Laboratory	**SGS India Private Limited, D.No. # 45-56-3/5/1, Narasimha Nagar, 1st Lane, Akkayapalem, Visakhapatnam, Andhra Pradesh**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Chemical Testing**	**Issue Date**	**11.09.2015**
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S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I.	**ORES & MINERALS**			
1.	**Iron Ore**	Total Moisture %	IS 1493 (Part 1): 1981 (RA 2011)	0.50 % to 20.0 %
		Loss on Ignition (LOI)	IS 2000 (Part 1): 1985 (RA 2011)	0.50 % to 10.0 %
		Silica as SiO_2 %	IS 1493 (Part 1): 1981 (RA 2011)	0.50 % to 10.0 %
		Alumina as Al_2O_3 %	IS 1493 (Part 1): 1981 (RA 2011)	0.30 % to 6.0 %
		Total Iron as Fe %	IS 1493 (Part 1): 1981 (RA 2011) IHM-01/WI-01	45.0 % to 69.0 %
		Titanium as TiO_2 %	IS 1493:1959 (RA 2011)	0.05 % to 2.0 %
		Ferrous Iron as FeO %	IS 1493:1959 (RA 2011)	0.5 % to 3.0 %
		Manganese as Mn %	IS 1493:1959 (RA 2011)	0.05 % to 1.0 %
		Calcium as CaO %	IS 1493:1959 (RA 2011)	0.10 % to 3.0 %
		Magnesium as MgO	IS 1493:1959 (RA 2011)	0.10 % to 2.0 %
		Sodium as Na_2O %	IS 1493 (Part 6): 1959 (RA 2011)	0.02 % to 0.5 %
		Potassium as K_2O %	IS 1493 (Part 6): 1959 (RA 2011)	0.02 % to 0.5 %
		Sulphur as S %	IS 1493 (Part 1): 1981 (RA 2011)	0.002 % to 0.009 %
		Phosphorus as P %	IS 1493 (Part 1): 1981 (RA 2011)	0.02 % to 0.5 %
2.	**Manganese Ore**	Manganese as Mn %	IS 1473: 2004 (RA 2011)	15.0 % to 60.0 %
		Silica as SiO_2 %	IS 1473: 2004 (RA 2011)	0.8 % to 20.0 %

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	Manganese Ore	Iron as Fe %	IS 1473: 2004 (RA 2011)	0.5 % to 2.0 %
		Alumina as Al_2O_3 %	IS 1473: 2004 (RA 2011)	0.5 % to 10.0 %
		Phosphorus as P %	IS 1473: 2004 (RA 2011)	0.02 % to 0.5 %
		Sulphur as S %	IS 1473: 2004 (RA 2011)	0.001 % to 0.01 %
3.	**Chrome Ore**	Chromium as Cr_2O_3 %	IS 4737: 1982 (RA 2011)	1.0 % to 60.0 %
		Ferrous Iron as FeO %	IS 4737: 1982 (RA 2011)	10.0 % to 15.0 %
		Silica as SiO_2	IS 4737: 1982 (RA 2011)	1.0 % to 20.0 %
		Alumina as Al_2O_3 %	IS 4737: 1982 (RA 2011)	5.0 % to 15.0 %
		Calcium as CaO %	IS 4737: 1982 (RA 2011)	1.0 % to 20.0 %
		Magnesium as MgO %	IS 4737: 1982 (RA 2011)	1.0 % to 15.0 %
		Phosphorus as P %	IS 13452 (Part 3): 1992 (RA 2009)	0.002 % to 0.10 %
		Sulphur as S %	IS 13452 (Part 4): 1992 (RA 2009)	0.002 % to 0.10 %
4.	**Ferro Manganese**	Manganese as Mn %	IS 1559: 1961 (RA 2012)	60.0 % to 80.0 %
		Silicon as Si %	IS 1559: 1961 (RA 2012)	0.2 % to 2.0 %
		Phosphorus as P %	IS 1559: 1961 (RA 2012)	0.02 % to 1.0 %
		Carbon as C %	ASTM E 1019: 2011	6.0 % to 8.0 %
		Sulphur as S %	ASTM E 1019: 2011	0.02 % to 0.06 %

