Bureau Veritas

Metals, Minerals & Environmental

Schedule of Services & Fees 2019

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MINERALS

MERCURY

CODE	DESCRIPTION	DETECTION LIMIT	UPPER LIMIT	CAD
AQ200-Hg	Hg – ICP-MS	0.01 ppm	50 ppm	$12.50
CV400	Trace Hg – CVAA	0.01 ppm	100 ppm	$10.00

WATER AND GENERAL CHEMISTRY

CODE	DESCRIPTION	DETECTION LIMIT	UPPER LIMIT	CAD
GC002	pH and conductivity on solids			$18.00
GC002-COND	Conductivity of solids	3 µS/cm		$13.45
GC002-pH	pH of solids	0.1 units		$10.65
GC901	Moisture (105°C)			$8.40
GC902	Lattice water			$28.95
TG001	LOI	0.1 %	100 %	$9.80

OTHER TRACE AND ORE GRADE ANALYSES

CODE	DESCRIPTION	DETECTION LIMIT	UPPER LIMIT	CAD
BR405	Sb – high grade assay, AAS	0.01 %	100 %	$14.60
GC204	Ge or Ga by ICP-MS	1 ppm	2000 ppm	$22.70
	Second element			+ $4.15
GC304	Ge or Ga by ICP-ES	0.01 %	100 %	$18.65
	Second element			+ $4.15
GC320	Ba by Na_2CO_3/K_2CO_3 fusion, ICP-ES	0.01 %	30 %	$29.25
GC410	NiS	0.001 %	100 %	$28.95
GC519	SiO_2 gravimetric	0.02 %	100 %	$27.85
GC520	Ba by Na_2CO_3/K_2CO_3 fusion, gravity	0.1 %	100 %	$29.25
GC806	FeO	0.2 %	100 %	$24.65
GC816	Zn Titration	1.00 %	100 %	$33.00
GC817	Pb Titration	2.00 %	100 %	$34.60
GC818	Fe Titration	1.00 %	100 %	$36.20
GC819	Mn Titration	1.00 %	100 %	$33.00
GC820	Cu Titration	1.00 %	100 %	$42.45
GC840	F – Trace Level	10 ppm	10000 ppm	$18.15
GC841	F – Ore Grade	0.01 %	15 %	$19.20
	Surcharge samples > 15%	10 %	50 %	$19.20
GC923	Pb or Zn Oxide	0.01 %	10 %	$26.50
	Extra element			+ $4.15
PF100	B	3 ppm	2000 ppm	$11.70

Requires at least 5 g per sample.

OTHER CHARGES

EN001-MA	Environmental disposal charge - Multi-acid waste disposal	$0.25

AQUA REGIA GOLD

Recommended for soils, sediments, vegetation or reconnaissance rock samples. Samples are digested in 1:1:1 aqua regia then analyzed by ICP-MS. Refractory, massive sulphide and graphitic samples can limit Au solubility.

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	DESCRIPTION	CAD
AQ115	Au	0.5 ppb	10 ppm	15 g Aqua regia ICP-MS	$11.10
AQ130				30 g Aqua regia ICP-MS	$15.85
AQ115-IGN				Ignited 15 g Aqua regia ICP-MS Rock samples are ignited at 550°C before aqua regia digestion	$12.50
AQ130-IGN				Ignited 30 g Aqua regia ICP-MS Rock samples are ignited at 550°C before aqua regia digestion	$17.25

Fire Assay

Lead collection fire assay fusion is a classic method for total sample decomposition. Total Au content is determined by digesting an Ag dore bead and then analysing by AAS, ICP-ES, or ICP-MS. The Lab reserves the right to reduce sample weight to 15 g or less for proper fusion.

ICP-MS

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	DESCRIPTION	CAD
FA130 FA150	Au	1 ppb	1 ppm	30 g / Fire Assay / ICP-MS	$22.30
	Pt	0.1 ppb	1 ppm	50 g / Fire Assay / ICP-MS	$25.25
	Pd	0.5 ppb	1 ppm		

ICP-ES

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	DESCRIPTION	CAD
FA330-Au*	Au	2 ppb	10 ppm	30 g / Fire Assay / ICP-ES	$17.50
FA350-Au*				50 g / Fire Assay / ICP-ES	$20.70
FA330* FA350*	Au	2 ppb	10 ppm	30 g / Fire Assay / ICP-ES	$18.75
	Pt	3 ppb	10 ppm	50 g / Fire Assay / ICP-ES	$21.70
	Pd	2 ppb	10 ppm		

