Air Testing











2012 Schedule of Services

Highlights

VOC Analysis – full range of reporting limits

- For most compounds standard MRLs down to 0.5 μg/m³
- For selected compounds low level MRLs down to 0.1 μg/m³
- Ultra low-level MRLs, down to 0.025 μg/m³ by Selective Ion Monitoring (SIM)

See Page 9 for analysis and Page 13 for sampling media

LEED Testing

Indoor air testing for green buildings (formaldehyde, TVOC, and 4-PCH)

See page 10 for details

1L Summa Canisters

 Functioning just like the more standard 6L Summa canister, these canisters are convenient for collection of soil gas samples, and can be used for other applications as well

See page 13 for details

Amines and Carboxylic Acids

Amines target compound list features 13 amines

See Page 2 for details

Carboxylic acids target compound list features 17 carboxylic acids

See Page 3 for details

Chinese Drywall Testing

- Elemental sulfur test screening analysis to positively identify corrosive drywall
- Hydrogen sulfide emission test an innovative chamber test to measure gaseous sulfur compounds
- Copper corrosion confirmation test visual confirmation of corrosion in the presence of drywall

See page 4 for details

Chamber Testing

 Measurement of chemicals off-gassed from a wide range of products using environmental chambers to determine VOCs and/or other airborne chemicals

See page 3 for details

Passive Air Sampling

Applications include monitoring of ambient air, indoor air, workplace, remediation fence lines, landfill
perimeter, sub-slab air and soil gas

See page 11 for details

Analysis		Method	Media/ Container
Acetaldehyde Must submit field blank with cartridge or tube samples		EPA TO-5	DNPH impinger*
		EPA TO-11A	DNPH cartridge or tube
			Blank
		EPA TO-5	DNPH impinger*
Aldehydes, speciated Must submit field blank	l; carbonyl scan k with cartridge or tube samples	EPA TO-11A	DNPH cartridge or tube
		LIX 10 TIX	Blank
Amines	with cost of analysis	In-house Method 101	ALS Environmental amine tube
	Sorbent tube included with cost of analysis A field blank is recommended		Blank
Ammonia Sorbent tube included with cost of analysis		OSHA ID 188/164	Treated anasorb tube
A field blank is recommended Minimum three samples including blank			Blank
BTEX (benzene, tolue + MTBE (methyl terti	ene, ethylbenzene, xylenes) ary-butyl ether)	EPA TO-15	Tedlar or canister
BTEX + MTBE plus total petroleum hydrocarbons (TPH) as gasoline		EPA TO-3 M TO-15	Tedlar or canister
BTEX		NIOSH 1501	Coconut shell charcoal tube
BTU heat content / CHONS		ASTM D3588	Tedlar
Carbon dioxide	% Level	EPA 3C M	Tedlar or canister
כמוטטוו טוטגוטפ	ppmV	EPA 25C M	Tedlar or canister

^{*} Minimum 3 days lead time required to prepare and QC impinger solutions/media

M = modification of method

Analysis		Method	Media/ Container
Carbon dioxide and	% Level	EPA 3C M	Tedlar or canister
carbon monoxide	ppmV	EPA 25C M	Tedlar or canister
Carbon monoxide	% Level	EPA 3C M	Tedlar or canister
Carbon monoxide	ppmV	EPA 25C M	Tedlar or canister
Carboxylic acids	Carboxylic acids Sorbent tube included with cost of analysis A field blank is recommended		Treated silica gel tube
			Blank
Chamber testing Measurement of chemicals off-gassed from client- supplied material Costs will include a one-time chamber setup fee per project of \$100 to \$150 Costs for analysis and sampling media billed separately A fee for a custom report may also apply		California specification 01350 modified	Environmental chamber
Diesel A field blank is recommended Minimum three samples including blank		NIOSH 1550	Charcoal tube
		ועוטסח וססט	Blank

