

Laboratory **Pai & Pai Chemicals (I) Pvt. Ltd., 29/A, Kumbalgotu Indl. Area, 1st Phase, Bengaluru, Karnataka**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-7282**

Page 1 of 9

Validity **18.05.2018 to 17.05.2020**

Last Amended on **21.12.2018**

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|-----|----------------------------|-------------------------|---|--|
|-----|----------------------------|-------------------------|---|--|

BIOLOGICAL TESTING

| I. | WATER | | | |
|----|--------------------------------|---|---|----------------------------------|
| 1. | Packaged Drinking Water | Aerobic microbial count at 37 °C | IS 5402:2012 | ≤ 1 cfu / ml |
| | | Aerobic microbial count at 22 °C | IS 5402:2012 | |
| | | Coliform | IS 5401(Part 1):2012 IS 15185:2016 | Present / Absent Per 250ml |
| | | Sulphite reducing anaerobes | IS 13428:2005 (Annex-C) | Present/Absent per 50 ml |
| | | Escherichia. coli | IS 5887(Part 1)1976 (2005) IS 15185:2016 | Present/Absent per 250 ml |
| | | Faecal streptococci & Enterococci | IS 5887(part-2)1976(2005) IS 15186:2002 | Present/Absent per 250 ml |
| | | Staphylococcus aureus | IS 5887(Part 2) 1976(2005) | Present/Absent per 250 ml |
| | | Pseudomonas aeruginosa | IS 13428:2005 (Annex D) | Present /Absent per 250ml |
| | | Yeast & Mould | IS 5403:1999 RA2005 | Present /Absent per 250ml |
| | | Salmonella | IS 5887(Part 3) 1999 (2005) IS 15187(2016) | Present / Absent per 250ml |
| | | Shigella | IS 5887(Part 7) 1999(2005) | Present /Absent per 250ml |
| | | Vibrio cholera | IS 5887(Part 5) 1976(2005) | Present /Absent per 250ml |
| | | Vibrio parahaemolyticus | IS 5887(Part 5) 1976(2005) | Present /Absent per 250ml |
| 2. | Drinking Water/ Borewell Water | Total plate count/ Standard plate count | IS 1622:1981 RA: 2009 | ≤ 1 cfu/ml |
| | | Coliform | ISO 9308 (Part 1) 2014 IS 5401 (Part 1) 2012 | < 1 MPN/100 ml to 161 MPN/100 ml |

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Page 2 of 9

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| | | Coliform | IS 1622:1981 RA:2009 | Present /Absent per 100ml <1 MPN/100 ml to 161 MPN/100 ml |
| | | Escherichia. coli | ISO 9308 (Part 1) 2014 IS 5887(Part 1)1976, RA2005 IS 1622:1981, RA 2009 | Present /Absent per 250ml Present /Absent per 100ml ≤ 1 MPN/100 ml to 161 MPN/100 ml |
| | | Faecal coliform | IS 1622:1981 RA-2009 | ≤ 1 MPN/100 ml to 161 MPN/100 ml Present /Absent per 100 ml |
| | | Enterococci | ISO 7899-2 2000 IS5887 (Part 2) 1976 RA:2005 | Present /Absent per 250ml |
| | | Phytoplankton | IS 1622:1981 RA:2009 | Present /Absent |
| II. | ENVIRONMENT AND POLLUTION | | | |
| 1. | Effluent Water/ Waste Water | Total coliform | APHA (23rd edition) 9221 (B&C) APHA (23rd edition) 9221(D) | 1.8 MPN -1600 MPN |
| | | Thermotolerant Escherichia. coli | APHA (23rd edition)9221(F) | 1.8 MPN -1600 MPN |
| | | Faecal enterococcus/ Streptococcus group | APHA (23rd edition) 9221(B&C) | 1.8 MPN -1600 MPN |
| | | Faecal coliform | APHA (23rd edition) 9221(E) | 1.8 MPN -1600 MPN |
| | | Phytoplanktons | IS:1622:1981 RA2009 (only 4.2.4) | Present /Absent |

***NOTE:** The Laboratory has demonstrated competence for the stated scope for **WATER**. This however **does not fully cover** the specification requirements of **BIS for the Packaged Drinking Water as per IS:14543 and the Packaged Natural Mineral Water IS:13428**.

