


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p>UKAS TESTING</p> <p>1364</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p>Bureau Veritas Commodities UK Limited</p> <p>Issue No: 035 Issue date: 01 October 2021</p>	
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<p>Testing performed at the above address only</p>		

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
CATALYST MATERIALS	<u>Chemical Tests</u> Pt, Pd, Rh, Ir, Ru, Au, Ag	<u>Documented In house methods using:</u> Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques: Gravimetric or ICP-OES or AAS Finish XRF Fire Assay, ICP-OES by F42 and F43
Alumina Based Catalysts	Total and Acid Soluble Silver	Volumetric titration
Autocatalysts	Platinum, Palladium, Rhodium Platinum, Palladium and Rhodium	ICP-OES XRF Spectrometry
Carbon Based Catalysts	Platinum, Palladium	ICP-OES, Gravimetry
Industrial Based Catalysts	Palladium Silver Palladium, Gold	Fire Assay, Gravimetry, ICP-OES Volumetric Titration Gravimetry, ICP-OES
Petroleum Catalysts	Acid Insolubles Iridium Platinum, Rhenium Platinum, Palladium Rhenium, Total and Acid Soluble	Gravimetry ICP-OES UV/VIS Spectrophotometry Gravimetry UV/VIS Spectrophotometry



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<p>CONCENTRATES, ORES AND MINERALS - BASE METAL</p>	<p><u>Chemical Tests</u></p> <p>Cl and F</p> <p>Determination of carbon and sulphur</p> <p>Multiple elements including but not limited to: Al, Sb, As, Ba, Bi, Cd, Ca, Cr, Co, Cu, Ge, Au, In, Ir, Fe, Pb, Mg, Mn, Mo, Ni, Os, Pd, P, Pt, K, Rh, Ru, Se, Si, Ag, Na, Sr, S, Te, Tl, Sn, Ti, V, U, Th, Y, Zn</p> <p>Al, Sb, As, Ba, Be, Bi, B, Cd, Ce, Ca, Cr, Co, Cu, Ga, Ge, Au, In, Fe, Pb, Mg, Ni, K, Se, Ag, Na, Sr, Te, Tl, Sn, Ti, V, Zn</p> <p>Sb, As, B, Cr, Co, F, Ge, Fe (elemental and oxide), Mg, Mn (including oxide), Pb, S, Sn, Ti, Zn (including oxide)</p>	<p><u>Documented In-House Method using:</u></p> <p>Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques:</p> <p>Ion Selective Electrode</p> <p>Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques:</p> <p>Carbon/Sulphur Analyser (combustion with infra-red analyser)</p> <p>Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques:</p> <p>Acid digestion, microwave digestion or fusion peroxide followed by AAS or ICP-OES Fusion or pressed pellet with XRF finish</p> <p>Fusion, acid digestion or fire assay followed by AAS using I1, I2, I8, I10, I17, I18, I19, I20, I31, F18, F19, F20, F21, F22, F23, F25, F26, F29, F33, F38, F41</p> <p>Fusion or acid digestion and removal of impurities by analyte precipitation or oxidation or reduction followed by volumetric titration using G2, G3, G83, G6, G14, G15, G42, G77, G70, G22, G23, G25, G26, G28, G75, G36, G37, G38, G51, G57, G62, G65, G66, G67, G68, G81, G88, G31, G32, G33 & G34</p>



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CONCENTRATES, ORES AND MINERALS - BASE METAL (cont'd)	<p><u>Chemical Tests</u> (cont'd)</p> <p>Al, Sb, As, Ba, Cd, Cu, Fe, Pb, Mg, Mn, Hg, Ni, Ag</p> <p>Ba, C, Cl, Cu, Au, Mo, Ni, Si, Ag, S as sulphate</p> <p>Pb & Zn</p> <p>Chlorine</p> <p>Fluorine, Germanium, Phosphorus, Silicon</p> <p>Sulphur</p>	<p><u>Documented In-House Method</u> using:</p> <p>Fusion or acid digestion followed by ICP-OES using I2, I6, I17, I18, I19, 120 & I31</p> <p>Analyte precipitation or fire assay followed by Gravimetric quantification using G4, G8, G9, G11, G13, G16, G18, G20, G41, G42, G43, G44, G48, G52, G53, G54, G55, G56, F18, F19, F20, F21, F22, F23, F25, F26, F29, F33, F38 & F41</p> <p>Fusion and XRF by I28</p> <p>Gravimetry by G11</p> <p>UV/VIS Spectrophotometry by G21, G78, G45, G48, G49, G76, G79 & G80)</p> <p>Combustion/Volumetric titration by G51</p>
Concentrates	Gallium and Germanium	Acid digestion followed by ICP-OES using I42
Mining Concentrates	Platinum, Palladium, Rhodium	Acid digestion followed by ICP-OES using P35
Barytes	Barium, Silicon, Strontium, Calcium, Iron	Gravimetry, AAS
Bastanite, Monazite and Rare Earth Materials	Acid Insolubles	Gravimetry
	Total Rare Earths	Gravimetry
	Cerium	Volumetric titration
Bauxite	Alumina, Ca, Fe, Mg, P, K, Na, Si, Ti	XRF Spectrometry
Copper Concentrates	Chlorine (50 - 1000 ppm)	XRF Spectrometry
Copper, Lead, Zinc, Silver and Gold concentrates	Fluorine (40 – 3500 ppm)	Ion Selective Electrode using G85



