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|---|---|
| **Laboratory** | **Udaipur Min Tech Pvt. Ltd. (Analytical & Testing Division), 270, Sector 11, Hiran Magari, Udaipur, Rajasthan** |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** |
| **Certificate Number** | **TC-5343** ***(in lieu of T-3257)*** **Page 1 of 9** |
| **Validity** | **08.02.2017 to 07.02.2019** **Last Amended on --** |

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**CHEMICAL TESTING**

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **AT LABORATORY** | | | |
| **I.** | **POLLUTION AND ENVIRONMENT** | | | |
| **1.** | **Waste Water (Effluents/ Sewage)** | Temperature | APHA-22nd Edition. 2550 B -2012<br>IS 3025 (P-9) 1984 (RA 2006) | 20 °C to 60 °C |
| | | pH value @ $25^0$C | APHA-22nd Edition. 4500-$H^+$ B - 2012<br>IS 3025 (P-11) 1983 (RA 2006) | 2.0 to 12.0 |
| | | Total Solids | APHA-22ndEdition. 2540 B - 2012<br>IS 3025 (P-15) 1984 (RA 2009) Amd.1 | 10 mg/L to 10000 mg/L |
| | | Total Dissolved Solids | APHA-22ndEdition. 2540 B – 2012<br>IS 3025 (P-16) 1984 (RA 2006) Amd.1 | 10 mg/L to10000 mg/L |
| | | Total Suspended Solids | APHA-22nd Edition. 2540D – 2012 or IS 3025 (P-17) 1984, (RA 2006) Amd.1 | 10 mg/L to10000 mg/L |
| | | Chloride as Cl | APHA-22ndEdition. 4500-Cl B -2012<br>IS 3025 (P-32) 1988 (RA 2009)<br>Argentometric Method | 1 mg/L to 2000 mg/L |
| | | Sulphate as $SO_4$ | APHA- 22ndEdition. 4500-C2012-<br>IS 3025 (P-24) 1986 (RA 2009) | 10 mg/L to 1000 mg/L |

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**Convenor**

**N. Venkateswaran**
**Program Director**

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|---|---|---|---|---|
| | | | Gravimetric method | |
| | | Sulphate as $SO_4$ | APHA- 22nd Edition2012-4500$SO_4$-E<br>IS 3025 (P-24) 1986 (RA 2009) Turbidity Method | 1 mg/L to 40 mg/L |
| | | Biochemical Oxygen Demand (BOD) 3-days at 27 ºC | IS: 3025 (P-44)-1993 (RA 2009) Amd.1 | 2 mg/L to10000 mg/L |
| | | Chemical Oxygen Demand (COD) | APHA 22nd Edition5220 B:2012 or IS 3025 (P-58) 2006 (RA 2012) Open Reflux Method | 4 mg/L to 20000 mg/L |
| | | Oil & Grease | IS 3025 (P-39) 1991 (RA 2009) Amd.2 Partition Gravimetric Method | 1 mg/L to 100 mg/L |
| | | Oxygen Dissolved (DO) | APHA-22nd Edition4500C – 2012, IS 3025 (P-38) 1989 (RA 2009) | 1 mg/L to 8.5 mg/L |
| | | Copper as Cu | APHA-22ndEdition3111B: 2012 | 0.1 mg/L to10 mg/L |
| | | Chromium as Cr | APHA-22ndEdition 3111B: 2012 | 0.5 mg/L to 10 mg/L |
| | | Chromium (Hexavalent) | APHA-22nd Edition 3500B: 2012 | 0.05 mg/L to 5 mg/L |
| | | Lead (as Pb) | APHA-22ndEdition 3111B: 2012 | 0.5 mg/L to 10 mg/L |
| | | Nickel as Ni | APHA-22ndEdition 3111B: 2012 | 0.1 mg/L to10 mg/L |
| | | Zinc as Zn | APHA-22ndEdition 3111B - 2012 | 0.1 mg/L to10 mg/L |
| **2.** | **Soil** | pH | IS:2720 (P-26 ) 1987 R 2011 | 5 to 12 |
| | | Conductivity | IS:14767: 2000 R 2010 | 1.0 µs/cm to 500 µs/cm |

