IAQ Survey

Sample Collection Certification

For Indoor Air Quality Professionals

ENTHALPY ANALYTICAL

Certificate Information

- This document will provide you all the information needed to collect a viable IAQ Survey sample
  - Read the following documentation
  - Complete the 30 Questions at the end and submit to Enthalpy
  - 80% correct is required to gain Sampling Certification
  - A Certificate will be emailed to you from Enthalpy staff
- There is no cost for this Online certification
  - You can retake the test 2 days following a failing score.
- Thank you for using IAQ Survey for your sampling needs

Education Outline

- Common Terms
- What are VOCs?
- When to test for VOCs
- How to test for VOCs
  - Sampling plan
  - Building/Space Preparation
  - Equipment Operation
  - Form Completion & Shipping
  - Receiving Results
- VOC Remedial Actions
- Communication with the Client
- Billing, Tube/Pump Orders, Shipping Labels
- General Contact Information

Terms and Phrases

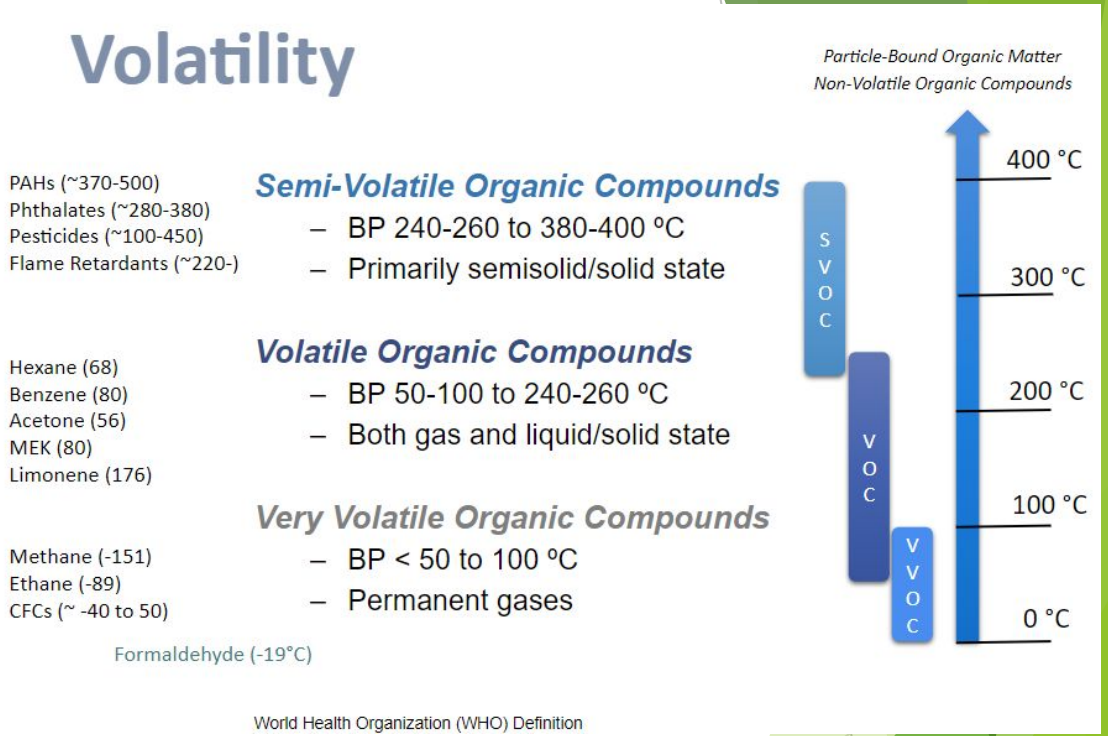
- IAQ Home or Commercial Survey™ - Our Survey Analysis name/trademark
- Basic, Predict, Reveal – Survey analysis options, different levels of detail provided with each
- VOC – Volatile Organic Compounds
- TVOC – Total Volatile Organic Compounds, scan of over 500 compounds
- TMVOC – Total Mold Volatile Organic Compounds, 21 specific Mold VOCs totalled
- Contamination Index -Predicted sources of contamination based on chemical fingerprints detected
- Significant VOCs - Highest concentration compounds detected in the sample from list of 150 of the most common indoor air VOCs
- EPA HAPS - Environmental Protection Agency Hazardous Air Pollutants
- TDT – Thermal Desorption Tube
- Sampling Pump/PATI-100 – Low flow sampling pump, battery operated and pre-calibrated to 200 ml/min flow.
- COC – Chain of Custody
- Sample Volume – Calculation based on duration of sampling using a set flow rate, i.e. how much air has passed through the sample tube.

