ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING

5301 East River Road, Suite 101
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ENVIRONMENTAL HEALTH SURVEY REPORT
INDUSTRIAL HYGIENE SURVEY
AIR SAMPLING FOR RESPIRABLE DUST AND SILICA

For

GRACO, INC.
88 – 11TH AVENUE NORTHEAST
MINNEAPOLIS, MINNESOTA 55413

AIRBORNE RESPIRABLE DUST AND SILICA SAMPLING
DURING
THREE SEPARATE BLASTING OPERATIONS

1. **Schmidt AmphiBlast™ "Dry"**
2. **Schmidt AmphiBlast™ "Wet"**
3. **GRACO EcoQuip 2 EQs Elite**

ATC Project No. M50327-0001

Report Date:
July 2, 2018

Conducted by: Kevin Cairns, Certified Industrial Hygienist

Report Prepared by: Kevin Cairns, Certified Industrial Hygienist

ABIH Certification #5688

Graco Contacts: Adam Feia, Senior Safety Specialist
Courtney Beall, Marketing Manager
Bryce Gapinski, Product Manager
Patrick Ackerman, Mechanical Engineer

EXECUTIVE SUMMARY

ATC Group Services, LLC (ATC) was retained by Graco Inc. to perform an Industrial Hygiene Survey in order to assist the company in evaluating potential exposures to **respirable airborne dust** and **respirable silica** during three separate blasting operations. All air sampling was performed on June 5, 2018. ATC collected five air samples for respirable dust and silica during each of the three blasting operations for a total of 15 air samples. All blasting operations were performed in the same outdoor location at the Graco facility located at 88 - 11th Avenue Northeast in Minneapolis, Minnesota. The specific setup and the air sampling results for all three tests were as follows:

Media: Medium recycled crushed glass
Blast Hose: 50' x 1.25" ID
Nozzle: #8 high performance
Compressor: Doosan 425 CFM
Substrate: 4' x 4' Concrete Slab placed in a Vertical Position against a Wall
Blasting time per test: 25 to 28 minutes
Personal Air Samples Per Test: One personal air sample in the breathing zone of the blaster operator
Area Air Samples Per Test: Four samples placed about 5' from Concrete Slab at height of about 4-5'

1. Blasting Operation #1 (Schmidt AmphiBlast™ "Dry")

Respirable dust levels for the five air samples ranged from 11 to 24 milligrams per cubic meter of air (mg/m^3) with an average of 15 mg/m^3. All five air sampling results were **well above** the 8-hour time-weighted average (TWA) Federal OSHA Permissible Exposure Limit (PEL) for respirable dust of 5.0 mg/m^3.

Respirable crystalline silica (RCS) results for the five air samples ranged from 200 to 260 micrograms of RCS per cubic meter of air (ug/m^3) with an average of 232 ug/m^3. All five air sampling results were **well above** the 8-hour TWA Federal OSHA PEL for RCS of 50 ug/m^3.

2. Blasting Operation #2 (Schmidt AmphiBlast™ "Wet")

Respirable dust levels for the five air samples ranged from 5.2 to 33 mg/m^3 with an average of 14 mg/m^3. All five air sampling results were **above** the 8-hour TWA Federal OSHA PEL for respirable dust of 5.0 mg/m^3.

Respirable crystalline silica results for the five air samples ranged from 89 to 130 ug/m^3 with an average of 109 ug/m^3. All five air sampling results were **above** the 8-hour TWA Federal OSHA PEL for RCS of 50 ug/m^3.

3. Blasting Operation #3 (GRACO EcoQuip 2 EQs Elite)

Respirable dust levels for the five air samples ranged from 0.78 to 5.5 mg/m^3 with an average of 2.5 mg/m^3. Only one of the five air sampling results was **above** the 8-hour TWA Federal OSHA PEL for respirable dust of 5.0 mg/m^3.

Respirable crystalline silica results for the five air samples ranged from "none detected" (< 25) to 65 ug/m^3 with an average of less than 41 ug/m^3. Two of the five air sampling results were **above** the 8-hour TWA Federal OSHA PEL for RCS of 50 ug/m^3.

4. Comparison of Three Blasting Operations

Respirable dust and respirable crystalline silica results were significantly lower with the Graco EcoQuip 2 EQs Elite when compared to the Schmidt AmphiBlast™ in both the "wet" and "dry" modes. Average respirable dust levels were about 82% lower and average respirable crystalline silica levels were about 62% lower when using the Graco EcoQuip 2 EQs Elite as compared to the Schmidt AmphiBlast™ in the "wet" mode.

TABLE OF CONTENTS

APPENDICES

ENVIRONMENTAL • GEOTECHNICAL
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1. INTRODUCTION

ATC Group Services, LLC (ATC) was retained by Graco Inc. to perform an Industrial Hygiene Survey in order to assist the company in evaluating potential exposures to **respirable airborne dust** and **respirable silica** during three separate blasting operations. All air sampling was performed on June 5, 2018. ATC collected five air samples for respirable dust and silica during each of the three blasting operations for a total of 15 air samples. All blasting operations were performed in the same outdoor location at the Graco facility located at 88 - 11th Avenue Northeast in Minneapolis, Minnesota.

