



**PRODUCT MANUAL**  
**FOR REVERSE OSMOSIS (RO) BASED POINT-OF-USE (POU) WATER**  
**TREATMENT SYSTEM**  
**ACCORDING TO IS 16240 : 2015**

*This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.*

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| 1. | <b>Product</b>                                                                                                                                                                                                                                                                                                                     | :                                                                                                                                                                                                                                     | IS 16240 : 2015                                                      |
|    | <b>Title</b>                                                                                                                                                                                                                                                                                                                       | :                                                                                                                                                                                                                                     | Reverse Osmosis (RO) Based Point-of-Use (PoU) Water Treatment System |
|    | <b>No. of Amendments</b>                                                                                                                                                                                                                                                                                                           | :                                                                                                                                                                                                                                     | Nil                                                                  |
| 2. | <b>Sampling Guidelines:</b>                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                       |                                                                      |
| a) | <b>Raw material</b>                                                                                                                                                                                                                                                                                                                | :                                                                                                                                                                                                                                     | As per Clause 5 of IS 16240 and Table 1 of SIT.                      |
| b) | <b>Grouping guidelines</b>                                                                                                                                                                                                                                                                                                         | :                                                                                                                                                                                                                                     | NA                                                                   |
| c) | <b>Sample Size</b>                                                                                                                                                                                                                                                                                                                 | :                                                                                                                                                                                                                                     | 2 Nos.                                                               |
| 3. | <b>List of Test Equipment</b>                                                                                                                                                                                                                                                                                                      | :                                                                                                                                                                                                                                     | Please refer ANNEX – <u>A</u>                                        |
| 4. | <b>Scheme of Inspection and Testing</b>                                                                                                                                                                                                                                                                                            | :                                                                                                                                                                                                                                     | Please refer ANNEX – <u>B</u>                                        |
| 5. | <b>Possible tests in a day:</b>                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                       |                                                                      |
|    | i) Reject Water Control Mechanism<br>ii) TDS Reduction<br>iii) Percent Recovery of Product Water<br>iv) Hourly Production Rate<br>v) Leakage Current Test<br>vi) High Voltage Test<br>vii) Type Pressure Test (Hydrostatic Test)<br>viii) Routine Pressure Test (Pneumatic Test)<br>ix) Chemical Reduction (Copper, Iron, Nitrate) |                                                                                                                                                                                                                                       |                                                                      |
| 6. | <b>Scope of the Licence:</b>                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                       |                                                                      |
|    | “Licence is granted to use Standard Mark as per IS 16240 : 2015 with the following scope:                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                       |                                                                      |
|    | <b>Name of the product</b>                                                                                                                                                                                                                                                                                                         | Reverse Osmosis (RO) Based Point-of-Use (PoU) Water Treatment System                                                                                                                                                                  |                                                                      |
|    | <b>The manufacturer shall declare</b>                                                                                                                                                                                                                                                                                              | a. Production rate in litres per hour;<br>b. Recovery rating;<br>c. Maximum operatable feed Water TDS;<br>d. Operating Pressure range;<br>e. Supply of voltage whether single or Three-phase, frequency, Working voltage and Wattage. |                                                                      |

ANNEX - A

TO PRODUCT MANUAL  
FOR REVERSE OSMOSIS (RO) BASED POINT-OF-USE (POU) WATER  
TREATMENT SYSTEM  
ACCORDING TO IS 16240 : 2015

LIST OF TEST EQUIPMENT

*Major test equipment required to test as per the Indian Standard*

| Sl. No. | Test Equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Tests used in with<br>Clause Reference                                 |
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| 1.      | <ul style="list-style-type: none"> <li>– Desiccator</li> <li>– Drying oven (<math>180 \pm 2^{\circ}\text{C}</math>)</li> <li>– Filtering Assembly (suitable for type of filter selected)</li> <li>– Analytical balance (200 g capacity, l.c. 0.1 mg)</li> <li>– Pipettes</li> <li>– Evaporating dish</li> <li>– Magnetic stirrer recommended</li> <li>– Conductivity meter</li> </ul>                                                                                                                                                                                                                                                                                                                                                       | TDS Reduction<br>Clause 6.3.1<br>{IS 3025 (Part 16)}                   |
| 2.      | <p><b>i. Atomic Absorption Method:</b></p> <ul style="list-style-type: none"> <li>– Atomic absorption spectrometer equipped with gas flow meter for Argon or Nitrogen and Hydrogen and with arsenic electrodeless discharge lamp</li> <li>– Atomizer</li> <li>– Reaction cell for producing arsenic hydride</li> <li>– Eye dropper or syringe</li> <li>– Refrigerator</li> <li>– Argon or Nitrogen and Hydrogen</li> <li>– Sodium borohydride</li> <li>– Sodium hydroxide</li> <li>– Sodium Iodide</li> <li>– Sulphuric acid-18 N &amp; 2.5 N</li> <li>– Potassium persulphate</li> <li>– Concentrated Nitric acid</li> <li>– Concentrated Perchloric acid</li> <li>– Concentrated Hydrochloric acid</li> <li>– Arsenic trioxide</li> </ul> | Chemical Reduction<br>(Clause 6.3.3)<br>Arsenic<br>{IS 3025 (Part 37)} |