What Are VOCs?

Volatile - Gas at Room Temperature, 6 – 16 Carbons with a boiling point: 50 – 250°C (~120 – 480° F).

Organic - Contains Carbon & Hydrogen atoms

Compound - Chemical



So many!

Hundreds commonly found; thousands exist

So different!

Hydrocarbons, aromatics, oxygenated (alcohols, aldehydes, ketones, esters, acids, glycol ethers), nitrogen (amines, amides), terpenes

When to Perform VOC Testing

Indoor air quality is very dynamic and can change with many different variables, here are some of the most common reasons for testing Indoor Air Quality:

- Odors
- Respiratory Irritations
- Health Concerns
- New Furnishings
- Remodel or New Construction
- Sensitized Individuals – New Diagnosis
- Significant Weather Events/Fire
- Each Season – Heating vs. Cooling

- Employee Exposure Concerns
- IAQ Certifications

Developing Your Sampling Plan –

Understand the Driving Force and Context from Your Client

- History
  - Recent changes
  - Nature of problem
- Occupants
  - Healthy vs. Chronic Condition
  - Children/Elderly
- Outdoor Conditions
  - Rain, winds, sun make it worse?
- Layout
  - Floors, open vs. closed
  - Basement, attached garage
- Ventilation system
- Activities
  - Hobbies
  - Storage/Collectables
- Central vs. Targeted location

Good Investigative Questions can move the project along in huge strides – Possibly discovering the issue/cause before sampling!

Developing Your Sampling Plan -

Deciding Number, Location, Time of Day, etc.

Now that you have a good understanding of the client's specific concern, the layout of the space including HVAC system, and have confirmed that it looks to be a VOC issue – you're ready to sample.

- Each tube can cover up to 2,000 sq. ft. on the same forced air HVAC. Use your training/experience for areas not serviced by one central HVAC.
- Separate levels of the space should be considered for separate sampling collections (basement, second floor).
- Central vs. Targeted location – concern spaces such as a bedroom should be one sample collection and if budget allows, a second sample from a non-complaint area should be collected for comparison (elimination of common VOCs).
- If tracking down an odor, be sure to collect when it is at its worst, if possible, for best chance of detection.

Developing Your Sampling Plan – Analysis Descriptions

- IAQ Home or Commercial Survey™
  - Basic: Includes TVOC, Contamination Index, Significant VOCs, Odorants, & EPA HAPS.
  - Predict: Includes TVOC, TMVOC, Contamination Index, Significant VOCs, Odorants, & EPA HAPS.
  - Reveal: Includes TVOC, TMVOC, Contamination Index, Significant VOCs, Odorants, EPA HAPS, and full chemical breakdown.
  - Formaldehyde: Formaldehyde concentration in ng/L and ppb.
  - PF Breakdown: Full chemical breakdown following initial report of the Basic or Predict options.
- IAQ Dust Survey
- Tobacco Smoke Check
- Many more available – Contact us for a sample report
  - Post Fire/Smoke Damage
  - Green Building Certifications
  - Vapor Intrusion/EPA Indoor Air Assessments

IAQ HOME SURVEY™ TEST OPTIONS			
FEATURES	BASIC	PREDICT	REVEAL
Product Code	A2-IAQHSB	A2-IAQHSP	A2-IAQHSR
Total VOCs	Included	Included	Included
Total Mold VOCs	Not Available	Included	Included
Contamination Index™	Home Version	Home Version	Home Version
Significant VOCs Identified	Included	Included	Replaced by Full Chemical Analysis
EPA Hazardous Air Pollutants (HAPs) Reported	Included	Included	Replaced by Full Chemical Analysis
Ability to do full chemical analysis without further air sampling	Included	Included	Not Applicable (Full Chemical Analysis Already Included)
Full chemical analysis with complete breakdown of chemical compounds	Available for Additional Charge	Available for Additional Charge	Included
Testing Environment	Residential Only	Residential Only	Residential Only
Formaldehyde Testing	Available for additional charge. Requires separate air sample.	Available for additional charge. Requires separate air sample.	Available for additional charge. Requires separate air sample.
Tobacco Smoke Testing	Available for additional charge. Must be requested at time sample is submitted.	Available for additional charge. Must be requested at time sample is submitted.	Available for additional charge. Must be requested at time sample is submitted.
Laboratory Consultation / Interpretation of Results	Limited	Limited, unless additional analysis ordered.	Included
Application	Residential Indoor Air Quality (IAQ) Screening	Residential Indoor Air Quality (IAQ) Screening, but significant issues are suspected.	Full residential Indoor Air Quality (IAQ) screening (detailed reporting).
Potential Users	Home buyers and home occupants desiring to know basic IAQ level of home, or who have older persons, children, or pregnant women in the home where mold is not a concern.	Anyone with chronic respiratory issues like asthma, bronchitis, or COPD; people with severe chemical sensitivities or allergies.	Home buyers purchasing foreclosed homes or suspect houses; anyone with severe respiratory illnesses, allergies, or chemical sensitivities; anyone needing additional documentation for potential legal proceedings.
Turnaround Time**	2 Business Days	2 Business Days	10 Business Days

