



Laboratory Services Fee Schedule

Effective: January 1, 2018

Chemical Analysis
Problem Solving
Research
Consultation
Method Development
Instrument Development

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ABOUT HUFFMAN HAZEN LABORATORIES

Huffman Hazen Laboratories, Inc. has been providing chemical microanalytical services to industrial, academic and governmental scientists since our inception in 1936. The foundation of excellence and integrity forged during those early years propelled this family owned and operated independent laboratory into the forefront of elemental analysis in the 21st century. Today we routinely analyze for most of the elements in the periodic table in a wide variety of matrices, including:

- ◆ Environmental samples – water, soil, air, sediment, biota, sampling filters and traps
- ◆ Geologic samples – rocks, minerals, ores and process samples
- ◆ Synthesized organics, organo-metallics, and inorganic samples
- ◆ Biomass – plant and animal tissues and extracts
- ◆ Petroleum products and derivatives
- ◆ Pulp and paper related materials
- ◆ Coal and coal derived materials
- ◆ Industrial process samples
- ◆ Oil shale and shale oil
- ◆ Natural products
- ◆ Humic materials
- ◆ Biomedical
- ◆ Pilot Plants

AFFILIATIONS AND ACCREDITATIONS

Huffman Hazen Laboratories is a member of and subscribes to the ethical principles of the American Council of Independent Laboratories. Our senior staff has served a variety of professional organizations, including ACIL, ACS, and SAS. We have served as Task Group chairs for Standard Methods and ASTM. We are licensed by USDA Animal and Plant Health Inspection Service to receive and process soil samples. The Colorado Department of Public Health and Environment certifies us for drinking water analyses for organic carbon, trace metals, nitrate, nitrite, and fluoride. We participate in multiple client sponsored interlaboratory performance studies including the U.S. Geological Survey (Analytical Evaluation Program for Standard Reference Samples), consensus organizations such as ASTM and commercial standards organizations such as ERA. We are listed among laboratories providing sample certification data on Certificates of Analyses for Standard Reference Materials for NIST and other SRM providers. We are certified by the U.S. Geological Survey for the analysis of very low-level determination of metals in natural surface waters.

TABLE OF CONTENTS

Analytical Services

Analysis for Metals and other Elements.....5

Analysis for Organic Carbon.....4, 6

Analysis for Organic Halogen.....6

Coal, Biomass, and Refuse Derived Fuels Analysis7

Custom Analysis and Consultation7

Elemental Microanalysis4

Elemental Speciation5, 7

Ion Chromatography.....4

Other Determinations4

Paper Pulping (Kraft Process) Liquors and Solids.....7

Sample Preparation.....3, 5

Soil Analysis7

Special Handling.....3

Specialty Carbon Analysis.....7

Water Analysis6

Ordering Information

Analysis Reports.....8

General Ordering Information, Pricing Policy, Payment, Terms, Minimum Charges.....8

Priority Service.....3

Replicate Analysis3

Quality Assurance / Quality Control.....3

Quotations, Discount Pricing Policy.....8

Sample Quantity Required, Sample Storage, Return and Disposal8

PRIORITY SERVICE

Routine analyses are normally reported within 10-15 working days. Samples arriving after 2:00 p.m. Mountain Time are logged into our system on the following business day.

When our analysis load permits, priority services are available for an additional charge. These services do not guarantee results within the number of days specified as some procedures or combinations of procedures require additional time. Priority service does insure that your samples will be prioritized over standard service samples. **Priority services require prior arrangement to insure availability.** Projects requiring exceptional levels of effort (e.g. same-day turnaround), if available, may be subject to additional surcharges.

HIGH PRIORITY100% surcharge
Results are delivered by phone, FAX, or email, typically within 2 working days after sample receipt.

PRIORITY50% surcharge
Results are delivered by phone, FAX, or email, typically within 5 working days after sample receipt.