M = modification of method

Analysis		Method	Media/ Container
	Methane, ethane, ethene (MEE)	RSK 175	Vials must be acid preserved
Dissolved gases A minimum of two	Methane, ethane, ethene propane, propene (MEEPP)	GC/FID	with HCl or H ₂ SO ₄
40mL VOA vials must be submitted per sample	Carbon dioxide (CO ₂)	RSK 175 GC/TCD	Vials must not contain any preservatives
	MEE and CO ₂	RSK 175 GC/FID/TCD	At least two vials must be acid preserved
Drywall testing			
Elemental sulfur tes Screening analysis to drywall	positively identify corrosive	CAS AQL 103A GC/ECD	N/A
Hydrogen sulfide er Chamber test to mea		CAS AQL 104 GC/SCD	Environmental chamber
	sure H ₂ S , COS, CS ₂ and 17other bunds	CAS AQL 104 GC/SCD	Environmental chamber
Copper corrosion co Visual confirmation o drywall	onfirmation test f corrosion in the presence of	CAS AQL 105	Environmental chamber
Ethanol		EPA TO-3 M	Canister
Fixed gases H ₂ , O ₂ , N ₂ , CH ₄ , CO, CO ₂	One or two compounds only (e.g. $\mathrm{CH_4}$ only, $\mathrm{CH_4}$ and $\mathrm{CO_2}$)	ASTM D1946 EPA 3C M	Tedlar or canister
	Three or more compounds	LI / C JVI	Confision
Formaldehyde		EPA TO-11A M	radiello® passive/ diffusive sampler

^{*} Minimum 3 days lead time required to prepare and QC impinger solutions/media M = modification of method

Analysis		Method	Media/ Container
Formaldehyde Must submit field blank with cartridge or tube samples		EPA TO-5	DNPH impinger*
		EPA TO-11A	DNPH cartridge or tube
		2.7.10	Blank
Formaldehyde Field blank built into ba	adge	EPA TO-11A M	Passive dosimeter (badge)
			Blank
Formaldohudo and a	cotaldobudo	EPA TO-5	DNPH impinger*
Formaldehyde and a Must submit field blanl tube samples		EPA TO-11A	DNPH cartridge or tube
			Blank
Helium		EPA 3C M	Mylar or canister
Hydrocarbon speciati	on (C ₁ - C ₆ & >C ₆)	EPA TO-3 M	Tedlar or canister
Hudrogon	% Level	EPA 3C M	Mylar or canister
Hydrogen	ppmV	EPA 3C M	Mylar or canister
Hydrogen fluoride (H	Hydrogen fluoride (HF)		radiello® passive/ diffusive sampler
Hydrogen sulfide (H ₂	5)	ASTM D5504 SCAQMD 307.91M	Tedlar
Hydrogen sulfide		CAS AQL 110	radiello® passive/ diffusive sampler
	% Level	EPA 3C M	
Methane	ppmV	EPA TO-3 M	Tedlar or canister
		EPA 25C M	

M = modification of method

Analysis		Method	Media/ Container
Methanol		EPA TO-3 M	Canister
Methanol		Nuosu 2000	Silica gel tube
A field blank is recomm Minimum three sample		NIOSH 2000	Blank
Naphthas (ex., kerosene, miner diesel #2, fuel oil or N	(ex., kerosene, mineral spirits, Stoddard solvent,		Charcoal tube
A field blank is recomm Minimum three sample	nended ,	NIOSH 1550	Blank
Nicotine Minimum three samples inclu Minimum 5-7 days lead time		ASTM D5075-01	XAD-4
Nicotine and 3-ethen Minimum three samples inclu Minimum 5-7 days lead time	uding blank	ASTM D5075-01	XAD-4
Nitrogen (N,)	Single injection	EPA 3C M ASTM D1946	Tedlar or canister
wittogen (w ₂)	Duplicate injections	EPA 3C ASTM D1946	Tedlar or canister
Nitrogen dioxide (NO	2)	CAS AQL 108	radiello® passive/ diffusive sampler
	N-Nitrosodimethylamine (NDMA)		ALS Environmental amine tube
Sorbent tube included with cost of analysis A field blank is recommended		EPA TO-7 M	Blank
Nitrous oxide (N ₂ 0)		EPA 3C M	Tedlar or canister
Ozone (O ₃)		CAS AQL 107	radiello® passive/ diffusive sampler
PAHS 16 Polynuclear aromatic hydr Low-volume or high-volume	rocarbons	EPA TO-13A (SIM)	PUF/XAD-2*

