

Laboratory	Scientific Services, Tata Steel Limited, R & D Scientific Services, Tata Steel Limited Jamshedpur, Jharkhand		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Chemical Testing	Issue Date	23.12.2016
Certificate Number	T-0946	Valid Until	22.12.2018
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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.	METAL & ALLOYS			
1.	Plain Carbon & Low Alloy Steel	C	IS 8811: 1998 (RA 2012) ASTM E415-15	0.002 % to 1.5 %
		Mn		0.005 % to 2.0 %
		S		0.0005 % to 0.10 %
		P		0.001 % to 0.10 %
		Si		0.01 % to 2.0 %
		Al		0.001 % to 0.15 %
		Cu		0.001 % to 0.50 %
		Cr		0.001 % to 2.0 %
		Ni		0.001 % to 2.0 %
		Mo		0.001 % to 2.0 %
		Ti		0.001 % to 0.25 %
		V		0.001 % to 0.50 %
		B		0.0001 % to 0.007 %
		Nb		0.001 % to 0.076 %
		Co		0.001 % to 0.20 %
		W		0.001 % to 0.20 %
		Pb		0.0002 % to 0.15 %

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2.	Plain Carbon & Low Alloy Steel	Sn	IS 8811: 1998 (RA 2012) ASTM E415-15	0.001 % to 0.40 %
		As		0.001 % to 0.20 %
		Sb		0.0003 % to 0.20 %
		Ca		0.0002 % to 0.01 %
		Zr		0.0001 % to 0.15 %
	Iron & Steel	N	IS 228 (Part 23): 2003 (RA 2008)	0.001 % to 0.05 %
		C	IS 228 (Part 20): 2003 (RA 2008) SS/CHEM/003, Rev. 03: 2012	0.0005 % to 5.0 %
		S		0.0003 % to 0.35 %
		N	IS 228 (Part 24): 2003 (RA 2008)	0.001 % to 0.03 %
		O	IS 228 (Part 18): 1998 (RA 2006)	0.0005 % to 0.03 %
3.	Cast Iron	C	ASTM E1999-11 IS 15338: 2003 (RA 2008)	1.90 % to 5.0 %
		Mn		0.03 % to 18.0 %
		S		0.002 % to 0.20 %
		P		0.002 % to 0.50 %
		Si		0.10 % to 5.0 %
		Al		0.001 % to 1.5 %
		Cu		0.01 % to 0.50 %
		Cr		0.003 % to 1.5 %

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	Cast Iron	Ni	ASTM E1999-11 IS 15338: 2003 (RA 2008)	0.02 % to 15 %
		Mo		0.01 % to 1.2 %
		Ti		0.003 % to 0.12 %
		V		0.008 % to 3.0 %
		Cr	ASTM E 322-12 SS/CHEM/002. Rev 03: 2012	0.005 % to 2.0 %
		Cu		0.005 % to 1.0 %
		Mn		0.005 % to 2.0 %
		Mo		0.005 % to 1.5 %
		Ni		0.005 % to 2.5 %
		P		0.005 % to 0.75 %
		S		0.005 % to 0.15 %
		Si		0.005 % to 3.5 %
		Ti		0.005 % to 0.20 %
		V		0.005 % to 0.25 %
4.	Stainless Steel	C	IS 9879: 1998 (RA 2008) ASTM E1086-14	0.005 % to 0.30 %
		Mn		0.01 % to 5.0 %
		S		0.002 % to 0.10 %
		P		0.003 % to 0.15 %

Nikhil Kumar
Convenor

N. Venkateswaran
Program Manager

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	Stainless Steel	Si	IS 9879: 1998 (RA 2008) ASTM E1086-14	0.01 % to 2.0 %
		Cu		0.01 % to 0.50 %
		Cr		5.00 % to 23.00 %
		Ni		2.00 % to 15.00 %
		Mo		0.01 % to 3.0 %
		Pb		0.004 % to 0.50 %
		As		0.01 % to 0.25 %
		Nb		0.010 % to 1.0 %
		Co		0.05 % to 0.10 %
5.	Ferro Alloys	C	SS/CHEM/003 Rev. 03: 2012	0.010 % to 10 %
		S		0.001 % to 0.50 %
6.	Ferro-silicon	Si	SS/CHEM/002 Rev 03: 2012	60 % to 80 %
		Al		0.01 % to 2.0 %
		Ti		0.01 % to 0.10 %
7.	Ferro-vanadium	V	SS/CHEM/002 Rev 03: 2012	35 % to 60 %
		P		0.01 % to 1.0 %
8.	Ferro-niobium	Nb	SS/CHEM/002 Rev 03: 2012	50 % to 75 %
		P		0.01 % to 1.0 %