The purpose of the industrial hygiene survey was to compare and document airborne respirable dust and respirable silica levels during three separate blasting operations. An attempt was made to keep all blasting parameters constant for the three scenarios with the exception of the blasting equipment used and the usage of water. Blasting was performed on a 4' x 4' slab of concrete placed vertically against the exterior wall of a building. The blaster was instructed to blast back and forth across the face of the concrete slab in a sweeping motion, generally from top to bottom and from left to right. Total air sampling time for each of the three blasting operations ranged from 25 to 28 minutes. During the first air sampling period, blasting was stopped for about 5 minutes to reload the hopper with media providing a blasting time of 23 minutes during the 28 minute air sampling period. To maintain similar blasting times during the second and third blasting operations, the blasting was also stopped for about 5 minutes during the second and third air sampling periods. The specific setup parameters for all three tests were as follows:

Media: Medium recycled crushed glass
Blast Hose: 50' x 1.25" ID
Nozzle: #8 high performance
Compressor: Doosan 425 CFM
Substrate: 4' x 4' Concrete Slab placed in a Vertical Position against a Wall
Blasting time per test: 25 to 28 minutes
Personal Air Samples Per Test: One personal air sample in the breathing zone of the blaster operator
Area Air Samples Per Test: Four samples placed about 5' from Concrete Slab at height of about 4-5'

2. METHODS

2.1 Air Sampling for Respirable Dust and Respirable Silica

Respirable crystalline silica (quartz) exposure was evaluated by X-ray diffraction per a modified version of NIOSH 7500 and OSHA ID-142. Sampling pumps were calibrated before and after sampling using a precision rotameter (calibrated against a primary standard). Samples were collected with SKC manufactured disposable 8.0 LPM respirable Parallel Particle Impactors (PPIs) filled with pre-weighed 37 mm PVC filters. Sampling rates were initially set at 8.0 liters per minute, as required for respirable silica sampling with the 8.0 LPM PPIs.

For personal sampling, the battery-powered air sampling pump was hung from the selected worker's belt. The sampling media was attached at the collar in the breathing zone. The area air samples were collected with high volume electric sampling pumps. The area samples were placed at a height of approximately four feet. Following sampling, the samples were post calibrated before being capped and shipped to the laboratory for analysis.

2.2 Laboratory Qualifications

For this project, laboratory analysis was performed by SGS Galson Laboratory (Galson) located in East Syracuse, New York. Galson is accredited by the American Industrial Hygiene Association under the Laboratory Accreditation Program (AIHA-LAP ID #100324).

3. STANDARDS

Employee exposures to airborne contaminants are regulated by Federal OSHA standards in the United States. Occupational exposures to airborne contaminants are evaluated by comparing them to Permissible Exposure Limits (PELs) and Short-Term Exposure Limits (STELs) established by OSHA. PELs are time-weighted average (TWA) concentrations for a normal 8-hour workday or a 40-hour workweek. STELs are 15-minute TWA concentrations that shall not be exceeded anytime during the workday. If an exposure exceeds the listed PEL or STEL, controls are required to reduce the exposure below the PEL or STEL. To control employee exposures within allowable limits, OSHA requires implementation of engineering controls, or product substitution, if feasible. If not, administrative controls (work scheduling) or personal protective equipment (respirators) must be employed. Personal protective equipment is considered a temporary control to be used only until engineering or administrative controls can be devised. The current PELs for the materials sampled during this survey are as follows:

Table of OSHA Standards

Material	8-hour TWA Federal OSHA PEL	Federal OSHA STEL
Total Particulates Not Otherwise Regulated	5,000 ug/m^3 (respirable)	No Limit
Silica, Crystalline (quartz - respirable)	Action Level = 25 ug/m^3 PEL = 50 ug/m^3	No Limit

Organizations:

ACGIH -American Conference of Governmental Industrial Hygienists - widely recognized professional organization that recommends exposure Threshold Limit Values (TLVs).

OSHA - Occupational Safety and Health Administration - enforces 8-hour Action Levels (AL), Permissible Exposure Limits (PELs), and the Short-Term Exposure Limits (STELs).

Notes: "µg/m^3," denotes micrograms of contaminant per cubic meter of air.
"TWA" denotes time-weighted average.

4. RESULTS

4.1 Results for Blasting Operation #1 (Schmidt AmphiBlast™ "Dry")

Sample Information	Start/Stop Times	Material Sampled	Measured Exposure	OSHA PEL 8-hr TWA
Sample: 1-36086 Personal sample on blaster operator	9:52 am to 10:20 am	Respirable Dust Respirable Silica	**11,000 µg/m³** **200 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 2-36107 Area sample about 5' to the north of the blasting operation	9:53 am to 10:21 am	Respirable Dust Respirable Silica	**13,000 µg/m³** **260 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 3-36062 Area sample about 5' to the northeast of the blasting operation	9:53 am to 10:21 am	Respirable Dust Respirable Silica	**12,000 µg/m³** **240 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 4-36065 Area sample about 5' to the southeast of the blasting operation	9:53 am to 10:21 am	Respirable Dust Respirable Silica	**13,000 µg/m³** **210 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 5-36071 Area sample about 5' to the south of the blasting operation	9:53 am to 10:21 am	Respirable Dust Respirable Silica	**24,000 µg/m³** **250 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Summary Statistics		**Range of Respirable Dust Levels**	**11,000 to 24,000 µg/m³**	
		Average of Respirable Dust Levels	**15,000 µg/m³**	
		Range of Respirable Silica Levels	**200 to 260 µg/m³**	
		Average of Respirable Silica Levels	**232 µg/m³**	

OSHA - Federal Occupational Safety and Health Administration - enforces 8-hour Action Levels (AL), Permissible Exposure Limits (PELs), and the Short-Term Exposure Limits (STELs).

Notes: "TWA" denotes time-weighted average
"µg/m³" denotes micrograms of contaminant per cubic meter of air.
"AL" denotes OSHA Action Level
"<" denotes that the contaminant, if found, was less than the laboratory's minimum reporting limit.
Results that equal or exceed an OSHA PEL are indicated in **bold red** font.
Blasting did not occur for 5 minutes from 10:02 am to 10:07 am while the blaster hopper was refilled.