Building Preparation

Residential

- ➔ Close outside doors and windows - preferably for one entire day before sampling.
- ➔ Leave all interior doors (including closets) open to allow the air to flow freely.
- ➔ Refrain from frying or cooking with oils the day before and during the test to prevent artificially high VOC results. Also, please do not cook at all during the test.
- ➔ Do not clean or dust during the test or within 12 hours of beginning the test.

Commercial

To the extent possible, keep the area closed and operating in a normal manner.

Industrial

Some industrial locations may have high concentrations, especially in production or manufacturing areas. If high concentrations are suspected or unusual sampling conditions exist, contact the lab to discuss sampling modifications (e.g., decrease sample collection time).

Know the most about the space that you can -
Consider having the client perform one or both of these free surveys and share their results: Hayward Score or QEESI

Building Preparation - What if….

- **Windows and outside doors are open when you arrive?**
  - Close them and wait approximately 30 to 60 minutes before starting test if client insists that it still be done that day
  - Note on report that windows and doors were open when you arrived
  - This will result in lower than normal readings
- **The indoor temperature is not between 60 - 80º F?**
  - Sampling can be done but it will not be the BEST representation, offer to come back when proper preparation steps are followed
  - Lower temperatures can cause VOCs to condense and produce low reading
  - Higher temperatures might cause a slightly higher TVOC reading

Building Preparation - What if….

- **You are requested to test in a specific location?**
  - Such as guest room only complaints, close this area off while sampling by shutting the door
  - A second sample collection where there isn't a complaint can assist by process of elimination of common contaminants in the spaces
- **You find out they just painted 2 days ago or had the maid in this morning?**
  - Performing activities such as these will elevate the VOCs present in the air, offer to return
  - Please extend us courtesy - If sampling must take place when there are known high concentrations, please note the Chain of Custody accordingly (we will put the sample at the end of a batch to ensure that it does not contaminant other subsequent samples on the instrument)

Be sure to note any observances that may impact the VOC reading on the COC

Sampling Event

- Ideal sampling temperature is 70F (21C).
  - Acceptable sampling temperature range is from 60-80F (15-27C).
- Closed to the exterior - open on the interior
- HVAC running if available (not required)
  - Fan will further mix chemicals so one test can cover more ground
- Place sampler in the most centralized area approximately 3-5 ft off the floor
  - This can be one individual room if there are specific concerns **or** the center of the floor/level to be tested
- No requirement for outdoor air sample

Equipment

Sample Media

- Multi-Matrix Thermal Desorption tubes (TDT)
  - 12-month shelf life
  - 4.5” x ¼” OD, Glass or Stainless-Steel options
- Formaldehyde Sorbent Tubes – Custom application
- DNPH Sorbent Tubes
- Dust Collectors
- Bio Slides (Tape Lifts)

Sampling Pump

- Low Flow PATI-100
  - Preset to 200 ml/min (0.2 LPM) flow
  - Battery operated
  - Pumps should be returned to Enthalpy every year for flow recertification

Before Site Visit
Equipment Preparation

Verify Pump Operation, use the following procedure

- Turn the pump on before using
  - Confirm LED – Light Emitting Diode is on
  - Confirm you can hear the pump turn on
- The sample pump has two holes on the top for battery checking

Check battery voltage before each use

  - **Check the batteries only with the pump in the off position**
  - New batteries should last about 60 hours or 30 sample collections
  - Batteries voltage should be greater than 4.5 VDC (B-Series) or 3.5 VDC (C-Series) for proper operation
    - The pump flow should run at 200 ml/min when voltage is greater than 4.5B/3.5C VDC

