



Investigation of Mould Growth

4267 Bridge Street, Niagara Falls, Ontario

Prepared for:

Niagara Region

1815 Sir Isaac Brock Way
Thorold, Ontario L2V 4T7

Attn: Nicole Menard
Project Manager

April 9, 2019

Pinchin File: 236564



Issued to: Niagara Region
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1.0 INTRODUCTION AND SCOPE

1.1 Statement of Understanding

Pinchin Ltd. (Pinchin) was retained by Niagara Region (Client) as represented by Nicole Menard to conduct an investigation of potential mould growth at the Niagara Falls VIA Rail train station building located at 4267 Bridge Street, Niagara Falls, Ontario. This project was managed by Henry Laharnar.

This investigation was undertaken to address recommendations provided in a prior Pinchin Ltd. Report entitled "Hazardous Building Materials Assessment 4267 Bridge Street Niagara, Ontario", Project 218282.011, issued December 20, 2018 after suspect mould growth was observed on drywall wall finishes around the custodial sink and door frame within the ground floor Women's Washroom.

1.2 Scope of Work

Evan Faubert, Project Technologist, performed the investigation on March 26, 2019. The investigation addressed all accessible areas of the building with the exception of areas above ceilings that could not be safely accessed by a six foot ladder. The Customs portion of the building on the ground floor was not accessible during the investigation and was not assessed.

The investigation involved the following activities:

- Spot readings of moisture content of building materials.
- Thermographic scan of building materials for areas of elevated moisture.
- Collection and analysis of the following (including reference and field blanks):
 - Five spore trap mould air samples
 - Three mould tape-lift samples

2.0 METHODOLOGY

2.1 Interviews and Inspections

Pinchin interviewed a representative from VIA Rail Canada to discuss the history of the building, maintenance practices, and water damage.

Pinchin performed a walkthrough inspection for indications of suspect mould growth and/or water damage on accessible building materials, paying particular attention to areas where past water damage had been reported.

The investigator used a moisture meter to test for elevated moisture levels in building materials. The investigator also performed a thermographic scan using a FLIR B300 infrared camera, to help identify wet conditions.

2.2 Test Methods and Criteria

The following table presents the parameters tested in this investigation, recommended limits or interpretation guides, the units of measurement, and the instruments and sampling/analytical methods employed.

Table I – Parameters Tested, Recommended Limits and Instruments or Methods Used

Parameter	Unit of Measurement	Recommended Limit or Guide to Interpretation	Instrumentation or Test Method
Temperature, T	°C	Consider the risk of condensation on cold surfaces to prevent mould growth	Protimeter® Surveymaster
Relative Humidity, RH	%RH	Maintain long term below 80 %, to prevent mould growth ¹	Protimeter® Surveymaster
Moisture in building materials (Note: detects surface moisture only, may not detect deeper moisture)	% Moisture	Threshold for mould growth: ² Drywall, 0.7% Wood materials, 17%	Protimeter® Surveymaster and Delmhorst® BD-2100
Airborne mould (spore trap method)	Spores per cubic metre of air	Compare test area to reference areas and outdoors ³ Consider water-damage indicator moulds Reference results of Pinchin Ambient Mould Index (PAMI)	Allergenco-D® sampler, laboratory analysis by Direct Microscope Examination
Mould in bulk, swab, tape-lift samples (DME)	Presence or absence of Mould	Current guidelines recommend remediation of all interior	Direct Microscope Examination with

1 O.A.G. Adan, R.A. Samson (Editors): *Fundamentals of Mold Growth in Indoor Environments and Strategies for Healthy Living*. Wageningen, The Netherlands: Wageningen Academic Publishers, 2011

2 Macher, J. (Ed): *Bioaerosols, Assessment and Control*. Cincinnati OH: American Conference of Governmental Industrial Hygienists, 1999.

3 Health Canada: *Fungal Contamination in Public Buildings: Health Effects and Investigation Methods*. Ottawa ON: Health Canada, 2004.