QUALITY ASSURANCE/QUALITY CONTROL

We maintain a QA/QC program to assure reliable results. We maintain a supply of certified standard reference materials for a wide variety of matrices and analytes, which allows us to provide better matching between reference material and samples. In many cases, we have alternate methods that can be used to confirm values obtained by our standard methods. Our results are very reliable, but we encourage customers to contact us if data does not meet expectations. Since quality is very important to us, we will, within reason, verify results at no additional charge.

Quality control (QC) data is available as a part of your report at an additional charge. These data normally include associated raw data, including adjacent blank, control values, and replicates associated with your sample(s). Contact Huffman Hazen Laboratories for information on customized data deliverables and QA/QC packages.

QA/QC Data Reporting25% surcharge
 (\$50.00 minimum)

REPLICATE ANALYSES

Replicate analyses are usually charged at the multiple of the normal rate of a single analysis. Some services have special rates for duplicate or higher level replicate analyses and are listed in the fee schedule. Please contact us.

SPECIAL HANDLING (2 samples per test minimum charge)†

Dry Nitrogen Transfer (per sample per analysis)\$12.00
 Hazardous Material Handling (requires special personal protective equipment or monitoring)..... inquire

SAMPLE DRYING AND GRINDING (2 samples per test minimum charge)†

Drying (set time period, no loss reported)\$10.00
 Drying (loss reported)25.00
 Drying (constant weight, loss reported).....40.00
 Vacuum Drying Surcharge.....10.00
 Grinding / Homogenizing..... 25.00 (minimum)

SAMPLE RETURN

See page 8 for sample retention, return and disposal policies, and charges.

We are licensed by the USDA Animal and Plant Health Inspection Service to ship, receive, and dispose of unsterilized soil from foreign sources or domestically quarantined areas. **Please contact us for a copy of our permit before shipment.**

Treatment and disposal of samples and containers handled under this permit... \$50.00 (minimum per sample batch)

†Quantity discounts are available. Refer to the MINIMUM CHARGES and DISCOUNT PRICING sections on page 8 for more information.

ELEMENTAL MICROANALYSIS (typically 0.1 to 100%) (2 samples per test minimum charge)†

Carbon and Hydrogen	\$28.00
Carbon, Hydrogen and Nitrogen.....	40.00
Hydrogen.....	25.00
Nitrogen (instrumental Dumas)	25.00
Nitrogen (Kjeldahl).....	50.00
Oxygen.....	40.00
Oxygen (Merz) in the presence of reducible metals or phosphorus	60.00
Phosphorus	see Analysis for Metals and Other Elements
Sulfur.....	30.00
Halogens	
Chlorine.....	45.00
Bromine	60.00
Fluorine.....	60.00
Iodine	60.00
Ash	30.00
Sulfated Ash	40.00
Carbonate Carbon	30.00
Total Carbon	25.00
Total Organic Carbon by Difference (includes Total and Carbonate Carbon determinations)	45.00
Total Organic Carbon by Acidification	45.00
Water, Loss on Drying.....	see SAMPLE DRYING AND GRINDING (page 3)
Other Analyses.....	inquire

TRACE ELEMENTAL ANALYSIS (typically below 0.1%) (5 samples per test minimum charge)†

In many matrices we can determine elements such as C, N, S, P, and halogens to ppm levels or below. Some of the options are given in METALS ANALYSIS, ORGANIC HALOGEN, OTHER DETERMINATIONS, and ORGANIC CARBON ANALYSIS sections. Because the detection limits and applicability of specific methods vary with matrix, please contact us with sample details and requirements.

OTHER DETERMINATIONS (5 samples per test minimum charge)†

Nitrogen (chemiluminescence detection to sub ppm levels).....	\$ 50.00
Basic Nitrogen.....	35.00
Sulfide + Sulfite (acid evolution/coulometry).....	45.00
Free Sulfur (S ^o).....	inquire for applicable method
Density/Specific Gravity (solids)	inquire for applicable method
Density/Specific Gravity (liquid)	25.00
Flash Point (closed cup Pensky-Martens).....	60.00
Melting Point (300° C maximum)	60.00
Molecular Weight - single point by Vapor Pressure Osmometry.....	100.00
Molecular Weight - 4 point by Vapor Pressure Osmometry (2 sample minimum charge).....	300.00
Water, Karl Fischer direct injection (add \$15.00 surcharge for solvent dilution).....	35.00
Water, Karl Fischer (furnace drying, purging water into K.F. titrator).....	50.00
Custom analyses	inquire