Verify Tube Freshness

- Check the expiration date on the encapsulating tube
  - If it is past the date on the tube, return to Enthalpy for replacement

Media Preparation

To prepare sample media use the following process

- Break the encapsulation tube at the score, marked with an “X”.Be sure the enclosed sampling tube is at the other end, out of the break zone
  - See sample instructions in TB 602 for proper technique
  - Remove the glass-wool plug. The sample tube should now easily slide out.
  - Be careful with the tube, it will break if it hits the floor
- If you happen to break a TDT
  - Note the number of the tube and notify Enthalpy
  - Discard the tube, pieces and all the adsorbent contents in a trash container
  - The adsorbent material is non-toxic, but it is difficult to get off fabric
- Identify the arrow on the sample media tube
  - The arrow should point **down** towards the sampling pump for correct sample flow

Sample Collection

- IAQ Home and Commercial Survey™ Samples
  - Use Standard tri-matrix tubes (3 dark sorbent materials inside the sample tube) for all VOC analyses including tobacco smoke
  - **VOC (A2 TDT) 2-4 hours recommended**
  - Longer sample durations may be declined as they can cause damage to instruments & provide inaccurate data
  - There are some VOC special considerations for duration, such as: small spaces such as vehicles, super high concentrations expected, intermittent band to catch odor or neighboring space complaints such as apartments, strip malls or condos. Please contact us to discuss the best sampling approach.
- IAQ Home and Commercial Survey™ Formaldehyde
  - Use the Formaldehyde specific tube (2 white and 1 dark sorbent materials inside the sample tube) for Formaldehyde tests
  - Formaldehyde (A14 TDT) – 20-30 minutes recommended (45 minutes maximum)

Collecting a Sample

https://youtu.be/T3LqgWehd3o

→ Remove sample collection tube

→ Place tube in pump

→ Turn pump on

→ Record Tube ID & Start Time on COC

Collecting a Sample (continued)

To complete sample collection

- Turn sample collection pump off
  - Note **Stop time** on COC
- Cap sample collection media with red caps
- Place sample collection media into 2 pc. plastic transport tube
  - Tube should fit snugly when two pieces are pressed together
  - Put tube in the foam sleeve and into the cardboard transport cylinder
- Sample tube requires no refrigeration
  - Be careful ,however, not to leave collected sample in a hot vehicle over 100º F
  - If high temperatures are expected, a cooler can be used but do not allow media to come into direct contact with ice blocks or packaged freezer packs. Use paper towels or some fabric to prevent contact with the cooling material.
- Complete COC and return to:

  Enthalpy Analytical-MTP 2625 Denison Dr, Ste D, Mt. Pleasant, MI 48858

ENTHALPY ANALYTICAL

2625 Denison Drive, Suite D, Mt. Pleasant, MI 48858
Tel: 989-772-5088 Fax: 989-772-5870
Email: mtpinfo@enthalpy.com
www.enthalpy.com

Chain of Custody

IAQ Home Survey™ IAQ Commercial Survey™

COC No:

Enthalpy Use Only – Do No

CONTACT INFORMATION		LOCATION TESTED	
Sampling Professional:	Phone:	Project Name:	Project No.
Company:	Email:	Address:	
Billing Address:			

It is important to fill out all information so your results can be correctly calculated and returned to you.
Please notify lab when a sample is shipped for any 1 business day (1 BD) rush turnaround request and by checking the box at bottom of page.

*Required Field - Please Write Legibly

	Sample Information						Analysis Requested*									Sample Name
							Residential			Commercial				Other		
Sample Number Enthalpy Use Only	Tube Number* Ex: AA123	Date Collected*	Pump Start Time*	Pump Stop Time*	Temperature	Humidity	A2-IAQHSB (IAQHS – Basic)	A2-IAQHSP (IAQHS – Predict)	A14-IAQHSF (Formaldehyde) *Max 30min sample*	A2-IAQCSB (IAQCS – Basic)	A2-IAQCSP (IAQCS – Predict)	A14-IAQCSF (Formaldehyde) *Max 30min sample*	A2-TSC (Tobacco Smoke)			Note: Briefly describe the actual sample collection location. Ex. Kitchen

Location, notes, and comments about testing:

Custody

Turn Around Time (TAT):	Requested Service:
STD: Within 2 business days of receipt for Basic, Predict, Formaldehyde. Within 5 business days for TSC. STD is default. 1 BD: 1 Business Day (2x $)	☐ Standard ☐ 1 BD *Note: STD is default*