4.2 Results for Blasting Operation #2 (Schmidt AmphiBlast™ "Wet")

Sample Information	Start/Stop Times	Material Sampled	Measured Exposure	OSHA PEL 8-hr TWA
Sample: 6-36077 Personal sample on blaster operator	10:30 am to 10:55 am	Respirable Dust Respirable Silica	**5,300 µg/m³** **89 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 7-36080 Area sample about 5' to the north of the blasting operation	10:31 am to 10:56 am	Respirable Dust Respirable Silica	**33,000 µg/m³** **130 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 8-36119 Area sample about 5' to the northeast of the blasting operation	10:31 am to 10:56 am	Respirable Dust Respirable Silica	**5,200 µg/m³** **110 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 9-36131 Area sample about 5' to the southeast of the blasting operation	10:31 am to 10:56 am	Respirable Dust Respirable Silica	**6,200 µg/m³** **95 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Sample: 10-36134 Area sample about 5' to the south of the blasting operation	10:31 am to 10:56 am	Respirable Dust Respirable Silica	**22,000 µg/m³** **95 µg/m³**	**5,000 µg/m³** **50 µg/m³** **(25 µg/ m³ AL)**
Summary Statistics		**Range of Respirable Dust Levels**	**5,200 to 33,000 µg/m³**	
		Average of Respirable Dust Levels	**14,000 µg/m³**	
		Range of Respirable Silica Levels	**89 to 130 µg/m³**	
		Average of Respirable Silica Levels	**109 µg/m³**	

OSHA - Federal Occupational Safety and Health Administration - enforces 8-hour Action Levels (AL), Permissible Exposure Limits (PELs), and the Short-Term Exposure Limits (STELs).

Notes: "TWA" denotes time-weighted average
"µg/m³" denotes micrograms of contaminant per cubic meter of air.
"AL" denotes OSHA Action Level
"<" denotes that the contaminant, if found, was less than the laboratory's minimum reporting limit.
Results that equal or exceed an OSHA PEL are indicated in **bold red** font.
Blasting did not occur for 5 minutes from 10:51 am to 10:56 am for better comparison with blasting operation #1.

4.3 Results for Blasting Operation #3 (GRACO EcoQuip 2 EQs Elite)

Sample Information	Start/Stop Times	Material Sampled	Measured Exposure	OSHA PEL 8-hr TWA
Sample: 11-45722 Personal sample on blaster operator	11:51 am to 12:20 pm	Respirable Dust Respirable Silica	2,900 µg/m^3 **61 µg/m^3**	5,000 µg/m^3 **50 µg/m^3** **(25 µg/ m^3 AL)**
Sample: 12-45731 Area sample about 5' to the north of the blasting operation	11:52 am to 12:21 pm	Respirable Dust Respirable Silica	**5,500 µg/m^3** **65 µg/m^3**	**5,000 µg/m^3** **50 µg/m^3** **(25 µg/ m^3 AL)**
Sample: 13-45719 Area sample about 5' to the northeast of the blasting operation	11:52 am to 12:21 pm	Respirable Dust Respirable Silica	780 µg/m^3 < 25 µg/m^3	5,000 µg/m^3 50 µg/m^3 (25 µg/ m^3 AL)
Sample: 14-45675 Area sample about 5' to the southeast of the blasting operation	11:52 am to 12:21 pm	Respirable Dust Respirable Silica	1,500 µg/m^3 29 µg/m^3	5,000 µg/m^3 50 µg/m^3 (25 µg/ m^3 AL)
Sample: 15-45551 Area sample about 5' to the south of the blasting operation	11:52 am to 12:21 pm	Respirable Dust Respirable Silica	2,000 µg/m^3 < 25 µg/m^3	5,000 µg/m^3 50 µg/m^3 (25 µg/ m^3 AL)
Sample: 16-63364 Field Blank		Respirable Dust Respirable Silica	< 50 ug < 5.0 ug	
Summary Statistics		**Range of Respirable Dust Levels**	780 to **5,500 µg/m^3**	
		Average of Respirable Dust Levels	2,500 µg/m^3	
		Range of Respirable Silica Levels	< 25 to **65 µg/m^3**	
		Average of Respirable Silica Levels	< 41 µg/m^3	

OSHA - Federal Occupational Safety and Health Administration - enforces 8-hour Action Levels (AL), Permissible Exposure Limits (PELs), and the Short-Term Exposure Limits (STELs).

Notes: "TWA" denotes time-weighted average
"µg/m^3" denotes micrograms of contaminant per cubic meter of air.
"AL" denotes OSHA Action Level
"<" denotes that the contaminant, if found, was less than the laboratory's minimum reporting limit.
Results that equal or exceed an OSHA PEL are indicated in **bold red** font.
Blasting did not occur for a total of 5 minutes from 11:51 am to 11:54 am and again from 11:55 am to 11:57 am.
No blasting and no air sampling occurred for 5 additional minutes from 11:57 am to 12:02 pm.
All air sampling and blasting resumed at 12:02 pm.