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5.	**Silico Manganese**	Manganese as Mn %	IS 1559: 1961 (RA 2012)	50.0 % to 65.0 %
		Silicon as Si %	IS 1559: 1961 (RA 2012)	13.0 % to 25.0 %
		Phosphorus as P %	IS 1559: 1961 (RA 2012)	0.15 % to 0.4 %
		Carbon as C %	ASTM E 1019: 2011	1.0 % to 2.5 %
		Sulphur as S %	ASTM E 1019: 2011	0.02 % to 0.06 %
6.	**Ferro Silicon**	Manganese as Mn %	IS 1559 (Part 7): 1982 (RA 2012)	0.01 % to 1.0 %
		Silicon as Si %	IS 1559 (Part 1): 1988 (RA 2014)	50.0 % to 80 %
		Phosphorus as P %	IS 1559 (Part 4): 1982 (RA 2014)	0.01 % to 0.4 %
		Carbon as C %	ASTM E 1019: 2011	0.02 % to0.05 %
		Sulphur as S %	ASTM E 1019: 2011	0.5 % to 2.00 %
7.	**High Carbon Ferro Chrome**	Chromium as Cr %	IS 13452 (Part 5): 1992 (RA 2012)	55.0 % to 67.0 %
		Silicon as Si %	IS 13452 (Part 1): 1992 (RA 2012)	0.5 % to 5.0 %
		Phosphorus as P %	IS 13452 (Part 7): 2003 (RA 2014)	0.02 % to 0.07 %
		Carbon as C %	ASTM E 1019: 2011	5.0 % to 8.5 %
		Sulphur as S %	ASTM E 1019: 2011	0.02 % to 0.06 %

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8.	**Low Carbon Ferro Chrome**	Chromium as Cr %	IS 13452 (Part 6): 1997 (RA 2012)	60 % to 75.0 %
		Silicon as Si %	IS 13452 (Part 2): 1992 (RA 2012)	0.2 % to 1.50 %
		Phosphorus as P %	IS 13452 (Part 3): 1992 (RA 2012)	0.01 % to 0.04 %
		Carbon as C %	ASTM E 1019: 2011	0.1 % to 1.0 %
		Sulphur as S %	ASTM E 1019: 2011	0.02 % to 0.05 %
9.	**Pig Iron/Cast Iron**	Manganese as Mn %	IS 12308 (Part 3): 1987 (RA 2012)	0.10 % to 1.0 %
		Silicon as Si %	IS 12308 (Part 6): 1991 (RA 2012)	0.10 % to 1.5 %
		Chromium as Cr %	IS 12308 (Part 8): 1997 (RA 2012)	0.10 % to 1.0 %
		Phosphorus as P %	IS 12308 (Part 5): 1991 (RA 2012)	0.01 % to 10.0 %
		Carbon as C %	ASTM E 1019: 2011	0.50 % to 4.0 %
		Sulphur as S %	ASTM E 1019: 2011	0.01 % to 0.06 %
10.	**Sponge Iron**	Metallic Fe as Fe(M)	IS 15774: 2007 (RA 2012)	77.0 % to 82 %
		Total Iron as Fe(T)	IS 1493 (Part 1): 1981 (RA 2011)	75.0 % to 90.0 %
		Metallization	IS 15774: 2007 (By calculation)	80.0 % to 90.0 %
		Silica as SiO_2	IS 1493 (Part 1): 1981 (RA 2011)	1.00 % to 3.00 %
		Alumina as Al_2O_3	IS 1493 (Part 1): 1981 (RA 2011)	1.50 % to 2.00 %

