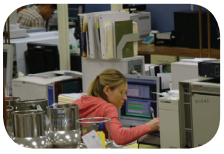
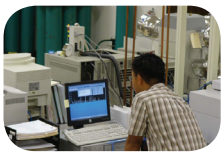
Air Testing







2009 Schedule of Services

Columbia Analytical Services, Inc.

2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Highlights

VOC Analysis – Full Range of Reporting Limits

- For most compounds standard MRLs down to 0.5 µg/m^3
- For selected compounds low level MRLs down to 0.1 µg/m^3
- Ultra-Low Level MRLs down to 0.025 µg/m^3 by Selective Ion Monitoring (SIM)

See Page 8 for Analysis and Page 13 for Sampling Media

LEED Testing

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

See page 9

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

Amines and Carboxylic Acids

- Amines Target Compound List Features 13 Amines

See Page 2

- Carboxylic Acids Target Compound List Features 17 Carboxylic Acids

See Page 3

NCASI Method 99.02

- Long list of 21 Hazardous Air Pollutants (HAPs)
- Short list of 5 HAPs
- Spiking Canister with Syringe for Benzene Spiking in the Field
- Spiked Canisters: High and Low Benzene Spikes

See page 10

NCASI Method ISS/FP-A105.01

- Target list of 6 compounds: Methanol, Phenol, Acetaldehyde, Acrolein, Formaldehyde, Propionaldehyde
- Appropriate for water-soluble compounds
- Analysis includes impinger solution, spiking solutions, and two separate GC runs

See page 10

Alphabetical List of Services by Compound of Interest

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
Aldehydes, Speciated Carbonyl Scan *Must submit field blank with cartridge or tube samples.*		EPA TO-5	DNPH Impinger*
		EPA TO-11A	DNPH Cartridge or Tube
			Blank
Amines *Sorbent tube included with cost of analysis.* *A field blank is recommended.*		In-house Method 101	Columbia Analytical Amine Tube
			Blank
Ammonia *A field blank is recommended.* *Minimum three samples including blank.*		OSHA ID 188/164	Treated Anasorb tube
			Blank
BTEX (Benzene, Toluene, Ethylbenzene, Xylenes) + MTBE (Methyl tertiary-Butyl Ether)		CARB 410 M	Tedlar or Canister
		EPA TO-15	Canister or Tedlar
BTEX + MTBE plus Total Petroleum Hydrocarbons (TPH) as Gasoline		EPA TO-3 M CARB 410 M	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
	ppmV	EPA 25C M	Tedlar or Canister
Carbon Dioxide and Carbon Monoxide	% Level	EPA 3C M	Tedlar or Canister
	ppmV	EPA 25C M	Tedlar or Canister

* Minimum 3 days lead time required to prepare & QC impinger solutions

Alphabetical List of Services by Compound of Interest

Analysis		Method	Media/ Container
Carbon Monoxide	% Level	EPA 3C M	Tedlar or Canister
	ppmV	EPA 25C M	Tedlar or Canister
Carboxylic Acids *Sorbent tube included with cost of analysis.* *A field blank is recommended.*		In-house Method 102	Treated Silica Gel Tube
			Blank
Diesel *A field blank is recommended.* *Minimum three samples including blank.*		NIOSH 1550	Charcoal Tube
			Blank
Environmental tobacco smoke – solanesol *A field blank is recommended.* *Minimum three samples including blank.*		ASTM D6271	Teflon filter
			Blank
Ethanol		EPA TO-3 M	Canister
Dissolved Gases *A minimum of two 40 ml VOA vials must be submitted per sample*	Methane, Ethane, Ethene (MEE)	RSK 175 GC/FID	*Vials* must *be acid preserved with HCl or H_2SO_4*
	Methane, Ethane, Ethene Propane, Propene (MEEPP)		
	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*
Fixed Gases H_2, O_2, N_2, CH_4, CO, CO_2	One or two compounds only (e.g. CH_4 only, CH_4 and CO_2)	ASTM D1946 EPA 3C M	Tedlar or Canister
	Three or more compounds		
Formaldehyde *Must submit field blank with cartridge or tube samples.*		EPA TO-5	DNPH Impinger*
		EPA TO-11A	DNPH Cartridge or Tube
			Blank

