



E n v i r o n m e n t a l C o n s u l t i n g G r o u p , I n c .

March 3, 2020

Mr. Dan Gilbert
District Office Supervisor of Maintenance & Facilities
Libertyville School District 70
1381 Lake Street
Libertyville, Illinois 60048

Re: **Formaldehyde Air Quality Retest**
 Highland Middle School
 310 West Rockland Road
 Libertyville, Illinois 60048

Dear Mr. Gilbert:

Environmental Consulting Group, Inc. (ECG) has completed a formaldehyde air quality retest at Libertyville SD 70 Highland Middle School, 310 West Rockland Road, Libertyville, Illinois, 60048. The assessment took place on February 18, 2020. This report summarizes the work performed, outlines the sampling methodology, and provides the analytical results along with conclusions.

If you have any questions or need additional information, please contact our office.

Sincerely,

ENVIRONMENTAL CONSULTING GROUP, INC.



Daniel Brust
Senior Project Manager





E n v i r o n m e n t a l C o n s u l t i n g G r o u p , I n c .

REPORT

**Formaldehyde Air Quality Retest
Highland Middle School
310 West Rockland Road
Libertyville, Illinois 60048**

Performed for:

Libertyville School District 70
1381 Lake Street
Libertyville, Illinois 60048

Prepared by:

Environmental Consulting Group, Inc.
105 S. York Road, Suite 250
Elmhurst, Illinois 60126
(630) 607-0060
www.ecgmidwest.com

ECG Project Number: II202651-150
Date: March 3, 2020

EXECUTIVE SUMMARY

On November 1, 2019, formaldehyde concentrations were tested in every occupiable room (classrooms, workrooms, conference rooms, gyms, offices, etc.) at Libertyville SD 70 Highland Middle School (HMS), 310 West Rockland Road, Libertyville, Illinois 60048. All the results were below the strictest applicable guideline (<0.0073 parts per million [ppm], according to ASHRAE 62.1-2016 / California EPA Office of Environmental Health Hazard Assessment), except for 3 locations which ranged from 0.008 to 0.020 ppm (Classroom 002, Workroom 101 and Learning Center 127).

At the request of HMS, on February 18, 2020, Environmental Consulting Group, Inc. (ECG) conducted a retest for formaldehyde at Libertyville SD 70 Highland Middle School (HMS), 310 West Rockland Road, Libertyville, Illinois, 60048 in Classroom 002, Workroom 101 and Learning Center 127.

Samples were submitted to Assay Technology in Boardman, Ohio for analysis. Assay Technology is accredited by the American Industrial Hygiene Association (AIHA) under Laboratory Number 100903. Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) analytical methods were followed for sampling and analysis protocols.

The formaldehyde concentrations were compared to the following standards and guidelines:

- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) – 0.1 ppm
- Center for Disease Control (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) – 0.008 ppm
- Indoor air quality standards developed by the Environmental Protection Agency (EPA) – Not Established
- Occupational Safety & Health Administration (OSHA) permissible exposure limit (PEL) – 0.75 ppm

The formaldehyde concentrations in Classroom 002, Workroom 101 and Outdoors were <0.0038 ppm. The formaldehyde concentration in Learning Center 127 was 0.0051 ppm. All the indoor formaldehyde concentrations were below the applicable standards and guidelines.

Table of Contents

1.0 PROJECT BACKGROUND.....1
2.0 METHODOLOGY & STANDARDS AND GUIDELINES.....2
3.0 RESULTS3
 FORMALDEHYDE.....3
4.0 CONCLUSIONS AND RECOMMENDATIONS.....3
5.0 QUALIFICATIONS4

APPENDICES

- Appendix A – Summary Table of IAQ Testing Results
- Appendix B – Floor Plan
- Appendix C – Laboratory Reports and Chains of Custody

1.0 PROJECT BACKGROUND

On November 1, 2019, formaldehyde concentrations were tested at Libertyville SD 70 Highland Middle School (HMS), 310 West Rockland Road, Libertyville, Illinois 60048. All the results were below the strictest applicable guideline (<0.0073 parts per million, according to ASHRAE 62.1-2016 / California EPA Office of Environmental Health Hazard Assessment), except for 3 locations which ranged from 0.008 to 0.020 ppm (Classroom 002, Workroom 101 and Learning Center 127).