4.4 Comparison of Three Blasting Operations

	Operation #1: Schmidt AmphiBlast™ "Dry"	Operation #2: Schmidt AmphiBlast™ "Wet"	Operation #3: GRACO EcoQuip 2 EQs Elite
Range of Respirable Dust Levels	**11,000 to 24,000 µg/m³**	**5,200 to 33,000 µg/m³**	780 to **5,500 µg/m³**
Average of Respirable Dust Levels	**15,000 µg/m³**	**14,000 µg/m³**	2,500 µg/m³ (82% reduction compared to operation #2)
Range of Respirable Silica Levels	**200 to 260 µg/m³**	**89 to 130 µg/m³**	< 25 to **65 µg/m³**
Average of Respirable Silica Levels	**232 µg/m³**	**109 µg/m³**	< 41 µg/m³ (> 62% reduction compared to operation #2)

Notes: "µg/m³" denotes micrograms of contaminant per cubic meter of air.
"<" denotes that the contaminant, if found, was less than the laboratory's minimum reporting limit.
Results that equal or exceed an OSHA PEL are indicated in **bold red** font

5. CONCLUSIONS

The purpose of the industrial hygiene survey was to compare and document airborne respirable dust and respirable silica levels during three separate blasting operations. Four area air samples and one personal air sample were taken for each of the three blasting operations. The four area samples were positioned to surround the employee performing the blasting in four general directions at a distance of approximately five feet. The five foot distance from the operator was chosen to ensure that measureable levels of respirable silica were detected given the short air sampling durations and to allow comparisons between the three blasting operations. All significant blasting parameters remained constant for the three scenarios with the exception of the blasting equipment used and the usage of water.

1. Schmidt AmphiBlast™ "Dry"
2. Schmidt AmphiBlast™ "Wet"
3. GRACO EcoQuip 2 EQs Elite

Respirable dust and respirable crystalline silica results were significantly lower with the Graco EcoQuip 2 EQs Elite when compared to the Schmidt AmphiBlast™ in both the "wet" and "dry" modes. Average respirable dust levels were about 82% lower and average respirable crystalline silica levels were about 62% lower when using the Graco EcoQuip 2 EQs Elite as compared to the Schmidt AmphiBlast™ in the "wet" mode.

When compared to the Schmidt AmphiBlast™ in the "dry" mode, the usage of the Graco EcoQuip 2 EQs Elite provided a reduction in average respirable dust levels of about 83% and a reduction in average respirable crystalline silica levels of about 82%.

We appreciate the opportunity to be of service to your office. If you have any questions regarding this report or require further assistance, please contact Kevin Cairns, Certified Industrial Hygienist, at 651-295-4037 or at kevin.cairns@atcgs.com.

Sincerely,

ATC Group Services, LLC

Kevin B. Cairns, CIH, MS
Senior Technical Director / Industrial Hygiene

Attachments:

Appendix I:	Air Sampling Laboratory Report
Appendix II:	Photographs

APPENDIX I

SGS GALSON

Mr. Kevin Cairns
ATC Group Services LLC
5301 East River Road
Suite 101
Fridley, MN 55421

June 14, 2018

DOH ELAP #11626
AIHA-LAP #100324

Account# 21643

Login# L445578

Dear Mr. Cairns:

Enclosed are the analytical results for the samples received by our laboratory on June 07, 2018. All test results meet the quality control requirements of AIHA-LAP and NELAC unless otherwise stated in this report. All samples on the chain of custody were received in good condition unless otherwise noted.

Results in this report are based on the sampling data provided by the client and refer only to the samples as they were received at the laboratory. When possible, non-IOM samples will be retained for 14 days following the date of this report (unless an extension is specifically requested). IOM samples are retained for 7 days.

Current Scopes of Accreditation can be viewed at www.sgsgalson.com in the accreditations section of the "About" page.

Please contact Patty Gregorich at (888) 432-5227, if you would like any additional information regarding this report. Thank you for using SGS Galson.

Sincerely,

SGS Galson

Lisa Swab
Laboratory Director

Enclosure(s)

SGS GALSON

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.galsonlabs.com

LABORATORY ANALYSIS REPORT

Client : ATC Group Services (fka Applie
Site : Graco Mpls
Project No. : 18-0525GRAC
Date Sampled : 05-JUN-18
Date Received : 07-JUN-18

Account No.: 21643
Login No. : L445578

Date Analyzed : 11-JUN-18 - 12-JUN-18
Report ID : 1070417

Respirable Dust

Sample ID	Lab ID	Air Vol liter	Total mg	Conc mg/m3
1-36086 PERSON TEST1	L445578-1	224	2.4	11
2-36107 AREA N TEST1	L445578-2	224	3.0	13
3-36062 AREA NETEST1	L445578-3	224	2.6	12
4-36065 AREA SETEST1	L445578-4	224	2.8	13
5-36071 AREA S TEST1	L445578-5	224	5.4	24
6-36077 PERSON TEST2	L445578-6	208	1.1	5.3
7-36080 AREA N TEST2	L445578-7	208	6.8	33
8-36119 AREA NETEST2	L445578-8	208	1.1	5.2
9-36131 AREA SETEST2	L445578-9	208	1.3	6.2
10-36137 AREA STEST2	L445578-10	208	4.5	22
11-45722 PERSONTEST3	L445578-11	200	0.59	2.9
12-45731AREA N TEST3	L445578-12	200	1.1	5.5
13-45731AREA NETEST3	L445578-13	200	0.16	0.78
14-45675 AREASETEST3	L445578-14	200	0.29	1.5
15-45551 AREA STEST3	L445578-15	200	0.40	2.0
16-63364 BLANK	L445578-16	NA	<0.050	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 0.050 mg
Analytical Method : mod. NIOSH 0600; Gravimetric
OSHA PEL : PNOR 5 mg/m3 (TWA)
Collection Media : PVC PW 37mm

