



# FLORIN ANALYTICAL SERVICES

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## 2023 Fee Schedule

Florin Analytical Services (FAS), a department of Kappes, Cassidy & Associates (KCA), is committed to providing the highest quality in assaying expertise. The knowledgeable staff at Florin Analytical Services, has extensive experience in both precious metals and industrial metals industries. Rigorous quality assurance practices and regular participation in national and international testing programs ensure that quality assays are provided to our clients.

Florin Analytical Services, provides sample preparation services, wet chemistry and fire assay analyses. Florin Analytical Services works in tandem with the Kappes, Cassidy & Associates metallurgical testing laboratory. This alliance provides our clients not only with quality analyses but with full laboratory metallurgical testing capabilities.

This **2023 Fee Schedule** provides an abbreviated list of the assaying services available at Florin Analytical Services. All pricing is in United States Dollars (USD). The minimum charge per submittal is \$400.00. If you are planning a large project please contact us for special pricing. Rush service may be available for an additional cost. Payment is required when samples are submitted unless other arrangements have been made in advance. Please note that there is a 4.5% surcharge added to any credit card transactions. Additional information may be obtained at our web page, [www.florinanalytical.com](http://www.florinanalytical.com), by email at [fas@florinanalytical.com](mailto:fas@florinanalytical.com) or phone at 775-677-2177.

Florin Analytical Services is committed to providing quality results in a timely manner. Typical turnaround time is seven to ten (7-10) working days. Recognizing that a quality program sometimes requires additional time, FAS will carefully review each submittal in conjunction with the necessary procedures and will then develop a time line that meets the needs of our client and results in quality analyses. Following our quality assurance reviews, analytical results will be provided by e-mail unless other reporting methods are arranged.

FAS will take all reasonable precautions to protect samples during analyses and storage but will not incur liability for loss, deterioration or damage from any cause whatsoever. FAS reserves the right to charge any and all costs associated with sample (pulp and/or reject material) return to the client or disposal in accordance with state regulations.

# Sample Preparation

<u>Item Number and Description</u>	<u>Price/sample</u>
MINIMUM	\$ 400.00
Surcharge for all credit card transactions	4.5%
RUSH Double normal rate (RUSH turnaround time, if available, is 3-5 business days, plus 1 additional day if drying samples is required.)	x2
1000 Drying, 0 to 5 kg, includes weight received, dry weight and moisture content	\$ 30.00
1001 Crushing, splitting, pulverizing, 0 to 5 kg	\$ 40.00
1002 Crushing, splitting, pulverizing, per kg for samples over 5 kg	\$ 7.00
1003 Re-blending pulps (250 grams)	\$ 7.00
1004 Pulverizing only (250 grams)	\$ 15.00
1005 Prepare second split from reject in storage	\$ 7.00
1006 Drying, 0 to 5 kg	\$ 15.00
1008 Compositing charge (per kg)	\$ 7.00
1009 Sample Preparation, special, per hour	\$ 130.00
1010 Prepare pulp from previously dried & crushed reject (250 grams)	\$ 15.00
1200 Screen analysis, dry, per sieve (up to 1000 grams)	\$ 130.00
1202 Screen analysis, wet, per sieve (up to 1,000 grams)	\$ 195.00



# Fire Assay

## Gold/Silver

<u>Item Number and Description</u>	<u>Price/sample</u>
4000 Gold, 1 AT, gravimetric finish	\$ 45.00
4001 Silver, 1 AT, gravimetric finish	\$ 45.00
4002 Gold and silver, 1 AT, gravimetric finish	\$ 65.00
4008 Gold, 1 AT, AAS finish	\$ 40.00
4009 Gold and silver, 5 AT, gravimetric or AAS finish (5 - 1 AT assays, beads combined for finish)	\$ 500.00
4010 Gold, concentrate, high grade assay, gravimetric finish	\$ 130.00
4011 Silver, concentrate, high grade assay, gravimetric finish	\$ 130.00
4012 Gold and silver, concentrate, high grade assay, gravimetric finish	\$ 200.00
4013 Gold and silver, 2 AT, gold AAS finish, silver gravimetric finish	\$ 110.00
4014 Gold and silver, 50g, gold AAS finish, silver gravimetric finish	\$ 105.00
4015 Gold and silver, 1 AT, gold AAS finish, silver, gravimetric finish	\$ 105.00
4016 Gold, 2 AT, gravimetric or AAS finish	\$ 105.00
4017 Gold and silver, in triplicate, doré filings, gravimetric finish	\$ 400.00
4018 Gold, 50g, AAS finish	\$ 55.00
4061 New crucible fee, additional cost per assay if requested	\$ 7.00
4020 Carbon, gold and silver, w/roast, gravimetric finish	\$ 65.00
4021 Carbon, settlement gold and silver, 5X, w/ roast, gravimetric finish	\$ 400.00
4022 Carbon, high grade gold and silver, w/roast, gravimetric finish	\$ 105.00

