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CERTIFICATE OF ACCREDITATION

This is to attest that

MITRA S K PRIVATE LIMITED

HOLDING NO. E-5-138/157, WARD NO. 23, GANGARAMPUR ROAD, PHASE-2 R.H.S.TO BEHALA,
BANERJEEPARA
KOLKATA, WB, 700141, INDIA

Testing Laboratory TL-1220

has met the requirements of AC89, *IAS Accreditation Criteria for Testing Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date June 27, 2024



International Accreditation Service
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MITRA S K PRIVATE LIMITED

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Accredited to ISO/IEC 17025:2017

Effective Date June 27, 2024

Iron Ore/Iron Ore Concentrate/Iron Ore Sinter/Iron Ore Pellet	
ASTM E246-21	Standard Test Methods for Determination of Iron in Iron Ores and Related Materials by Dichromate Titrimetry Total Iron (Fe)
IS 1493 (Part 1):1981, RA 2021	Chemical analysis of Iron Ore Part 1, Determination of Common Constituents Total Iron (Fe) Silica (SiO ₂) Alumina (Al ₂ O ₃)
IS 1493:1959, RA 2021	Method of Chemical analysis of Iron Ore Phosphorus (P)
IS 11690:1986, RA 2019	Method of Moisture determination of Iron Ore Lot
ISO 2597-1:2006, RC 2022	Iron Ores-Determination of Total Iron Content – Part 1: Titrimetric method after tin (II)chloride reduction.
ISO 2598-1:1992, RC 2022	Determination of Silicon content (Part-1): Gravimetric Method – Silica (SiO ₂)
ISO 3087:2020	Iron ores – Determination of the moisture content of a lot
ISO 4689-3:2017, RC 2022	Iron ores – Determination of sulfur content - Part 3: Combustion/infrared method
ISO 6830:1986, RC 2021	Iron Ores-Determination of Aluminium Content – EDTA titrimetric Method – Alumina (Al ₂ O ₃)
ISO 9035:1989, RC 2017	Iron ores – Determination of acid-soluble iron (II) content – Titrimetric method – Ferrous Iron (Fe ²⁺)
ISO 11535:2006, RC 2022	Iron ores – Determination of various elements – Inductively coupled plasma atomic emission spectrometric method Alumina (Al ₂ O ₃) Calcium Oxide (CaO) Magnesium Oxide (MgO) Manganese (Mn) Phosphorus (P) Titanium Dioxide (TiO ₂)
TPM/MSK/1/H (ICP-OES)	Determination of Trace Elements Copper (Cu), Chromium (Cr), Lead (Pb), Zinc (Zn), Nickel (Ni), Arsenic (As), Vanadium (V), Sodium (Na), Potassium (K) in Iron Ore by Instrument Method

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TPM/MSK/1/V1	Determination of Loss on Ignition (LOI) of Iron ore: Gravimetric method
Manganese Ore	
IS 1473:2004, RA 2021	Methods of Chemical Analysis of Manganese Ores Manganese (Mn) Iron (Fe) Silica (SiO ₂) Phosphorus (P) Manganese Dioxide (MnO ₂)
ISO 4298:2022	Manganese ores and concentrates – Determination of manganese content – Potentiometric method
ISO 4299:1989, RC 2022	Manganese ores – Determination of moisture content.
ISO 5890: 1981, RC 2022	Manganese ores and concentrates – Determination of silicon content – Gravimetric method – Silica (SiO ₂)
ISO 7990:1985 (Method A), RC 2022	Manganese ores and concentrates – Determination of total iron content – Titrimetric method after reduction and sulfosalicylic acid spectrophotometric method
TPM/MSK/2/B2 (ICP OES)	Determination of Alumina (Al ₂ O ₃), Calcium Oxide (CaO), Magnesium Oxide (MgO), Phosphorus (P), Titanium Dioxide (TiO ₂), Arsenic (As), Barium Oxide (BaO), Copper (Cu), Lead (Pb), Nickel (Ni), Potassium Oxide (K ₂ O), Sodium Oxide (Na ₂ O) And Zinc (Zn) in Manganese Ore by Instrumental Method.
TPM/MSK/2/J1	Determination of Sulphur in Manganese Ore by Instrument Method (Combustion Infrared Absorption)
Chromite Ore (Chromium ore)/Chrome Concentrate	
IS 4737:1982, RA 2021	Specification for Chromites for Chemical Industries. Chromic Oxide (Cr ₂ O ₃) Silica (SiO ₂) Total Iron (Fe)
ISO 5997-1984 (Method B), RC 2022	Chromium ores and concentrates – Determination of silicon content – Molecular absorption spectrometric method and gravimetric method Silica (SiO ₂)
ISO 6130:1985, RC 2022	Chromium ores – Determination of total iron content – Titrimetric method after reduction
ISO 6331:1983, RC 2016	Determination of chromium content – Titrimetric method Chromic Oxide (Cr ₂ O ₃)
TPM/MSK/3/A/1	Determination of Silica (SiO ₂) in Chromite Ore
TPM/MSK/3/B/1	Determination of Chromium Oxide (Cr ₂ O ₃) in Chromite Ore
TPM/MSK/3/C/1	Determination of Total Iron (Fe) in Chromite Ore
TPM/MSK/3/D/1	Determination of Alumina (Al ₂ O ₃) in Chromite Ore
TPM/MSK/3/E/1	Determination of Calcium Oxide (CaO) in Chromite Ore
TPM/MSK/3/F/1	Determination of Magnesium Oxide (MgO) in Chromite Ore



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Aluminium Ore/Bauxite	
IS 2000 (Part 1):1985, RA 2022	Methods of chemical analysis of Bauxite Part – 1 Determination of Loss on Ignition
IS 2000 (Part 2):1985, RA 2022	Methods of chemical analysis of Bauxite Part – 2 Determination of Silica
IS 2000 (Part 3):1985, RA 2022	Methods of chemical analysis of Bauxite Part – 3 Determination of Alumina
IS 2000 (Part 4):1985, RA 2022	Methods of chemical analysis of Bauxite Part – 4 Determination of Ferric Oxide
IS 2000 (Part 5):1985, RA 2022	Methods of chemical analysis of Bauxite Part – 5 Determination of Titania
TPM/MSK/4/F2	Determination of Calcium Oxide (CaO), Magnesium Oxide (MgO), Titania (TiO ₂), Phosphorus (P) in Bauxite
TPM/MSK/4/J	Determination of Reactive Silica in Bauxite
TPM/MSK/4/K	Determination of Available Alumina in Bauxite
Limestone	
ASTM C25-19	Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime Loss on Ignition (LOI) Silica (SiO ₂) Alumina (Al ₂ O ₃) Calcium Oxide (CaO) Magnesium Oxide (MgO) Ferric Oxide (Fe ₂ O ₃)
IS 1760 (Part 1):1991, RA 2022	Methods of chemical analysis of limestone, dolomite and allied materials Part 1: Determination of loss on ignition
IS 1760 (Part 2):1991, RA 2022	Methods of chemical analysis of limestone, dolomite and allied materials Part 2: Determination of Silica
IS 1760 (Part 3):1992, RA 2022	Methods of chemical analysis of limestone, dolomite and allied materials Part 3: Determination of Iron oxide, Alumina, Calcium oxide and Magnesia
IS 10345:2004, RA 2019	Flux Grade Limestone for Use in Iron and Steel Making – Decrepitation Index
TPM/MSK/5/C3 (ICP-OES)	Determination of Ferric Oxide (Fe ₂ O ₃), Alumina (Al ₂ O ₃), Titania (TiO ₂), Sodium Oxide (Na ₂ O), Potassium Oxide (K ₂ O) in Limestone/Dolomite by Instrumental Method.
Dolomite	
IS 1760 (Part 1):1991, RA 2022	Methods of chemical analysis of limestone, dolomite and allied materials Part 1: Determination of loss on ignition
IS 1760 (Part 2):1991, RA 2022	Methods of chemical analysis of limestone, dolomite and allied materials Part 2: Determination of Silica