Submitted by: HVN/PAH
Approved by : NRH
Date : 12-JUN-18
Supervisor: KRK

NYS DOH # : 11626
QC by: AMD

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms NA -Not Applicable ND -Not Detected
> -Greater Than ug -Micrograms l -Liters NS -Not Specified ppm -Parts per Million

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Account No.: 21643
Login No. : L445578
Date Analyzed : 11-JUN-18 - 14-JUN-18
Report ID : 1071223

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
1-36086 PERSON TEST1	L445578-1	Quartz	224	44	200
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	224	44	200
2-36107 AREA N TEST1	L445578-2	Quartz	224	59	260
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	224	59	260
3-36062 AREA NETEST1	L445578-3	Quartz	224	53	240
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	224	53	240

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
OSHA PEL : 50 ug/m3 RCS
Collection Media : PVC PW 37mm

Submitted: AMD/APG
Approved: AJD/KRK
Date : 14-JUN-18 NYS DOH # : 11626
Supervisor: KRK QC by: AMD

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
kg -Kilograms
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
NS -Not Specified
mppcf -Million Particles per Cubic Foot

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Date Analyzed : 11-JUN-18 - 14-JUN-18
Report ID : 1071223

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
4-36065 AREA SETEST1	L445578-4	Quartz	224	48	210
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	224	48	210
5-36071 AREA S TEST1	L445578-5	Quartz	224	56	250
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	224	56	250
6-36077 PERSON TEST2	L445578-6	Quartz	208	19	89
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	208	19	89

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
OSHA PEL : 50 ug/m3 RCS
Collection Media : PVC PW 37mm

Submitted: AMD/APG
Approved: AJD/KRK
Date : 14-JUN-18 NYS DOH # : 11626
Supervisor: KRK QC by: AMD

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
kg -Kilograms
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
NS -Not Specified
mppcf -Million Particles per Cubic Foot

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Date Received : 07-JUN-18

Account No.: 21643
Login No. : L445578

Date Analyzed : 11-JUN-18 - 14-JUN-18
Report ID : 1071223

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
7-36080 AREA N TEST2	L445578-7	Quartz	208	26	130
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	208	26	130
8-36119 AREA NETEST2	L445578-8	Quartz	208	24	110
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	208	24	110
9-36131 AREA SETEST2	L445578-9	Quartz	208	20	95
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	208	20	95

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
OSHA PEL : 50 ug/m3 RCS
Collection Media : PVC PW 37mm

Submitted: AMD/APG
Approved: AJD/KRK
Date : 14-JUN-18 NYS DOH # : 11626
Supervisor: KRK QC by: AMD

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
kg -Kilograms
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
NS -Not Specified
mppcf -Million Particles per Cubic Foot

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FAX: (315) 437-0571
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LABORATORY ANALYSIS REPORT

Client : ATC Group Services (fka Applie
Site : Graco Mpls
Project No. : 18-0525GRAC
Date Sampled : 05-JUN-18
Date Received : 07-JUN-18

Account No.: 21643
Login No. : L445578

Date Analyzed : 11-JUN-18 - 14-JUN-18
Report ID : 1071223

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
10-36137 AREA STEST2	L445578-10	Quartz	208	26	120
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	208	26	120
11-45722 PERSONTEST3	L445578-11	Quartz	200	12	61
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	200	12	61
12-45731AREA N TEST3	L445578-12	Quartz	200	13	65
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	200	13	65

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
OSHA PEL : 50 ug/m3 RCS
Collection Media : PVC PW 37mm

Submitted: AMD/APG
Approved: AJD/KRK
Date : 14-JUN-18 NYS DOH # : 11626
Supervisor: KRK QC by: AMD

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
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m3 -Cubic Meters
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LABORATORY ANALYSIS REPORT

Client : ATC Group Services (fka Applie
Site : Graco Mpls
Project No. : 18-0525GRAC
Date Sampled : 05-JUN-18
Date Received : 07-JUN-18

Account No.: 21643
Login No. : L445578
Date Analyzed : 11-JUN-18 - 14-JUN-18
Report ID : 1071223

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
13-45731AREA NETEST3	L445578-13	Quartz	200	<5.0	<25
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	200	<5.0	<25
14-45675 AREASETEST3	L445578-14	Quartz	200	5.8	29
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	200	5.8	29
15-45551 AREA STEST3	L445578-15	Quartz	200	<5.0	<25
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	200	<5.0	<25

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
OSHA PEL : 50 ug/m3 RCS
Collection Media : PVC PW 37mm

Submitted: AMD/APG
Approved: AJD/KRK
Date : 14-JUN-18 NYS DOH # : 11626
Supervisor: KRK QC by: AMD

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
kg -Kilograms
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
NS -Not Specified
mppcf -Million Particles per Cubic Foot

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LABORATORY ANALYSIS REPORT

Client : ATC Group Services (fka Applie
Site : Graco Mpls
Project No. : 18-0525GRAC
Date Sampled : 05-JUN-18
Date Received : 07-JUN-18

Account No.: 21643
Login No. : L445578
Date Analyzed : 11-JUN-18 - 14-JUN-18
Report ID : 1071223

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
16-63364 BLANK	L445578-16	Quartz	NA	<5.0	NA
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	NA	<5.0	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
OSHA PEL : 50 ug/m3 RCS
Collection Media : PVC PW 37mm

Submitted: AMD/APG
Approved: AJD/KRK
Date : 14-JUN-18 NYS DOH # : 11626
Supervisor: KRK QC by: AMD

< -Less Than	mg -Milligrams	kg -Kilograms	ppm -Parts per Million
> -Greater Than	ug -Micrograms	m3 -Cubic Meters	NS -Not Specified
NA -Not Applicable	ND -Not Detected	l -Liters	mppcf -Million Particles per Cubic Foot

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Client Name : ATC Group Services (fka Applied Env Svcs
Site : Graco Mpls
Project No. : 18-0525GRAC

Date Sampled : 05-JUN-18 Account No.: 21643
Date Received: 07-JUN-18 Login No. : L445578
Date Analyzed: 11-JUN-18 - 14-JUN-18

Unless otherwise noted below, all quality control results associated with the samples were within established control limits or did not impact reported results.

