

Laboratory **Bhagavathi Ana Labs Pvt. Limited, Plot No. 7-2-C14, Sanath Nagar Industrial Estate, Sanath Nagar, Hyderabad, Telangana**

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

Certificate Number **TC-6735 (in lieu of T-0923)**

Page 1 of 10

Validity **08.10.2017 to 07.10.2019**

Last Amended on **12.01.2018**

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

I.	ORES & MINERALS			
1.	Iron Ores	Moisture	IS 1493 (Part 1): 1981 (RA 2016)	0.1 % to 15 %
		Iron (as Fe)	IS 1493 (Part 1): 1981 (RA 2016)	30 % to 70 %
		Silica (as SiO ₂)	IS 1493 (Part 1): 1981 (RA 2016)	0.5 % to 30%
		Alumina (as Al ₂ O ₃)	SOP-IO-01(D/I-2/05/2015)	0.3 % to 15 %
		Sulphur(as S)	IS 1493 (Part 1): 1981 (RA 2016)	0.01 % to 0.05 %
		Phosphorus (as P)	IS 1493 (Part 1): 1981 (RA 2016)	0.01 % to 0.15 %
2.	Rock Phosphate	Phosphorus (as P ₂ O ₅)	IS 9386:1979 (RA 2006)	10 % to 50 %
		Calcium (as CaO)	IS 9386:1979 (RA 2006)	10 % to 55 %
3.	Bauxite/Laterite	Loss on Ignition	IS 2000 (Part 1): 1985 (RA 2006)	5.0 % to 32 %
		Silica (as SiO ₂)	IS 2000 (Part 2): 1985 (RA 2006)	0.5 % to 30 %
		Alumina (as Al ₂ O ₃)	IS 2000 (Part 3): 1985 (RA 2006)	2.0 % to 60 %
		Ferric Oxide (as Fe ₂ O ₃)	IS 2000 (Part 4): 1985 (RA 2006)	0.5 % to 50.0 %
		Titanium(as TiO ₂)	IS 2000 (Part 5): 1985 (RA 2006)	0.50 % to 20.0 %
4.	Lime Stone & Dolomite	Loss on Ignition	IS 1760 (Part 1): 1991 (RA 2006)	0.1 % to 50 %
		Silica (as SiO ₂)	IS 1760 (Part 2): 1991 (RA 2006)	0.1 % to 70 %
		Ferric oxide	SOP/LS-D/02	0.1 % to 10 %

Bhumi Rajyaguru
Convenor

Alok Jain
Program Director

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Page 2 of 10

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		(as Fe ₂ O ₃)	(D/I-1/04/2015)	
		Alumina (as Al ₂ O ₃)	SOP/LS-D/02 (D/I-1/04/2015)	0.10 % to 10.0 %
		Calcium Oxide (as CaO)	IS 1760 (Part 2): 1991 (RA 2006)	1 % to 56 %
		Magnesium Oxide (as MgO)	SOP/LS-D/02 (D/I-1/ 04/ 2015)	0.2 % to 40 %
5.	Quartz, Quartzite / Silica Sand / Beach Sand	Loss on Ignition	IS 1917 (Part 1): 1991 (RA 2006)	0.15 % to 5.0 %
		Silica (as SiO ₂)	IS 1917 (Part 3): 1992 (RA 2005)	80 % to 99.9 %
		Sodium Oxide (as Na ₂ O)	IS 1917 (Part 2): 1991 (RA 2006)	0.01 % to 1.0 %
		Potassium Oxide (as K ₂ O)	IS 1917 (Part 2): 1991 (RA 2006)	0.01 % to 1.0 %
6.		Gypsum	Sulphur(as SO ₃)	IS 1288:1982 (RA 2010)
	Combined Water		IS 1288:1982 (RA 2010)	1.0 % to 22.0 %
	Free Water		IS 1288:1982 (RA 2010)	0.1 % to 10.0 %
	Silica (as SiO ₂)		IS 1288:1982 (RA 2010)	0.5 % to 10.0 %
	Alumina (as Al ₂ O ₃)		IS 1288:1982 (RA 2010)	0.5 % to 5.0 %
	Iron (as Fe ₂ O ₃)		IS 1288:1982 (RA 2010)	0.1 % to 5.0 %
	Calcium (as CaO)		IS 1288:1982 (RA 2010)	15.0 to 40.0 %
	Magnesium (as MgO)		IS 1288:1982 (RA 2010)	0.1 % to 5.0 %
7.	Potash Feldspar / Soda Feldspar	Sodium (as Na ₂ O)	IS 9749:2007 (RA 2017)	0.50 % to 15.0 %
		Potassium (as K ₂ O)	IS 9749:2007 (RA 2017)	0.50 % to 15.0 %
		Silica (as SiO ₂)	IS 9749:2007 (RA 2017)	40.0 % to 70 %
		Alumina (as Al ₂ O ₃)	IS 9749:2007 (RA 2017)	15.0 % to 25.0 %
		Iron (as Fe ₂ O ₃)	IS 9749:2007 (RA 2017)	0.05% to 0.80 %
		Calcium (as CaO)	IS 9749:2007 (RA 2017)	0.2 % to 3.0 %
		Magnesium (as MgO)	IS 9749:2007 (RA 2017)	0.2 % to 3.0 %
		Loss on Ignition	IS 9749:2007 (RA 2017)	0.1 % to 5 %
8.	Manganese Ores	Silica as SiO ₂	IS 1473:2004 (RA 2016)	0.3 % to 20 %