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IS 1760 (Part 3):1992, RA 2022	Methods of chemical analysis of limestone, dolomite and allied materials Part 3: Determination of Iron oxide, Alumina, Calcium oxide and Magnesia
TPM/MSK/5/C3 (ICP-OES)	Determination of Ferric Oxide (Fe ₂ O ₃), Alumina (Al ₂ O ₃), Titania (TiO ₂), Sodium Oxide (Na ₂ O), Potassium Oxide (K ₂ O) in Limestone/Dolomite by Instrumental Method.
Gypsum	
ASTM C471M-20a	Standard Test Methods for Chemical Analysis of Gypsum and Gypsum Products Free Water Combined Water Calcium Sulfate dihydrate (CaSO ₄ .2H ₂ O)/Purity Calcium Oxide (CaO) Magnesium Oxide (MgO) Sulfur trioxide (SO ₃) Silicon Dioxide (SiO ₂) and other Acid insoluble matter Iron and Aluminium Oxide (Fe ₂ O ₃ +Al ₂ O ₃)
IS 1288:1982, RA 2021	Methods of test for Mineral Gypsum Free Water Combined Water Calcium Sulfate dihydrate (CaSO ₄ .2H ₂ O)/Purity Calcium Oxide (CaO) Magnesium Oxide (MgO) Sulfur trioxide (SO ₃) Silica (SiO ₂) and Acid insoluble Iron and Aluminium Oxide (Fe ₂ O ₃ +Al ₂ O ₃)
Rock phosphate	
IS 9386:1979, RA 2019	Methods for chemical analysis of rock phosphate Calcium Oxide (CaO)
IS 11224:1985, RA 2020	Rock phosphate for chemical industries Total P ₂ O ₅ (A-3.2) Silica (SiO ₂) (A-4) Alumina (Al ₂ O ₃) (A-7) Ferric Oxide (Fe ₂ O ₃) (A-7.2) Magnesium Oxide (MgO) Loss on Ignition (LOI) (A-11.1) Moisture (A-8) Chloride (Cl) (A-10)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii)	Determination of Total Phosphorus
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size in different Fertilizers Particle Size (+0.25 mm) Particle Size (-0.25 mm+0.15 mm) Particle Size (-0.15 mm)



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TPM/MSK/26/D2 (ICP-OES)	Determination of Alumina (Al ₂ O ₃), Ferric Oxide (Fe ₂ O ₃) and Magnesium Oxide (MgO) in Rock Phosphate by Instrumental Method.
Quartz/Silica Sand	
IS 1917 (Part 1):1991, RA 2022	Chemical analysis of quartzite and high silica sand Part 1: Determination of loss on ignition
IS 1917 (Part 3):1992, RA 2022	Chemical analysis of quartzite and high silica sand Part 3: Determination of silica
TPM/MSK/25/F1 (ICP-OES) (Issue No.04 dated 01.12.2022)	Determination of Alumina (Al ₂ O ₃), Ferric Oxide (Fe ₂ O ₃), Sodium Oxide (Na ₂ O), Potassium Oxide (K ₂ O) and Titania (TiO ₂) in Quartz by Instrumental Method.
Pyroxenite/Oliflux/Olivine Sand/Dunite	
TPM/MSK/43/A (Issue No.02 dated 01.04.2022)	Determination of Calcium Oxide (CaO) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Complexometric method
TPM/MSK/43/B (Issue No.02 dated 01.04.2022)	Determination of Magnesium Oxide (MgO) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Complexometric method
TPM/MSK/43/C (Issue No.02 dated 01.04.2022)	Determination of Silica (SiO ₂) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Gravimetric Method
TPM/MSK/43/D (Issue No.02 dated 01.04.2022)	Determination of Ferric Oxide (Fe ₂ O ₃) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Volumetric method
TPM/MSK/43/E (Issue No.02 dated 01.04.2022)	Determination of Alumina (Al ₂ O ₃) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Complexometric Method
TPM/MSK/43/F (Issue No.02 dated 01.04.2022)	Determination of Loss on Ignition (LOI) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Gravimetric Method
TPM/MSK/43/G (Issue No.02 dated 01.04.2022)	Determination of Chromic Oxide (Cr ₂ O ₃) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Volumetric method
TPM/MSK/43/H (Issue No.04 dated 01.04.2022)	Determination of Sodium Oxide (Na ₂ O) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Instrumental method
TPM/MSK/43/H (Issue No.04 dated 01.04.2022)	Determination of Potassium Oxide (K ₂ O) content in Pyroxenite / Oliflux/ Olivine Sand / Dunite by Instrumental method
Copper Ore/Concentrates/Copper Mette	
ISO 10258:2018	Copper sulfide concentrates – Determination of Copper content – Titrimetric methods
ISO 10469:2006, RC 2020	Copper sulfide concentrates – Determination of copper content – Electro gravimetric method
ISO 10251:2006, RC 2020	Copper, lead, zinc and nickel concentrates – Determination of mass loss of bulk material on drying. Moisture
ISO 10378:2016	Copper, lead and zinc sulfide concentrates – Determination of gold and silver – Fire assay gravimetric and flame atomic absorption spectrometric method Gold (Au)



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TPM/MSK/47/A (Issue No.02 dated 01.04.2022)	Determination of Copper in Copper Ore/ Concentrates / Sulfides by Titrimetric Method
TPM/MSK/47/B (Issue No.02 dated 01.04.2022)	Determination of Silica in Copper Ore/ Concentrates / Sulfides by Gravimetric Method
TPM/MSK/47/C (Issue No.02 dated 01.04.2022)	Determination of Lead in Copper Ore/ Concentrates / Sulfides by Titrimetric Method
TPM/MSK/47/D (Issue No.02 dated 01.04.2022)	Determination of Zinc in Copper Ore/ Concentrates / Sulfides by Titrimetric Method
TPM/MSK/47/E (Issue No.02 dated 01.04.2022)-	Determination of Iron in Copper Ore/ Concentrates / Sulfides by Titrimetric Method
TPM/MSK/47/F (Issue No.02 dated 01.04.2022)	Determination of Sulphur in Copper Ore/ Concentrates / Sulfides by Titrimetric Method
TPM/MSK/47/I (ICP-OES) (Issue No.03 dated 01.12.2022)	Determination of Silver in Copper Ore/ Concentrates / Sulfides by Instrumental Method
Copper (Cu)-TPM/MSK/47/G (ICP-OES) (Issue No.03 dated 01.12.2022)	Determination of Trace elements in Copper Ore/ Concentrates / Sulfides by Instrumental Method Copper (Cu) Iron (Fe) Lead (Pb) Zinc (Zn)
Lead Ores/Concentrate	
ISO 10251:2006, RC 2020	Copper, lead, zinc and nickel concentrates – Determination of mass loss of bulk material on drying. Moisture
ISO 13545:2000, RC 2020	Lead sulfide concentrates -Determination of lead content – EDTA titration method after acid digestion
TPM/MSK/46/A (Issue No.02 dated 01.04.2022)	Determination of Lead in Lead Ore / Sulphides / Concentrates by Titrimetric method
TPM/MSK/46/B (Issue No.02 dated 01.04.2022)	Determination of Silica in Lead Ore / Sulphides / Concentrates by Gravimetric method
TPM/MSK/46/C (Issue No.02 dated 01.04.2022)	Determination of Copper in Lead Ore / Sulphides / Concentrates by Titrimetric method
TPM/MSK/46/D (Issue No.02 dated 01.04.2022)	Determination of Zinc in Lead Ore / Sulphides / Concentrates by Titrimetric method
TPM/MSK/46/E (Issue No.02 dated 01.04.2022)	Determination of Iron in Lead Ore / Sulphides / Concentrates by Titrimetric method
TPM/MSK/46/F (Issue No.02 dated 01.04.2022)	Determination of Sulphur in Lead Ore / Sulphides / Concentrates by Gravimetric method
TPM/MSK/46/G (ICP-OES) (Issue No.03 dated 01.12.2022)	Determination of Trace elements in Lead Ore / Sulphides / Concentrates by Instrumental Method. Lead (Pb)