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|---|---|---|---|---|
| | | Moisture Content | IS:2720 (P-2) 1973 R 2010 Amd.1 | 1 % to 50 % |
| | | Organic Matter | IS:2720 (Part 22 ) 1972 R2010 Amd.1 | 0.1 % to 50 % |
| | | Bulk Density | UMT/SOP/33.9 Issue 01 dated 01.06.15 | 1 gm/cc to 4 gm/cc |
| | | Available Nitrogen | UMT/SOP/33.6 Issue 01 dated 01.06.15 | 5 Kg/Ha to1000 Kg/Ha |
| | | Available Phosphorus | UMT/SOP/33.5 Issue 01 dated 01.06.15 | 5 Kg/Ha to1000 Kg/Ha |
| | | Available Potassium | UMT/SOP/33.7 Issue 01 dated 01.06.15 | 5 Kg/Ha to 500 Kg/Ha |
| **II.** | **WATER** | | | |
| **1.** | **Surface Water / Ground Water/ Drinking Water** | Color | IS 3025 (P-4) 1983 R2012 Amd.1 | 1 Hazen unit to 50 Hazen unit |
| | | Odour | IS 3025 (P-5) 1983 R2012 | Qualitative (Objectionable/Unobjectionable) |
| | | Temperature | APHA-22nd Edition 2550 B:2005 IS 3025 (P-9) 1984 (RA 2006) | 20 °C to 60 °C |
| | | pH value @ $25^0$C | APHA-22nd Edition 4500-$H^+$ B:2012, IS 3025 (P-11) 1983 (RA 2006) | 2.0 to 12.0 |
| | | Conductivity | APHA-22nd Edition 2510 B: 2012 IS 3025 (P-14) 1984 (RA 2006) | 1.0 µmhos/cm to 5000 µmhos/cm |
| | | Turbidity | IS 3025 (P-10)1984 (RA 2006) APHA-22nd Edition 2130B:2012 | 1 NTU to 100 NTU |
| | | Total Solids | APHA-22nd Edition 2540 B: | 10 mg/L to 10000 mg/L |

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|---|---|---|---|---|
| | | | 2012 IS 3025 (P-15) 1984 (RA 2009) Amd.1 | |
| | | Total Dissolved Solids | APHA-22nd Edition 2540-C:2012 IS 3025 (P-16) 1984 (RA 2006) Amd.1 | 10 mg/L to 10000 mg/L |
| | | Total Hardness as $CaCO_3$ | APHA-22nd Edition 2340C:2012 IS 3025 (P-21) 2009 | 10 mg/L to 5000 mg/L |
| | | Total Suspended Solids | APHA-22nd Edition 2540D: 2012 or IS 3025 (P-17) 1984 (RA 2006) Amd.1 | 10 mg/L to10000 mg/L |
| | | Chloride as Cl | APHA-22nd Edition 4500- B: 2012- IS 3025 (P-32) 1988 (RA 2009) | 1 mg/L to1000 mg/L |
| | | Fluoride as F | APHA 22nd Edition 4500F D:2012 | 0.1 mg/L to10 mg/L |
| | | Sulphate as $SO_4$ | APHA- 22nd Edition 4500$SO_4$-E: 2012 IS 3025 (P-24) 1986 (RA 2009) Turbidity Method | 1 mg/L to 40 mg/L |
| | | Calcium as Ca | APHA-22nd Edition 3500-Ca-B:2012, IS 3025 (P-40) 1991 (RA 2009) | 2 mg/L to 600 mg/L |
| | | Magnesium as Mg | APHA-22nd Edition 3500-Mg-B:2012 IS 3025 (P-46) 1994 (RA1999) Amd.2 | 2 mg/L to 600 mg/L |
| | | Iron as Fe | APHA -22nd Edition 3500 B:2012, IS 3025 (P-53) 2003 (RA 2009) | 0.1 mg/L to100 mg/L |
| | | Potassium (K) | APHA-22nd Ed 3500K-B: 2012 IS3025 (P-45) 1993 | 1.0 mg/L to 100 mg/L |

