

Thermochem 2024 Price List Consulting, Laboratory and Field Services

Personnel Rates, Project site (international or domestic)

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|---|-----------|--------------------|
| Senior Chemical Engineer / Process Chemist | US\$/day | \$ 3,150.00 |
| Senior Geochemist | US\$/day | \$ 2,785.00 |
| Chemical Engineer / Geochemist | US\$/day | \$ 2,625.00 |
| Senior Field Chemist | US\$/day | \$ 2,625.00 |
| Field or Lab Chemist | US\$/day | \$ 2,100.00 |
| Field or Lab Technician | US\$/day | \$ 1,900.00 |
| Travel Expenses For on-site services or travel as required (other than mileage) | US\$/trip | |
| Mileage Field Service Truck to site (4WD Utility truck, Van or SUV) | US\$/mile | \$ 1.95 |
| Travel Time For on-site services or travel as required. | US\$/day | |
| General Field Equipment Rate, Project site (domestic) Two-phase sampling separator (ASTM E-1675) Non-isokinetic sample probes, condenser/coolers, high-pressure Teflon hose NIST-traceable digital temperature and pressure instrumentation, field analyzers Tools, pipe fittings, supplies; Utility truck, Van or SUV (+ mileage) | US\$/day | \$ 2,975.00 |

Consulting Services, Thermochem or Client Offices (international or domestic)

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|---|-----------|------------------|
| Senior Chemical Engineer / Process Chemist | US\$/hour | \$ 395.00 |
| Senior Geochemist | US\$/hour | \$ 345.00 |
| Chemical Engineer / Geochemist | US\$/hour | \$ 330.00 |
| Senior Field Chemist | US\$/hour | \$ 330.00 |
| Field or Lab Chemist | US\$/hour | \$ 265.00 |
| Field or Lab Technician | US\$/hour | \$ 235.00 |
| Data Processing/MIS | US\$/hour | \$ 205.00 |

Laboratory Analysis Services

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|---|-------------|----|-----------------|
| General Steam Condensate Analysis Na, Cl, B, SiO ₂ , pH | US\$/sample | \$ | 485.00 |
| Comprehensive Steam Condensate Analysis Na, Cl, B, SiO ₂ , As, Hg, Fe, pH | US\$/sample | \$ | 660.00 |
| Comprehensive Steam Condensate Analysis, less Hg Na, Cl, B, SiO ₂ , As, Fe, pH | US\$/sample | \$ | 625.00 |
| Steam Purity Analysis- Na, Ca, Cl, B, SiO ₂ , Fe, TDS (calc) | US\$/sample | \$ | 580.00 |
| Steam Quality and Separator Efficiency Analysis Liquid Tracer Analysis | US\$/sample | \$ | 235.00 |
| Total Noncondensable Gas Analysis Ar, O ₂ , N ₂ , CH ₄ , H ₂ , CO ₂ , NH ₃ , H ₂ S, Total NCG | US\$/sample | \$ | 845.00 |
| Limited Gas Analysis Residual Gas (PVT) CO ₂ , NH ₃ , H ₂ S, Total NCG | US\$/sample | \$ | 610.00 |
| Hydrocarbon Scan Analysis C1 - C6 Hydrocarbons | US\$/sample | \$ | 1,025.00 |
| BTXE Scan Analysis Benzene, Toluene, Xylene, Ethylbenzene | US\$/sample | \$ | 605.00 |
| Benzene Analysis C ₆ H ₆ only | US\$/sample | \$ | 370.00 |
| Carbon Monoxide Analysis CO | US\$/sample | \$ | 500.00 |
| Sulphur Dioxide Analysis SO ₂ in absorbing solution | US\$/sample | \$ | 415.00 |
| Radon-222 Gas Analysis Rn-222 in Steam, Gas, or Water | US\$/sample | \$ | 500.00 |
| Stable Isotope Analysis Deuterium, Oxygen 18 | US\$/sample | \$ | 210.00 |
| Tritium Analysis Enrichment and low level counting | US\$/sample | \$ | 790.00 |
| General Water Analysis-(A) Na, K, Ca, Mg, Li, B, SiO ₂ , Cl, SO ₄ , HCO ₃ , NH ₃ , pH, TDS(calc) | US\$/sample | \$ | 665.00 |
| General Water Analysis-(B) Na, K, Ca, Mg, Fe, B, SiO ₂ , Cl, SO ₄ , HCO ₃ , pH, TDS(calc) | US\$/sample | \$ | 650.00 |
| Comprehensive Water Analysis Na, K, Ca, Mg, Li, Sr, Ba, Fe, Mn, Al, As, Sb, B, SiO ₂ , Cl, F, SO ₄ , HCO ₃ , NH ₃ , H ₂ S, CO ₂ , pH, TDS(calc) | US\$/sample | \$ | 925.00 |