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|    | <ul style="list-style-type: none"> <li>– Arsenic pentaoxide</li> <li>– Dimethyl arsenic acid/cacodylic acid</li> <li>– Calcium chloride</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p><b>ii. Silver diethyl dithiocarbamate method (Referee method):</b></p> <ul style="list-style-type: none"> <li>– Arsine generator &amp; absorption assembly (Fig. 2 of IS 3025 Pt 37)</li> <li>– Spectrophotometer, 535 nm with 1 cm cells</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric acid Conc., Potassium Iodide, Stannous chloride, arsenic free<br/>Lead acetate, Ephedrine, Pyridine, Chloroform<br/>Silver diethyl dithiocarbamate, Zinc – 20 to 30 mesh, arsenic free, Arsenic trioxide, Sodium hydroxide.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>iii. Mercuric bromide stain method:</b></p> <ul style="list-style-type: none"> <li>– Arsine generator glass assembly (Fig 3 of IS 3025 Pt 37)</li> </ul> <p><b>Chemicals/Reagents:</b> Sulphuric acid (1:1), Nitric acid, conc., Roll cotton, Lead acetate, Arsenic papers, Mercuric bromide, Ethyl alcohol/isopropanol, Potassium iodide, Arsenic free stannous chloride, Zinc-20 to 30 Mesh, arsenic free, Arsenic trioxide, Sodium hydroxide.</p> |                                |
| 3. | <p><b>i. Atomic Absorption Method (Direct):</b></p> <ul style="list-style-type: none"> <li>– Atomic Absorption spectrophotometer with Air-Acetylene Flame</li> <li>– Cadmium Hollow Cathode Lamp or Multi Element Hollow Cathode Lamp for Use at 228.8 nm</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric acid, Conc., Nitric acid, Conc., Nitric acid, dilute – 1:499, Pure Cadmium Metal</p> <p style="text-align: center;"><b>OR</b></p> <p><b>ii. Atomic Absorption Method (Chelation and Extraction):</b></p> <ul style="list-style-type: none"> <li>– Atomic Absorption spectrophotometer with Air-Acetylene Flame.</li> <li>– Cadmium Hollow Cathode Lamp or</li> <li>– Multi Element Hollow Cathode Lamp</li> <li>– for use at 228.8 nm</li> <li>– Separating funnel</li> <li>– pH meter</li> <li>– pH paper</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric acid, Conc., Hydrochloric acid – 1:49, Nitric acid, Conc., Nitric acid, dilute – 1:499, Pure Cadmium Metal, Sodium hydroxide, Methyl Isobutyl Ketone (MIBK),</p>                                                                                                                                                                                          | Cadmium<br>{IS 3025 (Part 41)} |