Table I – Parameters Tested, Recommended Limits and Instruments or Methods Used

Parameter	Unit of Measurement	Recommended Limit or Guide to Interpretation	Instrumentation or Test Method
	Growth, to genus, and Light, Moderate or Heavy density ⁴	mould growth, regardless of species	staining

All air sampling pumps were calibrated before and after use.

2.3 Laboratory Analysis

The analysis for mould was performed at the Pinchin Environmental Microbiology Laboratory, Mississauga. The Pinchin laboratory is independently accredited to ISO/IEC 17025:2005 for mould and bacteria analysis, by the American Industrial Hygiene Association Laboratory Accreditation Program LLC (AIHA LAP LLC) (Lab ID 158835)⁵ and the Quebec government (Lab ID 495).⁶

The spore trap mould air sample results include a report from the Pinchin Ambient Mould Index database (PAMI) ©. PAMI is a compilation of over 36,000 outdoor spore trap mould air samples analysed in the Pinchin laboratory, since 2006. The database has been analysed by month and region (18 regions across Canada) to report statistical data on means, medians, confidence intervals, etc. As a measure of the ranges in outdoor mould concentrations, the PAMI data can assist in the interpretation of indoor mould air sample results.

3.0 FINDINGS

3.1 Results of Interviews

John Walsh, Sr. Property Manager of Via Rail Canada, reported the following:

- The south portion of the station roof was reshingled in 2013.
- The roof has sustained damage from windstorms over the years and various patchwork repairs have been performed on the roof before and since 2013.

⁴ The density of mould growth is ranked by the Pinchin Environmental Microbiology Laboratory as: Light (covers less than about 10% of specimen); Moderate (covers 10-20% of specimen); or Heavy (covers more than about 20% of specimen).

⁵ Accredited by the American Industrial Hygiene Association Laboratory Accreditation Program LLC (AIHA LAP LLC) under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), for Bulk, Surface and Air testing for moulds, Escherichia coli, Legionella by the ISO 11731 method and for Legionella pneumophila by qPCR ISO 12869 method (Lab ID 158835).

⁶ Accredited by the Quebec government under the Programme d'accréditation des laboratoires d'analyses (PALA) program for Air Microbiology – domains 601, 603, 604, 605 606.

- In March 2017, a leak from a urinal water supply line impacted the server room below. The washroom, server room and impacted equipment were cleaned.
- In September 2018, a minor water leak occurred from a toilet's water supply line in the 2nd floor washroom.
- The burnt roof in the attic occurred long ago and repairs on the fire damage have been restricted.

3.2 Building Description

Table II – VIA Rail Niagara Falls

Item	Details
Construction Date	1880
Number of Floors	Two
Area of Building	8,800 square feet
Structural Type	Structural steel and wood
Exterior Cladding	Brick
HVAC	Forced air
Roof	Sloped roof shingles
Flooring	Vinyl tile, concrete and carpet
Interior Walls	Drywall, concrete block and plaster
Ceilings	Plaster and lay-in ceiling tiles

The Pinchin Revised Hazardous Building Materials Assessment, 4267 Bridge Street, Niagara Falls, Ontario, issued December 20, 2018 confirmed the presence of asbestos-containing building materials and lead paint at the site.

3.3 Results of Inspections and Testing

This section presents the findings of the walkthrough investigation and any tests for mould. Appendix I presents the drawings. The analytical certificates for the mould tests are given in Appendix II.

Table III – Ground Floor

Temperature	19.8 °C	Extent of Mould Growth	12 ft ²
Relative Humidity	42.6 %RH	Extent of Water Damage Including Mould Growth	60 ft ²

Table III – Ground Floor



Photo 1 - Wet drywall in the ticket booth office.