Note: The findings recorded within this report were drawn from analysis of the sample(s) provided to the laboratory by the Client (or a third party acting at the Client's direction). The laboratory does not have control over the sampling process. The findings herein constitute no warranty of the samples' representativeness of any sampled environment and strictly relate to the samples as they were presented to the laboratory.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

Unless otherwise noted below, reported results have not been blank corrected for any field blank or method blank.

L445578 (Report ID: 1070417):
SOPs: GRAV-SOP-5(18), GRAV-SOP-6(17)
Gravimetric analytical accuracy of the sampling media is 0.002 +/- 0.018 mg (average blank weight change +/- 95% confidence interval or k=2). The estimated uncertainty applies to the media, technology, and SOP(s) referenced in this report and does not account for any uncertainty associated with the sampling process.
PNOR = Particulates Not Otherwise Regulated.
NIOSH 0600 states "Do not exceed approximately 2mg dust loading on filter."

L445578 (Report ID: 1071223):
SOPs: ix-xrdreview(13), ix-xrdashprep(30), ix-calibrate(12), ix-xrdstdprep(26)

L445578-5 (Report ID: 1071223):
Secondary angle was used for Quartz mass determination.

L445578 (Report ID: 1071223):
We perform a quantitative secondary angle confirmation on all Quartz results greater than 0.025 mg.
Secondary angle quantitative confirmation is not possible below 0.025 mg.

<	-Less Than	mg	-Milligrams	m3	-Cubic Meters	kg	-Kilograms	ppm	-Parts per Million
>	-Greater Than	ug	-Micrograms	l	-Liters	NS	-Not Specified	ND	-Not Detected	NA	-Not Applicable

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Client Name : ATC Group Services (fka Applied Env Svcs
Site : Graco Mpls
Project No. : 18-0525GRAC

Date Sampled : 05-JUN-18 Account No.: 21643
Date Received: 07-JUN-18 Login No. : L445578
Date Analyzed: 11-JUN-18 - 14-JUN-18

L445578-6,8-9 (Report ID: 1071223):
We were able to confirm Quartz qualitatively using the secondary angle.

L445578-3 (Report ID: 1071223):
Visible particulate on both the filter and the back-up pad. Reported Silica results represent the filter only and may be biased low.

L445578-6-7,10 (Report ID: 1071223):
During sample preparation for silica analysis, larger particles in the sample did not break apart to form an uniform deposit. It is possible that large particulate was not included in the analysis. Potential impact on reported silica results is unknown.

L445578 (Report ID: 1071223):
Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Primary Quartz	+/-12.0%	93.0%
Secondary Quartz	+/-18.6%	90.7%

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms ppm -Parts per Million
> -Greater Than ug -Micrograms l -Liters NS -Not Specified ND -Not Detected NA -Not Applicable

781306441033
Date:06/07/18
Shipper:FEDEX
Initials:MAK
Prep:UNKNOWN

L445578

GALSON CHAIN OF CUSTODY

69

Turn Around Time (TAT)	(Surcharge)
[X] Standard	0%
[ ] 4 Business Days	35%
[ ] 3 Business Days	50%
[ ] 2 Business Days	75%
[ ] Next Day by 6pm	100%
[ ] Next Day by Noon	150%
[ ] Same Day	200%

[ ] Samples submitted using the FreePumpLoan™ Program

[ ] Samples submitted using the FreeSamplingBadges™ Program

You may edit and complete this COC electronically by logging in to your Client Portal account at https://portal.galsonlabs.com/

Client Acct No.: 21643

Original Prep No.: PSY480615

CS Rep: BHONEYCUTT

Online COC No.: 154758

Report To: Mr. Kevin Cairns
Company Name: ATC Group Services LLC
Address 1: 5301 East River Road
Address 2: Suite 101
City, State Zip: Fridley, MN 55421
Phone No.: 651 - 635 - 9050
Cell No.: 651 - 295 - 4037
Email reports to: kevin.cairns@atcgs.com
Comments:

Invoice To: Gloria DelMain
Company Name: ATC Group Services LLC
Address 1: 5301 East River Road
Address 2: Suite 101
City, State Zip: Fridley, MN 55421
Phone No.: 651 - 635 - 9050
Email Address: gloria.delmain@atcgs.com
Comments:
P.O. No.: M50327-0001-Graco
Payment info.: [ ] I will call SGS Galson to provide credit card info
[ ] Card on File (enter the last five digits on the line below)

Comments:
Test 1 was performed dry. Test 2 was performed with water added during blasting. Test 3 was performed with a new piece of equipment with water added during blasting.
Per client, silica = quartz only for all samples. JLS 6/8/18

State Sampled: MN

Please indicate which OEL(s) this data will be used for:
[ ] OSHA PEL [ ] ACGIH TLV [ ] MSHA [ ] Cal OSHA
[ ] IAQ: _____ (Specify Limit(s)) [X] Other: OSHA AL (Specify Other)

Site Name: Graco Mpls

Project: 18-0525GRAC

Sampled By: Kevin Cairns, CIH

List description of industry or Process/interferences present in sampling area: Blasting concrete slab with crushed recycled glass