AAS

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	DESCRIPTION	CAD
FA430*	Au	0.005 ppm	10 ppm	30 g / Fire Assay / AAS	$16.50
FA450*				50 g / Fire Assay / AAS	$19.55

GRAVIMETRIC

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	DESCRIPTION	CAD
FA530-Ag	Ag	20 ppm		30 g / Fire Assay / gravimetric	$20.80
FA550-Ag				50 g / Fire Assay / gravimetric	$23.80
FA530-Au	Au	0.9 ppm		30 g / Fire Assay / gravimetric	$20.80
FA550-Au				50 g / Fire Assay / gravimetric	$23.80
FA530	Au, Ag	as above		30 g / Fire Assay / gravimetric	$20.80
FA550				50 g / Fire Assay / gravimetric	$23.80

Require at least 15 g sample weight.
*Au>10 ppm are automatically analyzed by gravimetric method.

ULTRA-TRACE BY ICP-MS

ICP-MS analysis of a 0.5, 15 or 30 g sample after modified aqua regia digestion (1:1:1 HNO_3:HCl:H_2O) for low to ultra-low determination on soils, sediments and lean rocks. Larger splits (15 or 30 g) give a more representative analysis of elements subject to nugget effect (e.g., Au). Gold solubility can be limited in refractory and graphitic samples. The lead isotope method adds ^{204}Pb, ^{206}Pb, ^{207}Pb, ^{208}Pb. This data is suitable for geochemical exploration of U and other commodities where gross differences in non-radiogenic to radiogenic Pb ratios are of benefit.

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	CAD
AQ250	Aqua Regia ICP-ES/MS, 37 elements, 0.5 g			$21.00
AQ251	Aqua Regia ICP-ES/MS, 37 elements, 15 g			$25.75
AQ252	Aqua Regia ICP-ES/MS, 37 elements, 30 g			$30.50
	Ag	2 ppb	100000 ppb	
	Al	0.01 %	10 %	
	As	0.1 ppm	10000 ppm	
	Au	0.2 ppb	100000 ppb	
	B*	20 ppm	2000 ppm	
	Ba	0.5 ppm	10000 ppm	
	Bi	0.02 ppm	2000 ppm	
	Ca	0.01 %	40 %	
	Cd	0.01 ppm	2000 ppm	
	Co	0.1 ppm	2000 ppm	
	Cr	0.5 ppm	10000 ppm	
	Cu	0.01 ppm	10000 ppm	
	Fe	0.01 %	40 %	
	Ga	0.1 ppm	1000 ppm	
	Hg	5 ppb	50000 ppb	
	K	0.01 %	10 %	
	La	0.5 ppm	10000 ppm	
	Mg	0.01 %	30 %	
	Mn	1 ppm	10000 ppm	
	Mo	0.01 ppm	2000 ppm	
	Na	0.001 %	5 %	
	Ni	0.1 ppm	10000 ppm	
	P	0.001 %	5 %	
	Pb	0.01 ppm	10000 ppm	
	S	0.02 %	10 %	
	Sb	0.02 ppm	2000 ppm	
	Sc	0.1 ppm	100 ppm	
	Se	0.1 ppm	100 ppm	
	Sr	0.5 ppm	2000 ppm	
	Te	0.02 ppm	1000 ppm	
	Th	0.1 ppm	2000 ppm	
	Ti	0.001 %	5 %	
	Tl	0.02 ppm	1000 ppm	
	U	0.1 ppm	2000 ppm	
	V	1 ppm	10000 ppm	
	W	0.1 ppm	100 ppm	
	Zn	0.1 ppm	10000 ppm	
+ PGM	Pt Pd, add-on			$2.35

*Detection limit = 1 ppm for 15/30 g analysis.

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	CAD
AQ250-EXT	Extended Pkg, 53 elements, 0.5 g			$24.75
AQ251-EXT	Extended Pkg, 53 elements, 15 g			$29.50
AQ252-EXT	Extended Pkg, 53 elements, 30 g			$34.25
	Be	0.1 ppm	1000 ppm	
	Ce	0.1 ppm	2000 ppm	
	Cs	0.02 ppm	2000 ppm	
	Ge	0.1 ppm	100 ppm	
	Hf	0.02 ppm	1000 ppm	
	In	0.02 ppm	1000 ppm	
	Li	0.1 ppm	2000 ppm	
	Nb	0.02 ppm	2000 ppm	
	Pd	10 ppb	100000 ppb	
	Pt	2 ppb	100000 ppb	
	Rb	0.1 ppm	2000 ppm	
	Re	1 ppb	10000 ppb	
	Sn	0.1 ppm	100 ppm	
	Ta	0.05 ppm	2000 ppm	
	Y	0.01 ppm	2000 ppm	
	Zr	0.1 ppm	2000 ppm	