Between December 2019 and February 2020, HMS made adjustments to the air handling units that provide conditioned air to these 3 locations and requested that ECG perform another assessment to re-evaluate the spaces for airborne formaldehyde concentrations in 002, 101 and 127.

This retest was designed by ECG Senior Project Manager, Mr. Daniel Brust. Mr. Dan Gilbert, Libertyville SD 70 District Office Supervisor of Maintenance & Facilities, provided assistance in completing this project.

Formaldehyde is a gas that may be emitted from many indoor sources, such as wood particleboard, plywood, fiberboard, glues and adhesives, carpeting, permanent pressed fabrics, and combustion sources. These materials may release formaldehyde into the air, usually when they are newer. This process, commonly referred to as “off-gassing,” may cause short-term health effects with symptoms including eye, nose, throat, and skin irritation, nausea, headache, allergic sensitization, and exacerbation of asthma.

When formaldehyde is present in the air at levels in excess of approximately 0.1 ppm, some individuals may experience adverse effects such as watery eyes; burning sensations in the eyes, nose, and throat; coughing; respiratory tract irritation; and skin irritation.

2.0 METHODOLOGY & STANDARDS AND GUIDELINES

Methodology

Formaldehyde concentrations were measured using Assay Technology 581 Formaldehyde Monitors. These formaldehyde monitors contain glass fiber filters, treated with 2,4-dinitrophenylhydrazine and phosphoric acid.

The formaldehyde monitors were placed in Classroom 002, Workroom 101 and Learning Center 127. A formaldehyde monitor was also placed outdoors, for comparison purposes. The monitors were placed in the ‘breathing zone’, between approximately 3 feet and 6 feet from the floor. The monitors collected air over a duration of 170 minutes, in order to measure formaldehyde concentrations down to a detection limit below 0.0073 parts per million (0.0073 ppm).

Samples were submitted to Assay Technology in Boardman, Ohio for analysis. Assay Technology is accredited by the American Industrial Hygiene Association (AIHA) under Laboratory Number 100903. Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) analytical methods were followed for sampling and analysis protocols.

Standards and Guidelines

The formaldehyde concentrations were compared to the following standards and guidelines:

- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs)
- Center for Disease Control (CDC) Agency for Toxic Substances and Disease Registry (ATSDR)
- Indoor air quality standards developed by the Environmental Protection Agency (EPA)
- Occupational Safety & Health Administration (OSHA) permissible exposure limit (PEL)

IAQ Limits & Guideline Levels

ACGIH TLV – 2020	0.1 ppm
CDC ATSDR	0.008 ppm
EPA	NE
OSHA PEL	0.75 ppm

ACGIH and OSHA limits are applicable to workers/employees. CDC and EPA are guidelines applicable to the public. Except for the OSHA PEL (a regulatory limit for workers), these guidelines are based on research conducted by each of these agencies. These health-based guidelines are established by professionals in the scientific community, including industry, research and educational settings. These guidelines do not represent a strict line between safe and unsafe exposure conditions, but they do represent exposure levels under which each of these agencies believes that a person may be exposed without adverse health effects.

3.0 RESULTS

A summary table of formaldehyde concentrations results is provided in Appendix A. A Floor plan of the facility is provided in Appendix B. The laboratory reports and chains of custody are provided in Appendix C.

Formaldehyde

During the IAQ assessment, no occupants or employees complained of any of the symptoms commonly associated with formaldehyde exposure and ECG's consultants did not experience or observe any of the symptoms associated with formaldehyde exposure.