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Certificate Number **TC-7282**

Page 3 of 9

Validity **18.05.2018 to 17.05.2020**

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| <u>CHEMICAL TESTING</u> | | | | |
| I. | WATER | | | |
| I. | Borewell Water, River Water, Drinking Water) | Boron as B | IS 3025 (Part 57) 6.0:2005 RA 2010 /APHA 23rd Edn (2017) 4500-B / colorimetric Curcumin Method | 0.5 mg/l to 5 mg/l |
| | | Calcium as Ca | IS 3025 (Part 40)5.0:1991 RA 2009 / APHA 23rd Edn (2017) 3500 –Ca B / EDTA Titrimetric method. | 5 mg/l to 200 mg/l |
| | | Chloride as Cl | IS 3025 (Part 32)2.0:1988 RA 2009 / APHA 23rd Edn (2017) 4500-CIB / Argentometric method | 10 mg/l to 1000 mg/l |
| | | Copper as Cu | IS 3025 (Part 42)6.0:1992 RA 2009 / APHA 23rd Edn (2017) 3111B / AAS Method – Direct | 0.1 mg/l to 3.0 mg/l |
| | | Fluoride as F | APHA 23rd Edn(2017) 4500-F D / SPANDS method | 0.1 mg/l to 1.5 mg/l |
| | | Iron as Fe | IS 3025 (Part 53)7.0:2003 RA 2009 / APHA 23rd Edn (2017) 3111B / AAS Method Direct | 0.1 mg/l to 5 mg/l |
| | | Magnesium as Mg | IS 3025:1994 RA 2009 (Part 46) 6.0 / APHA 23rd Edn 3500(2017) - mg B / Volumetric Method Using EDTA | 10 mg/l to 100 mg/l |

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Certificate Number **TC-7282**

Page 4 of 9

Validity **18.05.2018 to 17.05.2020**

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| | | pH @ 25°C | IS 3025 (Part 11)2.0:1983 RA 2006 / APHA 23rd Edn (2017) 4500 pH Value B / Electrometric method | 2to 12 |
| | | Residual Free Chlorine | IS 3025 (Part 26)3.0:1986 RA 2009 /APHA 23rd Edn (2017) 4500-CI B / Iodimetric Method | 1 mg/l to 10.0 mg/l |
| | | Sulphate as SO ₄ | IS 3025 (Part 24)4.0:1986 RA 2009 / APHA 23rd Edn (2017) 4500-SO ₄ ²⁻ E / Turbidity method | 20 mg/l to 400 mg/l |
| | | Total Alkalinity | IS 3025 (Part 23)1.0:1986 RA 2003 / APHA 23rd Edn (2017) 2320B / Titrimetric Method | 2 mg/l to 100 mg/l |
| | | Total Dissolved Solids | IS 3025 (Part 16)1.0:1984 RA 2006 / APHA 23rd Edn (2017) 2540C / Gravimetric Method | 20 mg/l to 2000 mg/l |
| | | Total Hardness | IS 3025 (Part 21)5.0:2009 / APHA 23rd Edn(2017) 2340C / EDTA Method | 15 mg/l to 600 mg/l |
| | | Total Solids | IS 3025 (Part 15)1.0:1984 RA 2009 / APHA 23rd Edn (2017) 2540B / Gravimetric Method | 20 mg/l to 2100 mg/l |
| | | Total Suspended Solids | IS 3025 (Part 17)1.0:1984 RA 2012 / APHA 23rd Edn (2017) 2540D / Gravimetric Method | 20 mg/l to 100 mg/l |
| | | Turbidity | IS 3025 (Part 10)1.0:1984 RA 2009 /APHA 23rd Edn (2017) 2130B / Nephelometric method | 1 NTU to 10 NTU |