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	CAD
+ REE	Rare Earth, add-on			$6.95
	Dy	0.02 ppm	2000 ppm	
	Er	0.02 ppm	2000 ppm	
	Eu	0.02 ppm	2000 ppm	
	Gd	0.02 ppm	2000 ppm	
	Ho	0.02 ppm	2000 ppm	
	Lu	0.02 ppm	2000 ppm	
	Nd	0.02 ppm	2000 ppm	
	Pr	0.02 ppm	2000 ppm	
	Sm	0.02 ppm	2000 ppm	
	Tb	0.02 ppm	2000 ppm	
	Tm	0.02 ppm	2000 ppm	
	Yb	0.02 ppm	2000 ppm	
+ ISO	Lead Isotope, add-on			$14.35

CARBON & SULPHUR ANALYSIS

CODE	DESCRIPTION	DETECTION LIMIT	UPPER LIMIT	CAD
TC000	Leco – C	0.02 %	50 %	$20.00
	Leco – S	0.02 %	20 %	
	Surcharge samples > 20% (S)	20 %	50 %	+ $7.30
TC000-C	Leco – Total C	0.02 %	100 %	$17.00
TC005	Graphite C	0.02 %	20 %	$33.00
TC006	Inorganic Carbon, (Direct CO_2 evolution Leco analysis)	0.08 %	100 %	$20.00
TC007	Organic C (TC000-C, TC005, TC006)	0.02 %	100 %	$31.75
TC000-S	Leco – Total S	0.02 %	20 %	$15.00
	Surcharge samples > 20% (S)	20 %	50 %	+ $7.30
TC008	Sulphate – Leco after ignition	0.05 %	100 %	$25.00
TC009	Sulphide – (TC000-S, TC008)	0.05 %	100 %	$26.25
TC508	Sulphate – gravimetric	0.05 %	100 %	$30.00
TC901	Elemental S	0.01 %	14 %	$33.00

Requires at least 5 g per sample.

XRF

X-ray fluorescence analysis on fused discs is an excellent method for the determination of whole rock major elements, as well as some minor elements. It is the preferred method for iron ore, bauxite, Ni-laterites, and phosphate ores. Bureau Veritas also offers a specific XRF method for the determination of major elements, plus sub-percent to high-grade Cu, Pb, and Zn ore concentrations.

WHOLE ROCK MAJOR OXIDES

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	CAD
XF700	Standard Package, 15 elements			$36.75
	SiO_2	0.01 %	100.0 %	
	Al_2O_3	0.01 %	100.0 %	
	Fe_2O_3	0.01 %	100.0 %	
	CaO	0.01 %	100.0 %	
	MgO	0.01 %	100.0 %	
	Na_2O	0.01 %	15.0 %	
	K_2O	0.01 %	15.0 %	
	MnO	0.01 %	50.0 %	
	TiO_2	0.01 %	20.0 %	
	P_2O_5	0.01 %	40.0 %	
	Cr_2O_3	0.01 %	10.0 %	
	Ba	0.01 %	58.8 %	
	LOI	0.1 %	100.0 %	
	SO_3	0.002 %	10.0 %	
	Sr	0.002 %	1.5 %	
XF702	Standard Package including TC000 (C & S)			$41.85

Requires at least 12 g per sample.

BAUXITE

CODE	ELEM	DETECTION LIMIT	UPPER LIMIT	CAD
XF701	Bauxite Package, 17 elements			$41.50
	SiO_2	0.01 %	100.0 %	
	Al_2O_3	0.01 %	100.0 %	
	Fe_2O_3	0.01 %	100.0 %	
	CaO	0.01 %	50.0 %	
	MgO	0.01 %	40.0 %	
	Na_2O	0.01 %	8.5 %	
	K_2O	0.01 %	15.0 %	
	MnO	0.01 %	50.0 %	
	TiO_2	0.01 %	10.0 %	
	P_2O_5	0.001 %	40.0 %	
	Cr_2O_3	0.004 %	10.0 %	
	BaO	0.01 %	10.0 %	
	ZnO	0.002 %	1.0 %	
	ZrO_2	0.01 %	1.5 %	
	V_2O_5	0.002 %	10.0 %	
	SO_3	0.01 %	3.5 %	
	LOI	0.1 %	100.0 %	