Out of the 4 indoor locations that were tested, all the formaldehyde concentrations throughout the building, and outdoors, were less than the strictest guideline (CDC ATSDR 0.008 ppm):

- Classroom 002 <0.0034 ppm
- Workroom 101 <0.0033 ppm
- Learning Center 127 0.0051 ppm
- Outdoors <0.0038 ppm

4.0 CONCLUSIONS AND RECOMMENDATIONS

All the indoor formaldehyde concentrations were below the applicable standards and guidelines. No further action is needed in these spaces, other than to maintain the air handling units and provide sufficient fresh air into the spaces during occupancy.

5.0 QUALIFICATIONS

ECG believes this study was developed in general accordance with the technical standards of practice for indoor air testing at the time the study was conducted. The standard of care exercised for this study was in accordance with generally accepted practices, and a reasonable effort was made to ensure that the information presented in this report is materially complete and accurate.

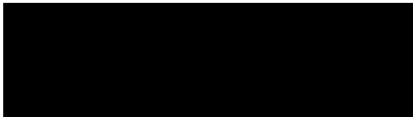
The conclusions presented in this report are professional opinions based solely upon visual observations of the site, analytical data, and other research as described in this report. They are intended for the sole use of our client. The scope of services performed in execution of this assessment may not be appropriate to satisfy the need of other users, and any use or reuse of this document of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Therefore, we cannot be responsible for independent conclusions, opinions or recommendations of others based on our study. If additional information from the site is generated, it should be provided to us so that we may evaluate its impact on our conclusions.

If you have any questions or need additional information, please contact our office.

Sincerely,

ENVIRONMENTAL CONSULTING GROUP, INC.



Daniel Brust
Senior Project Manager



Appendix A

Summary Table of IAQ Testing Results

Table 1: Summary of Indoor Air Quality Results

Highland Middle School
 310 West Rockland Avenue
 Libertyville, Illinois
 Date: 2-18-2020