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|    | <p>Bromophenol Blue, Ethanol or Isopropanol, Pyrrolidine dithiocarbamic acid, Carbon Disulphide.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>iii. Differential Pulse Anodic Stripping Voltametry:</b></p> <ul style="list-style-type: none"> <li>– Polarograph – Capable of Differential Pulse Work</li> <li>– Hanging Mercury Drop Electrode</li> <li>– Platinum Counter Electrode</li> <li>– Saturated calomel Reference Electrode</li> <li>– Magnetic Stirrer Control Unit with Stirring Bar</li> <li>– Nitrogen Gas (Cylinder)</li> <li>– Scrubber assembly for nitrogen purification</li> <li>– Voltametric Cell assembly</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric Acid, Conc., spectro grade, Nitric Acid, Conc., spectro grade, Nitric Acid, dil – 1:1, Hydroxylamine Hydrochloride, L-Ascorbic Acid, Pure Cadmium Metal, Granular Zinc, Mercury, Ammonium Meta Vanadate.</p>                                                                                                                                                                      |                                 |
| 4. | <p><b>i. Diphenylcarbazide Method:</b></p> <ul style="list-style-type: none"> <li>– Spectrophotometer, for use at 540 nm, with a light path of 1 cm, pH meter, Standard volumetric glass wares</li> </ul> <p><b>Chemicals/Reagents:</b> Stock Chromium Solution, Standard Chromium Solution, Nitric Acid—concentrated (16N), Sulphuric Acid—concentrated (36 N), Phosphoric Acid—concentrated (41N), Methyl Orange Indicator Solution, Ammonium Hydroxide—concentrated(14N), Potassium Permanganate Solution, Sodium Azide Solution, Diphenyl carbazide Solution, Acetone</p> <p style="text-align: center;"><b>OR</b></p> <p><b>ii. Atomic Absorption Method (Direct):</b></p> <ul style="list-style-type: none"> <li>– Atomic absorption spectrophotometer with air- acetylene flame.Hollow-cathode lamp or electrode less discharge lamp for use at 357.9nm.</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric Acid concentrated (11N)and1:1, Nitric Acid—concentrated, Sulphuric Acid—concentrated( 36N), Hydrogen Peroxide—(30percent m/m), Stock Chromium Solution.</p> | Chromium<br>{IS 3025 (Part 52)} |
| 5. | <p><b>i. Neocuproine Method:</b></p> <ul style="list-style-type: none"> <li>– Spectrophotometer &amp; 1cm cell Hot plate</li> <li>– Separating funnels (125 ml)</li> <li>– Conical flasks</li> </ul> <p><b>Chemicals/Reagents:</b> Ammonium Hydroxide, Chloroform, AR Grade, Hydrochloric acid, Conc., Hydroxylamine Hydrochloride, Isopropyl Alcohol, Neocuproine, Double Distilled water, Nitric</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Copper<br>{IS 3025 (Part 42)}   |

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|    | <p>Acid, Conc., Sulphuric Acid, Conc., Hydrated Sodium Citrate, Stock copper (II) solution 200µg/ml, (Pure Copper Metal, hot plate), Hydrogen Peroxide.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>ii. Atomic Absorption Method (Direct):</b></p> <ul style="list-style-type: none"> <li>– Atomic Absorption Spectro- photometer with air-acetylene flame; &amp; Copper Hollow Cathode lamp</li> <li>• Atomic Absorption Spectrophotometer with air-acetylene flame</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric Acid, Conc., Nitric Acid, Conc., Dilute Sulphuric Acid, Stock copper (II) solution – 1.0mg/ml, (Pure Copper metal &amp; hot plate).</p> <p style="text-align: center;"><b>OR</b></p> <p><b>iii. Atomic Absorption Method (Chelation Extraction):</b></p> <ul style="list-style-type: none"> <li>–Atomic Absorption Spectrophotometer with air-acetylene flame</li> <li>–Copper Hollow Cathode Lamp Separating Funnel</li> <li>–Volumetric Flasks</li> <li>– Distillation Assembly</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric Acid, Conc., Nitric Acid, Conc., Pyrrolidine, Dithiocarbamic acid, Methyl Isobutyl Ketone, AR grade, Carbon Disulphide, Sodium Hydroxide, Distilled water, Water Standard MIBK, Bromophenol Blue, Ethanol or Isopropanol, Stock copper (II) solution – 1.0mg/ml, (Pure Copper metal &amp; hot plate).</p> <p style="text-align: center;"><b>OR</b></p> <p><b>iv. Differential Pulse Anodic Stripping Voltametry:</b></p> <ul style="list-style-type: none"> <li>– Polarograph capable of Performing differential pulse work</li> <li>– Hanging Mercury Drop electrode</li> <li>– Platinum Counter Electrode</li> <li>– Saturated Calomel Reference Electrode</li> <li>– Magnetic Stirrer</li> <li>– Control unit with Stirring Bar</li> <li>– Scrubber Assembly</li> <li>– Whatman Filter Paper No. 40</li> </ul> <p><b>Chemicals/Reagents:</b> Nitrogen Gas, Hydrochloric Acid Conc. (Spectro Grade), Nitric Acid-Conc. (Spectro Grade), Sulphuric Acid Conc., Pure Copper Metal, Granular Zinc, Mercury</p> |                                         |
| 6. | <p><b>i. Zirconium alizarin Method:</b></p> <ul style="list-style-type: none"> <li>– Nessler Tubes (100ml) Distillation Apparatus</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Fluoride<br/>{IS 3025 (Part 60)}</p> |