Sample ID * (Maximum of 20 Characters)	Date Sampled *	Collection Medium	Sample Volume Sample Time Sample Area *	Liters Minutes in², cm², ft² *	Analysis Requested	Method Reference ^	Hexavalent Chromium Process (e.g., welding, plating, painting, etc.)
1-36086 Person test1	6-5-18	PW 37mm PVC for PPI	224	liters	Resp. Dust/ Silica	N0600/7500	
2-36107 Area N test1	6-5-18	PW 37mm PVC for PPI	224	liters	Resp. Dust/ Silica	N0600/7500	

[ ] ^ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By:	Kevin Cairns, CIH	Kevin Cairns	6/6/18	7:50	Received By:				
Relinquished By:					Received By:	Michelle Krause	Michelle Krause	6/7/18	1144

*** You must fill in these columns for any samples which you are submitting.**

Samples received after 3pm will be considered as next day's business.

Online COC No.: 154758
Prep No.: PSY480615
Account No.: 21643
Draft: 5/30/2018 5:04:37 PM

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/en/Terms-and-Conditions.aspx

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Comments :

Sample ID * (Maximum of 20 Characters)	Date Sampled *	Collection Medium	Sample Volume Sample Time Sample Area *	Liters Minutes in², cm², ft² *	Analysis Requested	Method Reference ^	Hexavalent Chromium Process (e.g., welding, plating, painting, etc.)
3-36062 Area NE test1	6-5-18	PW 37mm PVC for PPI	224	L	Resp. Dust/ Silica	N0600/7500	
4-36065 Area SE test1	6-5-18	PW 37mm PVC for PPI	224	L	Resp. Dust/ Silica	N0600/7500	
5-36071 Area S test1	6-5-18	PW 37mm PVC for PPI	224	L	Resp. Dust/ Silica	N0600/7500	
6-36077 Person test2	6-5-18	PW 37mm PVC for PPI	208	L	Resp. Dust/ Silica	N0600/7500	
7-36080 Area N test2	6-5-18	PW 37mm PVC for PPI	208	L	Resp. Dust/ Silica	N0600/7500	
8-36119 Area NE test2	6-5-18	PW 37mm PVC for PPI	208	L	Resp. Dust/ Silica	N0600/7500	
9-36131 Area SE test2	6-5-18	PW 37mm PVC for PPI	208	L	Resp. Dust/ Silica	N0600/7500	
10-36134 Area S test2	6-5-18	PW 37mm PVC for PPI	208	L	Resp. Dust/ Silica	N0600/7500	
11-45722 Person test3	6-5-18	PW 37mm PVC for PPI	200	L	Resp. Dust/ Silica	N0600/7500	
12-45731 Area N test3	6-5-18	PW 37mm PVC for PPI	200	L	Resp. Dust/ Silica	N0600/7500	
13-45719 Area NE test3	6-5-18	PW 37mm PVC for PPI	200	L	Resp. Dust/ Silica	N0600/7500	

☐ ^ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By :	Kevin Cairns, CIH		6/6/18	7:50P	Received By :				
Relinquished By :					Received By :	Michelle Krause		6/7/18	1144

*** You must fill in these columns for any samples which you are submitting.**

Samples received after 3pm will be considered as next day's business.

Online COC No. : 154758
Prep No. : PSY480615
Account No. : 21643
Draft : 5/30/2018 5:04:37 PM

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SGS GALSON CHAIN OF CUSTODY

Comments :

Sample ID * (Maximum of 20 Characters)	Date Sampled *	Collection Medium	Sample Volume Sample Time Sample Area *	Liters Minutes in², cm², ft² *	Analysis Requested	Method Reference ^	Hexavalent Chromium Process (e.g., welding, plating, painting, etc.)
14-45675 Area SE test3	6-5-18	PW 37mm PVC for PPI	200	L	Resp. Dust/ Silica	N0600/7500	
15-45551 Area S test3	6-5-18	PW 37mm PVC for PPI	200	L	Resp. Dust/ Silica	N0600/7500	
16-63364 Blank	6-5-18	PW 37mm PVC for PPI	0	L	Resp. Dust/ Silica	N0600/7500	

☐ ^ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By :	Kevin Cairns, CIH	Kevin Cairns	6/6/18	7:50p	Received By :				
Relinquished By :					Received By :	Michelle Krause	Michelle Krause	6/7/18	1144

*** You must fill in these columns for any samples which you are submitting.**

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Draft : 5/30/2018 5:04:37 PM