Libertyville SD 70 IL202651-150 Formaldehyde Results Table

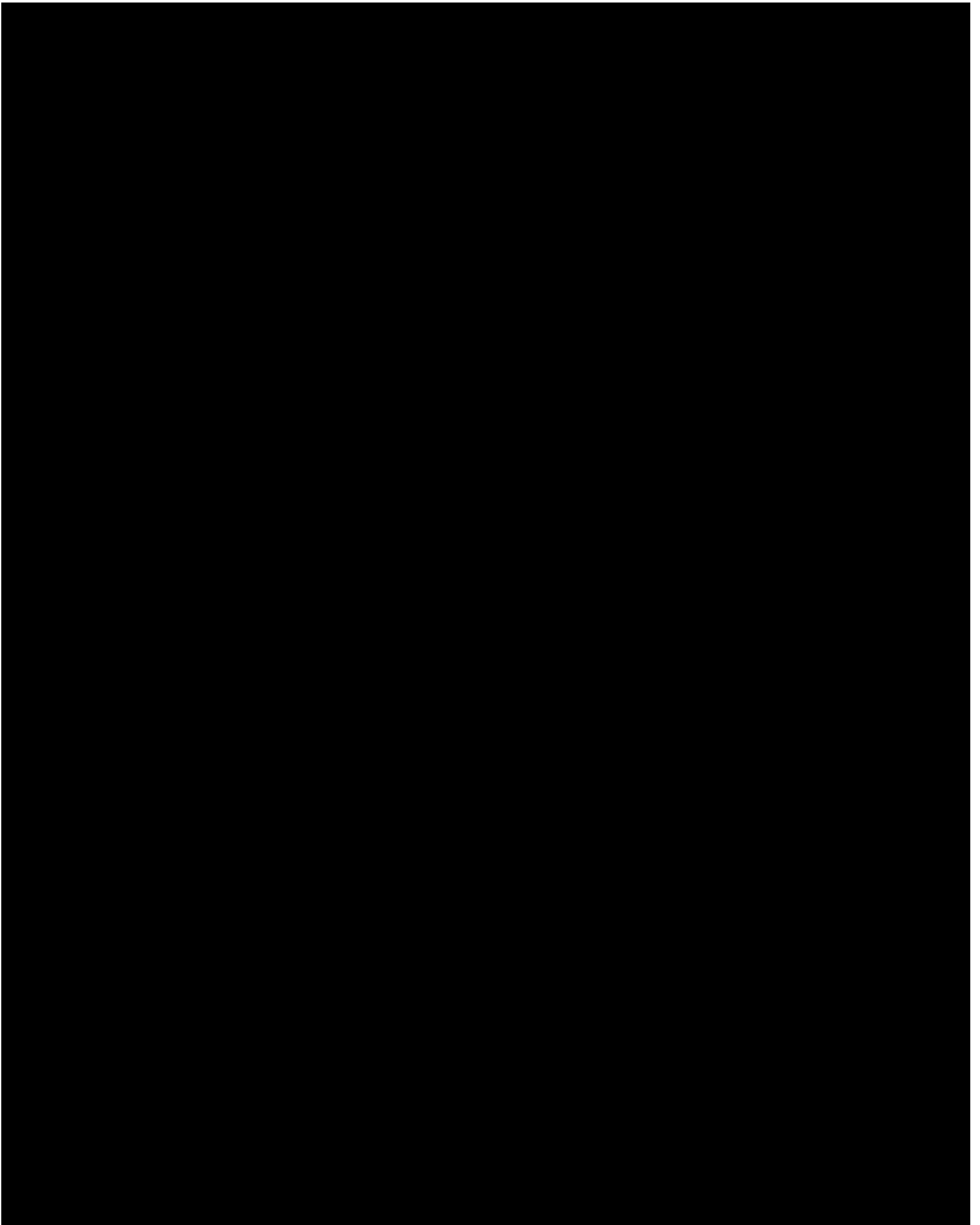
Sample Location	Duration (minutes)	Sample Number	Formaldehyde (ppm)	Type of Ventilation
IAQ Limits & Guideline Levels				
ACGIH-2020			0.1	/
CDC ATSDR			0.008**	
EPA			NE	
OSHA PEL			0.75	
Outdoors	172	OH0685	<0.0038	-
101 Workroom	202	OH0501	<0.0033	Ducted
002 Classroom	193	OH0391	<0.0034	Univent
127 Learning Center	196	OH0657	0.0051	Ducted

ppm = parts per million
 mg/m³ = milligrams per cubic meter of air
 TVOCs = Total Volatile Organic Compounds

NE = Not Established
 < = Less Than

Appendix B

Floor Plan



Appendix C

Laboratory Reports & Chains of Custody

Lab Report

Lab Work Order: 2020020518

Customer: ENVIRONMENTAL CONSULTING GROUP INC

Customer No.: 62813

Attention: DANIEL BRUST

Received Date: February 19, 2020

Address: 105 SOUTH YORK STREET
SUITE 250
ELMHURST, IL 60126
USA

Date Reported: February 26, 2020

Project ID: 11202651-150

Phone No.: (630) 607-0060

PO No.:

Fax No.: (630) 607-0650

Exposure results are the average concentration for the period of time monitored. '<' means the result is less than the RptLmt. RptLmt = Reporting Limit. The results relate only to the items tested. Unless noted below, samples were received in acceptable condition, all applicable quality control were within method specifications, lab blanks were subtracted before a result was reported, and any customer supplied field blanks were not subtracted from sample results. The molar volume at 25 C (24.45 L/mole) was used to calculate parts per million, ppm. Air concentrations reported are based upon field sampling information provided by the customer. For assistance with the content of this report, please visit the Customer Support section of our web site at <http://www.assaytech.com> or contact Technical Support at 1-800-833-1258. For details of significant method modifications go to www.assaytech.com/method.html.