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|    | <p>– Refrigerator (Recommended) • Heating mantle</p> <p><b>Chemicals/Reagents:</b> Thiosulphate Solution (0.1 N), Standard Sodium Fluoride Solution (1ml = 0.01 mg F), Zirconium Oxychloride OR Zirconium Oxynitrate, Alizarin Sodium Monosulphonate (AlizarinS), Conc. Hydrochloric Acid, Conc. Sulphuric Acid, Silver Sulphate, Perchloric Acid</p> <p>Phenolphthalein Indicator, Sodium Hydroxide Solution.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>ii. Electro Chemical Probe Method:</b></p> <ul style="list-style-type: none"> <li>– Millivolt Meter</li> <li>– Fluoride Ion – Selective Electrode</li> <li>– Reference Electrode – Either a calomel electrode,</li> <li>– filled with saturated Potassium Chloride (KCl) Solution or a Silver / Silver Chloride Electrode</li> <li>– Measuring Cells – 100ml (Polypropylene fitted with thermostated jacket)</li> <li>– Water Bath</li> <li>– Magnetic Stirrer with a polytetrafluoroethylene (PTFE)</li> <li>– Polyethylene Beaker</li> <li>– pH meter</li> <li>– Standard Volumetric</li> <li>– Glass wares</li> <li>– Desiccator</li> <li>– Screw Capped Polyethylene Container</li> <li>– Plastic Bottle</li> </ul> <p><b>Chemicals/Reagents:</b> Sodium Hydroxide- 5 M, Total Ionic Strength Adjustment Buffer (TISAB)-[Sodium Chloride, Glacial Acetic Acid, Sodium Hydroxide, CDTA( trans -1,2- diaminocyclohexane – N,N,N',N' tetra acetic acid)], Fluoride, Stock Solution, 1000mg/1 (Sodium Fluoride )</p> |                             |
| 7. | <p><b>i. Atomic absorption method (direct):</b></p> <ul style="list-style-type: none"> <li>– Atomic absorption spectrophotometer with air acetylene flame</li> <li>– Hollow cathode lamp OR Electrodeless Discharge lamp for use at 283.3 nm</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric acid, conc., Nitric acid, conc., Lead nitrate, Nitric acid, dil (1:499),</p> <p style="text-align: center;"><b>OR</b></p> <p><b>ii. Atomic absorption method (chelation – extraction):</b></p> <ul style="list-style-type: none"> <li>– Atomic absorption spectrophotometer with air acetylene flame</li> <li>– Hollow cathode lamp OR Electrode less Discharge lamp for use at 283.3 nm</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Lead<br>{IS 3025 (Part 47)} |

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|    | <ul style="list-style-type: none"> <li>– Separatory funnel</li> <li>– 0.45µm membrane filter</li> <li>– Acid washed filter paper.</li> <li>– pH meter</li> </ul> <p><b>Chemicals/Reagents:</b> Hydrochloric acid, conc., Hydrochloric acid, dil (1:2), Hydrochloric acid, dil (1:49)<br/>Nitric acid, conc., Pyrrolidine, Chloroform, Carbon disulphide, Sodium hydroxide, Bromophenol blue, Lead nitrate</p> <p style="text-align: center;"><b>OR</b></p> <p><b>iii. Differential pulse anodic stripping voltametry (DPASV)</b><br/><b>Method:</b></p> <ul style="list-style-type: none"> <li>– Polarograph capable of performing differential pulse work</li> <li>– Hanging mercury drop electrode</li> <li>– Platinum counter electrode</li> <li>– Saturated calomel reference electrode</li> <li>– Magnetic stirrer control unit with stirring bar</li> <li>– Scrubber assembly for nitrogen purification</li> <li>– Nitrogen gas (cylinder)</li> <li>– 0.45µm membrane filter</li> </ul> <p><b>Chemicals/Reagents:</b> Lead nitrate, Hydrochloric acid, conc., Nitric acid, conc., Nitric acid, dil (1:1), Granular zinc, Mercury, Ammonium metavanadate</p> <p style="text-align: center;"><b>OR</b></p> <p><b>iv. Dithizone method:</b></p> <ul style="list-style-type: none"> <li>– Spectrophotometer for use at 510 nm with 1-cm cell</li> <li>– pH meter</li> <li>– TEF beakers, 100 ml</li> <li>– Separating funnels, 250 ml, 500 ml</li> </ul> <p><b>Chemicals/Reagents:</b> Lead free distilled water, Lead nitrate<br/>Nitric acid, 95% (w/w), Nitric acid, dil 20% (w/w), Nitric acid, dil (1:1), Ammonium hydroxide Conc. (14 N), Ammonium hydroxide, dil. 10% ( v/v), Ammonium hydroxide, dil. 1% v/v), Anhydrous Ammonium Citrate, Anhydrous Sodium Sulphite, Hydroxylamine hydrochloride<br/>Potassium cyanide, Dithizone, Chloroform, Hydrochloric acid (1:1).</p> |                                |
| 8. | <p><b>i. Cold Vapour Atomic Absorption Spectrophotometric Method:</b></p> <ul style="list-style-type: none"> <li>– Atomic Absorption Spectrometer and Associated Equipment (Cold Vapour Technique)</li> <li>– Mercury Vapour Generation Assembly</li> <li>– Mercury Hollow Cathode Lamp</li> <li>– Recorder/Printer/Display</li> <li>– Meter</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Mercury<br>{IS 3025 (Part 48)} |