Sent By:	Date:	Time:
Received By: (At Prism)	**Date:**	**Time:**

Chain of Custody Form

This is your contract with us to perform services

- Fill in company information block
  - Company Name, **Contact Name and Contact Info**
  - Address of sampling location, project # or name
- Fill in sample identification block
  - **Media/Tube ID**
  - Location and Date collected
  - **Analysis requested**
    - A2-IAQHSB, A2-IAQHSP, A14-IAQHSF; A2-TSC
    - A2-IAQCSB, A2-IAQCSP, A14-IAQCSF
    - Not sure? Don't guess, leave it blank or add a note to call you
  - **Start and Stop time**
    - No requirement to calculate total flow, unless a non-Enthalpy pump is used
- Special handling requests: Include rush analysis requests on COC
- Include pertinent details such as odor description or a recent event such as a fire or remodeling. Also include any specific symptoms or client concerns
- Custody release/Signature

Observations

Observations are valuable to all analytical techniques

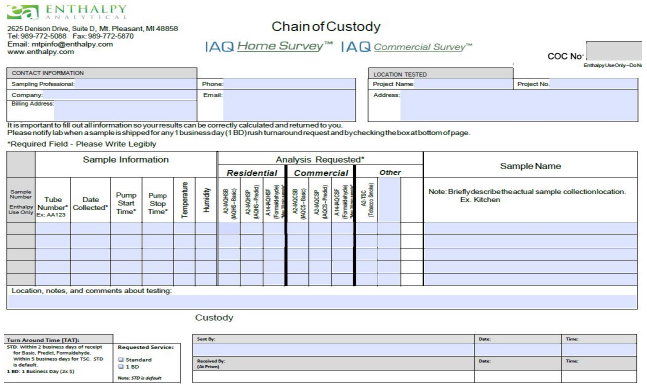
- **Write pertinent observations on the COC form**
  - Windows and doors open?
  - New paint, carpeting, etc.
  - Gas cans in attached garage or storage
  - Odors
    - Note any odors that you notice as you enter the building
    - Odors will seem to dissipate over time as your nose gets accustomed to odor
    - New paint, carpeting or furniture smell, animal odors, sewer gas odors, etc.
  - Fragrances placed in area (Potpourri, plug ins, wicking solutions)
  - Mold like substances on walls and surfaces

Returning Sample to Enthalpy

Recommended Sample Media Shipping Practices

- Place the sample tube with plastic transport tube into the foam shipping sleeve
- Place shipping sleeve into the hard cardboard shipping tube
- Cap the end of the shipping tube with white plastic cap
- **Do not** place shipping label directly on the shipping tube
  - To reduce waste, cardboard tubes are reused. Please do not write on them.
  - Shipping with the label directly on cardboard tube may result in the small package becoming lost or destroyed during transport
- Cardboard shipping tube along with completed COC can be placed in the following
  - Small Priority box from Post office – least costly 2 to 3 days delivery
    - No delivery confirmation without additional costs
  - Next day, 2-day or standard shipping from UPS or FedEx
    - Delivery confirmation available
    - Can use padded envelope or box, the cardboard tube with cap will protect the sample

Getting to the Lab



Order shipping labels at https://enthalpy.com/air/indoor-air/order-shipping-labels/

Confirmation & Results

- Receipt at the lab – review your email! A confirmation email will be sent to the email address provided on your testing form and will ***include the expected report date***

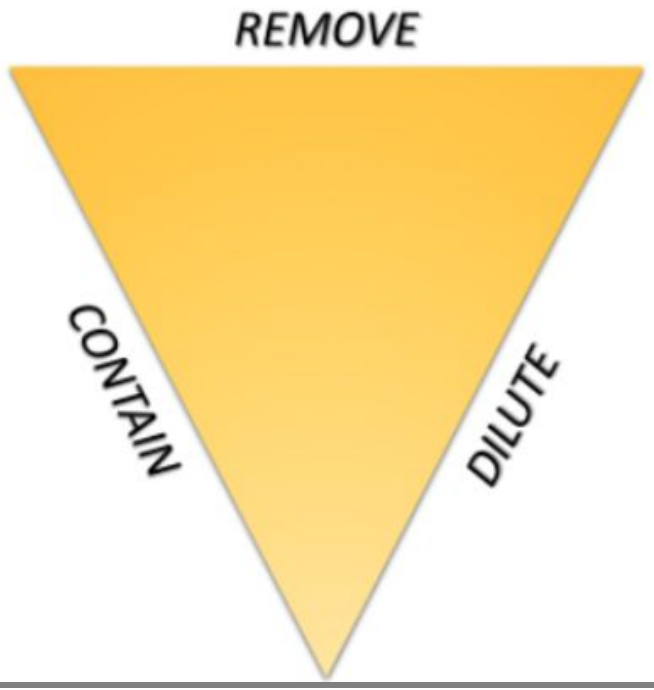
- Instrument work is initiated - Fancy Stuff with Expensive, Sensitive (at times finicky) Instruments. Once received, our chemists jump into action to begin running your sample(s)