* Minimum 3 days lead time required to prepare & QC impinger solutions

Alphabetical List of Services by Compound of Interest

Analysis		Method	Media/ Container
Formaldehyde *Must submit field blank– built into badge*		EPA TO-11A M	Passive dosimeter (badge)
			Blank
Formaldehyde and Acetaldehyde *Must submit field blank with cartridge or tube samples.*		EPA TO-5	DNPH Impinger*
		EPA TO-11A	DNPH Cartridge or Tube
			Blank
Helium		EPA 3C M	Mylar or Canister
Hydrocarbon Speciation (C_1 – C_6 & >C_6)		EPA TO-3 M	Tedlar or Canister
Hydrogen	% Level	EPA 3C M	Mylar or Canister
	ppmV	EPA 3C M	Mylar or Canister
Hydrogen Sulfide (H_2S)		ASTM D5504 SCAQMD 307.91M	Tedlar
Methane	% Level	EPA 3C M	Tedlar or Canister
	ppmV	EPA TO-3 M	
		EPA 25C M	
Methanol		EPA TO-3 M	Canister
Methanol *A field blank is recommended.* *Minimum three samples including blank.*		NIOSH 2000	Silica gel tube
			Blank
Naphthas (ex., Kerosene, Mineral Spirits, Stoddard, Diesel #2, Fuel Oil or VMP Naphtha) *A field blank is recommended* *Minimum three samples including blank.*		NIOSH 1550	Charcoal tube
			Blank
Nicotine *Minimum three samples including blank.* *Minimum 5-7 days lead time required for project setup*		ASTM D5075-01	XAD-4

* Minimum 3 days lead time required to prepare & QC impinger solutions

Alphabetical List of Services by Compound of Interest

Analysis		Method	Media/ Container
Nicotine and 3-Ethenylpyridine (3-EP) *Minimum three samples including blank.* *Minimum 5-7 days lead time required for project setup*		ASTM D5075-01	XAD-4
Nitrogen (N_2)	Single Injection	EPA 3C M ASTM D1946	Tedlar or Canister
	Duplicate injections	EPA 3C ASTM D1946	Tedlar or Canister
N-Nitrosodimethylamine (NDMA) *Sorbent tube included with cost of analysis.* *A field blank is recommended.*		EPA TO-7 M	Columbia Analytical Amine Tube
			Blank
Nitrous oxide (N_2O)		EPA 3C M	Tedlar or Canister
PAHs 16 Polynuclear Aromatic Hydrocarbons *Low Volume or High Volume* *Minimum 3 days notice needed to prepare and QC media.*		EPA TO-13A (SIM)	PUF/XAD-2
PAHs 16 Polynuclear Aromatic Hydrocarbons *A field blank is recommended* *Minimum three samples including blank.*		NIOSH 5515 M (GC/MS)	PTFE/XAD-2 tube
			Blank
PCBs *A field blank is recommended* *Minimum three samples including blank.* *Minimum 5-7 days lead time required for project setup.* *Setup fee may apply.*		NIOSH 5503	Glass fiber filter and florisil tube
			Blank
PCBs *Minimum 3 days notice needed to prepare and QC media*	High volume sampler	EPA TO-4A	PUF
	Low volume sampler	EPA TO-10A	
	Wipes	EPA TO-10A M	WIPE
Pentachlorophenol *Minimum three samples including blank.*		OSHA 39	XAD-7