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Certificate Number **TC-6735 (in lieu of T-0923)**

Page 3 of 10

Validity **08.10.2017 to 07.10.2019**

Last Amended on **12.01.2018**

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		Manganese (total)	IS 1473:2004 (RA 2016)	2 % to 65 %
		Manganese Dioxide	IS 1473:2004 (RA 2016)	15.0 % to 70.0 %
		Iron	IS 1473:2004 (RA 2016)	2 % to 40.0 %
		Alumina	IS 1473:2004 (RA 2016)	0.3 % to 25 %
		Sulphur	IS 1473:2004 (RA 2016)	0.002 % to 0.15 %
		Phosphorous	IS 1473:2004 (RA 2016)	0.005 % to 1.0 %
		Barium Oxide	IS 1473:2004 (RA 2016)	0.1 % to 5.0 %
9.	Barium Ore - Barytes	Insoluble minus silica	IS 2881:1984 (RA 2010)	50 % to 99.5 %
		Silica as SiO ₂	IS 2881:1984 (RA 2010)	0.2 % to 25 %
		Alumina as Al ₂ O ₃	IS 2881:1984 (RA 2010)	0.1 % to 3.0 %
		Iron as Fe	IS 2881:1984 (RA 2010)	0.1 % to 3.0 %
		Calcium & Magnesium as CaCO ₃	IS 2881:1984 (RA 2010)	0.08 % to 1.00 %
		Fineness 75 microns	IS 2881:1984 (RA 2010)	0.1 % to 100 %
		Fineness 53 microns	IS 2881:1984 (RA 2010)	0.1 % to 100 %
		Relative Density at 27 °C	IS 2881:1984 (RA 2010)	3.8 to 4.5
		Matter soluble in water	IS 2881:1984 (RA 2010)	0.01 % to 0.1 %
II.	BUILDING MATERIALS			
1.	Cement (OPC, PPC & PSC)	Loss on Ignition	IS 4032:1985 (RA 2009) Clause 4.2, Amd.1	0.02to5.0 %
		Silica	IS 4032:1985 (RA 2009) Clause 4.2, Amd.1	1.0 % to 30.0 %
		Combined ferric oxide & alumina	IS 4032:1985 (RA 2009) Clause 4.2, Amd.1	0.5 % to 10 %
		Ferric oxide	IS 4032:1985 (RA 2009) Clause 4.5, Amd.1	0.5 % to 8 %
		Alumina	IS 4032:1985 (RA 2009) Clause 4.6, Amd.1	3 % to 15 %
		Calcium Oxide	IS 4032:1985 (RA 2009) Clause 4.7.2, Amd.1	40 % to 70 %

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Certificate Number **TC-6735 (in lieu of T-0923)**