Laboratory Analysis Services

| | | | |
|---|----------------------------|----------|--------------------------------|
| Exploration Water Analysis Na, K, Ca, Mg, Li, Rb, Cs, As, B, SiO ₂ , Cl, F, SO ₄ , HCO ₃ , NH ₃ , pH, TDS (calc) | US\$/sample | \$ | 845.00 |
| Helium Isotope Analysis He isotope ratios (R, Ra) Noble gases | US\$/sample | \$ | 745.00 |
| Elemental Analysis of Solids by XRF SiO ₂ , Ag, Al, As, B, Ba, Ca, Cd, Cr, Cu, Fe, Hg, K, Li, Mg, Mn, Mo, Na, Ni, Pb, S, Sb, Se, Sr, Ti, V, Zn | US\$/sample | \$ | 475.00 |
| Solid Sample X-Ray Analysis X-Ray diffraction mineralogy | US\$/sample | \$ | 600.00 |
| High-Resolution XRD | US\$/sample | \$ | 1,050.00 |
| Scanning Electron Microscopy (SEM/EDX) Surface analysis and elemental composition | US\$/sample | \$ | 1,050.00 |
| X-Ray Fluorescence 31 element scan | US\$/sample | \$ | 285.00 |
| Isopentane, Pentane, Isobutane , Butane Analysis | US\$/sample | \$ | 425.00 |
| Hydrofluorocarbon Reservoir Tracer Gas Analysis Includes Low-level Concentration Step Two Tracers in Same Sample | US\$/sample US\$/sample | \$ \$ | 445.00 600.00 |
| Perfluorocarbon Reservoir Tracer Gas Analysis Includes Low-level Concentration Step Up to 2 PFC tracers analyzed in the same sample | US\$/sample | \$ | 445.00 |
| Alcohol (Isopropanol, n-Propanol, n-Butanol) Reservoir Tracer Analysis Includes Low-level Concentration Step Up to 3 low-level alcohol tracers analyzed in the same sample | US\$/sample | \$ | 585.00 |
| Sulphur Hexafluoride Production Gas Tracer Analysis SF ₆ in Gas or Steam | US\$/sample | \$ | 325.00 |
| ThermoTrace Production Liquid Tracer Analysis TT in Brine or Condensate | US\$/sample | \$ | 235.00 |
| Low-level analysis of Naphthalene Sulfonate Tracers 1 - 2 of above Tracers per Sample | US\$/sample | \$ | 360.00 |
| 3 - 4 of above Tracers per Sample | US\$/sample | \$ | 395.00 |
| 5 - 6 of above Tracers per Sample | US\$/sample | \$ | 445.00 |
| 7 - 8 of above Tracers per Sample | US\$/sample | \$ | 475.00 |
| Extraction prep for concentration and matrix clean-up (Determination for extraction step based on background sample analysis) | US\$/sample | \$ | 185.00 |
| Additional runs to quantitate all tracers in one sample, if present at greatly different concentrations. | US\$/sample | \$ | 120.00 |

Individual Species Analysis (alone or added to group analysis)