Lab Sample ID	Lab Code	Date Sampled	Client Sample ID	Media	Media Lot / Serial #	Analytes Requested	Quantity Found		Sample Vol. (L)	Sample Time (min)	Concentration	
							Total	RptLmt			Units	Found
20006694	ATOH	02/18/2020	BLANK	581	11H19 - OH0628	FORMALDEHYDE	<	0.10	UG			
Analyzed By: JZATCHOK Analyzed On: 2/25/2020 Approved By: BEWING Approved On: 2/26/2020												
20006695	ATOH	02/18/2020	002 CL	581	11H19 - OH0391	FORMALDEHYDE	<	0.10	UG	23.9	193	< 0.0034 PPM
Analyzed By: JZATCHOK Analyzed On: 2/25/2020 Approved By: BEWING Approved On: 2/26/2020												
20006696	ATOH	02/18/2020	OA MAIN ENT	581	11H19 - OH0685	FORMALDEHYDE	<	0.10	UG	21.3	172	< 0.0038 PPM
Analyzed By: JZATCHOK Analyzed On: 2/25/2020 Approved By: BEWING Approved On: 2/26/2020												
20006697	ATOH	02/18/2020	127 LIBRARY	581	11H19 - OH0657	FORMALDEHYDE	0.15	0.10	UG	24.3	196	0.0051 PPM
Analyzed By: JZATCHOK Analyzed On: 2/25/2020 Approved By: BEWING Approved On: 2/26/2020												
20006698	ATOH	02/18/2020	101 WORKROOM	581	11H19 - OH0501	FORMALDEHYDE	<	0.10	UG	25.0	202	< 0.0033 PPM
Analyzed By: JZATCHOK Analyzed On: 2/25/2020 Approved By: BEWING Approved On: 2/26/2020												

Lab Report

Lab Work Order: 2020020518

Customer: ENVIRONMENTAL CONSULTING GROUP INC

Customer No.: 62813

Attention: DANIEL BRUST

Received Date: February 19, 2020

Address: 105 SOUTH YORK STREET
SUITE 250
ELMHURST, IL 60126
USA

Date Reported: February 26, 2020

Project ID: I1202651-150

Phone No.: (630) 607-0060

PO No.:

Fax No.: (630) 607-0650

Lab Sample ID	Lab Code	Date Sampled	Client Sample ID	Media	Media Lot / Serial #	Analytes Requested	Quantity Found		Sample Time (min)	Concentration	
							Total	RptLmt		Units	Vol. (L)

Method References:

TestCode 50000A
Analytes Requested FORMALDEHYDE

Method Reference MOD OSHA 1007

Regulatory Agency OSHA PEL / STEL

TWA Limit 0.75
STEL Limit 2
Exposure Units PPM

Applicable OSHA PELs or NIOSH RELS have been included in this lab report for guidance, but may not be sufficient for regulatory compliance. Clients should be aware that more stringent international, state, local, or organizational exposure limits may supersede the limits included with this report. Visit www.OSHA.gov/dsg/annotated-peils for detailed information on exposure limits and OSHA policies.

[Redacted Signature]

S. Green - Laboratory Director

[Redacted Signature]

K. Taylor - Ohio Supervisor

20-
006694

2020020518

Monitor Serial No.* 0H0628	LAB REQUEST FORM PLEASE Print Clearly & Complete all boxes	Assay Tech Customer No. 62813
--------------------------------------	---	---

Report To:

Name/Title/Mail Stop* Daniel Brust	
Company/Organization* Environmental Consulting Group, Inc.	E-Mail dbrust@envcg.com
Address* 105 South York Street, Suite 250	TEL* 630-607-0060
City/State/Zip* Elmhurst, IL 60126	FAX 630-607-0650

Sampling Data:

Client Sample ID (Name/Location) BLANK					
Start Time* —	AM PM	Stop Time* —	AM PM	OR OR	Time Sampled (min)* ∅
Date(s) Sampled* 02/18/2020	Sampled & Relinquished By Daniel Brust				

IMPORTANT! Record All Sampling Data!