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	Copper (Cu) Iron (Fe) Zinc (Zn)
TPM/MSK/46/I (ICP-OES) (Issue No.03 dated 01.12.2022)	Determination of Silver in Lead Ore / Sulphides / Concentrates by Instrumental Method
Zinc Ore/Concentrates	
ISO 10251:2006, RC 2020	Copper, lead, zinc and nickel concentrates – Determination of mass loss of bulk material on drying. Moisture
ISO 10378:2016, RC 2022	Copper, lead and zinc sulfide concentrates – Determination of gold and silver – Fire assay gravimetric and flame atomic absorption spectrometric method. Gold (Au)
ISO 13658:2000, RC 2020	Zinc sulfide concentrates – Determination of zinc content – Hydroxide precipitation and EDTA titrimetric method
TPM/MSK/48/A (Issue No.02 dated 01.04.2022)	Determination of Zinc in Zinc Ore / Concentrates / Sulphides by Titrimetric method.
TPM/MSK/48/B (Issue No.02 dated 01.04.2022)	Determination of Silica in Zinc Ore / Concentrates / Sulphides by Gravimetric method.
TPM/MSK/48/C (Issue No.02 dated 01.04.2022)	Determination of Lead in Zinc Ore/ Concentrates / Sulphides by Titrimetric method
TPM/MSK/48/D (Issue No.02 dated 01.04.2022)	Determination of Iron in Zinc Ore/ Concentrates / Sulphides by Titrimetric method
TPM/MSK/48/E (Issue No.02 dated 01.04.2022)	Determination of Copper in Zinc Ore / Concentrates / Sulphides by Titrimetric method.
TPM/MSK/48/F (Issue No.02 dated 01.04.2022)	Determination of Sulphur in Zinc Ore / Concentrates / Sulphides by Gravimetric method
TPM/MSK/48/G (ICP-OES) (Issue No.03 dated 01.12.2022)	Determination of Trace elements in Zinc Ore / Sulphides / Concentrates by Instrumental Method. Zinc (Zn) Iron (Fe) Lead (Pb) Copper (Cu)
TPM/MSK/48/I (ICP-OES) (Issue No.03 dated 01.12.2022)	Determination of Silver in Zinc Ore / Sulphides / Concentrates by Instrumental Method)
Aluminium Oxide/Fused Alumina/Calcined Alumina Powder	
ISO 806:2004, RC 2019	Aluminium oxide primarily used for the production of aluminium – Determination of loss of mass at 300 degrees C and 1 000 degrees C Moisture (0°C – 300°C) Loss on Ignition (300°C – 1000°C)



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ISO 12315:2010, RC 2018	Aluminium oxide primarily used for production of aluminium – Method for calculating the Alumina Al ₂ O ₃ content of smelter-grade alumina
ISO 18842:2015, RC 2022-	Aluminium oxide primarily used for the production of aluminium – Method for the determination of tapped and untapped density Untapped (Loose) Bulk Density Tapped Bulk Density
TPM/MSK/65 (ICP OES) (Issue No.01 dated 01.02.2023)	Determination of Trace elements in Aluminium Oxide/Fused Alumina/ Calcined Alumina Powder by Instrumental Method. Silica (SiO ₂) Ferric Oxide (Fe ₂ O ₃) Sodium Oxide (Na ₂ O) Potassium Oxide (K ₂ O) Titanium Dioxide (TiO ₂) Vanadium Pentoxide (V ₂ O ₅) Calcium Oxide (CaO) Zinc Oxide (ZnO) Phosphorus Pentoxide (P ₂ O ₅) Lithium Oxide (Li ₂ O) Galium Oxide (Ga ₂ O ₃)
Ferro Chromium (HCFC)	
ASTM E363-22	Standard Test Methods for Chemical Analysis of Chromium and Ferrochromium – Chromium (Cr)
ASTM E1915-20	Standard Test Methods for Analysis of Metal Bearing Ores and Related Materials for Carbon, Sulfur, and Acid-Base Characteristics Carbon (C) Sulphur (S)
IS 13452:2019 (Sec 5)	Methods of Chemical Analysis of Ferrochromium – Silicon (Si)
IS 13452:2019 (Sec 9)	Methods of Chemical Analysis of Ferrochromium – Chromium (Cr)
IS 13452:2019 (Sec 12)	Methods of Chemical Analysis of Ferrochromium – Chromium (Cr)
IS 13452:2019 (Sec 13)	Methods of Chemical Analysis of Ferrochromium – Phosphorus (P)
ISO 4140:1979, RC 2022)	Ferrochromium and ferrosilicochromium – Determination of chromium content – Potentiometric method
TPM/MSK/8/C (Issue No.03 dated 01.04.2020)	Determination of Phosphorous (P) in HCFC /LCFC by Alkalimetric Method
TPM/MSK/8/C/1 (ICP-OES) (Issue No.02 dated 01.12.2022)	Determination of Phosphorous (P) In High Carbon Ferrochrome (HCFC)/Low Carbon Ferrochrome (LCFC) by Instrument Method
TPM/MSK/8/D (Issue No.02 dated 02.01.2023)	Determination of Carbon And Sulphur in HCFC / LCFC by Instrument Method Carbon (C) Sulphur (S)
Ferro Chromium	



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TPM/MSK/8/E2 (ICP-OES) (Issue No.04 dated 01.12.2022)	Determination of Manganese (Mn), Cobalt (Co), Titanium (Ti), Nickel (Ni) and Vanadium (V) in Ferro Chrome by Instrument Method
Ferro Chromium (LCFC)	
ASTM E363-22	Standard Test Methods for Chemical Analysis of Chromium and Ferrochromium-Chromium (Cr)
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 13452:2019 (Sec 6)	Methods of Chemical Analysis of Ferrochromium – Silicon (Si)
IS 13452:2019 (Sec 10)	Methods of Chemical Analysis of Ferrochromium – Chromium (Cr)
IS 13452:2019 (Sec 12)	Methods of Chemical Analysis of Ferrochromium – Chromium (Cr)
IS 13452:2019 (Sec 13)	Methods of Chemical Analysis of Ferrochromium – Phosphorus (P)
ISO 4140:1979, RC 2022)	Ferrochromium and ferrosilicochromium – Determination of chromium content – Potentiometric method
TPM/MSK/8/C (Issue No.03 dated 01.04.2020)	Determination of Phosphorous (P) in HCFC /LCFC by Alkalimetric Method
TPM/MSK/8/C/1 (ICP-OES) (Issue No.02 dated 01.12.2022)	Determination of Phosphorous (P) In High Carbon Ferrochrome (HCFC)/Low Carbon Ferrochrome (LCFC) by Instrument Method
Ferro Manganese (FeMn)	
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
ASTM E1915-20	Standard Test Methods for Analysis of Metal Bearing Ores and Related Materials for Carbon, Sulfur, and Acid-Base Characteristics Carbon (C) Sulphur (S)
IS 1559:1961, RA 2018	Methods of Chemical Analysis of Ferro-Alloys- Manganese (Mn)
IS 13938 (Part 1):1994, RA 2019	Chemical Analysis of Ferro Manganese Part 1: Determination of Silicon by Gravimetric Method
IS 13938 (Part 3):1993, RA 2019	Chemical Analysis of Ferromanganese Part 3: Determination of Phosphorous by Volumetric (alkalimetric) Method
ISO 4159:1978, RC 2020	Ferromanganese and ferrosilicomanganese – Determination of manganese content – Potentiometric method