Alphabetical List of Services by Compound of Interest

Analysis		Method	Media/ Container
Pesticides *List of 20 Organochlorine pesticides* *Minimum 3 days notice needed to prepare and QC media*	High volume sampler	EPA TO-4A	PUF
	Low volume sampler	EPA TO-10A	
	Wipes	EPA TO-10A M	WIPE
Pesticides (Organochlorine) and PCBs *Minimum 3 days notice needed to prepare and QC media.*	High volume sampler	EPA TO-4A	PUF
	Low volume sampler	EPA TO-10A	
	Wipes	EPA TO-10A M	WIPE
Phenol *A field blank is recommended* *Minimum three samples including blank.*		OSHA 32	XAD-7
			Blank
Phenol and Cresols *A field blank is recommended* *Minimum three samples including blank.* *Minimum 3 days notice needed to prepare and QC media*		EPA TO-8	NaOH Impinger
4-Phenylcyclohexene (4-PCH) *A field blank is recommended*		EPA TO-17	Thermal Desorption tube
Solanesol *A field blank is recommended* *Minimum three samples including blank*		ASTM D6271	Teflon filter
Sulfur Compounds	Hydrogen Sulfide only	ASTM D5504 SCAQMD 307.91 M	Tedlar
	Hydrogen Sulfide, Methyl Mercaptan, Dimethyl Sulfide and Dimethyl Disulfide		
	Natural Gas Odorants		
	20 Speciated Reduced Compounds		
	Total Reduced Sulfur (TRS) as H_2S		

Alphabetical List of Services by Compound of Interest

Analysis		Method	Media/ Container
Sulfur hexafluoride (SF_6)		NIOSH 6602	Tedlar or Canister
Total Gaseous Non-Methane Organics (TGNMO)	Single Injection	EPA 25C M	Tedlar or Canister
	Triplicate Injection	EPA 25C	Canister
Total Petroleum Hydrocarbons (TPH) as Diesel *A field blank is recommended* *Minimum three samples including blank.*		NIOSH 1550	Charcoal tube
			Blank
Total Petroleum Hydrocarbons (TPH) as Gasoline *TPH as other fuels (e.g. JP-4) may be available; please call for more info*		EPA TO-3 M	Tedlar or Canister
Total Petroleum Hydrocarbons (TPH) as Gasoline plus BTEX + MTBE		EPA TO-3 M CARB 410 M	Tedlar or Canister
Total Volatile Organic Compounds (TVOC) as Toluene		EPA TO-15	Tedlar or Canister

Alphabetical List of Services by Compound of Interest

Volatile Organic Compounds (VOCs)

Analysis	Method	Media/ Container
Standard target compound list *MRLs down to 0.5 µg/m³ for most compounds**	EPA TO-15	Canister**
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		
Single compound analysis		
Less than 5 compounds		
6 to 10 compounds		
15 Tentatively Identified Compounds (TICs) added on		
15 Tentatively Identified Compounds (TICs) only		
C_3-C_{11+} speciation added on		
C_3-C_{11+} speciation only		
AFCEE QAPP 4.0 VOC List 24 Compounds		
Total Volatile Organic Compounds (TVOC) as Toluene	EPA TO-15	Tedlar or Canister
Volatile Organics, Landfill Gas (19 compounds) SCAQMD Rule 1150.1 *Does not include Hydrogen Sulfide*	EPA TO-15	Canister or Tedlar
Volatile Organics Compounds, MA DEP APH list	MA DEP APH	Canister**
MA DEP APH & EPA TO-15 Combo	MA DEP APH & EPA TO-15	Canister**
TVOC as Toluene via Thermal desorption *A field blank is recommended*	EPA TO-17	Thermal Desorption tube

* 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

Alphabetical List of Services by Compound of Interest

Analysis	Method	Media/ Container
Volatile Organic Sampling Train (VOST), Modified *Minimum 2 week lead time needed for setup*	SW846 0030 M	Tenax
Volatile Organics via Thermal desorption Target Compound List is Project Specific or Tentatively Identified Compounds *Must submit field blank with samples.*	EPA TO-17	Multi-sorbent tube
		Blank
Volatile Organic Compounds		
Single / First Compound Analysis	Applicable NIOSH/OSHA Methods	Various sorbents
Each Additional Compound		

Minimum three samples including blank. Confirm with project manager that multiple compounds can be analyzed from the same sorbent tube. Blanks will be billed as a sample.