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|    | <ul style="list-style-type: none"> <li>– BOD bottle, 300 ml</li> <li>– Water bath</li> <li>– Equipment assembly as per Fig 1</li> </ul> <p><b>Chemicals/Reagents:</b> Sulphuric acid, conc., Nitric acid, Conc., Stannous chloride, Hydrochloric acid, Conc., Sodium chloride, Hydroxylamine sulphate, Potassium permanganate<br/>Potassium persulphate, Mercuric chloride, Mercury free distilled water</p> <p style="text-align: center;">OR</p> <p><b>ii. Colorimetric Dithizone Method:</b><br/>Spectrophotometer<br/>Separating Funnels (250 and 1000ml with PTFE stopcocks)<br/>Glass wares<br/>Whatman Filter No. 42<br/><b>Chemicals/Reagents:</b> Redistilled or Deionised Distilled Water (Mercury free), Mercuric chloride, Nitric acid, Conc.<br/>Potassium permanganate, Potassium persulphate, Hydroxylamine hydrochloride, Dithiozone solution, 6 µg/ml<br/>Sulphuric acid – 0.25 N, Potassium bromide, Chloroform, Disodium hydrogen phosphate, Anhydrous potassium carbonate, Sodium sulphate, Anhydrous, Hydrochloric acid (1:1), Ammonium hydroxide.</p>          |                                |
| 9. | <p><b>i. Cadmium Reduction Method:</b></p> <ul style="list-style-type: none"> <li>– Reduction Column</li> <li>– Colorimeter OR</li> <li>– Spectrophotometer OR</li> <li>– Filter photometer Glass wool</li> <li>– 0.45 µm pore diameter membrane filter</li> <li>– Refrigerator</li> </ul> <p><b>Chemicals/Reagents:</b> Distilled water, Nitrate free water<br/>Cadmium granules (40 – 60 mesh), Hydrochloric Acid (6N)<br/>Copper Sulphate Solution, Sulphanilamide, Conc. Hydrochloric Acid, N-(1-naphthyl)-Ethylenediamine dihydrochloride (NED) Dihydrochloride), Ammonium Chloride, Disodium Ethylene diamine tetra acetate, Ammonia Solution, Copper sulphate Solution – 2%<br/>Stock nitrate solution – 100µg/ml, (Potassium Nitrate &amp; Chloroform), Chloroform, Stock nitrite solution - 100µg/ml, (Potassium Nitrite &amp; Chloroform), Nitrite free water.</p> <p style="text-align: center;">OR</p> <p><b>ii. Chromotropic Acid Method:</b><br/>Spectrophotometer<br/>Standard laboratory glasswares<br/>Nitrate free water<br/>Stock Nitrate Solution - 100µg/ml</p> | Nitrate<br>{IS 3025 (Part 34)} |