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|---|-------------|-----------|
| Chloride Analysis by IC (trace level IC, incl. prep) | US\$/sample | \$ 185.00 |
| Chloride Analysis in brine (titration) | US\$/sample | \$ 80.00 |
| Other Anions by IC (F, Br, NO3, SO4, S2O3, per analyte) | US\$/sample | \$ 115.00 |
| Major Metals in water, condensate or brine by AAS or ICP (Na, K, Ca, Mg, Li, Sr, Cs, Rb, SiO2, B; per analyte) | US\$/sample | \$ 90.00 |
| Trace Metals in water, condensate or brine by ICP (Fe, Mn, As, Sb, Zn, etc; per analyte) | US\$/sample | \$ 105.00 |
| Major or Trace Metals on gas/water filters by AAS or ICP (per analyte, incl. prep) | US\$/sample | \$ 285.00 |
| Total Mercury | US\$/sample | \$ 220.00 |
| pH, EC Analysis (per analyte) | US\$/sample | \$ 30.00 |
| TDS, TSS, TS Analysis (per analyte) | US\$/sample | \$ 165.00 |
| Alkalinity Analysis | US\$/sample | \$ 125.00 |
| Total Inorganic Carbon Analysis in water or brine | US\$/sample | \$ 125.00 |
| NH3 Analysis in water, condensate or brine | US\$/sample | \$ 125.00 |
| NH3 Analysis in gas scrubbing bottles (2 impingers) | US\$/sample | \$ 390.00 |
| H2S Analysis in water, condensate or brine | US\$/sample | \$ 120.00 |
| H2S Analysis in gas scrubbing bottles (2 impingers) | US\$/sample | \$ 390.00 |
| Low-level H2S Analysis in condensate or brine (0.05 mg/kg - 5 mg/kg) | US\$/sample | \$ 445.00 |
| Asbestos Analysis in water, condensate or brine | US\$/sample | \$ 340.00 |
| Oil & Grease Analysis | US\$/sample | \$ 130.00 |
| Gross Alpha & Gross Beta Analysis | US\$/sample | \$ 340.00 |
| Vinyl Chloride Analysis | US\$/sample | \$ 340.00 |
| High TSS Sample Prep / Filtration Charge (per sample bottle / aliquot) | US\$/sample | \$ 235.00 |

Rush Fees (depends on lab availability):

ASAP Rush - 100% (less than 1 week)

1 Week Rush - 50%

2 Week Rush - 25%

IC = Ion Chromatography

AAS = Atomic Absorption Spectroscopy

ICP = Inductively Coupled Plasma Spectroscopy (includes ICP/MS, mass spectroscopy)

Field Testing Services

Production Well Sampling

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|--|---------------|----|------------------|
| Single-Phase Production Wells/Pipelines- Direct Direct tap sampling with bleed tee for steam | US\$/location | \$ | 325.00 |
| Single-Phase Production Wells/Pipelines- Probe Non-isokinetic probe sampling with temperature measurement for saturation superheat determination | US\$/location | \$ | 400.00 |
| Wet or Two-Phase Production Wells/Pipelines Two-phase mini-separator sampling according to ASTM E-1675 | US\$/location | \$ | 1,000.00 |
| Isokinetic Steam Sampling for Steam Purity 6-point isokinetic traverse of pipelines, with temperature measurement at each point for saturation or superheat. Samples collected for direct analysis of impurities | US\$/test | \$ | 5,000.00 |
| Minimum charge, above sampling services (USA, except The Geysers) | US\$ | \$ | 5,000.00 |
| Steam Wash Optimization Field Testing Services Steam Scrubber Mass Balance and Efficiency Test, Including Steam Quality and Purity Sample Collection (not including lab analysis) | US\$/test | \$ | 18,500.00 |
| Mobilization charge for less than 2 tests (except The Geysers) | US\$ | \$ | 4,500.00 |

Note: Field services do not include travel time / expenses, or additional personnel and equipment when required.

Tracer Testing Services

Reservoir Tracer Testing Services

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| Low-Pressure Vapor Tracer Injection Vapor Tracer metered using computer interfaced to electronic balance for precise feed rate control (up to 250 kg of liquefied vapour tracer per well, WHP must be reduced to 10 psig or less) | US\$/well | \$ 5,775.00 |
| Mobilization charge for less than 2 wells (except The Geysers) | US\$ | \$ 3,300.00 |
| Low-Pressure Liquid Tracer Injection Liquid Tracer mixed on-site and injected (up to 200 kg of dry chemical tracer per well, WHP must be reduced to 10 psig or less) | US\$/well | \$ 12,500.00 |
| High-Pressure Liquid Tracer Injection Liquid Tracer mixed on-site and injected (up to 200 kg of dry chemical tracer per well, WHP up to 500 psig) | US\$/well | \$ 25,000.00 |
| Mobilization charge for less than 2 injection wells | US\$ | \$ 7,500.00 |
| Tracer-Based Mass Flowrate and Enthalpy Measurement (Includes lab tracer analyses) | | |
| Single-Phase Production Wells/Pipelines- Includes mass flowrate determination of steam or brine and sampling for geochemistry. Injection pressures up to 750 psig. | US\$/test | \$ 4,250.00 |
| Two-Phase Production Wells/Pipelines- Includes mass flowrate determination of steam and brine, total mass flowrate, total fluid enthalpy and mini-separator sampling of steam and brine for geochemistry. Injection pressures up to 750 psig. | US\$/test | \$ 5,250.00 |
| High-Pressure Single-Phase Production Wells/Pipelines- Includes mass flowrate determination of steam or brine and sampling for geochemistry. Injection pressures up to 3750 psig. | US\$/test | \$ 9,500.00 |
| High-Pressure Two-Phase Production Wells/Pipelines- Includes mass flowrate determination of steam and brine, total mass flowrate, total fluid enthalpy and mini-separator sampling of steam and brine for geochemistry. Injection pressures up to 3750 psig. | US\$/test | \$ 12,500.00 |
| Minimum charge 5 tests or additional mobilization fees may apply | | |

Note: Field services do not include travel time / expenses, or additional personnel and equipment when required.