<u>Item Number and Description</u>	<u>Price/sample</u>
4032 Bullion analysis, triplicate with proof, gold and silver, gravimetric finish	\$ 925.00
4045 Bullion analysis, triplicate with proof, gold, gravimetric finish	\$ 800.00
4060 Metallic screen assay, 1000 gram (limiting screen 150 mesh), 1x - plus fraction & 4x - minus fraction, gravimetric finish or AAS depending on doré weight	\$ 400.00

## Platinum/Palladium

<u>Item Number and Description</u>	<u>Price/sample</u>
5000 1 AT, platinum, ICP-OES finish	\$ 200.00
5001 1 AT, palladium, ICP-OES finish	\$ 200.00
5002 High grade, platinum and palladium, with slag re-fire, ICP-OES finish	\$ 330.00
5003 High grade, platinum, with slag re-fire, ICP-OES finish	\$ 265.00
5004 High grade, palladium, with slag re-fire, ICP-OES finish	\$ 265.00
5006 1 AT, Platinum and palladium in duplicate (trace), ICP-OES finish	\$ 330.00

## Cyanide/ DIBK

<u>Item Number and Description</u>	<u>Price/sample</u>
6005 Hot cyanide, gold and/or silver (80 degree Celsius, 15g/30ml, 1 hr leach)	\$ 45.00
6007 Cyanide soluble gold, silver and copper, 24 hour shake	\$ 40.00
6008 Cyanide soluble gold, 24 hour shake	\$ 30.00
6009 Cyanide soluble gold and silver, 24 hour shake	\$ 35.00
6010 Gold Preg Robbing Determination (Requires 6007, 6008 or 6009)	\$ 45.00
6011 DIBK Extraction for gold	\$ 180.00

# Process Solution

<u>Item Number and Description</u>	<u>Price/sample</u>
2045 Gold, AAS	\$ 25.00
2044 Silver, AAS	\$ 25.00
2015 Copper, AAS	\$ 25.00
5005 Platinum and palladium, ICP-OES	\$ 65.00
2072 Multi-element package, ICP-OES, AAS (See 7045 for elements)	\$ 35.00
2073 Multi-element plus toxics, ICP-OES, AAS & CVAAS (See 7060 for elements)	\$ 55.00
2083 Multi-element premium package, ICP-OES, AAS & CVAAS (See 7065 for elements)	\$ 100.00
2084 Rare Earth Element, ICP-OES (See 7079 for elements)	\$ 200.00
2085 Multi-element analysis on cyanide solution after 24 hr. shake, ICP-OES	\$ 100.00

## Multi-Element ICP-OES

<u>Item Number and Description</u>	<u>Price/sample</u>
7045 Multi-element package, 4-acid digestion, ICP-OES	\$ 40.00
7060 Multi-element plus toxics, 2- & 4-acid digestion, ICP-OES & CVAAS	\$ 70.00
7065 Multi-element premium package, 2- & 4-acid digestion, ICP-OES & CVAAS	\$ 145.00
7079 Rare earth elements (REEs), 4-acid digestion, ICP-OES	\$ 265.00
7046 Whole rock, major oxide analysis, includes loss on ignition (LOI), lithium metaborate (LMB) fusion, ICP-OES	\$ 85.00

See the following page for details and discussion of each ICP multi-element package listed above.