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Page 5 of 9

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|------------|---|-------------------------|---|---|
| | | Zinc as Zn | IS 3025 (Part 49) 6.0:1994 RA 2009 Part 49 /APHA 23rd Edn(2017) 3111B/ AAS Method Direct | 1 mg/l to 15 mg/l |
| II. | POLLUTION AND ENVIRONMENT | | | |
| 1. | Treated & Condensate Water, STP, Waste, Industrial and Cooling Water | Acidity | IS 3025 (Part 22)1.0: 1986 RA 2009 /APHA 23rd Edn (2017) 2310B / Titrimetric Method | 1 mg/l to 1000 mg/l 5 mg/l to 150000 mg/l |
| | | Ammonical Nitrogen | IS 3025(Part 34) 2.5: 1988 RA 2009 / APHA 23rd Edn (2017) 4500-NH3 B, C / Titrimetric Method | 1 mg/l to 50 mg/l 10 mg/l to 500 mg/l |
| | | BOD @ 27°C 3 Days | IS 3025(Part 44) 1.0: 1983 RA 2009 / APHA 23rd Edn (2017) 2310B / Oxygen Depletion method | 1 mg/l to 100 mg/l 2 mg/l to 150000 mg/l |
| | | Boron as B | IS 3025 (Part 57)6.0 :2005 RA 2010 / APHA 23rd Edn (2017) 4500-B B / colorimetric Curcumin Method | 0.5 mg/l to 2.0 mg/l 0.5 mg/l to 10.0mg/l |
| | | Calcium as Ca | IS 3025 (Part 40) 5.0:1991 RA 2009 / APHA 23rd Edn (2017) 3500-Ca B / EDTA Titrimetric method | 5 mg/l to 200 mg/l 15 mg/l to 10000mg/l |
| | | COD | IS 3025 (Part 58) 1.0:2006 RA 2012 / APHA 23rd Edn 5220B(2017) /Open Reflux method | 4 mg/l to 250 mg/l 4 mg/l to 300000 mg/l |
| | | Chloride as Cl | IS 3025 (Part 32)2.0 :1988 RA 2009 / APHA 23rd Edn (2017) 4500-Cl B / Argentometric method | 10 mg/l to 600 mg/l 25 mg/l to 100000 mg/l |

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Certificate Number **TC-7282**

Page 6 of 9

Validity **18.05.2018 to 17.05.2020**

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| | | Conductivity | IS3025(Part14)1.0:1985 RA 2013/APHA 23rd Edn 2017) 2510B/ Electrical Conductivity Method | 1 µmohs/cm to 2250 µmohs/cm 1 µmohs/cm to 50000 µmohs/cm |
| | | Copper as Cu | IS 3025 (Part42)6.0:1992 RA 2009 / APHA 23rd Edn(2017) 3111B / AAS Method – Direct Method | 0.1 mg/l to 3 mg/l 1 mg/l to 50 mg/l |
| | | Dissolved Oxygen | IS 3025 (Part 38)4.2:1989 RA 2009 / APHA 23rd Edn (2017) 4500-O B //Azide Modification Method | 1 mg/l to 10 mg/l |
| | | Fluoride as F | APHA 23rd Edn(2017) 4500-F D / SPANDS method | 1 mg/l to 3 mg/l 0.5 mg/l to 50000mg/l |
| | | Hexavalent Chromium as Cr6+ | IS 3025 (Part 52)6.0:2003 RA 2009 / APHA 23rd Edn (2017) 3500- Cr B /Diphenyl Carbazide Method | 0.25 mg/l to 2 mg/l 0.25 mg/l to 500 mg/l |
| | | Iron as Fe | IS 3025 (Part 53)7.0 :2003 RA 2009 / APHA 23rd Edn (2017) 3111B / AAS Method Direct | 0.3 mg/l to 10mg/l 1 mg/l to 500mg/l |
| | | Lead as Pb | IS 3025 (Part 47)7.0:1994 RA 2009 / APHA 23rd Edn (2017) 3111B / AAS Method Direct | 1 mg/l to 10mg/l 1 mg/l to 50 mg/l |
| | | Magnesium as Mg | IS 3025 (Part 46) 6.0:1994 RA 2009 / APHA 23rd Edn (2017) 3500-mg B / Volumetric Method Using EDTA | 1 mg/l to 100 mg/l 1 mg/l to 5000 mg/l |