^{*} Minimum 3 days lead time required to prepare and QC impinger solutions/media

M = modification of method

Analysis		Method	Media/ Container
PAHs 16 Polynuclear aromatic		NIOSH 5515 M (GC/MS)	PTFE filter/ XAD-2 tube
A field blank is recomme Minimum three samples		(dc/ MJ)	Blank
PCBs A field blank is recommon Minimum three samples		NIOSH 5503	Glass fiber filter and florisil tube
	time required for project setup	1410311 9303	Blank
	High-volume sampler	EPA TO-4A	PUF*
PCBs	Low-volume sampler	EPA TO-10A	PUF
	Wipes	EPA TO-10A M	Wipe
Pentachlorophenol Minimum three samples	including blank	OSHA 39	XAD-7
Pesticides	High-volume sampler	EPA TO-4A	PUF*
List of 20 organochlorine	Low-volume sampler	EPA TO-10A	
pesticides	Wipes	EPA TO-10A M	Wipe
Dooticidoo	High-volume sampler	EPA TO-4A	
Pesticides (organochlorine) and PCBs	Low-volume sampler	EPA TO-10A	PUF*
1 CD3	Wipes	EPA TO-10A M	Wipe
Phenol A field blank is recommended		OSHA 32	XAD-7
Minimum three samples		USHA 32	Blank
Phenol and cresols A field blank is recomme Minimum three samples		EPA TO-8	NaOH impinger*

^{*} Minimum 3 days lead time required to prepare and QC impinger solutions/media M = modification of method

Analysis		Method	Media/ Container
4-Phenylcyclohexene A field blank is recomm		EPA TO-17	Thermal desorption tube
Solanesol (environme A field blank is recomm Minimum three sample	ended	ASTM D6271	Teflon filter
	Hydrogen sulfide only		
Cultus compounds	Hydrogen sulfide, methyl mercaptan, dimethyl sulfide and dimethyl disulfide	ASTM D5504	Todlor
Sulfur compounds	Natural gas odorants	SCAQMD 307.91 M	Tedlar
	20 Speciated reduced compounds		
	Total reduced sulfur (TRS) as H ₂ S		
Sulfur dioxide (SO ₂)		CAS AQL 109	radiello® passive/ diffusive sampler
Sulfur hexafluoride (S	F ₆)	NIOSH 6602	Tedlar or canister
Total gaseous non- methane organics	Single injection	EPA 25C M	Tedlar or canister
(TGNMO)	Triplicate injection	EPA 25C	Canister
	ocarbons (TPH) as diesel	NIOSH 1550	Charcoal tube
A field blank is recommended Minimum three samples including blank		MIOST 1550	Blank
TPH as gasoline TPH as other fuels (e.g. JP-4) may be available; please call for more information		EPA TO-3 M	Tedlar or canister
TPH as gasoline plus	BTEX + MTBE	EPA TO-3 M TO-15	Tedlar or canister
Total volatile petroleum hydrocarbons (TVPH) as hexane		EPA TO-3 M	Tedlar or canister

M = modification of method

Volatile Organic Compounds (VOCs)