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
Combo TVOC as Toluene + 4-PCH	EPA TO-17	Thermal desorption tube
Top 15 Tentatively Identified Compounds (added on to TVOC analysis)	EPA TO-17	Thermal desorption tube

Alphabetical List of Services by Compound of Interest

NCASI Methods

Analysis	Method	Media/ Container
Methanol	NCASI 94.03[1]	40 mL VOA
Hazardous Air Pollutants (HAPs) in Condensate	NCASI 99.01[2]	40 mL VOA
Short List Hazardous Air Pollutants (HAPs) Methanol, Acetaldehyde, Propionaldehyde, Acrolein, Phenol	NCASI 99.02[3]	Canister
Long List Hazardous Air Pollutants (HAPs)		
Spiking Canister with syringe *50 ppm Benzene for spiking on sample train*		
Spiked Canisters *High and Low Benzene Spike - Client-specified ranges* *Two go to field, two stay in lab* *Quantity depends on sampling plan*		
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[4]	

[1] Method CI/SG/PULP-94.03 Chilled Impinger Test Method for Use on Pulp Mill Sources to Quantify Methanol Emissions (February 2005)
[2] Method DI/AHAPS-99.01 Selected HAP's in Condensates by 6C/F10 (February 2000)
[3] Method IM/CAN/WP-99.02: Impinger/Canister Source Sampling Method for Selected HAPs at Wood Products Facilities
[4] Method ISS-FP-A105.01: Impinger Source Sampling Method for Selected Aldehydes, Ketones, and Polar Compounds

QC runs are not included in unit price and must be billed separately.
Cost of sampling media (Summa canister) is not included in unit price.

Specialty Liquid Sample Analysis

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

Analysis		Method	Media/ Container
Acetaldehyde		EPA 8315 M	40 ml vials
Alcohols in Water	Single / First Compound	In-house method (modification of EPA TO-3)	
	Each Additional Compound		
Dissolved Gases	Methane, Ethane, Ethene (MEE)	RSK 175 GC/FID	*Vials must be acid preserved with HCl or H_2SO_4*
	Methane, Ethane, Ethene Propane, Propene (MEEPP)		
	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*
Formaldehyde *Minimum three samples including blank.*		EPA 8315 M	40 ml vials
Formaldehyde and Acetaldehyde *Minimum three samples including blank.*		EPA 8315 M	
Hydrogen Sulfide (H_2S)		In-house method (modification of ASTM D5504)	
Hydrogen Sulfide, Methyl Mercaptan, Dimethyl Sulfide and Dimethyl Disulfide			
20 Speciated Reduced Sulfur Compounds			

EPA Toxic Organics (TO) Compendium Methods

Method	Analysis
EPA TO-1/TO-2	Obsolete methods. Refer to EPA TO-17
EPA TO-3 Modified	Hydrocarbons, TPH as gasoline GC/FID
EPA TO-4A	Organochlorine Pesticides, Polychlorinated Biphenyls (PCBs) High Volume Method - GC/ECD
EPA TO-5	Carbonyl Scan (Speciated aldehydes, DNPH impinger)
EPA TO-7 M	N-Nitrosodimethylamine (NDMA), Columbia Analytical Amine Tube
EPA TO-10A	Organochlorine Pesticides, Polychlorinated Biphenyls (PCBs) Low Volume Method - GC/ECD
EPA TO-11A	Carbonyl Scan (Speciated aldehydes, DNPH cartridge, tube)
EPA TO-13A	Polynuclear Aromatic Hydrocarbons, PUF/XAD-2 (high volume)
EPA TO-13A Modified	Semivolatile Organic Compounds, PUF/XAD-2 (low volume)
EPA TO-14A	Volatile Organics, Summa Passivated Canister, GC/MS
EPA TO-14A Modified	Volatile Organics, Tedlar Bag GC/MS
EPA TO-15	Volatile Organics, Summa Passivated Canister GC/MS
EPA TO-15 Modified	Volatile Organics, Tedlar Bag GC/MS
EPA TO-17	Volatile Organics, Multi-sorbent Tube