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|     | <p><b>Chemicals/Reagents:</b> (Potassium Nitrate, Chloroform), Standard Nitrate solution – 10.0µg/ml, Sulphite Urea Reagent, (Urea &amp; Anhydrous sodium Sulphite)<br/>Antimony reagent (Antimony metal, Conc. Sulphuric acid), Chromotropic Acid Reagent (Purified chromotropic Acid crystals, Conc. Sulphuric Acid)<br/>Sulphuric Acid, Conc. Nitrate free<br/>OR<br/><b>iii. Devarda's Alloy Reduction Method:</b></p> <ul style="list-style-type: none"> <li>– Distillation Assembly (Kjeldahl Assembly)</li> <li>– Measuring Scoop spectrophotometer</li> </ul> <p><b>Chemicals/Reagents:</b> Ammonia Free Water, Borate Buffer Solution (0.1N Sodium Hydroxide, 0.025M Sodium Tetraborate), Sodium Hydroxide – 6 N, Devarda's Alloy – 20 mesh with less than 0.005 percent Nitrogen, Mixed indicator Solution (Methyl Red indicator, Ethyl alcohol/Isopropyl alcohol, Methylene Blue), Indicating Boric Acid Solution (Hydroboric Acid, mixed indicator solution), Std. Sulphuric Acid Titrant - 0.02 N, Nessler's Reagent (Mercuric Iodide, Potassium Iodine. Sodium Hydroxide), Stock Ammonia Solution - 1.22mg ammonia/ ml (Anhydrous Ammonium ammonia/ ml (Anhydrous Ammonium Chloride), Standard Ammonia Solution</p> |                                     |
| 10. | <p><b>i. 1,10 Phenanthroline Method:</b></p> <ul style="list-style-type: none"> <li>– Spectrophotometer</li> <li>– Std. volumetric glass wares</li> <li>– Hot Plate</li> <li>– Fuming Hood</li> <li>– 0.45µ m Membrane Filter with Filtration Assembly</li> </ul> <p><b>Chemicals/Reagents:</b> Amalgamated Zinc (Granular Zinc and Mercury), Ammonium Meta Vanadate Distilled water, Hydrochloric Acid-Conc. (Containing less than 0.00005% iron), Hydroxylamine Hydrochloride, Ammonium Acetate, Glacial Acetic Acid, Sodium Acetate, 1,10 Phenanthroline Monohydrate, Stock Iron Solution 1ml=200µg of Fe (Conc. Sulphuric Acid, Ferrous Ammonium Sulphate, Potassium Permanganate)<br/><br/>Std. Iron Solution (1.0 ml=1.0µg of Iron) Di-isopropyl Ether<br/>OR<br/><b>ii. Atomic Absorption Method (DIRECT):</b></p> <ul style="list-style-type: none"> <li>– Atomic Absorption Spectrophotometer</li> <li>– Air Acetylene Flame</li> </ul>                                                                                                                                                                                                                                                                                  | <p>Iron<br/>{IS 3025 (Part 53)}</p> |

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|     | <ul style="list-style-type: none"> <li>– Iron Hollow Cathode Lamp or Electrodeless discharge lamp for use at 248.3nm</li> <li>– Volumetric Flasks</li> </ul> <p><b>Chemicals/Reagents:</b> Distilled water, Hydrochloric Acid, Conc. Nitric Acid, Conc., Sulphuric Acid, Conc., Calcium Chloride Solution (Calcium Carbonate, Hydrochloric acid)<br/>Stock Iron Solution (1.0 ml=100µg of Fe) (Pure iron wire, Hydrochloric acid Nitric Acid).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                      |
| 11. | <ul style="list-style-type: none"> <li>– General microbiological lab equipment</li> <li>– Incubator capable of maintaining 36±2 °C</li> <li>– Equipment, for membrane filtration</li> <li>– Membrane filters</li> <li>– Disinfected forceps, for handling of membrane filters.</li> <li>– Incubator capable of maintaining 44°C</li> <li>– Microscope and Glass slides (for Gram staining)</li> <li>– Distilled water</li> <li>– Chromogenic Coliform Agar (Enzymatic digest of casein, Yeast Extract 2, Sodium chloride,</li> <li>– Sodium dihydrogen phosphate</li> <li>– Disodium Hydrogen Phosphate</li> <li>– Sodium pyruvate,</li> <li>– Sorbitol</li> <li>– Tryptophane, Tergitol – 7, 6-chloro 3 indoxyl Beta D Galactopyranoside, 5- Bromo 4-Chloro 3Indoxyl Beta D Glucuronic Acid,</li> <li>– Iso propyl Beta D thiogalactopyranoside (IPTG)</li> <li>– Bacteriological Agar</li> <li>– Oxidase reagent</li> <li>– N,N,N',N'- Tetramethyl p phenylenediamine dihydrochloride</li> <li>– Water</li> <li>– Tryptone Soya Agar</li> <li>– Tryptone</li> <li>– Soya Peptone</li> <li>– Sodium Chloride</li> <li>– Medium for indole production</li> <li>– Kovac's reagent (for indole test)</li> <li>– Gram stain – (Methyl violet or Crystal violet, Iodine, Potassium iodide; Neutral red, Acetic acid, Ethanol)</li> </ul> | Microbiological Reduction<br>(Clause 6.3.4)<br>E. Coli<br>(IS 10500) |

