

Laboratory Services

Price List



Sheppard T. Powell
Associates, LLC

1915 Aliceanna Street - Baltimore, MD 21231
voice: 410.327.3500 fax: 410.327.7506

www.stpa.com

August 2015

TERMS AND CONDITIONS



**Sheppard T. Powell
Associates, LLC**

Baltimore Maryland www.stpa.com

SAMPLE SUBMITTAL

Submit samples with the following.

- Contact information, sample description and level of required service (normal, priority, superpriority). Please indicate desired analyses and any billing instructions.
- Individual sample identification marks, corresponding to accompanying paperwork.

SAMPLING

The quality of the results depends on the quality of the sampling. The STPA technical staff is available to answer any questions regarding sampling procedures.

PRIORITY SAMPLES

Priority/Superpriority analyses are available and must be approved and scheduled by the laboratory. For metallurgical and deposit analyses Priority Service (10 business days from sample receipt) is 50% over base price. Superpriority Service (5 business days from sample receipt) is twice the base price. For water analyses, call for pricing.

QUOTATIONS

Quotations for laboratory services will be provided upon request. Fee discounts may be available for groups of samples submitted for the same analysis. All rates are in U.S. dollars.

CONFIDENTIALITY OF RESULTS

All testing is done in the strictest confidence. Results will be given only to the client. Identified results will be released to other parties only with the written consent of the client.

LIMITATION OF LIABILITY: Sheppard T. Powell Associates, LLC (STPA) shall not be liable to Client, in contract or in tort for special, indirect, incidental or consequential damages such as but not limited to damage or loss of other property or equipment, loss of profits or revenue, loss of use of equipment, cost of capital, cost of purchased or replacement equipment, or other claims of client. There are no warranties, expressed or implied, in connection with this Agreement or the services to be performed hereunder. Client agrees that STPA's potential liability to Client as a result of the services to be performed under this Agreement shall be limited to those direct losses or damages incurred by Client as a direct and proximate result of errors, omissions and/or negligent acts of STPA, and that in no event shall STPA's potential liability exceed One Million U.S. Dollars (\$1,000,000.00).

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METALLURGICAL EXAMINATIONS



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Boiler/HRSG Tube Deposit Weight Analyses, Mechanical Method Plus Dimensional Assessment - Section Sample, Remove Deposits And Report Grams Per Square Foot of Area, ASTM D3483-83 Method A, As Received Photos And Visual Examination	\$280 per Specimen
Dimensional/Visual Pipe Assessment - Section Sample, Measure Pipe Inner Diameter, Wall Thicknesses And Pit Depths, As Received Photos, And Document Visual Condition	\$280 per Specimen (Assumes a 3" or less diameter pipe. Call for larger samples)
Condenser Tube Dimensional Survey	Call for Quotation
Boiler/HRSG Tube Failure Analysis - Mounting And Polishing Of Specimens To Show Nature And Cause Of Damage, Preparation Of Macrographs, Photomicrographs and Dimensional Assessment	\$3100 Typical Cost Call for Quotation
Boiler/HRSG Tube Failure Analysis - Mounting And Polishing Of Specimens To Show Nature And Cause Of Damage, Preparation Of Macrographs, Photomicrographs and Dimensional Assessment and SEM/EDXS Analysis	\$4200 Typical Cost Call for Quotation
Other Failure Analyses (With SEM/EDXS)	Call for Quotation
Boiler/HRSG Tube Microstructure Evaluation - Checks Microstructure On Hot And Cold Side Plus a brief Metallurgical Memorandum	\$990 per Specimen
Scanning Electron Microscopy (SEM) and/or Energy Dispersive X-Ray Spectroscopy (EDXS) Analysis (Qualitative And Semiquantitative)	\$250 per Sample*
Preparation Of Mount With Polishing (Not Associated With Failure Analyses)	\$210 per Mount
Deposit Sample Preparation For SEM/EDXS Analysis (May Be Applicable To Unusual Sample Types)	\$75 per Specimen
Loss on Ignition Of Deposit	\$75 per Sample
Technical Consultation, Research And Report Preparation	\$190 per Hour
Rockwell Hardness Test	\$55 per Specimen
Surface Examinations (Visual, Microscopic, Metallographic And SEM/EDXS As Required)	Call for Quotation
Corrosion Or Remaining Life Assessments (Involving Metallurgical Laboratory Consulting And Testing Services)	Call for Quotation
Metallographic Deposit Thickness Measurement In Boiler/HRSG Tubes	\$400 per Mount
Additional Photographs (Not Associated With Failure Analyses)	\$50 per Exposure

NOTE: Rates do not include engineering fees for interpretation of results.