Analysis	Method	Media/ Container
Standard target compound list MRLs down to 0.5 µg/m³ for most compounds*		
Low-level analysis MRLs down to 0.1 µg/m³ for selected compounds call for details*		
Ultra low-level analysis by SIM Up to 10 target compounds from SIM list MRLs down to 0.025 µg/m³ for most compounds MRL down to 0.010 µg/m³ for TCE*		
Ultra low-level analysis by SIM Expanded target compound list	EPA TO-15	Canister**
Single compound analysis	EFA 10-13	Callister
Less than 5 compounds		
6 to 10 compounds		
Plus 15 tentatively identified compounds (TICs)		
Only 15 TICs		
Plus C ₃ - C ₁₁₊ speciation		
Only C ₃ - C ₁₁₊ speciation		
Total volatile organic compounds (TVOC) as toluene	EPA TO-15	Canister**
TVOC as toluene via thermal desorption A field blank is recommended	EPA TO-17	Thermal desorption tube
VOCs, landfill gas (19 compounds) SCAQMD Rule 1150.1 Does not include hydrogen sulfide	EPA TO-15	Tedlar or canister
VOCs, MA DEP APH list	MA DEP APH	Canister**
MA DEP APH & EPA TO-15 combined	MA DEP APH & EPA TO-15	Canister**
VOCs via thermal desorption Target compound list is project specific or TICs	EPA TO-17	Multi-sorbent tube
Must submit field blank with samples		Blank

^{*} MRLs do not take into account canister pressurization dilution factors. Actual MRLs will be slightly higher. Please call for details. ** Tedlar bags may be used instead of canisters; methods will be noted as "modified" in case narrative

VOCs

Analysis	Method	Media/ Container
VOCs Minimum three samples including blank A field blank is recommended	Applicable NIOSH / OSHA methods	Various sorbents
VOCs by passive sampling		
Project-specific list of VOCs	Thermal or solvent desorption	radiello® passive/ diffusive sampler
Project-specific list of VOCs	EPA TO-17 Thermal desorption	SKC ULTRA® passive sampler

LEED (Green Building) Methods

Formaldehyde	EPA TO-11A	DNPH silica gel tube
TVOC as toluene	EPA TO-17	Thermal desorption tube
4-Phenylcyclohexene (4-PCH) only	EPA TO-17	Thermal desorption tube
Combined TVOC as toluene + 4-PCH	EPA TO-17	Thermal desorption tube
Top 15 TICs (added on to TVOC analysis)	EPA TO-17	Thermal desorption tube

Passive Air Sampling

Analysis	Method	Media/ Container
Formaldehyde	EPA TO-11A modified	radiello® passive/ diffusive sampler
Hydrogen fluoride (HF)	CAS AQL 106	radiello® passive/ diffusive sampler
Hydrogen sulfide	CAS AQL 110	radiello® passive/ diffusive sampler
Nitrogen dioxide (NO ₂)	CAS AQL 108	radiello® passive/ diffusive sampler
Ozone (0 ₃)	CAS AQL 107	radiello® passive/ diffusive sampler
Sulfur dioxide (SO ₂)	CAS AQL 109	radiello® passive/ diffusive sampler
Project-specific list of VOCs	Thermal or solvent desorption	radiello® passive/ diffusive sampler
Project-specific list of VOCs	EPA TO-17 Thermal desorption	SKC ULTRA® passive sampler

NCASI Methods

Analysis	Method	Media/ Container
Methanol	NCASI 94.03*	40 mL VOA
Hazardous air pollutants (HAPs) in condensate	NCASI 99.01**	40 mL VOA
Methanol, acetaldehyde, propionaldehyde, acrolein, phenol, formaldehyde Includes impinger solution, spiking solutions, and two separate analytical runs Minimum 5-7 days lead time required for project setup	NCASI A105.01***	Canister

Method CI/SG/PULP-94.03: Chilled Impinger Test Method for Use on Pulp Mill Sources to Quantify Methanol Emissions (Feb. 2005) ** Method DI/AHAPS-99.01: Selected HAP's in Condensates by 6C/F10 (February 2000)

Specialty Liquid Sample Analysis

A minimum of two 40 mL VOA vials are required for each sample for each analysis

Alcohols in water	Single/first compound Each additional compound	In-house method (modification of EPA TO-3)	40 mL Vials	
Dissolved gases	Methane, ethane, ethene (MEE)	RSK 175	Vials must be acid preserved with HCl or H ₂ SO ₄	
	Methane, ethane, ethene propane, propene (MEEPP)	GC/FID		
	Carbon dioxide (CO ₂)	RSK 175 GC/TCD	Vials must not contain any acid preservatives	
	MEE and CO ₂	RSK 175 GC/FID/TCD	At least two vials must be acid preserved	
Hydrogen sulfide (H	₂ S)			
Hydrogen sulfide, m sulfide and dimethy	ethyl mercaptan, dimethyl I disulfide	In-house method (modification of 40 mL \ ASTM D5504)	40 mL Vials	
20 Speciated reduce	ed sulfur compounds	731111 2330 1)		

