1  $\mu$  Siemens/cm. The Central Pollution Control Board (CPCB) best use classes A-C, which include drinking water do not specify any guideline value for EC. The CPCB reference value shown here is for a lower class-E, best use case of irrigation water. <https://cpcb.nic.in/water-quality-criteria/>  
<sup>6</sup> TDS is based IS3025 Part-16 (Gravimetry). Detection limit: 4mg/L.

## B. General Chemical Characteristics:

Sl	Parameter	Result	Units	IS10500 Ref. Values	
				Acceptable	Permissible
1	Total Hardness (TH)	10	As CaCO <sub>3</sub> mg/L	200	600
2	Calcium	3.2	Ca <sup>++</sup> mg/L	75	200
3	Magnesium	0.48	Mg mg/L	30	100
4	Nitrate	2.6	NO <sub>3</sub> mg/L	45	No relaxation
5	Fluoride	0.1	F <sup>-</sup> mg/L	1.0	1.5
6	Chloride	3.9	Cl <sup>-</sup> mg/L	250	1.000
BDL: Below detection limit of the test method.					

- <sup>1</sup> Total hardness (TH) by EDTA titration of 50 ml sample, ammonia buffer & EBT indicator as in IS3025Pt21. Detection limit: 5mg/L.  
<sup>2</sup> Calcium by EDTA titration of 50 ml sample, NaOH, P&R indicator as in IS3025Pt40. Detection limit: 2mg/L.  
<sup>3</sup> Magnesium estimate is derived from Hardness & Calcium, following IS3025Pt46. Detection limit: 2mg/L.  
<sup>4</sup> Nitrate by UV spectrophotometric screening as in APHA 4500-NO3B. Detection limit: 0.10mg/L.  
<sup>5</sup> Fluoride by APHA 4500-F- D. SPADNS method. Detection limit: 0.10mg/L.  
<sup>6</sup> Chloride by titration of 100 ml sample with 0.0141N AgNO<sub>3</sub> & K<sub>2</sub>CrO<sub>4</sub> indicator as in IS3025Pt32. Detection limit: 2mg/L.

End of II: Chemical Lab Report

Authorised signatory: Ms. P. Sravanthi

## III. Notes and Recommendation

### 1. Notes

- EC & TDS: Although, EC and TDS are both indicators of salinity, their relationship is not linear. The EC to TDS ratio ranges from 0.5 to 0.75 for fresh and natural waters; and is usually higher (0.7 to 0.89) in case of brackish or seawater (Rusydi, 2018).*
- Hardness: The US Environment Protection Agency (USEPA 1991) classifies hardness of waters as (a) Soft: 0 to 75 mg/L, (b) Moderately hard: 76 to 150 mg/L, (c) Hard: 151 to 300 mg/L, and (d) Very hard: >300 mg/L. According to WHO Guidelines (2011), consumers, in some cases, may tolerate hardness in excess of 500 mg/l. Formula to compute hardness components from total alkalinity (TA) and total hardness (TH): Carbonate (temporary) hardness (CH): If TH > TA, then CH = TA' else, if TH ≤ TA, then CH = TH (and NCH=0). Non-carbonate hardness (NCH): If TH > TA, then NCH = (TH-TA), else NCH= 0.*
- Calcium & Magnesium: According to WHO guidelines drinking-water can be a contributor to Ca & Mg intake and could be important for those who are marginally deficient of these minerals. There is insufficient data to suggest either min or max concentrations of Ca or Mg at this time, as adequate intake will depend on a range of other factors. Therefore, no guideline values are proposed (by WHO) for hardness, Ca & Mg (WHO, 2011).*
- Ammonia: According to the WHO, presence of ammonia at higher than geogenic levels is an important indicator of faecal pollution. Ammonia may also be present in cases where chloramines are used for disinfection of drinking-water. On the other hand, in cases where chlorine gas is used for disinfection, presence of ammonia would reduce residual free*

- chlorine. The WHO has not proposed any guideline value for ammonia as it is not of immediate health relevance (WHO, 2011 p313).*
- e. *Nitrate (NO<sub>3</sub>): The WHO drinking water guideline value for nitrate is 10mg of Nitrate-Nitrogen (NO<sub>3</sub>-N) / L. This is equivalent to 10 X 4.4268 = 44.268 mg of NO<sub>3</sub>, which is almost the same as the IS10500 guideline value of 45 mg/l of NO<sub>3</sub>.*
2. Physical-sensory characteristics and observed values of chemical parameters tested in this case are within acceptable limits for human consumption.
  3. However, the water is soft, and its mineral content is low.
    - a. *Waters with hardness of less than 60 mg of calcium carbonate per litre (soft water) are aggressive (WHO 2011, p501). The aggressive water is corrosive. It leaches metals and other materials from containers and utensils. Hence, this water should be stored and delivered in nonmetallic food grade plastic, appropriate grade stainless steel, enameled metallic containers designed for the intended food processing operations.*
    - b. *Low-mineral content water may taste poorly and has also been reported to be less thirst quenching.*
    - c. *Some researchers have recommended that, the minimum level of calcium in drinking water should be 20 mg/L and the optimum should be 50 (40-80) mg/L. Similarly, the minimum level of magnesium in drinking water should be 10 mg/L and the optimum level should be about 20-30 mg/L (Kozisek, 2005, Pages 156-57).*
  4. If the R.O water plant has facility for adjustment of TDS level in treated water, then treated water TDS level should be adjusted upwards to around 100-150mg/L. Otherwise, installation of a post-treatment remineralization cartridge in the production line of R.O water plant may be considered.
  5. However, as the scope of the ordered testing service (BQT), does not include bacteriological analysis (BCT). Hence, **opinion about potability is not feasible.**

End of Report

*Sudhakar D.*  
Sudhakar D, Assistant Director

Test results are given only in relation to sample(s) tested for desired test service & based on sampling information provided by the client. The test report shall not be reproduced except in full, without prior written approval of the laboratory.

References:

- IS10500. 2012. Indian Standard Drinking Water Specification. Second Revision. New Delhi: Bureau of Indian Standard (BIS); 2012 May; <https://law.resource.org/pub/in/bis/S06/is.10500.2012.pdf>.
- WHO. Guidelines for drinking-water quality. Fourth Edition. Geneva: WHO, 2011.  
[http://www.who.int/water\\_sanitation\\_health/publications/2011/dwq\\_guidelines/en/](http://www.who.int/water_sanitation_health/publications/2011/dwq_guidelines/en/)
- WHO. Total dissolved solids in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality. Geneva: World Health Organization (WHO); 2003.
- USEPA. 1991. Manual of Individual and Non-Public Water Supply Systems. Washington, DC, USA: United States Environment Protection Agency (USEPA); 1991 May; Water WH-550.
- Rusydi Anna F. 2018. Correlation between conductivity and total dissolved solid in various type of water: A review. Earth and Environment Science. 2018; 118: <https://iopscience.iop.org/article/10.1088/1755-1315/118/1/012019>.
- Kozisek Frantisek. Health Risks from Drinking Demineralised Water. Ch-12 in: WHO. Nutrients in Drinking Water. Geneva: World Health Organization (WHO), 2005: 148-63.  
[http://www.who.int/water\\_sanitation\\_health/dwq/nutrientsindw.pdf](http://www.who.int/water_sanitation_health/dwq/nutrientsindw.pdf)
- NGT. Whether RO plants need to be deployed at all locations irrespective of water quality of raw water. Judgement. New Delhi: National Green Tribunal, Principal Bench; 2019 May 20; OA# 134/2015.