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	Sponge Iron	Phosphorus as P	IS 1493 (Part 1): 1981 (RA 2011)	0.02 % to 0.05 %
		Carbon as C	ASTM E 1019: 2011	0.5 % to 2.00 %
		Sulphur as S	ASTM E 1019: 2011	0.002 % to 0.009 %
11.	**Blast Furnace Slag**	Silica as SiO_2 %	IS 4032: 1985 (RA 2009)	20.0 % to38 .0 %
		Alumina as Al_2O_3 %	IS 4032: 1985 (RA 2009)	14.0 % to20.0 %
		Iron as Fe_2O_3 %	IS 4032: 1985 (RA 2009)	0.2 % to 5.0 %
		Calcium as CaO %	IS 4032: 1985 (RA 2009)	30.0 % to 39 %
		Magnesium as MgO %	IS 4032: 1985 (RA 2009)	5.0 % to 10.0 %
		Loss on Ignition (LOI)	IS 4032: 1985 (RA 2009)	0.5 % to 20.0 %
		Insoluble Residue as IR	IS 4032: 1985 (RA 2009)	0.5 % to 5.0 %
12.	**Stainless Steel**	Nickel as Ni %	IS 12308 (Part 7): 1991 (RA 2012)	0.50 % to 20.0 %
		Silicon as Si %	IS 12308 (Part 6): 1991 (RA 2012)	0.10 % to 1.5 %
		Manganese as Mn %	IS 12308 (Part 3): 1987 (RA 2012)	0.10 % to 1.0 %
		Chromium as Cr %	IS 12308 (Part 8): 1997 (RA 2012)	0.10 % to 20.0 %
		Phosphorus as P %	IS 12308 (Part 5): 1991 (RA 2012)	0.20 % to 0.10 %
		Carbon as C %	ASTM E 1019: 2011	0.05 % to 2.0 %
		Sulphur as S %	ASTM E 1019: 2011	0.02 % to 0.06 %

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13.	**Ferro Molybdenum**	Molybdenum as Mo %	IS 1261 (Part 1): 1988 (RA 2014)	35.0 % to 75.0 %
14.	**Bauxite**	Silica as SiO_2	IS 2000 (Part 2): 1985 (RA 2011)	0.50 % to 20.0 %
		Alumina as Al_2O_3 %	IS 2000 (Part 3): 1985 (RA 2011)	25.0 % to 90 %
		Iron as Fe_2O_3 %	IS 2000 (Part 4): 1985 (RA 2011)	1.0 % to 30.0 %
		Calcium as CaO %	IS 5949: 1990 (RA 2010)	0.1 % to 4.0 %
		Magnesium as MgO %	IS 5949: 1990 (RA 2010)	0.1 % to 4.0 %
		Titanium as TiO_2 %	IS 2000 (Part 5): 1985 (RA 2011)	0.5 % to 12.0 %
		Loss on Ignition(LOI)	IS 2000 (Part 1): 1985 (RA 2011)	1.0 % to 25.0 %
		Moisture %	IS 1493: 1984 (RA 2011)	0.10 % to 10.0 %
15.	**Feldspar**	Sodium as Na_2O %	IS 9749: 2012	1.0 % to 10.0 %
		Potassium as K_2O %	IS 9749: 2012	8.0 % to 15.0 %
		Silica as SiO_2 %	IS 9749: 2012	40.0 % to 68.0 %
		Alumina as Al_2O_3 %	IS 9749: 2012	15.0 % to 25.0 %
		Iron as Fe_2O_3 %	IS 9749: 2012	0.05 % to 2.00 %
		Calcium as CaO %	IS 9749: 2012	0.5 % to 5.00 %
		Magnesium as MgO	IS 9749: 2012	0.5 % to 5.00 %
		Loss on Ignition (LOI)	IS 9749: 2012	1.0 % -10.0 %