Downhole Testing Services

Wellbore Sampling and Logging

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|---|----------|---------------------|
| High-Temperature Downhole Sampler - PT Logging Tool | US\$/run | \$ 17,500.00 |
| For Steam, Brine or Two-Phase Sampling with PT log. Does not include on-site consulting, operation, hoisting or lab analysis. (2 Thermochem Engineers or Chemists required on-site) Requires guarantee for loss or damage in well up to \$95,000 | | |
| High-Temperature Downhole Sampler - PTS Logging Tool | US\$/run | \$ 20,000.00 |
| For Steam, Brine or Two-Phase Sampling with PTS log. Does not include on-site consulting, operation, hoisting or lab analysis. (2 Thermochem Engineers or Chemists required on-site) Requires guarantee for loss or damage in well up to \$95,000 | | |
| Mobilization charge for less than 2 tests | US\$ | \$ 17,500.00 |

Note: Field services do not include travel time / expenses, or additional personnel and equipment when required.

Other Miscellaneous Services

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|--|--------------|----|---------------|
| Gas Bottle Preparation Fee For each bottle received by customer | US\$/each | \$ | 90.00 |
| Gas Bottle Deposit and Replacement Cost | US\$/each | \$ | 275.00 |
| Water and Condensate Sample Bottle Preparation Fees | | | |
| 60 ml plastic, no preservative | US\$/each | \$ | 4.00 |
| 125 - 250 ml plastic, no preservative | US\$/each | \$ | 5.00 |
| 500 - 1000 ml plastic, no preservative | US\$/each | \$ | 12.00 |
| 125 - 500 ml plastic, dilute HNO ₃ , pre-weighed | US\$/each | \$ | 21.00 |
| 125 - 250 ml plastic, dilute HNO ₃ / DI (SiO ₂ dilution), pre-weighed | US\$/each | \$ | 28.00 |
| 125 - 250 ml plastic, 5XForm-Cd (SO ₂), pre-weighed | US\$/each | \$ | 28.00 |
| 125 ml plastic or glass, HNO ₃ / K ₂ Cr ₂ O ₇ (Hg), pre-weighed | US\$/each | \$ | 35.00 |
| 500 - 1000 ml plastic, Cd/NaOH (H ₂ S), pre-weighed | US\$/each | \$ | 35.00 |
| 500 - 1000 ml glass impinger, Cd/NaOH (H ₂ S), pre-weighed | US\$/each | \$ | 49.00 |
| 500 - 1000 ml glass impinger, HNO ₃ / K ₂ Cr ₂ O ₇ (Hg), pre-weighed | US\$/each | \$ | 49.00 |
| 500 - 1000 ml glass impinger, H ₂ SO ₄ (NH ₃), pre-weighed | US\$/each | \$ | 49.00 |
| Disposable Sample Filter Apparatus | | | |
| 60 ml Plastic Syringe for Filtration | US\$/each | \$ | 5.00 |
| Disposable Syringe Filter Disks | US\$/each | \$ | 7.00 |
| In-line Filter Disk | US\$/each | \$ | 30.00 |
| High-Capacity In-line Filter Cartridge | US\$/each | \$ | 80.00 |
| Helium Isotope Collection Tube Cu tube with clamps and support rack | US\$/each | \$ | 175.00 |
| Hazardous Material Packing and IATA Documentation (Gas Bottles) | US\$/package | \$ | 970.00 |
| Hazardous Material Packing and IATA Documentation (Water Bottles) | US\$/package | \$ | 760.00 |
| Hazardous Material IATA Documentation (paperwork only, per package) | US\$/package | \$ | 315.00 |
| Non-Hazardous Material Packing and Documentation (Fiberboard box + inner packings) | US\$/package | \$ | 185.00 |
| Import / Export Documentation (paperwork only, per package) | US\$/hour | \$ | 290.00 |
| Custom Wooden Crating (heat treated and stamped) | | | |

Note: Prices for any services not covered by current contracts or quotes are subject to change without notice.