Project Name/No. (optional): 11202651-150

Downloaded from website 9140-581 9/17

Check	CAS No.	CHEMICAL ANALYTE
	111-30-8	Glutaraldehyde
	643-79-8	o-Phthalaldehyde (Cidex OPA) *OPA must be analyzed separately*
	75-07-0	Acetaldehyde
	100-52-7	Benzaldehyde
	123-72-8	Butyraldehyde
	4170-30-3	Crotonaldehyde
✓	50-00-0	Formaldehyde
	66-25-1	Hexaldehyde (Hexanal)
	123-38-6	Propionaldehyde

Return to: AT Labs, 250 DeBartolo Place STE 2525, Boardman, OH 44512

* Minimum required fields. Failure to complete these fields may result in a delay of your samples being processed.

No clip

20-
006695

Monitor Serial No.* 040391	LAB REQUEST FORM PLEASE Print Clearly & Complete all boxes	Assay Tech Customer No.
--------------------------------------	---	-------------------------

Report To:

Name/Title/Mail Stop* Daniel Brust	
Company/Organization* Environmental Consulting Group, Inc.	E-Mail dbrust@envcg.com
Address* 105 South York Street, Suite 250	TEL* 630-607-0060
City/State/Zip* Elmhurst, IL 60126	FAX 630-607-0650

Sampling Data:

Client Sample ID (Name/Location) 002 CL			
Start Time* 713	<input checked="" type="radio"/> AM <input checked="" type="radio"/> PM	Stop Time* 1026	<input checked="" type="radio"/> AM <input checked="" type="radio"/> PM
		OR	Time Sampled (min)* 193
Date(s) Sampled* 02/18/2020	Sampled & Relinquished By Daniel Brust		

IMPORTANT! Record All Sampling Data!

Project Name/No. (optional): 11202651-150

Downloaded from website 9140-581 9/17

Check	CAS No.	CHEMICAL ANALYTE
	111-30-8	Glutaraldehyde
	643-79-8	o-Phthalaldehyde (Cidex OPA) *OPA must be analyzed separately*
	75-07-0	Acetaldehyde
	100-52-7	Benzaldehyde
	123-72-8	Butyraldehyde
	4170-30-3	Crotonaldehyde
✓	50-00-0	Formaldehyde
	66-25-1	Hexaldehyde (Hexanal)
	123-38-6	Propionaldehyde

Return to: AT Labs, 250 DeBartolo Place STE 2525, Boardman, OH 44512

* Minimum required fields. Failure to complete these fields may result in a delay of your samples being processed.

No Clif

20-
006696

Monitor Serial No.* 040685	LAB REQUEST FORM PLEASE Print Clearly & Complete all boxes	Assay Tech Customer No.
--------------------------------------	---	-------------------------

Report To:

Name/Title/Mail Stop* Daniel Brust	
Company/Organization* Environmental Consulting Group, Inc.	E-Mail dbrust@envcg.com
Address* 105 South York Street, Suite 250	TEL* 630-607-0060
City/State/Zip* Elmhurst, IL 60126	FAX 630-607-0650

Sampling Data:

Client Sample ID (Name/Location) OA MAIN ENT			
Start Time* 745	Stop Time* 1037	OR	Time Sampled (min)* 172
Date(s) Sampled* 02/18/2020	Sampled & Relinquished By Daniel Brust		

IMPORTANT! Record All Sampling Data!