Package	Digest	Finish	Units	Analyte
Multi-element FAS# 7045 <sup>a</sup>	4-acid	ICP-OES	mg/kg & %	Ag, Al, As, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Sr, Ti, V, W, Zn
Multi-element plus Toxics FAS# 7060 <sup>b</sup>	4-acid + 2-Acid	ICP-OES + CVAAS Hg	mg/kg & %	Ag, Al, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Sr, Ti, V, W, Zn, As, Bi, Sb, Se, Te, Hg
Multi-element premium FAS# 7065 <sup>c</sup>	4-acid + 2-Acid	ICP-OES + CVAAS Hg	mg/kg & %	Ag, Al, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Sr, Ti, V, W, Zn, As, Bi, Sb, Se, Te, Hg, w/ additional Be, La, Li, P, Sc, Sn, Ta, Tl, U
REE FAS# 7079 <sup>d</sup>	4-acid	ICP-OES	mg/kg & %	Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Tm, Y, Yb
Whole Rock FAS# 7046 <sup>e</sup>	LMB Fusion	ICP-OES	%	Al <sub>2</sub> O <sub>3</sub> , BaO, CaO, Cr <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , K <sub>2</sub> O, MgO, MnO, Na <sub>2</sub> O, P <sub>2</sub> O <sub>5</sub> , SiO <sub>2</sub> , SrO, TiO <sub>2</sub> , LOI

7045<sup>a</sup>, uses a 4-acid (HCl, HNO<sub>3</sub>, HF & H<sub>2</sub>O<sub>2</sub>) digest which, for most samples, provides a near total digestion and is especially effective for refractory elements like Al & Ti.

7060<sup>b</sup>, includes the elements offered in 7045, plus six "toxic" elements: As, Bi, Hg, Sb, Se and Te (As and Bi are ran with the 2-acid digestion in this package). To determine the "toxic" elements, samples are digested in 2-acid Aqua Regia (1:3, HNO<sub>3</sub>: HCl), since these elements are partially volatile in the 4-acid, higher temperature digest. Mercury (Hg) is determined by CVAAS, with all other elements determined by ICP-OES. At elevated concentrations these elements are often considered toxic in the environment.

7065<sup>c</sup>, uses both 2- and 4-acid digestions and includes all the elements in 7045 and 7060 plus Be, La, Li, P, Sc, Sn, Ta, Tl and U using AAS or ICP-OES as appropriate. A modified lithium metaborate fusion may be used for Sn and Ta.

7079<sup>d</sup>, uses a 4-acid digestion for the determination of the rare earth elements (REE).

7046<sup>e</sup>, uses a lithium metaborate (LMB) fusion with ICP-OES finish for a total mineral digestion without the volatilization of silicon which occurs during the 4-acid digestion. This method is used to determine the major element oxides for rocks and ores and when combined with Loss on Ignition (LOI) should total 100 ± 0.5%.



# Elemental Assays

## Individual Element Assay

<u>Item Number and Description</u>	<u>Price/sample</u>
7001 Aluminum, 4-acid digestion, ICP-OES	\$ 35.00
7047 Antimony, 2-acid digestion, ICP-OES	\$ 30.00
7002 Arsenic, 2-acid digestion, ICP-OES or AAS	\$ 30.00
7003 Barium, lithium metaborate fusion, ICP-OES	\$ 75.00
7004 Beryllium, 4-acid digestion, ICP-OES	\$ 35.00
7005 Bismuth, 2-acid digestion, ICP-OES	\$ 30.00
7006 Boron, sodium peroxide fusion, ICP-OES	\$ 155.00
7007 Cadmium, 4-acid digestion, ICP-OES	\$ 35.00
7008 Calcium, 4-acid digestion, ICP-OES	\$ 35.00
7010 Carbon (total), LECO	\$ 30.00
7011 Carbon (organic), difference of total carbon and inorganic carbon	
7012 Carbon (inorganic), roast at 510°C, LECO	\$ 45.00
7091 Carbon (inorganic), difference of total and 25% HCl leach organic carbon	
7092 Carbon, (organic), 25% HCl leach, LECO	\$ 50.00
7093 Carbon, Graphitic, Roast/25% HCl leach, LECO	\$ 55.00
7076 Cerium, 4-acid digestion, ICP-OES	\$ 35.00
7055 Chloride, nitric acid dissolution, ISE	\$ 65.00
7013 Chromium, 4-acid digestion, ICP-OES	\$ 35.00