- Data Analysis with Final Validation (all the QC/QA)

- And **SEND** ➡ Your report is off to your email inbox. At times, results may end up in spam, so always remember to check your spam folder if you don't see results

Taking Action

The "Big 3"



Remove

- Old paint containers
- Gasoline containers
- Gardening supplies (pesticides, etc.)
- Scented products

Contain

- Enclose Cleaning Supplies
- Separate Storage Area
- Seal Surfaces

Dilute

- Ventilation
- Air filtration
- Air purification

Steps to Reduce VOC Levels

Combine all 3 for the best results!

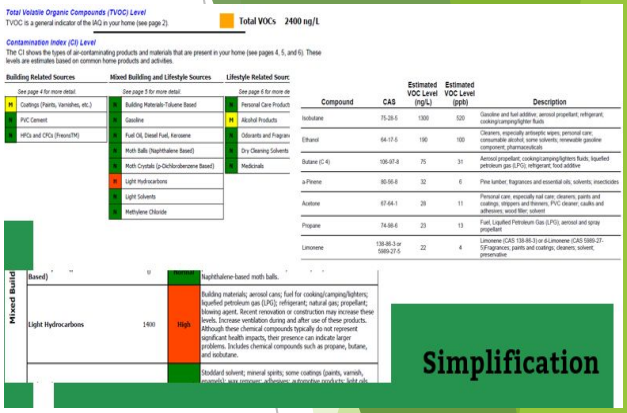
- **Removal** – gets rid of odor-causing chemicals, does not address what is already in the air
- **Containment** - slows the off gassing process, lower the current levels but takes longer to finish
- **Ventilation** – dilutes the amount in the air currently but doesn't get rid of the odor-causing chemicals

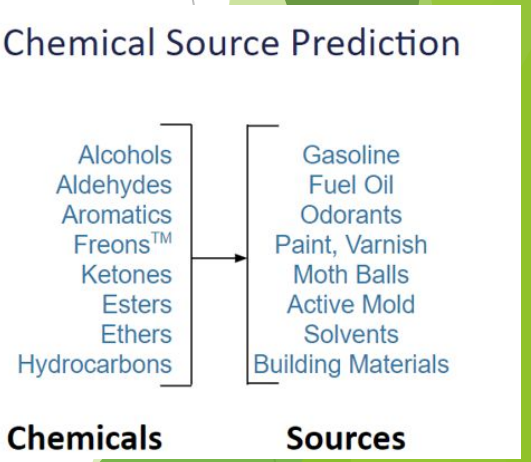
"Masking might cover an offensive odor, but doesn't get rid of odor-causing chemicals; it will only add to the number of chemicals in the air."