|     |                                                                                                                                                                       |                                                                            |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| 12. | Stop Watch, Measuring Flasks, Air Conditioner, Thermometer                                                                                                            | Percent Recovery of Product Water (Clause 6.4.1)                           |
| 13. | Stop Watch, Measuring Flasks, Air Conditioner, Thermometer                                                                                                            | Hourly Production rate Clause 6.4.3                                        |
| 14. | Microampere meter                                                                                                                                                     | Electrical Safety (Clause 6.5)<br>i. Leakage Current Clause 6.5.1 (IS 302) |
| 15. | High Voltage Tester, Stop watch                                                                                                                                       | ii. High Voltage Test Clause 6.5.2                                         |
| 16  | Pressure Gauge (capable of reading pressure of 0.294 MPa and capable of reading pressure of 1.5 times the maximum pressure exerted by the booster pump.<br>Stop Watch | Type Pressure test (Hydrostatic Test) Clause 6.7                           |
| 17  | Air Compressor with Pressure Gauge (capable of reading pressure of 0.2 MPa), Stop Watch, Manual Valve with Pressure Gauge (capable of reading pressure of 0.2 MPa).   | Routine Pressure Test (Pneumatic Test) Clause 7                            |

***The above list is indicative only and may not be treated as exhaustive.***

\*The list does not cover the requirements of Pesticide Residues, MS2 Phage as these tests are to be done from outside lab.

**ANNEX - B**

**SCHEME OF INSPECTION AND TESTING  
FOR REVERSE OSMOSIS (RO) BASED POINT-OF-USE (POU) WATER  
TREATMENT SYSTEM  
ACCORDING TO IS 16240 : 2015**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

**1.1** The manufacturer shall prepare a calibration plan for the test equipment.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. PACKING AND MARKING** – The Standard Mark as given in Schedule of the license shall be incorporated, and the marking labelling and packing done as per the provisions of the Indian Standard, provided always that the product thus marked and packed conforms to all the requirement of the specification.

**3.1 Marking** – The manufacturer shall explicitly state the CAUTION as per clause 10 of IS 16240. A name plate shall be fixed on the body of the RO system, at a prominent location. The name plate shall be marked with the details as mentioned under clause 11.1 of IS 16240.

**3.1.1** In addition, the following details shall be mentioned on each Reverse Osmosis (RO) Based Point-of-Use (PoU) Water Treatment System legibly and indelibly:

a) BIS Licence No. CM/L\_\_\_\_\_.

b) BIS website details i.e – “For details of BIS certification please visit [www.bis.gov.in](http://www.bis.gov.in)”.

**4. CONTROL UNIT** – For the purpose of this scheme all Water purifiers of the same capacity produced under similar condition of manufacturing in a week shall constitute a control unit.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