Photo 2 - Wet drywall adjacent to the north entrance



Photo 3 - Moisture meter confirms wet drywall adjacent to janitor's closet in the women's washroom



Photo 4 - Mould impacted drywall in the janitor's closet



Photo 5 - Area of mould and water impacted drywall in the women's washroom

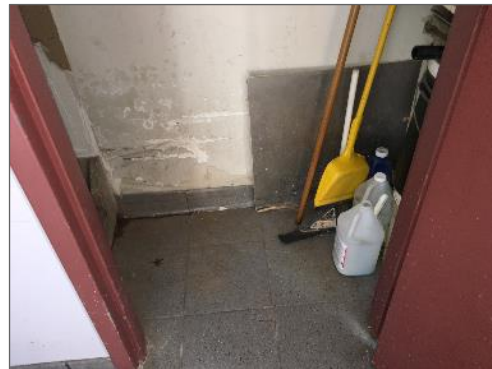


Photo 6 - Wet and water damaged drywall in the janitor's closet

Table III – Ground Floor



Photo 7 - Damaged hardboard ceiling in the baggage/server room



Photo 8 - Water damaged ceiling tile in the VIA train operations (location 12)



Photo 9 - Wet drywall in the waiting area adjacent to women's washroom



Photo 10 - Moisture reading of wet drywall in waiting area adjacent to the women's washroom

Moisture Measurements

Material/Location	Results	Material	Results
Drywall/Ticket booth office north west corner 4' high	11.8% -- WET	Drywall/ Waiting area north exit 1' high	1.5% -- WET
Drywall/Janitor's closet 4' high	17.9% -- WET	Drywall/ Waiting area adjacent to women's washroom 4' high	1.2% -- WET
Drywall/Baggage room washroom	0.1% -- DRY	Drywall/ Baggage-server room	0.1% -- DRY
Drywall/West stairwell	0.2% -- DRY	Drywall/ Baggage-server room	0.1% -- DRY

Sample Log

Sample Type/ Location	Sample No.	Result
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Table III – Ground Floor

Mould Tape-Lift/ Drywall Women’s washroom – ground floor	TL-01	Mould growth confirmed
Mould Tape-Lift/ Drywall Women’s washroom – ground floor	TL-02	Mould growth confirmed
Airborne Mould Spore Trap/ Ticket booth	ST-2766567	Not impacted
Airborne Mould Spore Trap/ 1 st Floor women’s washroom	ST-2766574	Impacted

Observations and Comments

Peeling paint and wet drywall was detected up to 4 feet in height in the northwest corner of the ticket booth office and was approximately 8 square feet in total.

Wet drywall was detected up to four feet in the south east corner of the waiting area adjacent to the women’s washroom and was approximately 25 square feet in total. As well as, on the west side of the north exit and totalled approximately 2 square feet.

Mould growth and water damaged drywall was detected in the janitors closet and adjacent drywall in the women’s washroom. Mould growth was approximately 12 square feet and was located on drywall behind the janitor’s sink. Drywall was removed behind the janitor’s sink exposing concealed mould growth in the wall cavity.

Missing and water damaged ceiling tiles were observed in the baggage and server room, VIA rail operations room. Water damaged hardboard is also present above the dropped ceiling in the baggage and server room.

The mould air sample collected in the ticket booth was similar in composition and concentration compared to the outdoor and PAMI reference data. The air sample collected in the women’s washroom indicated elevated *Aspergillus*/*Penicillium*-like spores, *Cladosporium* and *Stachybotrys* mould spores.

Table IV – Second Floor

Extent of Mould Growth	0 ft ²	Extent of Water Damage Including Mould Growth	160 ft ²
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Table IV – Second Floor



Photo 11 - Charred roof in attic



Photo 12 - Missing and water damaged ceiling tiles and insulation in the west stairwell



Photo 13 - Missing and water stained ceiling tiles in the open area



Photo 14 - Water stained ceiling tiles in the lunchroom

Moisture Measurements

Material/ Location	Results	Material	Results
Wood roof/West stairwell	14.5% -- DRY	Drywall/ Open area	0.0% -- DRY
Wood roof/Attic	12.6% -- DRY	Drywall/ Open area	0.1% -- DRY

Sample Log

Sample Type/ Location	Sample No.	Result
Airborne Mould Spore Trap/ 2 nd Floor open area	ST-2766578	Not impacted

Observations and Comments

Missing and water damaged ceiling tiles and batt insulation was observed in west stairwell and dark staining/suspect mould growth was observed on wooden roof sheathing that was exposed.