Customer Questions

We are happy to assist with interpretation of results

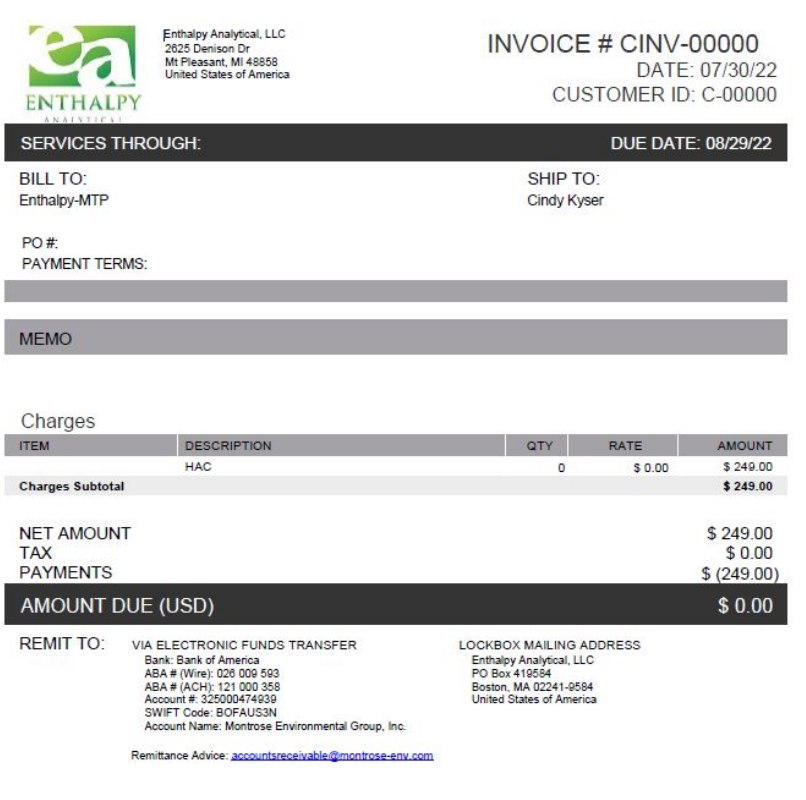
- When possible, we request that you set up a meeting time (30 minutes) to go over results. This gives us time to review results beforehand
- If your client has additional questions and you would like us to speak with them, we can do so via a 15-minute conference call including both you and your client. Please call our office (989)772-5088 to set up a conference call if needed
- Interpretation times exceeding those mentioned above may be subject to additional consulting fees
- If you would prefer we speak with your client direct, we will require approval in writing. Permission can be provided via email or on the COC with sample submission





Billing Procedure

- Media shipments are invoiced and charged the day following shipment
- Pump rental fees are invoiced with analyses, not at the time of shipment
- Analysis invoices are emailed and charged the day reports are due
- Invoices are typically emailed before results are released
- Invoices will be received via email from montrose@myworkday.com
- A check or valid credit card is required for each analysis. Payments can also be made via ACH.
- Questions regarding billing can be sent to Rebekah Armentrout Rebekah.Armentrout@enthalpy.com or Cindy Kyser Lucinda.Kyser@enthalpy.com
- If you need immediate assistance, please call our office at (989)772-5088



ENTHALPY ANALYTICAL

Enthalpy Analytical, LLC
2625 Denison Dr
Mt Pleasant, MI 48858
United States of America

INVOICE # CINV-00000
DATE: 07/30/22
CUSTOMER ID: C-00000

SERVICES THROUGH: DUE DATE: 08/29/22

BILL TO:
Enthalpy-MTP

SHIP TO:
Cindy Kyser

PO #:
PAYMENT TERMS:

MEMO

Charges

ITEM	DESCRIPTION	QTY	RATE	AMOUNT
	HAC	0	$ 0.00	$ 249.00
Charges Subtotal				**$ 249.00**

NET AMOUNT	$ 249.00
TAX	$ 0.00
PAYMENTS	$ (249.00)
AMOUNT DUE (USD)	$ 0.00

REMIT TO:

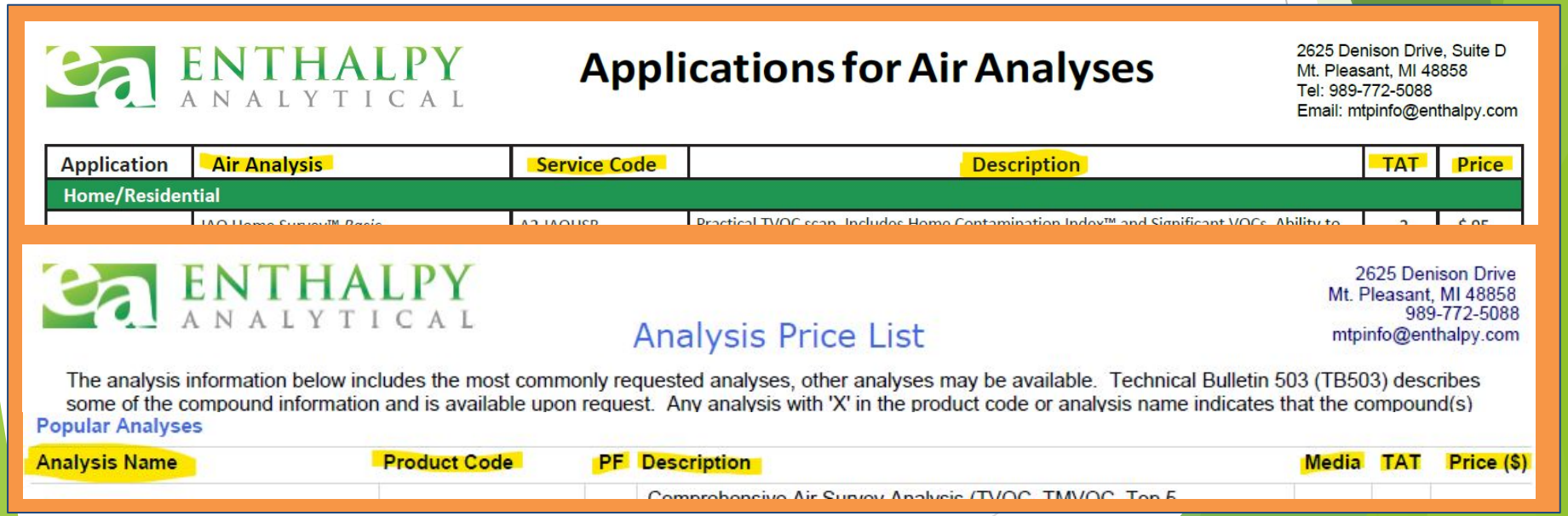
VIA ELECTRONIC FUNDS TRANSFER
Bank: Bank of America
ABA # (Wire): 026 009 593
ABA # (ACH): 121 000 358
Account #: 325000474939
SWIFT Code: BOFAUS3N
Account Name: Montrose Environmental Group, Inc.