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TPM/MSK/9/C1 (ICP-OES) (Issue No.02 dated 01.12.2022)	Determination of Phosphorous (P) In Ferro Manganese by Instrument Method
TPM/MSK/9/D (Issue No.02 dated 02.01.2023)	Determination of Carbon and Sulphur in Ferro Manganese by Instrument Method Carbon(C) Sulphur(S)
Silico Manganese (SiMn)	
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 1559:1961, RA 2018	Methods of Chemical Analysis of Ferro-Alloy Manganese (Mn) Silicon (Si) Phosphorus (P)
ISO 4158:1978, RC 2020-	Ferrosilicon, ferrosilicomanganese and ferrosilicochromium – Determination of silicon content – Gravimetric method
ISO 4159:1978, RC 2020	Ferromanganese and ferrosilicomanganese – Determination of manganese content – Potentiometric method
TPM/MSK/11/C1 (ICP-OES) (Issue No.02 dated 01.12.2022)	Determination of Phosphorous (P) In Silico Manganese by Instrument Method
TPM/MSK/11/E (ICP-OES) (Issue No.02 dated 01.12.2022)	Determination of Boron (B) In Silico Manganese by Instrument Method
Ferro Silicon (FeSi)	
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 1559 (Part 1):1988, RA 2019	Methods of chemical analysis of ferro silicon Part 1: Determination of silicon
IS 1559 (Part 4):1982, RA 2018	Methods of chemical analysis of ferro silicon Part 4: Determination of Phosphorus (P)
ISO 4158:1978, RC 2020	Ferrosilicon, ferrosilicomanganese and ferrosilicochromium – Determination of silicon content – Gravimetric method
TPM/MSK/10/B2 (ICP-OES) (Issue No.02 dated 01.12.2022)	Determination of Phosphorous (P), Calcium (Ca) and Aluminium (Al) in Ferro Silicon by Instrument Method.
Ferro Nickel (FeNi)	



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ISO 6352:1985, RC 2018	Ferronickel – Determination of nickel content – Dimethylglyoxime gravimetric method
ISO 7524:2020	Ferronickel – Determination of carbon content – Infrared absorption method after induction furnace combustion
ISO 8343:1985, RC 2022	Ferronickel – Determination of silicon content – Gravimetric method
ISO 23156:2021	Ferronickels – Determination of phosphorus, manganese, chromium, copper and cobalt contents – Inductively coupled plasma optical emission spectrometric method
Fero vanadium	
IS 1559:1961, RA 2018	Methods of Chemical Analysis of Ferro-Alloys Vanadium (V) Silicon (Si) Phosphorus (P)
ISO 6467:2018	Ferrovandium – Determination of vanadium content – Potentiometric method
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
Ferro Titanium	
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 1559:1961, RA 2018	Methods of Chemical Analysis of Ferro-Alloys – Titanium (Ti)
IS 13840:2019	Methods of Chemical Analysis of Ferrotitanium Titanium (Ti) Silicon (Si)
ISO 7692:1983, RC 2016	Ferrotitanium – Determination of titanium content – Titrimetric method
TPM/MSK/12/A1 (Issue No.03 dated 01.04.2022)	Determination of Titanium in Ferrotitanium by Wet Chemical Method
Fero Molybdenum	
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 12614 (Part 1):1988, RA 2019	Methods of Chemical Analysis of Ferromolybdenum – Part 1: Determination of Molybdenum



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IS 12614(Part 3):1988, RA 2019	Methods of Chemical Analysis of Ferromolybdenum – Part 3: Determination of Silicon
IS 12614(Part 5):1988, RA 2019	Methods of Chemical Analysis of Ferromolybdenum – Part 5: Determination of Phosphorus
TPM/MSK/14/A1 (Issue No.03 dated 01.04.2022)	Determination of Molybdenum as Lead Molybdate Gravimetric Method
Cast Iron/Pig Iron	
ASTM E351-18 (Sec 46-52)	Standard Test Methods for Chemical Analysis of Cast Iron – All Types Silicon (Si)
ASTM E351-18 (Sec 152-159)	Standard Test Methods for Chemical Analysis of Cast Iron – All Types Manganese (Mn)
ASTM E351-18 (Sec 160-167)	Standard Test Methods for Chemical Analysis of Cast Iron – All Types Phosphorus (P)
ASTM E351-18 (Sec 168-175)	Standard Test Methods for Chemical Analysis of Cast Iron – All Types Nickel (Ni)
ASTM E351-18 (Sec 218-226)	Standard Test Methods for Chemical Analysis of Cast Iron – All Types Chromium (Cr)
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 12308 (Part 5):1991, RA 2018	Methods for Chemical Analysis of Cast Iron and Pig Iron Part 5: Determination of phosphorus by alkalimetric method (for phosphorus 0.01 to 0.50 percent)
IS 12308 (Part 6):1991, RA 2018	Methods for Chemical Analysis of Cast Iron and Pig Iron Part 6: Determination of silicon by gravimetric method (for silicon 0.1 to 6.0 percent)
IS 12308 (Part 7):1991, RA 2018	Methods for Chemical Analysis of Cast Iron and Pig Iron Part 7: Determination of nickel by dimethyl glyoxime (gravimetric) method (for nickel 0.5 to 36 percent)
IS 12308 (Part 8):1997, RA 2018	Methods for Chemical Analysis of Cast Iron and Pig Iron Part 8: Determination of chromium by per sulphate oxidation method (for chromium 0.1 to 28 percent)
IS 12308 (Part 10):1991, RA 2018	Methods for Chemical Analysis of Cast Iron and Pig Iron Part 10: determination of manganese (up to 7.0 percent) by arsenite (volumetric) method
TPM/MSK/16/B2 (ICP-OES) (Issue No.04 dated 01.12.2022)	Determination of Chromium (Cr), Manganese (Mn), Phosphorus (P) and Nickel (Ni), in Pig Iron / Cast Iron by Instrument Method
Steel	
ASTM E350-18 (Sec 46-52)	Standard Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron Silicon (Si)
ASTM E350-18 (Sec 164-171)	Standard Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron



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	Manganese (Mn)
ASTM E350-18 (Sec 172-179)	Standard Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron Phosphorus (P)
ASTM E350-18 (Sec 180-187)	Standard Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron Nickel (Ni)
ASTM E350-18 (Sec 230-238)	Standard Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron Chromium (Cr)
ASTM E353-19 (Sec 172-179)	Standard Test Methods for Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys Nickel (Ni)
ASTM E353-19 (Sec 212-220)	Standard Test Methods for Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys Chromium (Cr)
ASTM E1019-18	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques Carbon (C) Sulphur (S)
IS 228 (Part 2):1987, RA 2018	Methods for Chemical Analysis of Steels – Part 2: Determination of Manganese in Plain-Carbon and Low Alloy Steels by Arsenite Method
IS 228 (Part 3):1987, RA 2018	Methods of chemical analysis of steels – Part 3: Determination of phosphorus by alkalimetric method
IS 228 (Part 5):1987, RA 2019	Methods of chemical analysis of steels – Part 5: Determination of nickel by dimethyl glyoxime (gravimetric) method (for nickel greater than or equal to 0.1 percent)
IS 228 (Part 6):1987, RA 2018	Methods for Chemical Analysis of Steels – Part 6: Determination of Chromium by Persulphate Oxidation Method (for Chromium>0.1 Percent)
IS 228 (Part 8):1989, RA 2019	Methods of chemical analysis of steels – Part 8: Determination of silicon by gravimetric method (for silicon 0.05 to 0.50 percent)
TPM/MSK/17/C2 (ICP-OES) (Issue No.04 dated 01.12.2022)	Determination of Manganese (Mn), Phosphorus (P), Nickel (Ni), Chromium (Cr) and Copper (Cu) in Steel by Instrument Method
High Purity Copper/Copper Cathode/Blister Copper	
TPM/MSK/41 (ICP-OES) (Issue No.04 dated 01.12.2022)	Determination of Trace Elements in High Purity Copper/Copper Cathode/Blister Copper by Instrument Method. Antimony (Sb) Phosphorus (P) Tin (Sn) Arsenic (As) Bismuth (Bi)

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	<p>Cadmium (Cd) Chromium (Cr) Cobalt (Co) Lead (Pb) Iron (Fe) Manganese (Mn) Nickel (Ni) Selenium (Se) Silicon (Si) Silver (Ag) Sulphur (S) Tellurium (Te) Zinc (Zn)</p>
High grade Primary aluminum	
<p>TPM/MSK/36 (ICP-OES) (Issue No.04 dated 01.12.2022)</p>	<p>Determination of Trace Elements in High grade Primary aluminum by Instrument Method. Magnesium (Mg) Chromium (Cr) Copper (Cu) Gallium (Ga) Iron (Fe) Manganese (Mn) Titanium (Ti) Vanadium (V) Zinc (Zn) Silicon (Si)</p>
Special High Grade Zinc	
<p>TPM/MSK/38 (ICP-OES) (Issue No.04 dated 01.12.2022)</p>	<p>Determination of Trace Elements in Special High Grade Zinc by Instrument Method. Aluminum (Al) Antimony (Sb) Arsenic (As) Cadmium (Cd) Copper (Cu) Iron (Fe) Lead (Pb) Magnesium (Mg) Nickel (Ni) Silver (Ag) Thallium (Tl) Tin (Sn)</p>
Pure Lead/Lead Ingot/Refined Lead	
<p>TPM/MSK/39 (ICP-OES) (Issue No.04 dated 01.12.2022)</p>	<p>Determination of Trace Elements in Standard Lead Metals by Instrument Method. Aluminium (Al) Antimony (Sb) Arsenic (As)</p>



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	<p>Bismuth (Bi) Cadmium (Cd) Calcium (Ca) Chromium (Cr) Copper (Cu) Iron (Fe) Manganese (Mn) Nickel (Ni) Selenium (Se) Silver (Ag) Sulphur (S) Tellurium (Te)</p>
Tin	
<p>TPM/MSK/37 (ICP-OES) (Issue No.04 dated 01.12.2022)</p>	<p>Determination of Trace Elements in Tin Metals by Instrument Method. Aluminum (Al) Antimony (Sb) Arsenic (As) Bismuth (Bi) Cadmium (Cd) Copper (Cu) Iron (Fe) Lead (Pb) Zinc (Zn)</p>
Primary Nickel	
<p>TPM/MSK/40 (ICP-OES) (Issue No.04 dated 01.12.2022)</p>	<p>Determination of Trace Elements in Primary Nickel Metals by Instrument Method. Bismuth (Bi) Cobalt (Co) Copper (Cu) Antimony (Sb) Arsenic (As) Iron (Fe) Lead (Pb) Manganese (Mn) Phosphorus (P) Silicon (Si) Sulphur (S) Tin (Sn) Zinc (Zn)</p>
Coal	
<p>ASTM D409/D409M-16</p>	<p>Standard Test Method for Grindability of Coal by the Hardgrove-Machine Method – Hardgrove Grindability Index (HGI)</p>
<p>ASTM D720/D720M-22</p>	<p>Standard Test Method for Free-Swelling Index of Coal – Crucible Swelling Number (CSN)</p>
<p>ASTM D1857/D1857M-18</p>	<p>Standard Test Method for Fusibility of Coal and Coke Ash IT (Initial Deformation Temperature) (Oxidizing) HT (Hemispherical Temperature) (Oxidizing)</p>



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	ST (Spherical Temperature) (Oxidizing) FT (Fluidity Temperature) (Oxidizing) IT (Initial Deformation Temperature) (Reducing) HT (Hemispherical Temperature) (Reducing) ST (Spherical Temperature) (Reducing) FT (Fluidity Temperature) (Reducing)
ASTM D3172-13(2021) e1	Standard Practice for Proximate Analysis of Coal and Coke Fixed Carbon (FC)
ASTM D3173/D3173M-17a	Standard Test Method for Moisture in the Analysis Sample of Coal and Coke
ASTM D3174-12(2018) e1	Standard Test Method For Ash In The Analysis Sample Of Coal And Coke From Coal
ASTM D3175-20	Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke
ASTM D3176-15	Standard Practice for Ultimate Analysis of Coal and Coke – Oxygen (O)
ASTM D3302/D3302M-22a	Standard Test Method for Total Moisture in Coal
ASTM D4239-18e1	Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion
ASTM D4326-21	Standard Test Method for Major and Minor Elements in Coal Ash By X-Ray Fluorescence Silica (SiO ₂) Alumina (Al ₂ O ₃) Ferric Oxide (Fe ₂ O ₃) Titania (TiO ₂) Phosphorus Pentoxide (P ₂ O ₅) Calcium Oxide (CaO) Magnesium Oxide (MgO) Potassium Oxide (K ₂ O) Sulphur Trioxide (SO ₃) Sodium Oxide (Na ₂ O) Manganese Dioxide (MnO ₂)
ASTM D5373-21	Standard Test Methods for Determination of Carbon, Hydrogen and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke Carbon (C) Hydrogen (H) Nitrogen (N)
ASTM D5865/D5865M-19	Standard Test Method For Gross Calorific Value Of Coal And Coke Gross Calorific Value (GCV) Net Calorific Value (NCV) (ADB) Net Calorific Value (NCV) (ARB) Net Calorific Value (NCV) (DB)
ASTM D6349-21	Standard Test Method for Determination of Major and Minor Elements in Coal, Coke, and Solid Residues from Combustion of Coal and Coke by Inductively Coupled Plasma – Atomic Emission Spectrometry