ION CHROMATOGRAPHY (IC) (5 samples per test minimum charge)†

Sample preparation charges may apply. See *Sample Preparation for Metals Analysis*

Quantitative Anion Determination (F ⁻ , Cl ⁻ , Br ⁻ , I ⁻ , NO ₂ ⁻ , NO ₃ ⁻ , SO ₄ ⁼ , SO ₃ ⁼ , S ₂ O ₃ ⁼ , PO ₄ ⁻³)	
IC sample setup	45.00
Each anion	25.00
IC Anion Scan (Cl ⁻ , Br ⁻ , NO ₃ ⁻ , SO ₄ ⁼ , PO ₄ ⁻³)	140.00
Other Ions (organic acids, SCN ⁻ , oxyhalides, cations, etc.)	inquire

†Quantity discounts are available. Refer to the MINIMUM CHARGES and DISCOUNT PRICING sections on page 8 for more information.

ANALYSIS FOR METALS AND OTHER ELEMENTS

(5 samples per test minimum charge)[†]

We determine many elements by various forms of atomic spectroscopy as well as colorimetric, gravimetric, titrimetric, or other procedures. Please inquire as to the best approach for your specific samples and analytical requirements.

Sample Preparation for Metals Analysis

Solids and often water or wastewater samples require digestion or other sample preparation prior to analysis. Because each matrix type normally requires a minimum of a blank, a duplicate and a reference standard and/or spike to assure quality analysis, there is a **minimum preparation and determination charge of five (5) samples per test per matrix.**

Analysis for metals generally involves introduction of an aqueous solution into our atomic spectroscopy instrumentation. The result of any analysis is no better than the viability of the sample solution presented to the instrument. Our knowledge and experience in the decomposition and dissolution of a wide variety of materials ranging from oils, polymers, and biological tissues to complex alloys, minerals, and ceramics allows us to provide quantitative results for virtually all sample matrices. If necessary, the sample is dried, ground, and homogenized prior to various acid digestion or high temperature fusion techniques to put the elements of interest into solution. Not all elements can be solubilized and maintained in solution from a single decomposition. Specific matrix and analyte combinations may require two or more different decompositions. By providing us with as much information as possible about your samples at the time of submittal, we are able to choose preparations appropriate for your sample matrix and analyte combinations at minimized time, cost, and consumption of sample material.

Single or mixed acid digestion.....	\$ 35.00
Single or mixed acid digestion including hydrofluoric acid.....	50.00
High temperature fusion with acid dissolution.....	50.00
Water leach (specify wt/vol, time, temperature, agitation).....	30.00
Thermal ashing prior to decomposition procedures.....	30.00
Oxygen bomb or oxygen flask combustion.....	40.00
Filtering.....	20.00 (minimum)

Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES)

ICP-AES sample setup.....	\$ 30.00
Each element (in same solution).....	10.00
ICP-AES Scan for approximately 30 elements (in single solution).....	260.00

Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Most elements from atomic mass 6 to mass 238 can be determined by this technique. In clean matrices such as deionized water, detection limits are sub parts per billion (µg/l) for the majority of elements. Quantifiable elements and actual detection limits vary with sample matrix and required sample decompositions. Our ICP-MS capabilities include both reaction and collision cell technology. This allows for the elimination of isobaric ICP-MS interferences for a variety of elements, providing lower detection limits and improved precision and accuracy.

ICP-MS sample setup.....	\$ 80.00
Each element (in the same solution).....	10.00
ICP-MS Scan for approximately 60 elements (in a single solution).....	410.00
ICP-MS and ICP-AES Scan (in a single solution).....	470.00
Bromine and Iodine by ICP-MS (not included in scans – requires separate sample preparations)	
First element.....	90.00
Second element (in the same solution).....	10.00
Mercury by ICP-MS.....	90.00
Isotope Ratio or Isotope Dilution by ICP-MS.....	inquire

Atomic Absorption (AA)

Mercury by Cold Vapor (CVAA - includes digestion).....	75.00
Mercury by Direct Combustion - Cold Vapor AA.....	75.00

[†]Quantity discounts are available. Refer to the MINIMUM CHARGES and DISCOUNT PRICING sections on page 8 for more information.