Table IV – Second Floor

The Pinchin investigator identified a strong musty odour in the west stairwell.

Charred wood roof framing and sheathing was observed on a section of the south roof in the attic space.

Missing and water stained acoustic ceiling tiles are prevalent throughout the second floor.

No wet building materials were detected on the second floor during the investigation.

The mould air sample collected in the open area was similar in composition and concentration compared to the outdoor and PAMI reference data

3.4 Summary of Hazardous Materials

Based on a review of available previous reports, the following is a summary of the designated substances, limited to the materials impacted the water damage.

3.4.1 Asbestos

No asbestos-containing materials are impacted by the remediation work.

3.4.2 Lead

No paints in the work area contain sufficient lead to require special precautions.

4.0 DISCUSSION

4.1 Discussion of Water Damage and Mould Growth

The water damage and mould growth identified in this investigation was likely caused by a combination of past plumbing leaks and past or on going roof leaks. Any water stained or missing acoustic ceiling tiles should be replaced including any water damaged fiberglass batt insulation. Replaced ceiling tiles should be monitored for future stains indicating leaks requiring repairs. It is recommended that the roof be assessed for any on going leaks before acoustic ceiling tiles are replaced.

The damage to the ceiling in the baggage/server room was likely from the recent plumbing leaks in the washroom above.

Mould air samples collected in the ticket booth, and second floor open area confirmed that the indoor air quality was not being impacted by mould growth at the time of inspection. The mould air sample collected in the women's ground floor washroom confirmed that the indoor air quality was being impacted by mould growth in that area.



The spot measurements of relative humidity ranged from 41.8 to 42.6 %RH. The outdoor relative humidity averaged 46.1 %RH. Authorities recommend that long-term interior relative humidity be maintained below 80 %RH at all locations to avoid mould growth.

4.2 Mould Remediation and Inspection

Mould growth in buildings can be a risk factor for adverse health effects.⁷ The mould growth found in this investigation should be remediated as soon as possible following currently accepted procedures. Pinchin recommends that mould remediation follow the procedures set by the Canadian Construction Association (CCA).⁸ The work should be performed by a contractor with appropriate training, experience and insurance coverage. Ensure that remaining building materials are dry prior to reinstating mould-susceptible finishes, to prevent future mould growth.

Pinchin would be pleased to provide project management services to develop a remediation work plan and retain a specialized environmental abatement contractor. Pinchin could conduct a competitive bidding process to achieve the lowest possible price for the work. Proceeding in this manner will relieve the Client from taking on regulatory responsibility for contractor health and safety, and will reduce the risk of poor contractor performance and possible cross-contamination. Pinchin recommends that the Client retain services for project management, as well as for inspection and testing of this project. Health Canada and other authorities recommend independent inspection of medium and large scale mould remediation, to protect the occupants and building from cross-contamination.

4.3 Communication and Interim Risk Management

The findings of this report should be communicated to the occupants as recommended by current mould guidelines, and in workplaces, as mandated by occupational health and safety legislation. The Client should consider any interim risk management actions that would be appropriate under the circumstances, until the mould growth can be remediated. Interim risk management might include isolating an area of the building, or relocating persons experiencing adverse health effects or with greater sensitivity to mould.

5.0 RECOMMENDATIONS

Pinchin offers the following recommendations to improve air quality in this building and address any mould growth or other microbial contamination found. Pinchin would be pleased to make

⁷ US Environmental Protection Agency: *Mold Remediation in Schools and Commercial Buildings*. US EPA. 2001.