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CONCENTRATES, ORES AND MINERALS - BASE METAL (cont'd)	<u>Chemical Tests</u> (cont'd)	<u>Documented In-House Method using:</u>
Copper concentrates containing less than 2% Arsenic	Copper	Volumetric titration
Chromium Ores	Chromium and Iron Phosphorus and Silica	Volumetric titration UV/VIS Spectrophotometry
	Silicon, Calcium, Aluminium, Titanium and Magnesium as oxides and Phosphorus, Chromium and Iron	XRF Spectrometry
Colemanite, Tincal, Ulexite	Boron	Volumetric titration
Ilmenite and Rutile	Titanium Dioxide	Volumetric titration
Iron Ores	Alumina, Ca, Cr, Mg, Mn, P, K, Si, Ti, V, Fe, Si, Al, S, V, Co, Ni, Cu, As, Pb, Zn Ca, Ce, Li, Mg, K, Na Iron and Iron as oxide Silica Determination of Sulphur	XRF Spectrometry AAS Volumetric titration Gravimetry Carbon/Sulphur Analyser
Manganese Ores	Alumina, Ba, Ca, Fe, Mg, P, K, Si, Ti	XRF Spectrometry
Manganese Ores	Manganese and Manganese Dioxide	Volumetric titration
Manganese Ores	Silica	Gravimetry



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CONCENTRATES, ORES AND MINERALS - BASE METAL (cont'd)	<u>Chemical Tests</u> (cont'd)	<u>Documented In-House Method using:</u>
Molybdenite	Molybdenum	Gravimetry
	Copper, Molybdenum, Rhenium	XRF Spectrometry I29
Olivine	Magnesium	Volumetric titration
Pyrite	Gold	Fire Assay Gravimetry
	Sulphur	Gravimetry
Siliceous Ores	Sb, As, Bi, Cd, Co, Cu, In, Fe, Pb, Mn, Ni, Se, Ag, Te, Tl, Zn	AAS
	Silica	Gravimetry
Silver ores	Aluminium as oxide, Sb, As, Pb, Zn	peroxide fusion followed by ICP-OES
Tantalite	Tantalum and Niobium	XRF Spectrometry
Zinc Concentrates	<u>Zinc, Copper, Iron</u>	<u>XRF Spectrometry using I57</u>
METALS AND ALLOYS - FERROUS	<u>Chemical Tests</u>	<u>Documented In-House Method using:</u>
	Multiple elements including but not limited to: Al, Sb, As, Ba, Bi, Cd, Ca, Cr, Co, Cu, Ge, Au, In, Ir, Fe, Pb, Mg, Mn, Mo, Ni, Os, Pd, P, Pt, K, Rh, Ru, Se, Si, Ag, Na, Sr, S, Te, Tl, Sn, Ti, V, U, Th, Y, Zn	Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques: Acid digestion, microwave digestion or fusion peroxide followed by AAS or ICP-OES XRF
Ferrochrome and Charge Chrome	Chromium	Volumetric titration