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16.	**Limestone/ Dolomite**	Silica as SiO_2 %	IS 1760 (Part 2): 1991 (RA 2011)	0.2 % to 10.0 %
		Alumina as Al_2O_3 %	IS 1760 (Part 3): 1992 (RA 2011)	0.2 % to 2.00 %
		Iron as Fe_2O_3 %	IS 1760 (Part 3): 1992 (RA 2011)	0.2 % to 1.5 %
		Calcium as CaO %	IS 1760 (Part 3): 1992 (RA 2011)	40.0 % to 55.0 %
		Magnesium as MgO	IS 1760 (Part 3): 1992 (RA 2011)	0.10 % to 20.0 %
		Loss on Ignition %	IS 1760 (Part1): 1991 (RA 2011)	30.0 % to 46.0 %
17.	**Quartz**	Loss on Ignition %	IS 1917 (Part 1): 1991 (RA 2011)	0.5 % to 1.0 %
		Silica as SiO_2 %	IS 1917 (Part 3): 1991 (RA 2011)	95.0 % to 99.5 %
		Titanium as TiO_2 %	IS 1917 (Part 7): 2001 (RA 2011)	0.01 % to 0.15 %
		Sodium as Na_2O %	IS 1917 (Part 2): 1991 (RA 2011)	0.01 % to 0.1 %
		Potassium as K_2O %	IS 1917 (Part 2): 1991 (RA 2011)	0.01 % to 0.1 %
18.	**Ileminate Sand**	Total Moisture	IS 1493: 1981 (RA 2011)	0.05 % to 2.00 %
19.	**Hydrated Lime**	Available Lime as $Ca(OH)_2$, $2H_2O$ %	IS 1514: 1990 (RA 2010)	50.0 % to 95.0 %
		Acid insoluble and SiO_2	IS 1514: 1990 (RA 2010)	0.2 % to 10.0 %
		R_2O_3(Fe_2O_3+Al_2O_3)	IS 1514: 1990 (RA 2010)	0.5 % to 3.0 %
		Magnesium as MgO %	IS 1514: 1990 (RA 2010)	0.5 % to 9.00 %

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	Hydrated Lime	Volatile Matter @105 °C	IS 1514: 1990 (RA 2010)	1.0 % to 5.0 %
		Loss on Ignition (LOI)	IS 1514: 1990 (RA 2010)	30.0 % to 45.0 %
		Calcium as CaO %	IS 1514: 1990 (RA 2010)	30.0 % to 80.0 %
		Phosphorus as P %	IS 1514: 1990 (RA 2010)	0.02 % to 0.15 %
		Sulphates as SO_4 %	IS 1514: 1990 (RA 2010)	0.1 % to 1.0 %
20.	**Rock Phosphate**	Moisture %	IS 11224: 1985 (RA 2010)	0.5 % to 5.0 %
		Total Phosphorus as P_2O_5 %	IS 11224: 1985 (RA 2010)	25.0 % to 45.0 %
		Silica as SiO_2 %	IS 11224: 1985 (RA 2010)	0.50 % to 10.0 %
		Loss on Ignition (LOI)	IS 11224: 1985 (RA 2010)	0.5 % to 10.0 %
		Chlorides as Cl %	IS 11224: 1985 (RA 2010)	0.005 % to 0.5 %
21.	**Gypsum**	Purity as $CaSO_4.2H_2O$	IS 1288: 1982 (RA 2011) ASTM 471C: 13	50.0 % to 98.0 %
		Sulphur as SO_3 %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	15.0 % to 35.0 %
		Combined Water %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	1.0 % to 25.0 %
		Free water %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	1.0 % to 5.0 %
		Silica as SiO_2 %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	1.0 % to 10.0 %