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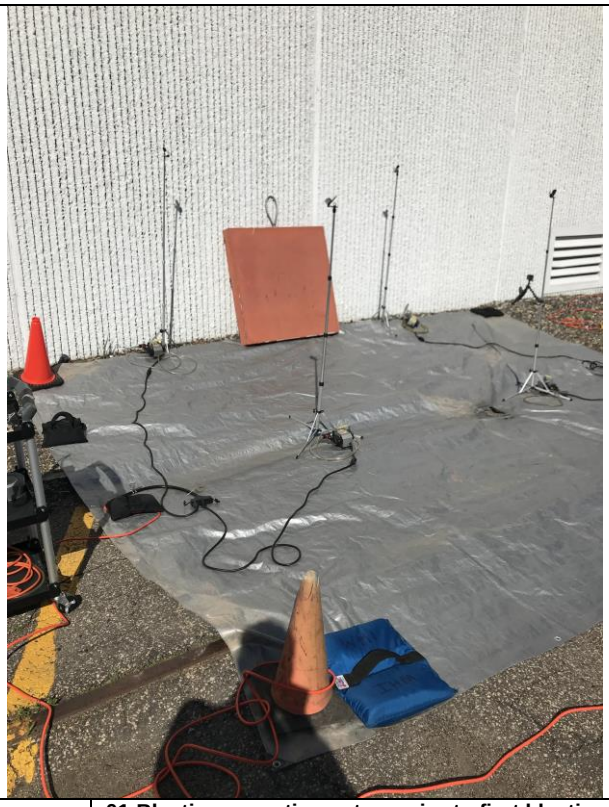
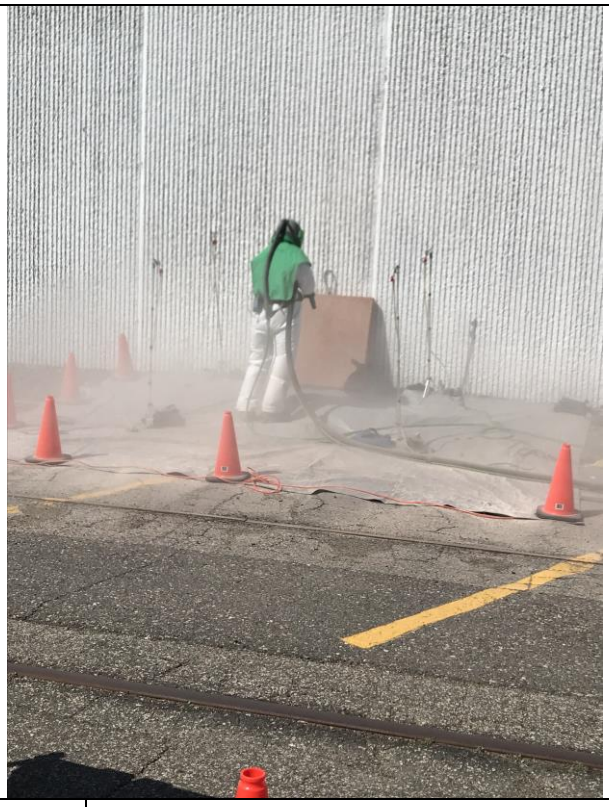
APPENDIX II

Graco, Inc.
88 – 11th Avenue Northeast, Minneapolis, MN
Project No. M50327-0001
Photos on 6-5-18 – Air Sampling

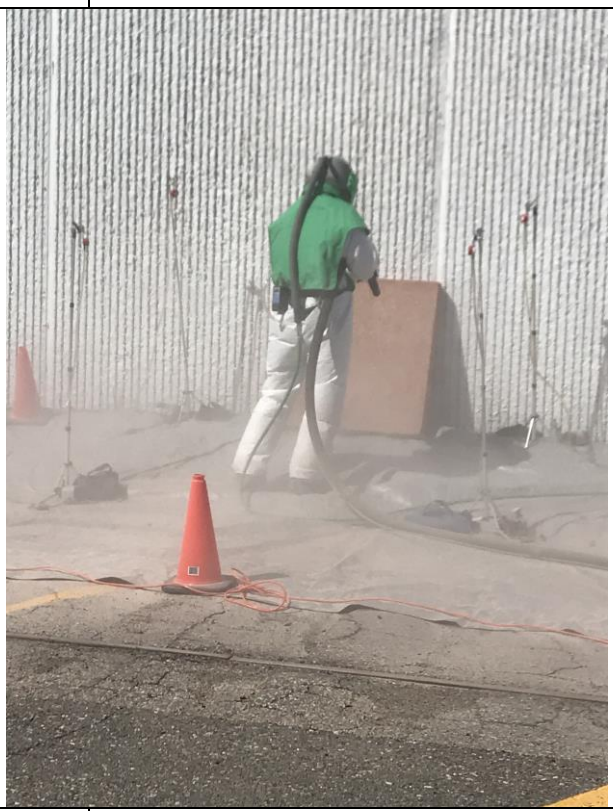
ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING



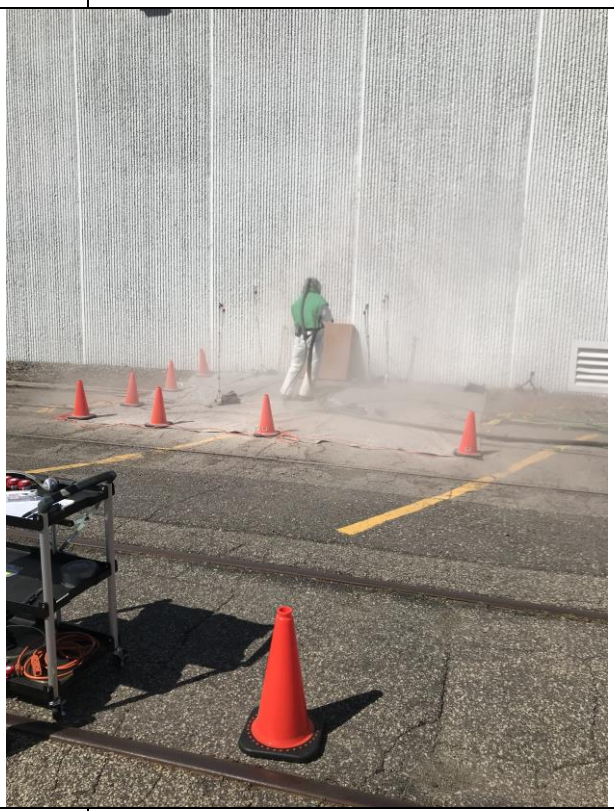
View of:	01-Blasting operation set up prior to first blasting operation



View of:	02-During blasting operation #1



View of:	03-During blasting operation #1



View of:	04-During blasting operation #1