^{***} Method ISS-FP-A105.01: Impinger Source Sampling Method for Selected Aldehydes, Ketones, and Polar Compounds

Air Sampling Equipment, Media and Supplies

Canisters

Summa canisters	
Batch certification (prices include one-way shipping)	
6 L	\$55
1 L	\$35
Individual certification* (prices include one-way shipping)	
6 L	\$95
1 L	\$95
Cleaning of client-owned canisters (does not include return shipping)	\$45
MiniCans 400 mL	\$35

Rental period is 10 business days

Rental fees will be assessed on canisters returned unused to the laboratory in order to cover the costs of cleaning and recertification for the

Please do not write directly on the summa canister, or affix any labels, stickers, or tape to the summa canister. Use only the tag provided. There will be a \$25 per canister fee assessed for any cans received with inappropriate writing or stickers affixed. *If multiple canister certifications are required, additional charges may apply.

Tedlar Bags

1 L	\$15
3 L	\$18
5 L	\$21
10 L	\$28

Zefon EconoGrab™ sampling bags

Suitable for collection of gaseous sulfur compounds. Not recommended for collection of VOCs

1 L \$12

Flow Controllers and Critical Orifice Assemblies

Flow controllers Laboratory will calibrate for client-specified sampling interval, from 30 minutes to 24 hours	\$20
Critical orifice assembly Laboratory will calibrate for client-specified sampling interval, from 30 minutes to 24 hours	\$20
Flow controllers for MiniCans Includes sampling belt, holder and Teflon sampling line Can be set for 4-hour to 10-hour sampling periods	\$45

Air Sampling Equipment, Media and Supplies

Miscellaneous Equipment

Additional equipment is available upon request from the laboratory:

- Pressure/vacuum gauges
- Teflon tubing: \$3.50/ft
- Duplicate sampling Ts
- Swagelok nuts/ferrules
- •Soil vapor purge manifold: \$60
- •Tedlar bag lung sampler: \$75
- Exemption shippers: \$30 (NOTE: ALS Environmental is NOT responsible for compliance with DOT shipping regulations)

Sampling Tubes, Traps, Cartridges

Amine tube For use with ALS Environmental Method 101 for amines	No charge Included with cost of analysis
DNPH coated silica gel tubes (with ozone scrubber) For use with EPA TO-11A for aldehydes	\$9
Formaldehyde badge by SKC	\$22
Organic vapor monitors 3M OVM (3500)	\$17
Organic vapor monitors 3M OVM (3520)	\$22
radiello® passive/diffusive samplers Includes sorbent cartridge, diffusive body, and support plate	\$50 RAD-165 Aldehydes
	\$30 RAD-166 Hydrogen fluoride, nitrogen dioxide, and/o sulfur dioxide
	\$30 RAD-170 Hydrogen sulfide
	\$35 RAD-172 Ozone
	\$30 RAD-130 VOCs (solvent desorptio
	\$75 RAD-145 VOCs (thermal desorption

Air Sampling Equipment, Media and Supplies

Call for quote
\$20
No charge Included with cost of analysis
\$40
\$25
\$55
\$35
\$100
\$25

^{*} PUF, PUF/XAD, and impinger solutions: Minimum 3-day lead time needed to prepare and QC media

Important Notes and Information Regarding Equipment & Media

Rental Information

Rental period is 10 business days.

An additional rental fee may be charged for Summa and Silco canisters, MiniCans, and flow controllers not returned within the standard ten business day rental period, unless specified in a price quote provided by ALS Environmental.

Rental fee of canisters does not include flow controller or vacuum gauge rental charges.

Shipping

Canisters

Shipping one-way via standard overnight delivery (FedEx or UPS) is included in the rental costs of the canisters.