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9.	Ferro-titanium	Ti	SS/CHEM/005 Rev 03: 2012	30 % to 75 %
		Si		0.1 % to 2.0 %
10.	Ferro-boron	B	SS/CHEM/005 Rev 03: 2012	10 % to 20 %
11.	Ferro-phosphorus	P	SS/CHEM/005 Rev 03: 2012	15 % to 30 %
12.	Ferro-molybdenum	Mo	SS/CHEM/005 Rev 03: 2012	40 % to 80 %
13.	Silico-manganese	Si	SS/CHEM/005 Rev 03: 2012	12 % to 25 %
		Mn		50 % to 70 %
		P		0.01 % to 0.50 %
		Ti		0.01 % to 0.50 %
14.	Ferro-chrome	Cr	SS/CHEM/005 Rev 03: 2012	50 % to 75 %
		Si		0.01 % to 4.0 %
		P		0.01 % to 0.10 %
		Ti		0.01 % to 0.50 %
15.	Ferro- manganese	Mn	SS/CHEM/005 Rev 03: 2012	60 % to 90 %
		Si		0.01 % to 4.0 %
		P		0.01 % to 0.50 %
		Ti		0.01 % to 0.50 %

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II. ORES & MINERALS				
1.	Iron & Steel Making Slags	Fe (t)	SS/CHEM/002 Rev 03: 2012	0.1 % to 60.0 %
		CaO		0.5 % to 60.0 %
		SiO ₂		0.5 % to 50.0 %
		P ₂ O ₅		0.05 % to 6.0 %
		S		0.02 % to 3.0 %
		MgO		0.50 % to 20.0 %
		MnO		0.05 % to 10.0 %
		Al ₂ O ₃		0.05 % to 50.0 %
		TiO ₂		0.05 % to 6.0 %
		Cr ₂ O ₃		0.005 % to 2.0 %
		K ₂ O		0.002 % to 2.0 %
2.	Iron Ore, Sinter & Pellet	Fe (t)	SS/CHEM/002 Rev 03: 2012	0.1 % to 70.0 %
		CaO		0.5 % to 25.0 %
		SiO ₂		0.5 % to 20.0 %
		P ₂ O ₅		0.05 % to 1.0 %
		S		0.02 % to 3.0 %
		MgO		0.50 % to 20.0 %

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3.	Iron Ore, Sinter & Pellet	MnO	SS/CHEM/002 Rev 03: 2012	0.05 % to 10.0 %
		Al ₂ O ₃		0.05 % to 15.0 %
		TiO ₂		0.05 % to 2.0 %
		Cr ₂ O ₃		0.005 % to 2.0 %
		K ₂ O		0.002 % to 2.0 %
	Iron ore, Sinter, Pellet and Process solid materials	Fe (t)	SS/CHEM/005 Rev 03: 2012	25 % to 75 %
		CaO		0.2 % to 25 %
		SiO ₂		0.05 % to 25 %
		P		0.01 % to 5.0 %
		MgO		0.05 % to 10 %
		MnO		0.01 % to 5 %
		Al ₂ O ₃		0.2 % to 15 %
		TiO ₂		0.05 % to 4.0 %
		Cr ₂ O ₃		0.01 % to 2.0 %
		Fe(t)	SS/CHEM/005 Rev 03: 2012	0.2 % to 15 %
4.	Iron and Steel making slags	CaO		0.2 % to 60 %
		SiO ₂		2 % to 37 %
		MgO		0.10 % to 25 %

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5.	Iron and Steel making slags	MnO	SS/CHEM/005 Rev 03: 2012	0.1 % to 10 %
		Al ₂ O ₃		2 % to 40 %
		TiO ₂		0.1 % to 4 %
	Pyroxenite	Fe (t)	SS/CHEM/005 Rev 03: 2012	0.01 % to 10 %
		CaO		0.2 % to 15 %
		SiO ₂		25 % to 60 %
		MgO		25 % to 40 %
		Al ₂ O ₃		1 % to 10 %
		Cr ₂ O ₃		0.1 % to 4 %
6.	Olivine	Fe (t)	SS/CHEM/005 Rev 03: 2012	3.0 % to 20 %
		CaO		0.10 % to 10 %
		SiO ₂		20 % to 60 %
		MgO		20 % to 55 %
		Al ₂ O ₃		0.01 % to 5.0 %
		Cr ₂ O ₃		0.01 % to 2 %
7.	Dunite	Fe (t)	SS/CHEM/005 Rev 03: 2012	3.0 % to 20 %
		CaO		0.10 % to 10 %
		SiO ₂		20 % to 60 %