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	Gypsum	Alumina as Al_2O_3 %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	1.0 % to 25.0 %
		Iron as Fe_2O_3 %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	0.1 % to 5.00 %
		Calcium as CaO %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	15.0 % to 40.0 %
		Magnesium as MgO %	IS 1288: 1982 (RA 2011) ASTM 471C: 13	0.1 % to 5.0 %
II.	**FERTILIZER**			
1.	**MOP**	Moisture %	FCO-NOV 13: 1985 (RA 2013)	0.05 % to 2.0 %
		Sodium as NaCl %	FCO-NOV 13: 1985 (RA 2013)	1.0 % to 3.5 %
		Potassium as K_2O %	FCO-NOV 13: 1985 (RA 2013)	59.0 % to 63.0 %
		Size analysis, Sieve Test	FCO-NOV 13: 1985 (RA 2013)	1 % to 99.0 %
2.	**Urea**	Moisture %	FCO-NOV 13: 1985 (RA 2013)	0.05 % to 1.0 %
		Total Nitrogen as N %	FCO-NOV 13: 1985 (RA 2013)	40.0 % to 47 %
		Size analysis, Sieve Test	FCO-NOV 13: 1985 (RA 2013)	1 % to 99.0 %
3.	**DAP**	Moisture %	FCO-NOV 13: 1985 (RA 2013)	0.01 % to 1.0 %
		Total Nitrogen as N %	FCO-NOV 13: 1985 (RA 2013)	15.0 % to 19.0 %
		Ammonical Nitrogen as N	FCO-NOV 13: 1985 (RA 2013)	15.0 % to 16.0 %
		Citrate soluble Phosphorus as P_2O_5	FCO-NOV 13: 1985 (RA 2013	44.0 % to 47.0 %
		Water Soluble Phosphate as P_2O_5 %	FCO-NOV 13: 1985 (RA 2013)	40.0 % to 44.0 %

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III.	**COAL, COKE AND SOLID FUELS**			
1.	**Coal / Coke**	Total Moisture (TM) %	ASTM D 3302/D3302M	1.00 % to 60 %
		Total Moisture (TM) %	ISO 589: 2008(E)	1.00 % to 60 %
		Total Moisture (TM) %	ISO 579: 2013(F)	0.5 % to 20 %
		Inherent Moisture %	IS 1350 (Part 1): 1984 (RA 2013)	0.5 % to 20.0 %
		Ash content %	IS 1350 (Part 1): 1984 (RA 2013)	0.5 % to 50.0 %
		Volatile Matter %	IS 1350 (Part 1): 1984 (RA 2013)	1.00 % to 50.0 %
		Fixed Carbon (FC) %	IS 1350 (Part 1): 1984 (RA 2013)	5 % to 99 %
		Sulphur as S %	IS 1350 (Part 3): 1984 (RA 2010)	0.005 % to 0.5 %
2.	**Coal / Coke Ash Analysis**	Phosphorus as P_2O_5 %	IS 1355: 1984 (RA 2013)	0.05 % to 1.0 %
		Manganese as Mn %	IS 1355: 1984 (RA 2013)	0.01 % to 1.0 %
		Titanium as TiO_2 %	IS 1355: 1984 (RA 2013)	0.5 % to 3.0 %
		Silica as SiO_2 %	IS 1355: 1984 (RA 2013)	30.0 % to 70.0 %
		Alumina as Al_2O_3 %	IS 1355: 1984 (RA 2013)	12.0 % to 30.0 %
		Iron as Fe_2O_3 %	IS 1355: 1984 (RA 2013)	2.0 % to 15.0 %
		Calcium as CaO %	IS 1355: 1984 (RA 2013)	1.0 % to 5.0 %
		Magnesium as MgO	IS 1355: 1984 (RA 2013)	0.50 % to 5.0 %

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	Coal / Coke Ash Analysis	Sulphur as S %	IS 1355: 1984 (RA 2013)	0.2 % to 2.0 %
		Sodium as Na_2O %	IS 1355: 1984 (RA 2013)	0.05 % to 2.0 %
		Potassium as K_2O %	IS 1355: 1984 (RA 2013)	0.05 % to 2.0 %

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