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	<p>Silica (SiO₂) Alumina (Al₂O₃) Ferric Oxide (Fe₂O₃) Titania (TiO₂) Phosphorus Pentoxide (P₂O₅) Calcium Oxide (CaO) Magnesium Oxide (MgO) Potassium Oxide (K₂O) Sulphur Trioxide (SO₃) Sodium Oxide (Na₂O) Manganese Dioxide (MnO₂)</p>
ASTM D6357-21b	<p>Standard Test Methods for Determination of Trace Elements in Coal, Coke, and Combustion Residues from Coal Utilization Processes by Inductively Coupled Plasma Atomic Emission Spectrometry, Inductively Coupled Plasma Mass Spectrometry, and Graphite Furnace</p> <p>Antimony (Sb) Arsenic (As) Beryllium (Be) Cadmium (Cd) Chromium (Cr) Cobalt (Co) Copper (Cu) Lead (Pb) Manganese (Mn) Molybdenum (Mo) Nickel (Ni) Vanadium (V) Zinc (Zn)</p>
ASTM D7582-15	<p>Standard Test Methods for Proximate Analysis of Coal and Coke by Macro Thermogravimetric Analysis</p> <p>Moisture Volatile Matter (VM) Ash Fixed Carbon (FC)</p>
IS 1350 (Part 1):1984, RA 2019	<p>Methods of Test for Coal and Coke – Part 1: Proximate Analysis</p> <p>Total Moisture Moisture Volatile Matter (VM) Ash Fixed Carbon (FC)</p>
IS 1350 (Part 2):2022	Method of test for Coal and Coke Part 2: Determination of gross calorific value
IS 1350 (Part 5):2017	Methods of Test for Coal and Coke Part 5: Determination of Special Impurities (Carbon Present as Carbonate, Chlorine and Phosphorus) – Phosphorus (P)
IS 1353 (Part 1):2018	Method of Test For Coal Carbonization Part 1: Determination of the Crucible Swelling Number (CSN)
IS 1353 (Part 3):2022	Method of Test for Coal Carbonization Part 3: Determination of Caking Index



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IS 4433:1979, RA 2020	Method for Determination of Hardgrove Grindability Index of Coal
IS 15438:2004, RA 2020	Coal – Determination of Forms of Sulphur Organic Sulphur Pyritic Sulphur Sulphate Sulphur
ISO 562:2010, RC 2021	Hard coal and coke – Determination of volatile matter
ISO 589:2008, RC 2018	Hard coal – Determination of total moisture
ISO 622:2016, RC 2022 – Solid mineral fuels	Determination of phosphorus content – Reduced molybdophosphate photometric method
ISO 1170:2020	Coal and coke – Calculation of analyses to different bases – Oxygen (O)
ISO 1171:2010, RC 2021	Solid mineral fuels – Determination of ash
ISO 1928:2020	Coal and coke – Determination of gross calorific value Gross Calorific Value (GCV) Net Calorific Value (NCV) (ADB) Net Calorific Value (NCV) (ARB) Net Calorific Value (NCV) (DB)
ISO 5074:2015, RC 2021	Hard coal – Determination of Hardgrove grindability index
ISO 11722:2013, RC 2018 – Solid mineral fuels	Hard coal – Determination of moisture in the general analysis test sample by drying in nitrogen
ISO 15585:2019	Hard coal – Determination of caking index
ISO 17246:2010, RC 2021	Coal – Proximate analysis Fixed Carbon (FC)
ISO 19579:2006, RC 2018	Solid mineral fuels – Determination of sulfur by IR spectrometry
ISO 29541:2010, RC 2021	Solid mineral fuels – Determination of total carbon, hydrogen and nitrogen content – Instrumental method Carbon (C) Hydrogen (H) Nitrogen (N)
TPM/MSK/6/M/6 (ICP- OES) (Issue No. 04 dated 02.01.2023)	Determination of Phosphorus (P) In Coal/Coke by Instrument Method
Coke	
ASTM D1857/D1857M-18	Standard Test Method for Fusibility of Coal and Coke Ash IT (Initial Deformation Temperature) (Oxidizing) HT (Hemispherical Temperature) (Oxidizing) ST (Spherical Temperature) (Oxidizing) FT (Fluidity Temperature) (Oxidizing) IT (Initial Deformation Temperature) (Reducing) HT (Hemispherical Temperature) (Reducing) ST (Spherical Temperature) (Reducing) FT (Fluidity Temperature) (Reducing)

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ASTM D3172-13(2021) e1	Standard Practice for Proximate Analysis of Coal and Coke – Fixed Carbon (FC)
ASTM D3173/D3173M-17a	Standard Test Method for Moisture in the Analysis Sample of Coal and Coke
ASTM D3174-12(2018) e1	Standard Test Method For Ash In The Analysis Sample Of Coal And Coke From Coal
ASTM D3175-20	Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke
ASTM D3176-15	Standard Practice for Ultimate Analysis of Coal and Coke – Oxygen (O)
ASTM D3302/D3302M-22a	Standard Test Method for Total Moisture in Coal
ASTM D4239-18e1	Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion
ASTM D5341/D5341M-19	Standard Test Method for Measuring Coke Reactivity Index (CRI) and Coke Strength After Reaction (CSR)
ASTM D5373-21	Standard Test Methods for Determination of Carbon, Hydrogen and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke Carbon (C) Hydrogen (H) Nitrogen (N)
ASTM D5865/D5865M-19	Standard Test Method For Gross Calorific Value Of Coal And Coke Gross Calorific Value (GCV) Net Calorific Value (NCV) (ADB) Net Calorific Value (NCV) (ARB) Net Calorific Value (NCV) (DB)
ASTM D6349-21	Standard Test Method for Determination of Major and Minor Elements in Coal, Coke, and Solid Residues from Combustion of Coal and Coke by Inductively Coupled Plasma – Atomic Emission Spectrometry Silica (SiO ₂) Alumina (Al ₂ O ₃) Ferric Oxide (Fe ₂ O ₃) Titania (TiO ₂) Phosphorus Pentoxide (P ₂ O ₅) Calcium Oxide (CaO) Magnesium Oxide (MgO) Potassium Oxide (K ₂ O) Sulphur Trioxide (SO ₃) Sodium Oxide (Na ₂ O) Manganese Dioxide (MnO ₂)
ASTM D6357-21b	Standard Test Methods for Determination of Trace Elements in Coal, Coke, and Combustion Residues from Coal Utilization Processes by Inductively Coupled Plasma Atomic Emission Spectrometry, Inductively Coupled Plasma Mass Spectrometry, and Graphite Furnace Atomic Absorption Spectrometry Antimony (Sb)

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	<p>Arsenic (As) Beryllium (Be) Cadmium (Cd) Chromium (Cr) Cobalt (Co) Copper (Cu) Lead (Pb) Manganese (Mn) Molybdenum (Mo) Nickel (Ni) Vanadium (V) Zinc (Zn)</p>
ASTM D7582-15	<p>Standard Test Methods for Proximate Analysis of Coal and Coke by Macro Thermogravimetric Analysis Moisture Volatile Matter (VM) Ash Fixed Carbon (FC)</p>
IS 1350 (Part 1):1984, RA 2019	<p>Methods of Test for Coal and Coke – Part 1: Proximate Analysis Total Moisture Moisture Volatile Matter (VM) Ash Fixed Carbon (FC)</p>
IS 1350 (Part 2):2022	Method of test for Coal and Coke Part 2: Determination of gross calorific value
IS 1350 (Part 5):2017	Methods of Test for Coal and Coke Part 5: Determination of Special Impurities (Carbon Present as Carbonate, Chlorine and Phosphorus) – Phosphorus (P)
IS 4023:2022	Methods for the Determination of Coke Reactivity Index (CRI) and Coke Strength After Reaction (CSR)
ISO 562:2010, RC 2021	Hard coal and coke – Determination of volatile matter
ISO 589:2008, RC 2018	Hard coal – Determination of total moisture
ISO 622:2016, RC 2022	Solid mineral fuels – Determination of phosphorus content – Reduced molybdophosphate photometric method
ISO 687:2024	Solid mineral fuels – Coke – Determination of moisture in the general analysis test sample
ISO 1170:2020	Coal and coke – Calculation of analyses to different bases – Oxygen (O)
ISO 1171:2010, RC 2021	Solid mineral fuels – Determination of ash
ISO 1928:2020	<p>Coal and coke – Determination of gross calorific value Gross Calorific Value (GCV) Net Calorific Value (NCV) (ADB) Net Calorific Value (NCV) (ARB) Net Calorific Value (NCV) (DB)</p>
ISO 18894:2018	Coke – Determination of coke reactivity index (CRI) and coke strength after reaction (CSR)