Project Name/No. (optional): 11202651-150

Downloaded from website 9140-581 9/17

Check	CAS No.	CHEMICAL ANALYTE
	111-30-8	Glutaraldehyde
	643-79-8	o-Phthalaldehyde (Cidex OPA) *OPA must be analyzed separately*
	75-07-0	Acetaldehyde
	100-52-7	Benzaldehyde
	123-72-8	Butyraldehyde
	4170-30-3	Crotonaldehyde
✓	50-00-0	Formaldehyde
	66-25-1	Hexaldehyde (Hexanal)
	123-38-6	Propionaldehyde

Return to: AT Labs, 250 DeBartolo Place STE 2525, Boardman, OH 44512

* Minimum required fields. Failure to complete these fields may result in a delay of your samples being processed.

No Clip

20-
006697

Monitor Serial No.* 0H0657	LAB REQUEST FORM PLEASE Print Clearly & Complete all boxes	Assay Tech Customer No.
--------------------------------------	---	-------------------------

Report To:

Name/Title/Mail Stop* Daniel Brust	
Company/Organization* Environmental Consulting Group, Inc.	E-Mail dbrust@envcg.com
Address* 105 South York Street, Suite 250	TEL* 630-607-0060
City/State/Zip* Elmhurst, IL 60126	FAX 630-607-0650

Sampling Data:

Client Sample ID (Name/Location) 127 LIBRARY			
Start Time* 707	Stop Time* 1023	OR	Time Sampled (min)* 196
Date(s) Sampled* 02/18/2020	Sampled & Relinquished By Daniel Brust		

IMPORTANT! Record All Sampling Data!

Project Name/No. (optional): 11202651-150

Downloaded from website 9140-581 9/17

Check	CAS No.	CHEMICAL ANALYTE
	111-30-8	Glutaraldehyde
	643-79-8	o-Phthalaldehyde (Cidex OPA) *OPA must be analyzed separately*
	75-07-0	Acetaldehyde
	100-52-7	Benzaldehyde
	123-72-8	Butyraldehyde
	4170-30-3	Crotonaldehyde
✓	50-00-0	Formaldehyde
	66-25-1	Hexaldehyde (Hexanal)
	123-38-6	Propionaldehyde

Return to: AT Labs, 250 DeBartolo Place STE 2525, Boardman, OH 44512

* Minimum required fields. Failure to complete these fields may result in a delay of your samples being processed.

No Clif

20-
006698

Monitor Serial No.* 0H0501	LAB REQUEST FORM <i>PLEASE</i> Print Clearly & Complete all boxes	Assay Tech Customer No.
--------------------------------------	--	-------------------------

Report To:

Name/Title/Mail Stop* Daniel Brust	
Company/Organization* Environmental Consulting Group, Inc.	E-Mail dbrust@envcg.com
Address* 105 South York Street, Suite 250	TEL* 630-607-0060
City/State/Zip* Elmhurst, IL 60126	FAX 630-607-0650

Sampling Data:

Client Sample ID (Name/Location) 101 WORK ROOM			
Start Time* 709 AM PM	Stop Time* 1031 AM PM	OR	Time Sampled (min)* 202
Date(s) Sampled* 02/18/2020	Sampled & Relinquished By Daniel Brust		

IMPORTANT! Record All Sampling Data!

Project Name/No. (optional): 11202651-150

Downloaded from website 9140-581 9/17

Check	CAS No.	CHEMICAL ANALYTE
	111-30-8	Glutaraldehyde
	643-79-8	o-Phthalaldehyde (Cidex OPA) *OPA must be analyzed separately*
	75-07-0	Acetaldehyde
	100-52-7	Benzaldehyde
	123-72-8	Butyraldehyde
	4170-30-3	Crotonaldehyde
✓	50-00-0	Formaldehyde
	66-25-1	Hexaldehyde (Hexanal)
	123-38-6	Propionaldehyde

Return to: AT Labs, 250 DeBartolo Place STE 2525, Boardman, OH 44512

* Minimum required fields. Failure to complete these fields may result in a delay of your samples being processed.

No Clif