* Minimum charge includes grinding and sieving of most deposit samples.

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DEPOSIT ANALYSES



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Constituent	Price
Loss On Ignition (LOI)***	\$75
Sample Preparation (For Unusual Samples)	\$75
Quantitative Analysis*	\$380
Elemental Analysis (by SEM/EDXS)**	\$250
Single SEM/EDXS With LOI**	\$325
SEM/EDXS Before And After LOI Test**	\$400
IC Scan Of Water Soluble Anions (See Ion Chromatography)	\$175
pH Of 0.1 - 1.0% Suspension	\$100

Note: Additional Metal Analyses Available Upon Request

* Quantitative analysis includes quantitative elemental analysis of iron, copper, nickel, zinc, chromium, aluminum, manganese, sodium, calcium, magnesium, molybdenum, phosphate, silica, lead (only reported if found). Barium, water-soluble chloride, and water-soluble sulfate are evaluated qualitatively and quantified if detected by the qualitative test.

** SEM/EDXS is a semiquantitative elemental analysis method.

*** Please notify the laboratory if vanadium is expected to be present in the sample.

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WATER ANALYSES



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Analysis	Method	Detection Limit (mg/L) as	Price
Acetate	IC	0.005 CH ₃ CO ₂	\$33
Acidity	SM 2310	5 CaCO ₃	\$28
Alkalinity	SM 2320	5 CaCO ₃	\$28
Aluminum	FAA	0.5 Al	\$18
	GFAA	0.005 Al	\$28
Ammonia	Hach 8038	0.10 N	\$28
Arsenic	GFAA	N.D.	\$28
Barium	FAA	1 Ba	\$18
	GFAA	0.050 Ba	\$28
Bromate	IC	0.3 BrO ₃	\$33
Bromide	EPA 300.1	0.1 Br	\$33
Cadmium	FAA	0.01 Cd	\$18
	GFAA	0.005 Cd	\$28
Calcium	FAA	0.2 Ca	\$18
	GFAA	0.002 Ca	\$28
Chlorate	EPA 300.1 B	0.10 ClO ₃	\$39
Chloride	EPA 300.1	0.1 Cl	\$33
	IC	0.001 Cl	\$33
Chlorine, Total	Hach 8167	0.02 Cl ₂	\$23
Chlorite	EPA 300.1 B	0.10 ClO ₂	\$39
Chromium	FAA	0.2 Cr	\$18
	GFAA	0.005 Cr	\$28
Color, True And Apparent	Hach 8025	Pt Co	\$18
Conductivity	SM 2510	0.1 μS/cm	\$13
Copper	FAA	0.05 Cu	\$18
	GFAA	0.001 Cu	\$28

ATSM – American Society of Testing and Methods

SM - Standard Methods For Examination Of Water And Wastewater. 22nd Edition, 2012

EPA - Methods For Chemical Analysis Of Water And Wastes, EPA-600/4-79-020, March 1983

Hach - Hach Company Water Analysis Method

IC - Ion Chromatography, SM 4110B. Ion Chromatography with Chemical Suppression of Eluent Conductivity

FAA - Flame Atomic Adsorption Spectroscopy

- SM 3111B - Direct Air - Acetylene FAA Method
- SM 3111D - Nitrous Oxide - Acetylene FAA Method

GFAA – Graphite Furnace Atomic Absorption Spectroscopy

- ASTM D3919-08 - Standard Practice for Measuring Trace Elements in Water by Graphite Furnace Atomic Absorption Spectrophotometry
- SM-3113B Electrothermal Atomic Absorption Spectrometric Method

NPOC - Nonpurgable Organic Carbon

N.D. - Not Determined

Note - Sample Preparation Charges May Apply:

- \$15.00 for Filtration or Dilution
- \$25.00 for Digestion

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Analysis	Method	Detection Limit (mg/L) as	Price
Fluoride	EPA 300.1	0.25 F	\$33
	IC	0.005 F	\$33
Formate	IC	0.005 HCO ₂	\$33
Glycol, Ethylene	Colorimetric	1 ppm HOCH ₂ CH ₂ OH	\$33
Hardness, Total (Ca + Mg)	FAA	0.2 CaCO ₃	\$36
	ASTM D3919-08	0.010 CaCO ₃	\$56
Iron	FAA	0.05 Fe	\$18
	GFAA	0.002 Fe	\$28
Iron, Total (Includes Digestion)	FAA	0.05 Fe	\$43
	GFAA	0.002 Fe	\$53
Lead	FAA	0.5 Pb	\$18
	GFAA	0.005 Pb	\$28
Magnesium	FAA	0.05 Mg	\$18
	GFAA	0.001 Mg	\$28
Manganese	FAA	0.5 Mn	\$18
	GFAA	0.010 Mn	\$28
Molybdenum	FAA	0.5 Mo	\$18
Molybdate	Hach 8036	0.5 Mo ⁺⁶	\$23
Nickel	FAA	0.5 Ni	\$18
	GFAA	0.005 Ni	\$28
Nitrate	EPA 300.1	0.07 N	\$33
	IC	0.003 NO ₃	\$33

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Analysis	Method	Detection Limit (mg/L) as	Price
Nitrite	EPA 300.1	0.03 N	\$33
	IC	0.002 NO ₂	\$33
pH	SM 4500 H+	N/A	\$12
Phosphonate	Hach	1.0	\$28
Phosphorous, Total	Hach 8190	0.10 P	\$28
	Hach 8048	0.10 P	\$28
Phosphate, Ortho	EPA 300.1	0.3 PO ₄	\$33
	IC	0.010 PO ₄	\$33
Phosphorus, Reactive	Hach 8178	0.10 PO ₄	\$28
Potassium	FAA	0.05 K	\$18
	GFAA	0.001 K	\$28
Propionate	IC	0.2 CH ₃ CH ₂ CO ₂	\$33
Selenium	GFAA	N.D.	\$28
Silica, Soluble (Reactive)	SM 4500-SiO ₂ D	0.005 SiO ₂	\$60
	Hach 8185	1 SiO ₂	\$28
	Hach 8186	0.010 SiO ₂	\$28
Silica, Total	ASTM D 4517-04	0.050 SiO ₂	\$75
Silver	FAA	1 Ag	\$18
	GFAA	0.005 Ag	\$28
Sodium	FAA	0.5 Na	\$18
	GFAA	0.001 Na	\$28
Solids			
Total Dissolved (TDS) And	SM 2540 C	10	\$55
Total Suspended (TSS)	SM 2540 D	4	\$55

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Analysis	Method	Detection Limit (mg/L) as	Price
Sulfate	EPA 300.1	0.3 SO ₄	\$33
	IC	0.002 SO ₄	\$33
Titanium	FAA	I Ti	\$18
TOC (NPOC)	SM 5310 C	0.010	\$46
	ASTM D 4779		
	EPA 415.2		
TOC + TIC	SM 5310 C	0.010	\$66
	ASTM D 4779		
	EPA 415.2		
Tolyltriazole	Hach 8079	I	\$28
Turbidity	EPA 180.1	I NTU	\$28
Vanadium	FAA	I V	\$18
	GFAA	0.05 V	\$28
Zinc	FAA	0.05 Zn	\$18
	GFAA	0.005 Zn	\$28

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WATER ANALYSES



SAMPLE BOTTLES

Provision Of Pretreated Bottles For High Purity Water Samples Is Available Upon Request For \$25.00 Plus The Following Per Bottle Charges. These Prices Do Not Include Shipping Charges, Which Are Billed At Cost. Shipping Is Provided Via UPS.

Qty	Description	Volume	Price
1	Pretreated Sample Bottle	125 mL	\$5.00
1	Pretreated Sample Bottle	250 mL	\$7.50
1	Pretreated Sample Bottle	500 mL	\$10.00