Page 4 of 10

Validity **08.10.2017 to 07.10.2019**

Last Amended on **12.01.2018**

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		Magnesium Oxide	IS 4032:1985 (RA 2009) Clause 4.8.2, Amd.1	0.1 % to 8.0 %
		Sulphuric anhydride	IS 4032:1985 (RA 2009) Clause 4.9, Amd.1	0.1 % to 5.0 %
		Insoluble residue	IS 4032:1985 (RA 2009) Clause 4.10, Amd.1	2.0 % to 50 %
		Sodium oxide and potassium oxide	IS 4032:1985 (RA 2009) Clause 4.10, Amd.1	0.1 % to 5 %
		Sulphide as Sulphur	IS 4032:1985 (RA 2009) Clause 6.12, Amd.1	0.1 % to 5 %
		Chloride	IS 4032:1985 Clause 4.13, Amd.2(2010)	0.01 % to 0.1 %
2.	Fly Ash/ Pulverized Fuel Ash	Loss on Ignition	IS 1727:1967 (RA 2008)	0.1 % to 15 %
		Silica as SiO ₂	IS 1727:1967 (RA 2008)	20 % to 70 %
		Iron as Fe ₂ O ₃	IS 1727:1967 (RA 2008)	0.5 % to 30 %
		Alumina as Al ₂ O ₃	IS 1727:1967 (RA 2008)	0.5 % to 50 %
		Calcium as CaO	IS 1727:1967 (RA 2008)	1.0 % to 10 %
		Magnesium as MgO	IS 1727:1967 (RA 2008)	0.4 % to 10 %
		Sodium as Na ₂ O	IS 1727:1967 (RA 2008)	0.2 % to 5 %
		Potassium as K	IS 1727:1967 (RA 2008)	0.2 % to 5 %
III.	SOLID FUELS			
1.	Coal/Coke/ Others	Moisture (As Received Basis/ Air Dried Basis)	IS 1350 (Part 1): 1984 (RA 2013)	0.1 % to 30 %
		Gross Calorific value	IS 1350 (Part 2): 1975 (RA 2015)	300 kCal/kg to 8000 kCal/kg
		Ash	IS 1350 (Part 1): 1984 (RA 2013)	1 % to 70 %
		Volatile Matter	IS 1350 (Part 1): 1984 (RA 2013)	1 % to 70 %
		Fixed Carbon	IS 1350 (Part 1): 1984 (RA 2013)	NA

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Certificate Number **TC-6735 (in lieu of T-0923)**

Page 5 of 10

Validity **08.10.2017 to 07.10.2019**

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		Sulphur as S	IS 1350 (Part 3): 1969 (RA 2010)	0.05 % to 6 %
2.	Ash Analysis of Coal/ Coke	SiO ₂	IS 1355:1984 (RA 2007)	15.0 % to 70.0 %
		Fe ₂ O ₃	IS 1355:1984 (RA 2007)	3.0 % to 30.0 %
		Al ₂ O ₃	IS 1355:1984 (RA 2007)	5.0 % to 40.0 %
		CaO	IS 1355:1984 (RA 2007)	0.05 % to 10 %
		MgO	IS 1355:1984 (RA 2007)	0.05 % to 10 %
		Na ₂ O	IS 1355:1984 (RA 2007)	0.01 % to 10.0 %
		K ₂ O	IS 1355:1984 (RA 2007)	0.01 % to 10.0 %
		TiO ₂	IS 1355:1984 (RA 2007)	0.05 % to 20 %
		Mn ₃ O ₄	IS 1355:1984 (RA 2007)	0.05 % to 20 %
		P ₂ O ₅	IS 1355:1984 (RA 2007)	0.01 % to 2.5 %
	SO ₃	IS 1355:1984 (RA 2007)	0.01 % to 10.0 %	
IV.	POLLUTION & ENVIRONMENT			
1.	Waste Water - Effluents	pH	APHA 23 rd edition 2017, 4500-H ⁺ B	1 to 12
		Oil and Grease	APHA 23 rd edition 2017, 5520-B	1 mg/L to 200 mg/L
		Total Dissolved Solids	APHA 23 rd edition 2017, 2540-C	1 mg/L to 5000 mg/L
		Total Suspended Solids	APHA 23 rd edition 2017, 2540-D	1 mg/L to 1000 mg/L
		Total Solids	APHA 23 rd edition 2017, 2540-B	1 mg/L to 5000 mg/L
		Iron as Fe	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 500 mg/L
		Conductivity	APHA 23 rd edition 2017, 2510-B	1 µS/cm to 10000 µS/cm
		Chloride as Cl	APHA 23 rd edition 2017, 4500-Cl-B	1 mg/L to 2000 mg/L
		Fluoride as F	APHA 23 rd 2017, 4500-F-	0.1 mg/L to 100 mg/L

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Certificate Number TC-6735 (in lieu of T-0923)