**5.1** All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

**6. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**TABLE 1**  
**LEVELS OF CONTROL**

| (1)             |                                 |                      |                     | (2)                                                                            | (3)                                                      |                      |                                                                                         |
|-----------------|---------------------------------|----------------------|---------------------|--------------------------------------------------------------------------------|----------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------|
| Testing Details |                                 |                      |                     | Test equipment requirement<br>R: required (or) S:<br>Sub-contracting permitted | Levels of control                                        |                      |                                                                                         |
| Clause          | Requirement                     | Test Method Cl. Ref. | Test Method IS      |                                                                                | No. of Samples                                           | Frequency            | Remarks                                                                                 |
| 5               | Materials                       |                      |                     |                                                                                |                                                          |                      |                                                                                         |
| 5.1             | Materials in contact with water | 5.1                  | IS 16240<br>IS 9845 | S                                                                              | Each Consignment of material received                    |                      |                                                                                         |
| 5.2             | Materials of Construction       | 5.2.1<br>5.2.2       | IS 16240            | S                                                                              | Each Consignment of material received                    |                      |                                                                                         |
| 5.3             | Membrane Preservatives          | 5.3                  | IS 16240            | S                                                                              | Shall be declared by the manufacturer in the user manual |                      |                                                                                         |
| 6               | Performance Requirements        |                      |                     |                                                                                |                                                          |                      |                                                                                         |
| 6.2.1           | Reject water control Mechanism  | 6.2.1                | IS 16240            | R                                                                              | 1                                                        | Each Control unit    |                                                                                         |
| 6.3.1           | TDS reduction                   | 6.3.1                | IS 3025 Part 16     | R                                                                              | 1                                                        | Each Control unit    |                                                                                         |
| 6.3.3           | Chemical reduction              | 6.3.3                |                     |                                                                                |                                                          |                      |                                                                                         |
|                 | i)Arsenic                       |                      | IS 3025 Part 37     | S                                                                              | 1                                                        | Once in three months | In absence of In-house testing facilities, test may be carried out from recognized OSL. |
|                 | ii)Cadmium                      |                      | IS 3025 Part 41     | S                                                                              | 1                                                        | -do-                 |                                                                                         |
|                 | iii)Chromium                    |                      | IS 3025 Part 52     | S                                                                              | 1                                                        | -do-                 |                                                                                         |
|                 | iv)Fluoride                     |                      | IS 3025 Part 60     | S                                                                              | 1                                                        | -do-                 |                                                                                         |
|                 | v)Lead                          |                      | IS 3025 Part 47     | S                                                                              | 1                                                        | -do-                 |                                                                                         |
|                 | vi)Mercury                      |                      | IS 3025 Part 48     | S                                                                              | 1                                                        | -do-                 |                                                                                         |

|       |                                   |                 |                            |   |                                                                                                                      |                      |  |
|-------|-----------------------------------|-----------------|----------------------------|---|----------------------------------------------------------------------------------------------------------------------|----------------------|--|
|       | vii)Pesticides total              |                 | IS 10500                   | S | 1                                                                                                                    | -do-                 |  |
|       | viii)Copper                       |                 | IS 3025 Part 42            | R | 1                                                                                                                    | Once in a Week       |  |
|       | ix)Iron                           |                 | IS 3025 Part 53            | R | 1                                                                                                                    | -do-                 |  |
|       | x)Nitrate                         |                 | IS 3025 Part 34            | R | 1                                                                                                                    | -do-                 |  |
| 6.3.4 | Microbiological reduction         | 6.3.4 & Table 1 |                            |   |                                                                                                                      |                      |  |
|       | i)E. Coli                         |                 | IS 15185 or IS 5887 Part 1 | R | 1                                                                                                                    | Each Control unit    |  |
|       | ii)MS2 (Viruses)                  |                 | IS 10500                   | S | 1                                                                                                                    | Once in a Six Months |  |
|       | iii)Cryptosporidium*              |                 |                            | S | Requirements are kept in abeyance till the time a laboratory is identified or manufacturer develops test facilities. |                      |  |
|       | iv) Giardia Lamblia*              |                 |                            | S |                                                                                                                      |                      |  |
| 6.4   | Percent Recovery of product Water |                 |                            |   |                                                                                                                      |                      |  |
| 6.4.1 | Percent Recovery of product Water | 6.4.1           | IS 16240                   | R | 1                                                                                                                    | Each Control unit    |  |
| 6.4.3 | Hourly Production Rate            | 6.4.3           | IS 16240                   | R | 1                                                                                                                    | Each Control unit    |  |
| 6.5   | Electrical Safety                 |                 |                            |   |                                                                                                                      |                      |  |
| 6.5.1 | Leakage current                   | 6.5.1           | IS 16240<br>IS 302         | R | 2                                                                                                                    | Each Control unit    |  |
| 6.5.2 | High voltage test                 | 6.5.2           | IS 16240<br>IS 302         | R | 3                                                                                                                    | Each Control unit    |  |
| 6.6   | Power Supply                      | 6.6             | IS 16240                   | R | 5                                                                                                                    | Each Control unit    |  |
| 6.7   | Hydrostatic Test                  |                 |                            |   |                                                                                                                      |                      |  |

|                      |                                       |                      |          |   |   |                   |  |
|----------------------|---------------------------------------|----------------------|----------|---|---|-------------------|--|
| 6.7.1, 6.7.2 & 6.7.3 | Type Pressure test (Hydrostatic test) | 6.7.1, 6.7.2 & 6.7.3 | IS 16240 | R | 2 | Each Control unit |  |
| 7.2                  | Pneumatic test                        | 7.2                  | IS 16240 | R | 5 | Each Control unit |  |

Note – 1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Subcontracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note – 2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.