WATER ANALYSIS

(5 samples per test minimum charge) †

Acidity	\$30.00	pH	20.00
Alkalinity (Total as CaCO ₃)	25.00	Phosphorus, Ortho-Phosphate	see IC
Alkalinity (OH ⁻ , CO ₃ ⁼ , HCO ₃ ⁻ , Total)	35.00	Phosphorus, Total	see ICP-AES
Bromide.....	see IC or ICP-MS	Silica, Dissolved (as SiO ₂).....	40.00
Carbon Dioxide.....	30.00	Solids, Dissolved (TDS).....	40.00
Chloride by Titration (also see IC)	40.00	Solids, Suspended (TSS).....	40.00
Conductance, Specific.....	20.00	Solids, Total (TS).....	30.00
Fluoride by ISE (also see IC)	40.00	Solids, Volatile (TVS - requires TS).....	30.00
Hardness (EDTA).....	40.00	Sulfur, Total.....	see ICP-AES
Iodide.....	see IC or ICP-MS	Sulfur, Sulfate (SO ₄ ⁼)	see IC
Metals.....	see METALS ANALYSIS	Sulfur, Sulfide (S ⁼)	50.00
Nitrogen, Ammonia (NH ₄ ⁺)	40.00	Sulfur, Sulfite (SO ₃ ⁼)	see IC
Nitrogen, Nitrate (NO ₃ ⁻)	see IC	Sulfur, Thiosulfate (S ₂ O ₃ ⁼)	see IC
Nitrogen, Nitrite (NO ₂ ⁻)	see IC	Thiocyanate (SCN ⁻)	inquire
Nitrogen, Total Kjeldahl (TKN).....	50.00	Turbidity.....	30.00
Nitrogen, Total (chemiluminescence).....	50.00	UV absorbance.....	40.00

Water or wastewater samples may require filtration, digestion or other sample preparation prior to analysis in compliance with certain methods and protocols. See the Sample Preparation for Metals Analysis section for applicable charges.

ANALYSIS FOR ORGANIC HALOGEN (Cl+Br+I reported as Cl)

(2 samples per test minimum charge) †

	Matrix	Single Analysis	Duplicate Analysis
Total Organic Halogen (TOX)	water.....	\$80.00	\$120.00*
Extractable Organic Halogen (EOX)	soil.....	80.00	120.00
Total Halogen (TX)	any	80.00	120.00

*Duplicate analysis required for EPA SW-846-9020

ANALYSIS FOR ORGANIC CARBON⁽¹⁾

(2 samples per test minimum charge) †

	Matrix	Single Analysis	Duplicate Analysis	Quad Analysis
Total Organic Carbon (TOC)	water.....	\$30.00	\$55.00	\$ 90.00
Trace Total Organic Carbon (TOC) ⁽²⁾	water.....	40.00	65.00	100.00 ⁽³⁾
Dissolved Organic Carbon (DOC)Add \$20.00 filtering charge per filtration to TOC or trace TOC charge			
Total Organic Carbon by Difference	soil.....	45.00	80.00	135.00
Total Organic Carbon by Acidification ⁽⁴⁾	soil.....	45.00	80.00	135.00
Colorado State Drinking Water Package for TOC ⁽⁵⁾ (minimums do not apply to packages)			175.00
Colorado State Drinking Water Package for SUVA ⁽⁶⁾ (minimums do not apply to packages)			180.00
Certified Clean TOC Bottles (per bottle)				3.00 (Plus \$10.00 minimum shipping charge)

- (1) Several different TOC methods are available for both liquids and solids, including high temperature combustion for micro and macro solid samples as well as water samples. Hot persulfate and uv-promoted persulfate methods are available for trace TOC in water.
- (2) Trace implies a detection limit below 1 mg/l (usually 0.05 mg/l).
- (3) Quadruplicate analyses required for EPA SW-846-9060.
- (4) Lloyd Kahn EPA Method
- (5) The TOC and SUVA packages include certified sampling bottles, cooler, field blank, fortified sample and laboratory QC and reporting on forms as required by the State of Colorado for sampling one treated and one untreated water source.
- (6) For State of Colorado reporting, SUVA package requires TOC package.