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ISO 19579:2006, RC 2018	Solid mineral fuels – Determination of sulfur by IR spectrometry
ISO 29541:2010, RC 2021	Solid mineral fuels – Determination of total carbon, hydrogen and nitrogen content – Instrumental method Carbon (C) Hydrogen (H) Nitrogen (N)
TPM/MSK/6/M/6 (ICP-OES) (Issue No. 04 dated 02.01.2023)	Determination of Phosphorus (P) In Coal/Coke by Instrument Method
Petroleum Coke	
ASTM D3172-13(2021) e1	Standard Practice for Proximate Analysis of Coal and Coke – Fixed Carbon (FC)
ASTM D4422-19	Standard Test Method for Ash in Analysis of Petroleum Coke
ASTM D4931-06:2017	Standard Test Method for Gross Moisture in Green Petroleum Coke
ASTM D5003/D5003M-23	Standard Test Method for Hardgrove Grindability Index (HGI) of Petroleum Coke
ASTM D5865/D5865M-19	Standard Test Method for Gross Calorific Value of Coal and Coke
ASTM D6374-22	Standard Test Method for Volatile Matter in Green Petroleum Coke Quartz Crucible Procedure
IS 1350 (Part 1):1984, RA 2019	Methods of Test for Coal and Coke – Part 1: Proximate Analysis – Fixed Carbon (FC)
IS 1350 (Part 2):2022	Method of test for Coal and Coke Part 2: Determination of gross calorific value
IS 1448 (Part 33):2021	Methods of test for petroleum and its products Part 33: Sulphur by Bomb method
IS:1448 (Part 126):2023	Methods of Test for Petroleum and its Products – Part 126 Determination of Ash Content in Raw and Calcined Petroleum Coke
IS 1448 (Part 132):2018	Methods of Test for Petroleum and its Products Part 132: Determination of Moisture Content in Raw and Calcined Petroleum Coke
IS 1448 (Part 134):2018	Methods of Test for Petroleum and its Products – Determination of Volatile Matter in Raw and Calcined Petroleum Coke
Graphite	
IS 495:1967, RA 2018	Graphite, Flake For Lubricants Loss on Heating Non Graphitic Carbon Petroleum Ether Soluble Matter Water Soluble Matter
IS 11321:1985, RA 2019	Graphite for graphite crucibles Moisture Ash Volatile Matter Fixed Carbon Sulphur



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Solid Biofuel	
ASTM E871-82(2019)	Standard Test Method for Moisture Analysis of Particulate Wood Fuels
ASTM E872-82(2019)	Standard Test Method for Volatile Matter in the Analysis of Particulate Wood Fuels
ASTM E1534-93(2019)	Standard Test Method for Determination of Ash Content of Particulate Wood Fuels
ASTM E1755-01(2020)	Standard Test Method for Ash in Biomass
IS 17653:2021	Solid biofuels Determination of ash content
IS 17654:2021	Solid biofuels Determination of calorific value – Gross Calorific Value (GCV)
IS 17655 (Part 2):2021	Solid biofuels Determination of moisture content Oven dry method Part 2: Total moisture – Simplified method
IS 17655 (Part 3):2021	Solid biofuels Determination of moisture content Oven dry method Part 3: Moisture in general analysis sample
IS 17832:2022	Solid biofuels – Determination of total content of carbon, hydrogen and nitrogen
IS 17833:2022	Solid biofuels Determination of total content of sulfur and chlorine – Sulphur
IS 17844:2022	Solid biofuels Determination of the content of volatile matter
ISO 16948:2015, RC 2020	Solid biofuels – Determination of total content of carbon, hydrogen and nitrogen
ISO 16994:2016	Solid biofuels – Determination of total content of sulfur and chlorine – Sulphur
ISO 18122:2022	Solid biofuels – Determination of ash content
ISO 18123:2023	Solid biofuels – Determination of volatile matter
ISO 18125:2017	Solid biofuels – Determination of calorific value – Gross Calorific Value (GCV)
ISO 18134-2:2017	Solid biofuels – Determination of moisture content – Oven dry method – Part 2: Total moisture – Simplified method
ISO 18134-3:2023	Solid biofuels – Determination of moisture content – Part 3: Moisture in general analysis sample
Cement	
ASTM C114-23	Standard Test Methods for Chemical Analysis of Hydraulic Cement Aluminum Oxide (Al ₂ O ₃) Calcium Oxide (CaO) Free Calcium Oxide Magnesium Oxide (MgO) Insoluble Residue Iron Oxide (Fe ₂ O ₃) Loss on Ignition (LOI) Silica (SiO ₂) Sulphur Trioxide (SO ₃) Sodium Oxide (Na ₂ O) Potassium Oxide (K ₂ O)



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IS 4032:1985, RA 2019	Method of chemical analysis of hydraulic cement Aluminum Oxide (Al ₂ O ₃) Calcium Oxide (CaO) Free Calcium Oxide Magnesium Oxide (MgO) Insoluble Residue Iron Oxide (Fe ₂ O ₃) Loss on Ignition (LOI) Silica (SiO ₂) Sulphur Trioxide (SO ₃)
IS 4032:1985, Amendment-2:2010	Method of chemical analysis of hydraulic cement – Chloride (Cl)
Clinker	
ASTM C114-23	Standard Test Methods for Chemical Analysis of Hydraulic Cement Aluminum Oxide (Al ₂ O ₃) Calcium Oxide (CaO) Free Calcium Oxide Magnesium Oxide (MgO) Insoluble Residue Iron Oxide (Fe ₂ O ₃) Loss on Ignition (LOI) Silica (SiO ₂) Sulphur Trioxide (SO ₃) Sodium Oxide (Na ₂ O) Potassium Oxide (K ₂ O)
IS 4032:1985, RA 2019	Method of chemical analysis of hydraulic cement Aluminum Oxide (Al ₂ O ₃) Calcium Oxide (CaO) Free Calcium Oxide Magnesium Oxide (MgO) Insoluble Residue Iron Oxide (Fe ₂ O ₃) Loss on Ignition (LOI) Silica (SiO ₂) Sulphur Trioxide (SO ₃)
IS 4032:1985, Amendment-2:2010	Method of chemical analysis of hydraulic cement – Chloride (Cl)
Fly Ash	
ASTM C114-23	Standard Test Methods for Chemical Analysis of Hydraulic Cement Sodium Oxide (Na ₂ O) Potassium Oxide (K ₂ O)
IS 1727:1967, RA 2018	Methods of test for pozzolanic materials Aluminum Oxide (Al ₂ O ₃) Calcium Oxide (CaO) Magnesium Oxide (MgO) Iron Oxide (Fe ₂ O ₃)