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8.	Dunite	MgO	SS/CHEM/005 Rev 03: 2012	20 % to 55 %
		Al ₂ O ₃		0.01 % to 5.0 %
		Cr ₂ O ₃		0.01 % to 2 %
	Limestone & Dolomite and Allied Materials	Fe(t)	SS/CHEM/005 Rev 03: 2012	0.2 % to 15 %
		CaO		0.10 % to 56 %
		SiO ₂		0.10 % to 15 %
		MgO		0.10 % to 52 %
		MnO		0.05 % to 5.0 %
		Al ₂ O ₃		0.10 % to 10 %
		TiO ₂		0.10 % to 4.0 %
9.	High Silica, High Alumina, Refractories	Fe(t)	SS/CHEM/005 Rev 03: 2012	0.2 % to 15 %
		CaO		0.2 % to 15 %
		SiO ₂		10 % to 97 %
		MgO		0.10 % to 10 %
		MnO		0.1 % to 5 %
		Al ₂ O ₃		2 % to 93 %
		TiO ₂		0.1 % to 4 %

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10.	Chrome Ore & High chrome refractories	Fe (t)	SS/CHEM/005 Rev 03: 2012	1.0 % to 25 %
		Cr ₂ O ₃		1.0 % to 60 %
		SiO ₂		0.25 % to 20 %
		MgO		0.50 % to 25 %
		CaO		0.25 % to 15 %
		Al ₂ O ₃		1.0 % to 25 %
		TiO ₂		0.1 % to 4 %
11.	Mn Ore	Fe (t)	SS/CHEM/005 Rev 03: 2012	0.2 % to 45 %
		Mn		5 % to 60 %
		SiO ₂		0.25 % to 20 %
		Al ₂ O ₃		1.0 % to 25 %
		P		0.01 % to 5.0 %
		CaO		0.10 % to 5 %
12.	Coal Ash and Coke Ash	Fe (t)	SS/CHEM/005 Rev 03: 2012	0.1 % to 3.0 %
		SiO ₂		1.0 % to 40 %
		Al ₂ O ₃		0.50 % to 20 %
		P		0.01 % to 0.25 %
		CaO		0.10 % to 2.0 %

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13.	Coal Ash and Coke Ash	MgO	SS/CHEM/005 Rev 03: 2012	0.05 % to 1.0 %
		TiO ₂		0.05 % to 0.50 %
	Iron Ore, Sinter, Pellet, Process Solid materials	FeO	SS/CHEM/010 Rev 06: 2014 ASTM D3872-05 (RA 2011)	0.10 % to 20.0 %
		Fe (met)	SS/CHEM/011 Rev 04: 2010 IS/ISO 5416: 2006	0.10 % to 90.0 %
		Fe (t)	SS/CHEM/012 Rev 04: 2010 ASTM E246 - 10 (Method B) (RA 2015)	0.10 % to 90 %
14.	Iron Ore Sinter	Reduction Degradation Index (RDI)	TS 0001: 2004	10 % to 50 %
		Reducibility Index (RI)	TS 0002: 2004	40 % to 90 %
15.	Iron Ore Pellet	Swelling Index (SI)	IS 8624: 1995 (RA 2006)	5 % to 30 %
		Cold Crushing Strength Test	IS 8625: 1986 (RA 2008)	25 kg to 1000 kg
		Porosity	ASTMD 4404 - 10	10 % to 50 %
16.	Iron Ore Fines	Particle size analysis	ISO13320: 2009	0.1 µm to 1000µm
		Blaine No	SS/CRMT/034 Rev. 00: 2014	300 cm ² /g to 7000 cm ² /g

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III. SOLID FUELS				
1.	Coal & Coke	Ash	SS/CHEM/007 Rev 04: 2014	3 % to 70 %
		VM	ASTM D7582 - 15 IS 1350 (Part 1): 1984 (RA 2013)	0.2 % to 50.0 %
2.	Coke	Coke strength after reaction (CSR)	IS 4023: 1991 (RA2007) (Method B)	25 % to 90 %
		Coke Reactivity Index (CRI)	IS 4023: 1991 (RA2007) Method B	10 % to 50 %
-X-X-X-X-X-X-X-X-X-X-X-X-				