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METALS AND ALLOYS - FERROUS (cont'd)	<u>Chemical Tests</u> (cont'd)	<u>Documented In-House Method using:</u>
Ferro Alloys	Palladium, Platinum, Rhodium, Phosphorus	ICP-OES, UV/VIS Spectrophotometry
	Silicon	Gravimetry
Ferro-Chromium and Ferro-Titanium Alloys	Determination of Carbon and Sulphur	Carbon/Sulphur Analyser
Ferro-Manganese	Manganese	Volumetric titration
Ferro-Molybdenum	Molybdenum	Gravimetry, XRF
Stainless steel residue	Chromium, Molybdenum, Nickel and Iron	XRF Spectrometry
	Determination of Carbon and Sulphur	Carbon/Sulphur Analyser
METALS AND ALLOYS - BASE METAL	<u>Chemical Tests</u>	<u>Documented In-House Method using:</u>
	Multiple elements including but not limited to: Al, Sb, As, Ba, Bi, Cd, Ca, Cr, Co, Cu, Ge, Au, In, Ir, Fe, Pb, Mg, Mn, Mo, Ni, Os, Pd, P, Pt, K, Rh, Ru, Se, Si, Ag, Na, Sr, S, Te, Tl, Sn, Ti, V, U, Th, Y, Zn	Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques: Acid digestion, microwave digestion or fusion peroxide followed by AAS or ICP-OES XRF
	Al, Bi, Cr, Co, Cu, Pb, Mn, Ag, Sn	Fusion or acid digestion and removal of impurities by analyte precipitation or oxidation or reduction followed by volumetric titration using G1, G5, G14, G42, G18, G31, G32, G33, G37, P2, G58, G59, G60 & G61
	Al, Sb, As, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Ga, Ge, In, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Sr, Te, Tl, Sn, Ti, V, Zn	Acid digestion followed by AAS using I3, I4, I5, I7, I9 & I22



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<p>METALS AND ALLOYS - BASE METAL (cont'd)</p>	<p><u>Chemical Tests</u></p> <p>Sb, As, Bi, Cd, Cu, In, Ni, Rh</p> <p>Ba, Cd, C, Cu, Ir, Mo, Ni, Rh, Si</p> <p>Au, Pd, Pt, Rh, Ag</p> <p>Molybdenum</p> <p>Phosphorus</p> <p>Sulphur</p>	<p><u>Documented In-House Method using:</u></p> <p>Acid digestion followed by ICP-OES using I9, I5, I27, I21, I32 & I22</p> <p>Element precipitation followed by Gravimetric quantification using G4, G7,G9, G18, P25, G40, G41, G44, P25 & G50</p> <p>Fire Assay with nickel sulphide collection, Gravimetry & ICP-OES using F15</p> <p>Oxidation, fusion & XRF using I29</p> <p>UV/VIS Spectrophotometry using G45</p> <p>Combustion/Volumetric titration using G51</p>
<p>BASE METAL MATERIALS - Sweeps, Residues, Slimes, Mattes and Secondary Materials</p>	<p><u>Chemical Tests</u></p> <p>Al, Sb, Bi, Cr, Co, Pb, Mg, Sn, Ti, Zn</p> <p>Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Ga, Ge, In, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Sr, Te, Tl, Sn, Ti, V, Zn</p> <p>Ba, Br, Cd, C, Cl, Cu, Mo, Ni, Os, Se</p> <p>Fluorine</p> <p>Au, Ir, Pd, Pt, Rh, Ru, Ag</p> <p>Selenium</p> <p>Sulphur</p>	<p><u>Documented In-House Method using:</u></p> <p>Volumetric titration</p> <p>AAS</p> <p>Gravimetry</p> <p>UV/VIS Spectrophotometry</p> <p>Fire Assay/Gravimetry ICP-OES</p> <p>ICP-OES</p> <p>Combustion/Volumetric titration</p>



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PRECIOUS METAL BEARING MATERIALS	<u>Chemical Tests</u>	<u>Documented In-House Method using:</u>
Bullion: Gold, Gold/Silver, Silver, Lead, Copper/Precious metal	Gold	Fire Assay
	Gold, Silver	Fire Assay, Gravimetry
	Palladium, Platinum	Fire Assay, ICP-OES
	Copper	Gravimetry
	Silver	Volumetric titration
	Iridium, Rhodium	ICP-OES
Platinum bullion, precious metal concentrates and residues	Platinum, Palladium, Rhodium	Gravimetry, ICP-OES
Carbonaceous Material	Gold	Fire Assay, Gravimetry
Complexed Organics, Resins and Cyanides	Gold	Gravimetry
Electronic/Computer Materials	Copper and Gold	Gravimetry
	Gold, Silver	Fire Assay, Gravimetry
	Palladium, Platinum	Fire Assay, ICP-OES
	Silver	AAS
Metals and Alloys	Copper	Gravimetry
	Gold, Silver	Fire Assay, Gravimetry
	Palladium, Platinum	Fire Assay, ICP-OES
	Platinum, Rhodium, Iridium	Gravimetry, ICP-OES
	Silver	Volumetric titration
	Palladium, Platinum, Rhodium	ICP-OES