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Page 7 of 9

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| | | Nickel as Ni | IS3025(Part 54)7.0 : 2003 RA 2009 / APHA 23rd Edn(2017) 3111B / AAS Method Direct | 1 mg/l to 3 mg/l 1 mg/l to 500mg/l |
| | | Oil & Grease | IS3025(Part 39)5.0:1991 RA 2009/Partition gravimetric Method | 1 mg/l to 10mg/l 5 mg/l to 1000 mg/l |
| | | Percent Sodium | SOP No: PPC/L/TP/20 Issue date: 09.09.2014, Issue No:01 | 5% to 60 % 5%to 100% |
| | | pH @ 25°C | IS 3025 (Part 11)2.0:1983 RA 2006 / APHA 23rd Edn(2017) 4500 pH Value /Electrometric method | 1to 12 |
| | | Phenols | IS 3025 (Part 43):1992 RA 2003 / APHA 23rd Edn(2017) 5530B, D / Direct Photometric Method | 0.1 mg/l to 1 mg/l |
| | | Potassium as K | IS 3025 (Part 45)5.0:1993 RA 2009 / APHA 23rd Edn(2017) 3500-K B / Flame Emission Photometric Method | 0.5 mg/l to 20 mg/l 0.5 mg/l to 500mg/l |
| | | Residual Free Chlorine | IS 3025 (Part 26)3.0 :1986 RA 2009 /APHA 23rd Edn(2017) 4500B / Iodimetric Method | 1 mg/l to 10 mg/l 1 mg/l to 5000 mg/l |
| | | Sodium Absorption Ratio | SOP No:PPC/L/TP/26 IssueDate:09.09.2014, Issue No:1 | 1 to 50 1 to 100 |
| | | Sodium Na | IS 3025 (Part:45) : 1993 RA 2009 / APHA 23rd Edn(2017) 3500 Na B / Flame Emission Photometric Method | 1 mg/l to 20mg/l 1 mg/l to 15000mg/l |

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Page 8 of 9

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| | | Sulphate as SO ₄ | IS 3025 (Part 24)4.0:1986 RA 2009 / APHA 23rd Edn(2017) 4500 SO ₄ ²⁻ / Turbidity method | 1 mg/l to 1000 mg/l 1 mg/l to 10000mg/l |
| | | Temperature | IS 3025 (Part 9)1.0:1984 RA 2006/ APHA 23rd Edn(2017) 4500 SO ₄ ²⁻ / Turbidity method 2550B/Mercury Therometer | 20°Cto 50 °C |
| | | Total Alkalinity | IS 3025 (Part 23)1.0:1986 RA 2003 / APHA 23rd Edn(2017) 2320B / Titrimetric Method | 1 mg/l to 1000 mg/l 1 mg/l to 20000mg/l |
| | | Total Chromium as Cr | IS 3025 (Part 52)7.0:2003 RA 2009 / APHA 23rd Edn(2017) 3111B / AAS Method Direct | 1 mg/l to 2 mg/l 1 mg/l to 500 mg/l |
| | | Total Dissolved Solids | IS 3025:1984 RA 2006 Part 16 1.0 / APHA 23rd Edn(2017) 2540C / Gravimetric Method | 20 mg/l to 2100 mg/l 1 mg/l to 150000mg/l |
| | | Total Hardness | IS 3025:2009 Part 21 5.0 / APHA 23rd Edn(2017) 2340C / EDTA Method | 15 mg/l to 300 mg/l 1 mg/l to 15000 mg/l |
| | | Total Kjeldahl Nitrogen | IS 3025 (Part 34)5.2:1988 RA 2009 / APHA 23rd Edn(2017) 4500B / Macro Kjaldhal Method | 10 mg/l to 100mg/l 1 mg/l to 500 mg/l |
| | | Total Solids | IS 3025 (Part 15)1.0:1984 RA 2009 / APHA 23rd Edn(2017) 2540B / Gravimetric Method | 10 mg/l to 2300mg/l 20 mg/l to 150000mg/l |

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Page 9 of 9

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| | | Total Suspended Solids | 3025 (Part 17)1.0:1984 RA 2012 / APHA 23rd Edn(2017) 2540D/ Gravimetric Method | 1 mg/l to 200mg/l 20 mg/l to 10000 mg/l |
| | | Turbidity | IS 3025 (Part 10)1.0:1984 RA 2009 /APHA 23rd Edn(2017) 2130B / Nephelometric method | 1 NTU to 10 NTU 1 NTU to 1000 NTU |
| | | Zinc as Zn | IS 3025 (Part 49)6.0 :1994 RA 2009 / APHA 23rd Edn(2017) 3111B / AAS Method Direct | 1 mg/l to 5 mg/l 1 mg/l to 50mg/l |

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Battal Singh
Convenor

N. Venkateswaran
Program Manager