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	Loss on Ignition (LOI) Silica (SiO ₂) Sulphur Trioxide (SO ₃)
Urea/Neem Coated Urea	
IS 6092 (Part 2/Sec 5):2004, RA 2017	Methods of Sampling and Test for Fertilizers – Part 2: Determination of Nitrogen – Section 5: Total Nitrogen Content – Titrimetric Method after Distillation
IS 6092 (Part 6):1985, RA 2017 (Method 5.1.2)	Methods of Sampling and Test for Fertilizers – Part 6: Determination of Moisture and Impurities in Urea/Neem Coated Urea – Biuret
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(i),c	Moisture in Urea/Neem Coated Urea
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv)	Determination of Total Nitrogen in Urea/Neem Coated Urea
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(Xii)	Determination of Biuret in Urea/Neem Coated Urea
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(Xvii)	Determination of Neem Oil Content (Soluble in Benzene) in Urea/Neem Coated Urea
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (2.8 mm+1 mm) in Urea/Neem Coated Urea
Ammonium Phosphate	
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination of Moisture in Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv-vi)	Determination of Total Nitrogen in Ammonium Phosphate



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The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(Vii)	Determination of Ammoniacal Nitrogen in Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination of Water-Soluble phosphorus (as P2O5) in Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii,iv,v)	Determination of Citrate Soluble Phosphorus (Available phosphorus) (as P2O5) in Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (- 4 mm+ 1 mm) in Ammonium Phosphate
Ammonium Phosphate Sulphate	
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination of Moisture in Ammonium Phosphate Sulphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv-vi)	Determination of Total Nitrogen in Ammonium Phosphate Sulphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(Vii)	Determination of Ammoniacal Nitrogen in Ammonium Phosphate Sulphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination of Water Soluble phosphorus (as P2O5) in Ammonium Phosphate sulphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii,iv,v)	Determination of Citrate Soluble Phosphorus (Available phosphorus) (as P2O5) in Ammonium Phosphate sulphate



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The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (-4 mm+1 mm) in Ammonium Phosphate sulphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-24(A)	Determination of Sulphate Sulphur (as S) in Ammonium Phosphate sulphate
Diammonium Phosphate	
IS 6092 (Part 2):1985, RA 2021	Methods of sampling and test for fertilizers Part 2: Determination of nitrogen – Ammoniacal Nitrogen
IS 6092 (Part 2/Sec 5):2004, RA 2017	Methods of Sampling and Test for Fertilizers – Part 2: Determination of Nitrogen – Section 5: Total Nitrogen Content – Titrimetric Method after Distillation
IS 6092 (Part 3):1985, RA 2021	Methods of sampling and test for fertilizers Part 3: Determination of phosphorus
IS 6092 (Part 3):1985, RA 2021 (Method:6.1)	Methods of sampling and test for fertilizers Part 3: Determination of phosphorus Total Phosphate (as P ₂ O ₅)
IS 6092 (Part 3):1985, RA 2021 (Method:7.3.1)	Methods of sampling and test for fertilizers Part 3: Determination of phosphorus
IS 6092 (Part 6):1985, RA 2017 (4.2 Method 2)	Methods of Sampling and Test for Fertilizers – Part 6: Determination of Moisture and Impurities – Moisture
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination of Moisture in Diammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv-vi)	Determination of Total Nitrogen in Diammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(Vii)	Determination of Ammoniacal Nitrogen in Diammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination of Water Soluble phosphorus (as P ₂ O ₅) in Diammonium Phosphate



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The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii,iv,v)	Determination of Citrate Soluble Phosphorus (Available phosphorus) (as P2O5) in Diammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (-4 mm+1 mm) in Diammonium Phosphate
Mono Ammonium Phosphate	
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination of Moisture in Mono Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv-vi)	Determination of Total Nitrogen in Mono Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination of Water Soluble phosphorus (as P2O5) in Mono Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4 (ii,iv,v)	Determination of Citrate Soluble Phosphorus (Available phosphorus) (as P2O5) in Mono Ammonium Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (-4 mm+1 mm) in Mono Ammonium Phosphate
N.P.K	
ISO 17319:2015, RC 2020	Fertilizers and soil conditioners – Determination of water-soluble potassium content – Potassium tetraphenylborate gravimetric method
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination of Moisture in N.P.K



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The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv-vi)	Determination of Total Nitrogen in N.P.K
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(Vii)	Determination of Ammoniacal Nitrogen in N.P.K
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination of Water Soluble phosphorus (as P2O5) in N.P.K
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii,iv,v)	Determination of Citrate Soluble Phosphorus (Available phosphorus) (as P2O5) in N.P.K
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-5(ii)	Determination of Water Soluble Potassium (as K2O) in N.P.K
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (-4 mm+1 mm) in N.P.K
N.P.K (S)	
ISO 17319:2015, RC 2020-	Fertilizers and soil conditioners – Determination of water-soluble potassium content – Potassium tetraphenylborate gravimetric method
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination of Moisture in N.P.K (S)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(iv-vi)	Determination of Total Nitrogen in N.P.K (S)
The Fertilizer (Control) Order 1985 (as amended	Determination of Ammoniacal Nitrogen in N.P.K (S)



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up to March 2023), Schedule II, Part B, Method-3(Vii)	
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination of Water Soluble phosphorus (as P ₂ O ₅) in N.P.K (S)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii,iv,v)	Determination of Citrate Soluble Phosphorus (Available phosphorus) (as P ₂ O ₅) in N.P.K (S)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-5(ii)	Determination of Water Soluble Potassium (as K ₂ O) in N.P.K (S)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination Particle Size (-4 mm+1 mm) in N.P.K (S)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-24(A)	Determination of Sulphate Sulphur (as S) in N.P.K (S)
Single Super Phosphate	
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(i),b	Determination Moisture in Single Super Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(iii)	Determination Water Soluble phosphorus (as P ₂ O ₅) in Single Super Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(ii,iv,v)	Determination Citrate Soluble Phosphorus (Available phosphorus) (as P ₂ O ₅) in Single Super Phosphate



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The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-4(Vii)	Determination Free phosphoric Acid in Single Super Phosphate
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-24(A)	Determination Sulphate Sulphur (as S) in Single Super Phosphate
Potassium Chloride (Muriate of Potash)	
ISO 17319:2015, RC 2020	Fertilizers and soil conditioners – Determination of water-soluble potassium content – Potassium tetraphenylborate gravimetric method) in Potassium Chloride (Muriate of Potash)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2	Determination Moisture in Potassium Chloride (Muriate of Potash)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-5(ii)	Determination Water Soluble Potassium (as K ₂ O) in Potassium Chloride (Muriate of Potash)
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-20	Determination of Particle Size (-1.7 mm+0.25 mm) in Potassium Chloride (Muriate of Potash)
TPM/MSK/29/D (issue No.01 dated 01.01.2022)	Determination of Sodium (as NaCl) in Potassium Chloride (Muriate of Potash)
Ammonium Chloride	
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-2(ii)	Determination Moisture in Ammonium Chloride
The Fertilizer (Control) Order 1985 (as amended up to March 2023), Schedule II, Part B, Method-3(vii)	Determination Ammoniacal Nitrogen in Ammonium Chloride
Sampling	



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IS 436 (Part 1): Sec 1:1964	Methods for Sampling of Coal and Coke
IS 1405:2010	Iron Ores – Sampling and Sample Preparation – Manual method
IS 1472:1977	Methods of Sampling Ferro Alloys for determination of Chemical composition
IS 8562:1977	Method of sampling of Chrome Ores
ISO 12743:2021	Copper, Lead, Zinc and Nickel Concentrate – Sampling Procedure for determination of metal and moisture content.