Page 6 of 10

Validity 08.10.2017 to 07.10.2019

Last Amended on 12.01.2018

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			B&D	
		Total Phosphate as PO ₄	APHA 23 rd edition 2017, 4500-P- D	0.03 mg/L to 100 mg/L
		Sulphates as SO ₄	APHA 23 rd edition 2017, 4500-SO4- E	1 mg/L to 1000 mg/L
		Sulphide as S	APHA 23 rd edition 2017, 4500-S2- F	1 mg/L to 100 mg/L
		Phenolic compounds as C ₆ H ₅ OH	APHA 23 rd edition 2017, 5530-D	0.1 mg/L to 100 mg/L
		Aluminum as Al	APHA 23 rd edition 2017, 3120 B	0.05 mg/L to 100 mg/L
		Antimony as Sb	APHA 23 rd edition 2017, 3120 B	0.03 mg/L to 100 mg/L
		Boron as B	APHA 23 rd edition 2017, 3120 B	0.1 mg/L to 100 mg/L
		Cadmium as Cd	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Copper as Cu	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Nickel as Ni	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Total Chromium as Cr	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Hexavalent Chromium, Cr ⁺⁶	APHA 23 rd edition 2017, 3500-Cr-B	0.02 mg/L to 100 mg/L
		Strontium as Sr	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Vanadium as V	APHA 23 rd edition 2017, 3120 B	0.03 mg/L to 100 mg/L
		Zinc as Zn	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Arsenic as As	SOP-ENV-WW-01, Issue	0.01 mg/L to 1 mg/L

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Page 7 of 10

Validity 08.10.2017 to 07.10.2019

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			No.1, dt 17.11.2017 by ICP-OES & VGA	
		Lead as Pb	APHA 23 rd edition 2017, 3120 B	0.01 mg/L to 100 mg/L
		Mercury as Hg	SOP-ENV-WW-01, Issue No.1, dt 17.11.2017 by ICP-OES & VGA	0.001 mg/L to 1 mg/L
		Selenium as Se	SOP-ENV-WW-01, Issue No.1, dt 17.11.2017 by ICP-OES & VGA	0.01 mg/L to 1 mg/L
		Sodium as Na	APHA 23 rd edition 2017, 3500-Na-B	1 mg/L to 1000 mg/L
		Potassium as K	APHA 23 rd edition 2017, 3500-K –B	1 mg/L to 100 mg/L
		Calcium as Ca	APHA 23 rd edition 2017, 3500-Ca-B	1 mg/L to 1000 mg/L
		Magnesium as Mg	APHA 23 rd edition 2017, 3500-Mg-B	1 mg/L to 1000 mg/L
		Total Alkalinity as CaCO ₃	APHA 23 rd edition 2017, 2320-B	1 mg/L to 1000 mg/L
		Total Hardness as CaCO ₃	APHA 23 rd edition 2017, 2340-C	1 to 1000 mg/L
		Biochemical Oxygen Demand 3 days at 27 °C	IS 3025 (Part 44): 1993 (RA 2014)	2 mg/L to 50,000 mg/L
		Chemical Oxygen Demand	APHA 23 rd edition 2017, 5220 B	4 mg/L to 1,00,000 mg/L
		Dissolved Oxygen	APHA 23 rd edition 2017, 4500-O-C	1 mg/l to 10 mg/l
2.	Wastes - Solid / Hazardous waste	Loss on drying at 105 °C	IS 9235:1979 (RA 2009)	0.1 to 20 %
		Loss on ignition at 550 °C	IS 10158:1982 (RA 2009)	0.1 % to 50 %

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Page 8 of 10

Validity 08.10.2017 to 07.10.2019

Last Amended on 12.01.2018

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		Total Cyanide as CN ⁻	USEPA 9013A (2014) for extraction; USEPA -9014 (2014) spectrophotometric method	0.1 mg/kg to 10 mg/kg
		Total Sulfide as S	USEPA 9030B (1996)	1 mg/kg to 50 mg/kg
		Hexavalent Chromium as Cr ⁺⁶	EPA 3060A (1996) alkaline digestion; EPA 7196A (1992) Colorimetric method	0.1 mg/kg to 1000 mg/kg
		Selenium as Se	USEPA 3050 B (1996) Acid Digestion, USEPA 6010B (1996) ICP OES	1 mg/kg to 1000 mg/kg
		Zinc as Zn	USEPA 3050 B (1996) Acid Digestion, USEPA 6010B (1996) ICP OES	1 mg/kg to 1000 mg/kg
3.	Soil	pH	SOP no. SNM:01 issue no.1 issue date 01.02.2015 (based on Soil Testing in India, Method manual by Dept. of Agriculture & Corporation, GOI, 2011)	2 Units to 11 Units
		Electrical Conductivity		10 µs/cm to 10,000 µs/cm
		Exchangeable Sodium		2 meq/100 g to 500 meq/100 g
		Available Potassium		10 kg/ha to 1000 kg/ha
		Exchangeable Calcium		2 meq/100 g to 500 meq/100 g
		Exchangeable Magnesium		2 meq/100 g to 500 meq/100 g
		Available Phosphorous		5 kg/ha to 2000 kg/ha
		Ammonical Nitrogen as NH ₄ -N		1 mg/kg to 100 mg/kg
		Total Nitrogen		0.05 % to 10 %
		Mineralizable Nitrogen		0.5 % to 10 %
		Inorganic Nitrogen as NO ₃ -N	0.1 mg/kg to 10 mg/kg	
		Organic Carbon	0.1 % to 10 %	