†Quantity discounts are available. Refer to the MINIMUM CHARGES and DISCOUNT PRICING sections on page 8 for more information.

COAL, BIOMASS, AND REFUSE DERIVED FUELS ANALYSIS (2 samples per test minimum charge)†

Ash	\$ 30.00
Ash Analysis (Al ₂ O ₃ , CaO, Fe ₂ O ₃ , MgO, MnO, P ₂ O ₅ , K ₂ O, SiO ₂ , Na ₂ O, SO ₃ , TiO ₂) requires ashed sample.....	200.00
Gross Calorific Value, Heat of Combustion (BTU).....	50.00
Carbon Dioxide.....	30.00
Moisture	25.00
Proximate Analysis (Moisture, Ash, Volatile Matter, Fixed Carbon).....	90.00
Proximate, BTU, S.....	160.00
Sulfur, Total.....	30.00
Sulfur Forms (Total, Sulfate, Pyritic, and Organic).....	170.00
Sulfur Forms (Same sample as Ultimate).....	140.00
Ultimate (C, H, N, S, Ash, Moisture, O by Difference).....	110.00
Ultimate (C, H, N, S, Ash, Moisture, Direct O)	145.00
Ultimate, Proximate (O by Difference)	145.00
Ultimate, Proximate (Direct O).....	180.00
Ultimate, Proximate, BTU (O by Difference).....	190.00
Ultimate, Proximate, BTU (Direct O)	225.00
Volatile Matter	45.00
Other Analyses.....	inquire

Please contact us to discuss the applicability and pricing of any of the specialty analyses and services and as shown below, or other analytical requirements for which we may offer support.

GEOCHEMICAL / MINING ANALYSES

We routinely perform full scale analyses related to the discovery and extraction of a wide variety of commodity constituents from earth materials. We perform ultratrace analyses for baseline geochemical exploration and modeling in rock, soil, sediment, water and biota samples. In addition, we provide full analytical support for orebody evaluation, mineral beneficiation and recovery processes, concentrate and product purity, and site reclamation.

PAPER PULPING (KRAFT PROCESS) LIQUORS AND SOLIDS

We provide TAPPI and other analytical methods to the pulp and paper industry, including Elemental Analysis, ABC Titration, Active and Total Alkali, Hydroxide, Inerts, TAPPI Solids, Sulfur Species, Crude Tall Oil, etc.

SPECIALTY CARBON ANALYSIS

We use a programmable infrared furnace as well as conventional resistance furnaces to provide controlled temperature gradients up to 1000° C to allow us to monitor CO₂ evolution from the pyrolysis or combustion of various materials. These techniques are valuable for distinguishing between organic and elemental carbon, both in bulk samples and on surfaces.

CUSTOM ANALYSIS and CONSULTATION

We are equipped to handle a variety of specialized determinations, method development (including instrumental analysis, wet chemistry, spectroscopy, etc.), research and consultation. In many cases, a fixed price can be arranged for this type of work. Please inquire about our custom analysis and consulting capabilities.

†Quantity discounts are available. Refer to the MINIMUM CHARGES and DISCOUNT PRICING sections on page 8 for more information.

ORDERING INFORMATION

GENERAL

Please complete either our Analytical Services Request Form, (download from our website) or supply the following information. (Include copy with samples):

1. Purchase Order Number or credit card information.
2. Reporting and billing addresses.
3. Reporting phone, FAX and/or email address.
4. Street address for sample return.
5. Sample Identifications.
6. Analyses requested.
7. Information about the chemical structure and physical properties of all samples.
8. The expected levels and required detection limits of requested analytes.
9. Any hazards associated with the samples.
10. Sample disposal information (see below).