Client will be billed for any expedited shipping costs, other than those incurred due to laboratory scheduling or capacity issues.

Summa canisters should be returned in the container or box in which they were shipped.

Do not apply any labels, stickers or tape directly to the Summa canister.

Use the tags provided with the shipment, and attach with accompanying ties.

Client may be billed for costs associated with the cleaning and removal of labels, tape or stickers applied to Summa canisters.

Client is responsible for compliance with any applicable DOT shipping regulations (ex. Shipping flammable gases, such as landfill gases).

Tedlar Bags

Tedlar bags should be shipped in a puncture-proof, rigid container, such as a sturdy cardboard box or a cooler.

Tedlar bags should be filled no more than two-thirds full to prevent popping during air shipment.

Receiving Samples

Regular laboratory hours are Monday through Friday, 8 am to 5 pm Pacific time.

Weekend delivery/receipt of samples is not available without prior authorization by the lab.

Please avoid sampling with Tedlar bags on Fridays unless arrangements have been made in advance with the laboratory to assure sample analysis within the specified holding times.

Holding Times

Samples collected in tedlar bags have a holding time of 72 hours, except for samples to be analyzed for sulfur compounds, which have a holding time of 24 hours.

There is no specified holding time for samples collected in Summa canisters. However, ALS Environmental follows the EPA Method TO-15 guideline of 30 days.

Set-up Fees

For non-validated methods, the compound response must be verified and a desorption study conducted. Set-up fees may apply for non-validated methods.

Sorbent Tubes

When requesting analysis of multiple compounds by a method requiring sorbent tubes, the client must confirm with a ALS Environmental project chemist that multiple compounds can be analyzed from the same sorbent tube and method.

Additional Services and Charges

Standard turn-around time (TAT) for analytical results is 10 business days. Surcharges for rush TATs are as follows:

Same day or next day, including weekends and holidays	Call for Quote
Next business day	100%
2 Business days	75%
3 Business days	50%
4 Business days	35%
5 Business days	25%

Semi-Volatile Organics Methods (For analyses such as EPA To-4A/TO-10A for pesticides or PCBs, TO-13A for PAHs)	
Five business days	50%

All rush TAT work must be pre-approved by laboratory prior to sample receipt. Rush TATs are adjusted for semi-volatile organics methods due to the length of extraction time required by these methods.

Electronic Data Deliverables (EDD)	
ALS Environmental standard format: Excel® spreadsheet	No Charge

Pricing Notes and Standard Terms

- (1) The prices indicated in this price list apply to standard ALS Environmental compound lists, reporting limits, report format, raw data deliverables and QA/QC level unless otherwise indicated.
- (2) Charges will be assessed for any sample media, container or equipment ordered and not returned to ALS Environmental for analysis, as well as for sample media or containers returned and analysis placed on hold.
- (3) An additional rental fee will be charged for Summa and Silco canisters not returned within the standard ten business day rental period, unless specified in a price quote provided by ALS Environmental.
- (4) Charges may also be assessed for lost, damaged and unreturned sampling containers and equipment:

Summa canister (6 Liter)	\$550
Silco canister (3 Liter)	\$550
Silco canister (6 Liter)	\$650
Vacuum flow controller	\$300
Vacuum/pressure gauges	\$100
High-volume sampler PUF glass housing	\$140
Summa canister (1 Liter)	\$550
MiniCans (500 mL)	\$550
Critical orifice assembly	\$50
Low-volume sampler PUF or PUF/XAD	\$75
	· · · · · · · · · · · · · · · · · · ·

- (5) Sample media that was delivered by ALS Environmental, but exceeds shelf life; that was specially ordered; or that must be kept refrigerated will be charged accordingly and cannot be returned to ALS Environmental. This applies to media such as sorbent tubes, monitoring badges, PUF and/or PUF/XAD-2 cartridges.
- (6) All work initiated by ALS Environmental's clients constitutes an agreement to do business according to the terms and conditions of ALS Environmental. Any changes or exceptions to these terms must be expressed and agreed upon.
- (7) Volume discounts may be available. Please contact a laboratory representative for consultation.