NIOSH & OSHA Methods

Method	Analysis
NIOSH 1500 / 1501	Volatile Organic compounds (VOCs) by GC/FID on Solid Sorbent
NIOSH 1550 Modified	Total Petroleum Hydrocarbons - Diesel range
NIOSH 1550 Modified	Total Petroleum Hydrocarbon speciation (C_8 to C_{35})
NIOSH 2000	Methanol
NIOSH 5503	PCBs
NIOSH 5515 Modified	PAHs (Polynuclear Aromatic Hydrocarbons)
NIOSH 6602	Sulfur Hexafluoride (SF_6), by GC/ECD
OSHA 7	Volatile Organic compounds (VOCs) by GC/FID on Solid Sorbent
OSHA 32	Phenols and Cresols
OSHA 39	Pentachlorophenol

Air Sampling Equipment, Media and Supplies

Canisters

Summa Canisters

Batch Certification

6 L

1 L

Individual Certification*

6 L

1 L

Cleaning of client-owned canisters

Silco canisters

3 L

MiniCans

400 mL

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 next use.

Please do not write directly on the Summa canister, or affix any labels, stickers, or tape to the Summa canister (use the tag provided). There will be a $25/can 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

3 L

5 L

10 L

Flow Controllers and Critical Orifice Assemblies

Flow Controllers

Laboratory will calibrate for client-specified sampling interval, from 30 minutes to 24 hours

Critical Orifice Assembly

Laboratory will calibrate for client-specified sampling interval, from 30 minutes to 24 hours

Flow Controllers for MiniCans

Includes Sampling Belt, Holder and Teflon Sampling Line

Can be set for 4-hour to 10-hour sampling periods

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: Columbia Analytical is NOT responsible for compliance with DOT shipping regulations)*

Sampling Tubes, Traps, Cartridges

Amine Tube
For Use With Columbia Analytical Method 101 for Amines

DNPH Coated Silica Gel Tubes (with ozone scrubber)
For Use with EPA TO-11A for Aldehydes

Organic Vapor Monitors 3M OVM (3500)

Organic Vapor Monitors 3M OVM (3520)

Formaldehyde Badge by SKC

Thermal Desorption Tube / Multi-bed Sorbent Tube
For Use With EPA TO-17 for VOC analysis

Treated Silica Gel Tube
For Use With Columbia Analytical Method 102 for Carboxylic Acids

Polyurethane Foam (PUF) Cartridges for Pesticides and PCBs*

Method TO-4A, high volume

Method TO-10A, low volume

PUF/XAD Cartridges for SVOCs (PAHs)*

Method TO-13A, high volume

Method TO-13A, low volume

Impinger Solutions*

DNPH Solution per 100mL volume for Method TO-5

NaOH Solution for Method TO-8

* PUF, PUF/XAD, and Impinger Solutions: Minimum 3 day lead time needed to prepare & QC media

Important Notes and Information Regarding Equipment and 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 Columbia Analytical .

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 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 analzed for Sulfur compounds, which have a holding time of 24 hours.

There is no specified holding time for samples collected in Summa canisters. However, Columbia Analytical 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. Setup 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 Columbia Analytical project chemist that multiple compounds can be analyzed from the same sorbent tube and method.

Additional Services

Standard Turn-around Time (TAT) for analytical results is 10 business days.
Surcharges for rush Turn-Around Time (TAT)

Volatile Organics Methods
Same day or next day, including weekends and holidays
Next Business Day
2 Business Days
3 Business Days
4 Business Days
5 Business Days

All rush TAT work must be **pre-approved** by laboratory prior to sample receipt.

Semi-Volatile Organics Methods (For analyses such as EPA TO-4A / TO-10A for pesticides or PCBs, TO-13A for PAHs)
3 Business Days
4 Business Days
5 Business Days

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)
Columbia Analytical Standard Format: Excel Spreadsheet
Standard formats available, including ERPIMS, GISKey, GEOTRACKER, EQUIS, HEIM, and others One EDD may be provided upon request free of charge. Additional EDD formats for the same sample delivery group may be an additional charge.

Columbia Analytical Services™

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