Samples arriving after 2:00 p.m. will be logged into our system on the next business day. Huffman Hazen Laboratories reserves the right to refuse to receive or analyze samples that are deemed to be unsafe to handle in our facilities or for any other reason.

SAMPLE QUANTITY REQUIRED

Except for some physical tests and water sample analyses, a few grams of sample are typically an adequate amount for most analyses. Most microchemical analyses (CHNO) require 2-20 mg of sample per determination.

Certain samples may require field preservation, cold shipment or other specialized handling to insure sample integrity and regulatory compliance.

Check with Huffman Hazen Laboratories to verify the sample quantities and/or handling requirements for analysis.

ANALYSIS REPORTS

Analysis reports are normally sent by first class mail. Upon request, reports will additionally be provided by telephone, FAX, or email at no additional charge. Most reports can be supplied in Excel format. Inquire about other custom electronic reporting formats and data deliverable requirements.

All results are held in strict confidence. Results will be released to a third party only if authorized by original client.

QUOTATIONS

Written quotations are available to secure pricing for projects and special analyses. These quotations are valid for 90 days unless otherwise noted. A copy of the quotation must accompany an order to insure proper billing for the analyses performed.

SAMPLE STORAGE, RETURN and DISPOSAL

All samples remain the property of the client.

Any unused portion of a sample will be returned unless the client certifies at the time of sample submittal that the sample can properly be disposed of in the municipal waste system (landfill or sewer). A fee of \$3.00 per sample (minimum \$10.00 per order) will be billed for all returned samples; this fee may be adjusted on the basis of sample size and quantity.

A minimum \$50.00 surcharge will be added to orders requiring special packaging and labeling as hazardous materials.

Clients are urged to submit small quantities of sample. Many of our analyses require mg sample quantities and rarely do we require more than a few grams of sample. Many hazardous materials have shipping exemptions for small quantities.

Samples are normally held for 30 days after reporting prior to sample disposal or return.

PRICING POLICY

It is the policy of Huffman Hazen Laboratories to set prices at a fair and equitable level for quality analytical services. While we attempt to maintain the listed rates, the prices are subject to change without notice. Specific test methods and pricing may not be applicable to all sample types. In these cases the customer will be notified and, if appropriate, a special price quotation will be provided.

All prices are in U.S.D., and unless otherwise specified, are per sample. (See MINIMUM CHARGES section below).

MINIMUM CHARGES

Our QA program requires, at minimum, that a blank, duplicate, and calibration check standard be analyzed with each group of 10 samples, or each significant matrix. Our minimum charges (minimum samples charged per test) help offset the cost of QA/QC and other handling costs for small quantity orders. The minimum charges are listed in each section of the fee schedule.

DISCOUNT PRICING POLICY

On large projects, we are frequently able to provide significant price discounts. These are offered by quotation only, and are based upon cost savings afforded to our laboratory. This is determined not simply by number of samples or gross dollar amount but by the specific analyses, sample quantity, sample matrix, analyte concentration ranges, required turnaround time, and other analytical process factors. We strongly encourage you to inquire about potentially substantial cost and time savings for your larger batch sample submittals or ongoing analytical projects. Advance scheduling of sample submittals may result in faster turnaround times and lower charge for priority service.

TERMS AND PAYMENT

Orders are accepted based on receipt of an acceptable Purchase Order or valid credit card information. Terms are net 30 days from the date of invoice. A 1.5% per month surcharge will be assessed on all past due accounts. In the event of default on payment, the client is responsible for all reasonable collection and legal fees.

We accept cash, check, Visa, MasterCard, and Discover for payment of services.

LIMITS OF LIABILITY AND WARRANTY

It is the intent of Huffman Hazen Laboratories to provide the most reliable data possible for contracted analyses. These services are provided without warranty or liability, implied or otherwise, of any kind. The sole remedy shall be limited to repeating the analyses or refunding the amount paid to Huffman Hazen Laboratories for services provided.