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Page 9 of 10

Validity **08.10.2017 to 07.10.2019**

Last Amended on **12.01.2018**

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		Organic Matter		0.1 % to 10 %
		Available Zinc	SOP no. SNM:01 issue no.1 issue date 01.02.2015 (based on Soil Testing in India, Method manual by Dept. of Agriculture & Corporation, GOI, 2011)	0.01 mg/kg to 10 mg/kg
		Available Copper		0.01 mg/kg to 10 mg/kg
		Available Iron		0.01 mg/kg to 10 mg/kg
		Available Manganese		0.01 mg/kg to 10 mg/kg
		Available Molybdenum		0.2 mg/kg to 10 mg/kg
		Available Boron		0.2 mg/kg to 20 mg/kg
		Total Lead		USEPA 3050B (1996) - Acid Digestion
		Total Zinc	USEPA6010 B (1996) - ICP OES	1 mg/kg to 1000 mg/kg
		Total Iron		0.01 % to 10 %
		Total Manganese		1 mg/kg to 1000 mg/kg
		Total Cadmium		1 mg/kg to 100 mg/kg
		Total Molybdenum		1 mg/kg to 100 mg/kg
		Total Boron		1 mg/kg to 100 mg/kg
		Total soluble sulphates	IS 2720 (Part 27): 1977 (RE 2006)	10 mg/kg to 1000 mg/kg
		Total soluble chlorides	SOP-ENV-WWM-02, Issue No.2, dt.17.11.2017 by Spectrophotometry	5 mg/kg to 500 mg/kg
V.	ATMOSHPERIC POLLUTION			
1.	Ambient Air	Sulphur Dioxide (SO ₂)	IS 5182 (Part 2): 2001 (RA 2017) West and Gaeke method	4 µg/m ³ to 1050 µg/m ³
		Nitrogen dioxide (NO ₂)	IS 5182 (Part 6): 2006 (RA 2017) Jacob & Hochheiser Sodium Arsenite method	9 µg/m ³ to 750 µg/m ³
		Ammonia (NH ₃)	Method 401, Air sampling and analysis, APHA, 3 rd edition	5 to 5000 µg /m ³
		Ozone (O ₃)	IS 5182 (Part 9): 1974	20 to 500 µg/m ³

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Page 10 of 10

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			(RA 2014) UV Spectrophotometric method	
		Chlorine	IS 5182 (Part 19): 1982 (RA 2014)	10 to 2000 µg /m ³
		Hydrogen Sulphide	IS 5182 (Part 7): 1973 (RA 2014) Ferric Chloride-amine method	3 to 200µg/m ³
2.	Stack emissions	Particulate matter	IS 11255 (Part 1): 1985 (RA 2014)	5 to 1000 mg/Nm ³
		Sulphur dioxide	IS 11255 (Part 2): 1985 (RA 2014)/ USEPA 6C (Flue Gas Analyser)	5 mg/Nm ³ to 1000 mg/Nm ³
		Flow rate	IS 11255 (Part 3): 2008	10 Nm ³ /hr to 50000 Nm ³ /hr
		Temperature	IS 11255 (Part 3): 2008	Ambient to 600 °C
		Flue gas velocity	IS 11255 (Part 3): 2008	3 m/sec to 60 m/sec
		Hydrogen sulphide	IS 11255 (Part 4): 2006 (RA 2017) USEPA Method-11	8 mg/Nm ³ to 740 mg/Nm ³
		Carbon disulphide	IS 11255 (Part 4): 2006 (RA 2017)/ USEPA Method-11	8 mg/Nm ³ to 740 mg/Nm ³
		Total fluorides	IS 11255 (Part 5): 1990 (RA 2014)	0.5 mg/Nm ³ to 300 mg/Nm ³
		Ammonia	IS 1255 (Part 6): 1990 (RA 2014)	0.1 mg/Nm ³ to 500 mg/Nm ³
		Oxides of Nitrogen	IS 11255 (Part 7): 2005 (RA 2017)/ USEPA 7E (Flue Gas Analyzer)	5 mg/Nm ³ to 1000 mg/Nm ³

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