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|---|---|---|---|---|
| | | | (RA 2009) Amd.1 | |
| | | Sodium (Na) | APHA-22nd Ed -3500Na-B: 2012<br>IS3025 (P-45) 1993<br>(RA 2009) Amd.1 | 1.0 mg/L to 200 mg/L |
| | | Boron as B | APHA-22nd Edition - 4500C: 2012, IS 3025 (P-57) 2005 (RA 2010) | 0.4 mg/L to10 mg/L |
| | | Alkalinity as $CaCO_3$ | APHA-22nd Edition 2320 B:2012<br>IS3025 (P-23) 1986<br>(RA 2009) Amd.2 | 5.0 mg/L to 1000 mg/L |
| | | Chlorine (Free Residual) | APHA-22nd Edition4500G 2012 | 0.1 mg/L to 10 mg/L |
| | | Nitrate ($NO_3$) | APHA-22nd Edition4500 $NO_3$ B 2012 | 1.0 mg/L to100 mg/L |
| | | Biochemical Oxygen Demand (BOD) 3-days at 27 ºC | IS: 3025 (P-44)-1993 (RA 2009) Amd.1 | 2 mg/L to1000 mg/L |
| | | Chemical Oxygen Demand (COD) | APHA 22ndEdition 5220 B 2012- or<br>IS 3025 (P-58) 2006 (RA 2012) | 4 mg/L to 10000 mg/L |
| | | Oil & Grease | IS 3025 (P-39) 1991 (RA 2009) Amd.2 | 10 mg/L to 100 mg/L |
| | | Oxygen Dissolved (DO) | APHA-22nd Edition 4500 O-C:2012, IS 3025 (P-38) 1989 (RA 2009) | 1 mg/L to 8.5 mg/L |
| | | Copper as Cu | APHA-22nd Ed 3111B:2012 | 0.1 mg/L to 10 mg/L |
| | | Chromium as Cr | APHA-22ndEdition -3111B: 2012 | 0.5 mg/L to 10 mg/l |
| | | Chromium (Hexavalent) | APHA-22ndEdition 3500B: 2012 | 0.05 mg/L to 5 mg/L |
| | | Lead (as Pb) | APHA-22nd Edition -3111B: | 0.5 mg/L to 10 mg/L |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | 2012 | |
| | | Nickel as Ni | APHA-22nd Edition 3111B:2012 | 0.1 mg/L to10 mg/L |
| | | Zinc as Zn | APHA-22nd Edition 3111B: 2012 | 0.1 mg/L to 10 mg/L |
| **III.** | **ATMOSPHERIC POLLUTION** | | | |
| **1.** | **Ambient Air** | Respirable Suspended Particulate Matter (PM-2.5) | UMT/SOP/31/AA-PM 2.5–01 Issue 02 Dated 01.06.15 | 10 $\mu g/m^3$ to 300 $\mu g/m^3$ |
| | | Respirable Suspended Particulate Matter ($PM_{10}$) | IS:5182 (P-23) 2006 (RA 2012) | 10 $\mu g/m^3$ to 800 $\mu g/m^3$ |
| | | Sulphur Dioxide ($SO_2$) | IS:5182 (P-2) 2001 (RA 2012) | 6.0 $\mu g/m^3$ to1000 $\mu g/m^3$ |
| | | Oxides of Nitrogen ($NO_2$) | IS:5182 (P-6) 2006 (RA 2012) | 6.0 $\mu g/m^3$ to 750 $\mu g/m^3$ |
| | | Ozone ($O_3$) | IS: 5182 (Part-9) -1974 (RA 2009) | 10 $\mu g/m^3$ to 200 $\mu g/m^3$ |
| | | Ammonia($NH_4$) | APHA Method of Air sampling &Analysis-Method 801 | 10 $\mu g/m^3$ to 400 $\mu g/m^3$ |
| | | Lead (as Pb) | IS 5182 (P-22) 2004 (RA 2009) | 0.1 $\mu g/m^3$ to10 $\mu g/m^3$ |
| **IV.** | **ORES & MINERALS** | | | |
| **1.** | **Dolomite, Lime Stone, Allied Material** | Loss On Ignition | IS:1760 (Part-1) 1991 (RA 2006) | 5 % to 50 % |
| | | Silica | IS:1760 (Part-2) 1991 (RA 2006) | 0.2 % to 10 % |
| | | Alumina | IS:1760 (Part-3) 1992 R2006 EDTA Method | 0.2 % to 5.0 % |
| | | Ferric Oxide | IS:1760-1992 (Part-3) 1992 (RA 2006) | 0.2 % to 2.0 % |