ION CHROMATOGRAPHY



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Constituent And Analysis	Method	Detection Limit (mg/L) As	Price
Acetate	IC	0.005 CH ₃ CO ₂	\$33
Bromate	IC	0.3 BrO ₃	\$33
Bromide	EPA 300.1	0.2 Br	\$33
	IC	0.003 Br	\$33
Chlorate	EPA 300.1 B	0.10 ClO ₃	\$39
Chloride	EPA 300.1	0.1 Cl	\$33
	IC	0.002 Cl	\$33
Chlorite	EPA 300.1 B	0.10 ClO ₂	\$39
Fluoride	EPA 300.1	0.25 F	\$33
	IC	0.005 F	\$33
Formate	IC	0.005 HCO ₂	\$33
Nitrate	EPA 300.1	0.3 N	\$33
	IC	0.003 NO ₃	\$33
Nitrite	EPA 300.1	0.2 N	\$33
	IC	0.003 NO ₂	\$33
Perchlorate	IC	0.010 ClO ₄	\$33
Phosphate, Ortho	EPA 300.1	0.3 PO ₄	\$33
	IC	0.010 PO ₄	\$33
Propionate	IC	0.2 CH ₃ CH ₂ CO ₂	\$33
Sulfate	EPA 300.1	0.3 SO ₄	\$33
	IC	0.003 SO ₄	\$33

EPA - Methods For Chemical Analysis Of Water And Wastes,
EPA-600/4-79-020, March 1983

IC - Ion Chromatography, SM 4110B. Ion Chromatography
With Chemical Suppression Of Eluent Conductivity.

Note - Method Development For Additional Anions Or Unusual Matrices
Available Upon Request

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CHEMICAL CLEANING SOLVENT ANALYSES



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Analysis	Method	Price
Alkalinity	SM 2320	\$28
Aluminum	FAA	\$18
Ammonia	ASTM D2790	\$28
Bromate	ASTM D2790	\$33
Calcium	FAA	\$18
EDTA	STPA	\$33
Chromium	FAA	\$18
Conductivity	SM 2510 B	\$18
Copper	FAA	\$18
HAF Acid	ASTM D2790	\$28
Hydrochloric Acid	ASTM D2790	\$28
Iron	FAA	\$18
Lead	FAA	\$18
Magnesium	FAA	\$18
Manganese	FAA	\$18
Nickel	FAA	\$18
Permanganate	STPA	\$33
pH	Electrode	\$12
Silica	FAA	\$18
Zinc	FAA	\$18

ASTM - American Society For Testing And Materials

STPA - Sheppard T. Powell Associates, LLC Procedure

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CHEMICAL LAB EVALUATIONS



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Chemical Cleaning Simulation (Laboratory Evaluation of
Prospective Cleaning Solvents And Process Conditions)

Call For Exact
Quotation

First Stage/Day

\$560

Subsequent Stages/Days

\$500

Corrosion Coupons (Preparation, Cleaning And Weighing Of
Corrosion Coupons And Determination Of Corrosion Rates)

Call For Quotation

Special Chemical Analyses (Following Client Procedures Or
Procedures Developed By STPA)

Call For Quotation

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RECOMMENDED SAMPLING AND PRESERVATION



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WATER SAMPLES

Analysis	Volume Required (mls)	Preservation	Holding Time
Acidity	100	Cool, 4°C	14 Days
Alkalinity	100	Cool, 4°C	14 Days
Ammonia	400	Cool, 4°C, H ₂ SO ₄ , pH <2	28 Days
BOD	1,000	Cool, 4°C	48 Hours
Bromide	100	None Required	28 Days
COD	50	Cool, 4°C, H ₂ SO ₄ , pH <2	28 Days
Chloride	100	None Required	28 Days
Chlorine	200	None Required	Analyze Immediately
Color	50	Cool, 4°C	48 Hours
Conductivity	100	Cool, 4°C	28 Days
Fluoride	100	None Required	28 Days
Hardness	100	HNO ₃ , pH <2	6 Months
Hydrazine	100	None Required	Analyze Immediately
Metals			
Dissolved	200	Filter On Site, HNO ₃ , pH <2	6 Months
Suspended	200	Filter On Site	6 Months
Total	100	HNO ₃ , pH <2	6 Months
Nitrate	100	Cool, 4°C	48 Hours
Nitrite	100	Cool, 4°C	48 Hours
pH	50	None Required	Analyze Immediately
Phosphonate	100	None Required	Analyze Immediately
Phosphorous, Total	200	Cool, 4°C, H ₂ SO ₄ , pH <2	28 Days
Phosphate, Ortho	100	Cool, 4°C	48 Hours
Silica, Soluble	250	Cool, 4°C	28 Days
Solids	100	Cool, 4°C	7 Days
Sulfate	100	Cool, 4°C	28 Days
TOC / TIC / NPOC	100	Cool, 4°C, H ₂ SO ₄ , pH <2	28 Days
Triazole	100	None Required	Analyze Immediately
Turbidity	100	Cool, 4°C	48 Hours

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