Remittance Advice: accountsreceivable@montrose-env.com

LOCKBOX MAILING ADDRESS
Enthalpy Analytical, LLC
PO Box 419584
Boston, MA 02241-9584
United States of America

Reading our Price Sheet

- **Analysis Name**: Enthalpy designated name for each analysis
- **Product/Service Code**: The analysis code to be recorded on the COC
- **PF**: Check marked when a post-facto full breakdown is available after initial reporting
- **Description**: Describes what is included in each report
- **Media:** Indicates whether a VOC (A2) or formaldehyde (A14) sampling tube is needed
- **TAT**: Result turnaround time in business days
- **Price:** Cost per sample



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Applications for Air Analyses

2625 Denison Drive, Suite D
Mt. Pleasant, MI 48858
Tel: 989-772-5088
Email: mtpinfo@enthalpy.com

Application	Air Analysis	Service Code	Description	TAT	Price
Home/Residential					

ENTHALPY ANALYTICAL

2625 Denison Drive
Mt. Pleasant, MI 48858
989-772-5088
mtpinfo@enthalpy.com

Analysis Price List

The analysis information below includes the most commonly requested analyses, other analyses may be available. Technical Bulletin 503 (TB503) describes some of the compound information and is available upon request. Any analysis with 'X' in the product code or analysis name indicates that the compound(s)

Popular Analyses

Analysis Name	Product Code	PF	Description	Media	TAT	Price ($)

Ordering New Media/Pumps/Labels

Equipment & Shipping Labels

ORDER EQUIPMENT >

ORDER SHIPPING LABELS >

Need new sampling media, pumps or shipping labels?

- Sample tubes can be ordered via our website
- By emailing MTPinfo@enthalpy.com
- By calling our office (989)772-5088
- If additional sampling pumps are required, Enthalpy has pumps readily available for purchase or rental
- Return labels can be requested via our website. Labels are charged per use weekly.

Help us stay GREEN!

Open and/or Expired media can be reconditioned for reuse.

Skip the trash bin - email for a return shipping label to send us your media

Contacts

- For general inquiries/project planning contact Cindy Kyser Lucinda.kyser@enthalpy.com
- For result questions/interpretation, collaboration or large project planning contact Sarah Mack sarah.mack@enthalpy.com
- For media orders, updates on result due dates or general sampling questions contact our office at 989-772-5088 or email mtpinfo@enthalpy.com

Enthalpy Staff do our best to return calls/emails within one business day, although there are times this is not possible, such as:

*Gathering additional information
*Coordination with correct personnel
*Large call/email volume

Helpful Links

www.whatsinproducts.com

pubchem.ncbi.nlm.nih.gov

www.thegoodscentscompany.com

tiltresearch.org

haywardscore.com

www.acmt.net

www.ifm.org

We would like to thank you for using IAQ Home & Commercial Survey. Contact us if you have questions or issues with sample collection. Feel free to download this presentation as a reference document.

https://enthalpy.com/air/indoor-air/

Get Certified

Take our on-line Sampling Certification test.

Click here to take the test