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|---|---|---|---|---|
| | | | Spectrophotometric | |
| | | CaO | IS :1760 (Part-3) 1992 (RA 2006) | 15 % to 56 % |
| | | MgO | IS 1760 (Part-3) 1992 (RA 2006) | 0.4 % to 40 % |
| **2.** | **Bauxite** | Loss On Ignition | IS 2000 (Part-1) 1985 (RA 2006) | 1 % to 40 % |
| | | Silica | IS:2000 (Part-2) 1985 (RA 2006) | 0.5 % to 10 % |
| | | Alumina | IS:2000 (Part-3) 1985 (RA 2006) | 25 % to 90 % |
| | | Ferric Oxide | IS:2000 (Part-4) 1985 (RA 2006) | 0.2 % to 20 % |
| | | $TiO_2$ | IS:2000 (Part-5) 1985 (RA 2006) | 0.5 % to 15 % |
| | | Calcium | IS 2000 (Part-9)-1985 (RA 2006) | 1 % to 4 % |
| | | Magnesium | IS 2000 (Part-9)-1985 (RA 2006) | 1 % to 2 % |
| **3.** | **Gypsum** | CaO | IS 1288-1982 R 2010 Amd.1 | 15 % to 40 % |
| **4.** | **Soap Stone** | Loss On Ignition | IS:10429-1982 | 1 % to 10 % |
| | | MgO | IS:10429-1982 | 10 % to 40 % |
| | | CaO | IS:10429-1982 | 1 % to 5 % |
| | | $Fe_2O_3$ | IS:10429-1982 | 1 % to 2 % |
| **5.** | **Quartz** | Silica | IS 1917 (P-3) 1992 R2005 Amd.1 | 70 % to 99 % |
| **6.** | **Feldspar** | Loss On Ignition | IS:9749-2007, (Annex-F) | 0.5 % to 1 % |
| | | CaO | IS:9749-2007 (Annex-F) | 0.5 % to 5 % |
| | | MgO | IS:9749-2007 (Annex-F) | 0.5 % to 5 % |
| | | Silica | IS:9749-2007 (Annex-F) | 30 % to 70 % |
| | | Alumina | IS:9749-2007 (Annex-F) | 10 % to 30 % |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | $Fe_2O_3$ | IS:9749-2007 (Annex-F) | 0.1 % to 0.50 % |
| | | $Na_2O$ | IS:9749-2007 (Annex-F) | 2 % to 15 % |
| | | $K_2O$ | IS:9749-2007 (Annex-F) | 2 % to 15 % |
| **7.** | **Iron Ore (Laterite & Red Ochre)** | Fe | IS-1493-1959 (RA 2006) | 30 % to 70 % |
| | | Calcium Oxide (CaO) | IS-1493-1959 (RA 2006) | 1.0% to 20 % |
| | | Magnesium Oxide (MgO) | IS-1493-1959 (RA 2006) | 1.0 % to 20 % |
| | | Ferric Oxide ($Fe_2O_3$) | IS-1493-1959 (RA 2006) | 1.0 % to 45 % |
| | | Alumina ($Al_2O_3$) | IS-1493-1959 (RA 2006) | 5.0 % to 25 % |
| | | Silica ($SiO_2$) | IS-1493-1959 (RA 2006) | 0.5 % to 40 % |
| | | Titanim ($TiO_2$) | IS 1493-1959 (RA 2006) | 0.5 % to10 % |
| **8.** | **China Clay** | LOI | IS: 2840:2002 (RA 2008) Amd.1 | 5 % to 50 % |
| | | Calcium Oxide (CaO) | IS: 2840:2002 (RA 2008) Amd.1 | 2.0 % to 10 % |
| | | Magnesium Oxide (MgO) | IS: 2840:2002 (RA 2008) Amd.1 | 0.1 % to 5 % |
| | | $Fe_2O_3$ | IS: 2840:2002 (RA 2008) Amd.1 | 0.1 % to 10 % |
| | | Alumnia ($Al_2O_3$) | IS: 2840:2002 (RA 2008) Amd.1 | 0.5 % to 50 % |
| | | Silica ($SiO_2$) | IS: 2840:2002 (RA 2008) Amd.1 | 5 % to 50 % |
| | | Titania ($TiO_2$) | IS: 2840:2002 (RA 2008) Amd.1 | 0.1 % to10 % |

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|---|---|---|---|
| **Laboratory** | **Udaipur Min Tech Pvt. Ltd. (Analytical & Testing Division), 270, Sector 11, Hiran Magari, Udaipur, Rajasthan** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Certificate Number** | **TC-5343** ***(in lieu of T-3257)*** | **Page 9 of 9** | |
| **Validity** | **08.02.2017 to 07.02.2019** | **Last Amended on --** | |

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|---|---|---|---|---|
| | **AT SITE** | | | |
| **I.** | **ATMOSPHERIC POLLUTION** | | | |
| **1.** | **Ambient Noise Levels** | Noise Levels - Ambient | IS: 9989-1981 (RA 2008) | 30 dB(A) to 130 dB(A) |
| **2.** | **Source Noise Levels** | Noise Levels –DG | IS: 4758-1968 (RA 2007) | 30 dB(A) to 130 dB(A) |
| **3.** | **Ambient Air** | Carbon Monoxide (CO) | UMT/SOP/31/AA-CO–05 Issue 02 Dated 01.06.15 (Electrochemical Method) | 1.15 µg/$m^3$ to 40 µg/$m^3$ |

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