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<p>PRECIOUS METAL BEARING MATERIALS (cont'd)</p> <p>Ores and Concentrates</p> <p>Silver/Film Scrap</p> <p>Sweeps/Residues</p>	<p><u>Chemical Tests (cont'd)</u></p> <p>Au, Ir, Pd, Os, Pt, Rh, Ru (Osmiridium)</p> <p>Silver: Halide and Raw Scrap</p> <p>Copper</p> <p>Au, Ag, Pd, Pt, Rh</p> <p>Au, Pd, Pt, Ir, Rh, Ru</p> <p>Silver</p>	<p><u>Documented In-House Method using:</u></p> <p>Gravimetry, ICP-OES</p> <p>Fire Assay, Gravimetry</p> <p>Gravimetry</p> <p>Fire Assay, ICP-OES</p> <p>Gravimetry ICP-OES</p> <p>Fire Assay, Gravimetry</p>
<p>CHEMICALS: INORGANIC</p> <p>Nickel Carbonate, Oxide, Sulphate</p> <p>Rhenium Salts</p> <p>Sulphur</p>	<p><u>Chemical Tests</u></p> <p>Nickel</p> <p>Rhenium</p> <p>Ash Acidity Hydrocarbons Sulphur</p> <p>Chlorine</p>	<p><u>Documented In-House Method using:</u></p> <p>Gravimetry</p> <p>Gravimetry</p> <p>Gravimetry</p> <p>UV/VIS Spectrophotometry</p>
<p>DUSTS AND PARTICULATES</p>	<p><u>Chemical Tests</u></p> <p>Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Ga, In, Fe, Pb, Mg, Mn, Mo, Ni, Se, Ag, Sr, Te, Th, Sn, Ti, V, Zn</p>	<p><u>Documented In-House Method using:</u></p> <p>ICP-OES</p>



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GLASS, OXIDES	<u>Chemical Tests</u> Boron B, Ca, Li, Mg, Al, Na, Pd, Rh, Ru Alumina, Ba, Ca, Cr, Hf, Fe, Mn, Mg, P, K, Si, Na, Sr, Ti, V, Y, Zn, Zr	<u>Documented In-House Method using:</u> Volumetric titration ICP-OES XRF Spectrometry
High grade Rhodium	Rhodium	ICP-OES
FLUORSPAR	<u>Chemical Tests</u> Ca, Fe, Pb, P, Si Fluorine	<u>Documented In-House Method using:</u> XRF Spectrometry UV/VIS Spectrophotometry, Volumetric titration
METALS: HIGH PURITY	<u>Chemical Tests</u> Multiple elements including but not limited to: Al, Sb, As, Ba, Bi, Cd, Ca, Cr, Co, Cu, Ge, Au, In, Ir, Fe, Pb, Mg, Mn, Mo, Ni, Os, Pd, P, Pt, K, Rh, Ru, Se, Si, Ag, Na, Sr, S, Te, Tl, Sn, Ti, V, U, Th, Y, Zn	<u>Documented In-House Method using:</u> Analysis through the appropriate application of Documented In-House Methods following the Flexible Scope Procedures Section 17 and SI246 Using the following techniques: Acid digestion, microwave digestion or fusion peroxide followed by AAS, ICP-OES or ICP-MS (I32)
Aluminium, Cadmium, Lead, Tin, Zinc	Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Ga, In, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, Te, Tl, Sn, Ti, V, Zn Silicon and Germanium	ICP-OES UV/VIS Spectrophotometry
Copper Cathode	Ag, As Bi, Cd, Co, Cr, Fe, Mn, Ni, Pb, Sb, Se, Si, Sn, Te, Zn P S	ICP-MS using method I55 ICP-OES using method I55 Carbon/Sulphur Analyser I55



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SOILS	<u>Chemical Tests</u> Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Ga, In, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, Te, Th, Sn, Ti, V, Zn Gold Au, Ir, Pd, Pt, Rh, Ru Silver	<u>Documented In-House Method using:</u> ICP-OES Fire Assay, Gravimetry Fire Assay, ICP-OES AAS
SCAN PROFILE QUALITATIVE/ QUANTITATIVE	<u>Chemical Tests</u>	<u>Documented In-House Method using:</u>
All Materials in Solution	Base Metals	ICP-OES
Non-Metallic Materials	Base/Precious Metals	ICP-OES
Metallic Materials and Solutions	Base/Precious Metals	ICP-OES
ALL MATERIALS (LISTED IN THIS SCHEDULE EXCEPT SOLUTIONS)	<u>Physical Tests</u> Moisture content Loss on Ignition Size Analysis Specific Gravity	<u>Documented In-House Method using:</u> Gravimetry Gravimetry Mesh Screening Gravimetry
END		