## Individual Element Assay Continued

7014	Cobalt, 4-acid digestion, ICP-OES or AAS	\$ 35.00
7015	Copper, 4-acid digestion, ICP-OES or AAS	\$ 20.00
7051	Fluoride, sodium peroxide fusion, ISE	\$ 155.00
7053	Gallium, 4-acid digestion, ICP-OES	\$ 165.00
7054	Germanium, 4-acid digestion, ICP-OES	\$ 165.00
7067	Hafnium, 4-acid digestion, ICP-OES	\$ 165.00
7068	Indium, 4-acid digestion, ICP-OES	\$ 165.00
7017	Iron, 4-acid digestion, ICP-OES or AAS	\$ 20.00
7077	Lanthanum, 4-acid digestion, ICP-OES	\$ 35.00
7018	Lead, 4-acid digestion, ICP-OES or AAS	\$ 20.00
7019	Lithium, 4-acid digestion, ICP-OES or AAS	\$ 35.00
7021	Magnesium, 4-acid digestion, ICP-OES	\$ 35.00
7022	Manganese, 4-acid digestion, ICP-OES	\$ 35.00
7023	Mercury, 2-acid digestion, CVAAS or ICP-OES	\$ 45.00
7024	Mercury on carbon, 2-acid digestion, CVAAS or ICP-OES	\$ 45.00
7025	Molybdenum, 4-acid digestion, ICP-OES	\$ 35.00
7026	Nickel, 4-acid digestion, ICP-OES or AAS	\$ 35.00
7069	Niobium, 4-acid digestion, ICP-OES	\$ 165.00
7027	Phosphorus, lithium metaborate fusion, ICP-OES	\$ 75.00
7028	Potassium, 4-acid digestion, ICP-OES	\$ 35.00



## Individual Element Assay Continued

7064	Rhenium, 4-acid digestion, ICP-OES	\$ 165.00
7090	Scandium, 4- acid digestion, ICP-OES	\$ 35.00
7029	Selenium, 2-acid digestion, ICP-OES	\$ 30.00
7030	Silicon, lithium metaborate fusion, silicon, ICP-OES	\$ 75.00
7048	Silver, 4-acid digestion, ICP-OES or AAS	\$ 20.00
7031	Sodium, 4-acid digestion, ICP-OES	\$ 35.00
7033	Strontium, 4-acid digestion, ICP-OES	\$ 35.00
7034	Sulfur (total), LECO	\$ 30.00
7035	Sulfur (sulfide), difference of total and sulfate sulfur	
7036	Sulfur (sulfate), roast at 650°C, LECO	\$ 45.00
7094	Individual Element, Sulfur, 25% HCl insoluble (sulfide) - LECO	\$ 55.00
7057	Tantalum, lithium metaborate fusion, ICP-OES	\$ 75.00
7038	Tellurium, 2-acid digestion, ICP-OES	\$ 35.00
7039	Tin, lithium metaborate fusion, ICP-OES	\$ 75.00
7037	Titanium, 4-acid digestion, ICP-OES	\$ 35.00
7041	Tungsten, 4-acid digestion and/or lithium metaborate fusion, ICP-OES	\$ 75.00
7042	Vanadium, 4-acid digestion, ICP-OES	\$ 35.00
7074	Yttrium, 4-acid digestion, ICP-OES	\$ 35.00
7043	Zinc, 4-acid digestion, ICP-OES or AAS	\$ 20.00
7044	Zirconium, lithium metaborate fusion, ICP-OES	\$ 75.00

# Miscellaneous Assays

## Surcharge Fees

7080	Lead Concentrate, >10% Pb	\$ 125.00
7082	Zinc Concentrate, >10% Zn	\$ 125.00
7084	Copper Concentrate, >10% Cu	\$ 125.00
7086	Mercury Concentrate, >10% Hg	\$ 150.00

## Other Rates

9501	Chemist, per hour	\$ 210.00
9502	Laboratory technician, per hour	\$ 130.00
9504	Cost for custom assay work, per hour (4 hour minimum)	\$ 210.00

## Explanation of Abbreviations

½ AT – one half assay ton (14.59g)

1 AT – one assay ton (29.17g)

2 AT – two assay ton (58.34g)

5 AT – five assay ton (145.85g)

AAS – atomic absorption spectrometer

CVAAS – cold vapor, atomic absorption spectrometer

HCl – hydrochloric acid

HF – hydrofluoric acid

H<sub>2</sub>O<sub>2</sub> – hydrogen peroxide

HNO<sub>3</sub> – nitric acid

ICP-OES – inductively coupled plasma, optical emission spectrometer

ISE – ion selective electrode

LECO – LECO brand, high temperature induction furnace with infrared detection

ORP – oxidation-reduction potential

pH – potential of hydrogen, a numeric scale to determine the acidity or alkalinity of a solution