⁸ Canadian Construction Association: *Mould Guidelines for the Canadian Construction Industry*, [Guide 82]. Ottawa, ON: CCA, 2004



recommendations for remediation contractors, and provide services for the planning and inspection of the recommended remediation work.

[Insert any recommendations for repair of damage from the intrusive inspections]

1. Communicate the findings of this report to the staff, joint health and safety committee.
2. Arrange for the preparation of a detailed Scope of Work for the mould remediation and finalize an inspection and oversight plan.
3. Arrange for the following mould remediation, following CCA Level 2 methods:
 - a. Remove mould impacted and water damaged drywall up to four feet in the janitor's closet and women's washroom, as shown on the attached drawing.
4. Arrange for the following mould remediation, following CCA Level 1 methods:
 - a. Remove wet drywall up four feet in height in the waiting area as shown in the attached drawing.
 - b. Remove wet drywall up to 4 feet in height in the ticket booth office as shown on the attached drawing.
 - c. Remove wet drywall up to 2 feet in height in the waiting area, as shown on the attached drawing.
 - d. Remove water damaged acoustic ceiling tiles and batt insulation in the west stairwell and clean and disinfect stained wooden roof sheathing.
5. Remove and replace all water damaged ceiling tiles and fiberglass batt insulation as required throughout the building and inspect roof for water leaks.
6. Consider assessing and repairing charred wood framing and sheathing in the attic space.
7. Finalize an inspection and testing plan to document the mould remediation. To confirm, Pinchin will perform inspections at the following stages:
 - a. Clean Site Preparation
 - b. Post-Remediation Inspection
8. Implement drying procedures as necessary. Ensure all surfaces are dry before installation of new finishes.



6.0 TERMS AND LIMITATIONS

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

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Niagara Region April 9 2019.docx

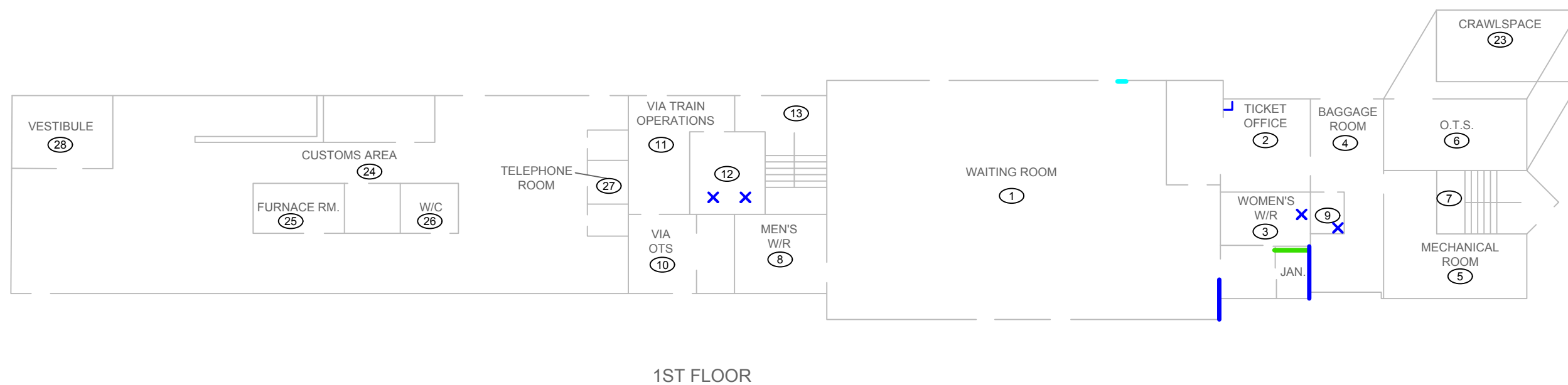
Template: Master Mould Investigation Report, IEQ, March 15, 2019

APPENDIX I
Drawings



LEGEND:

- (X) PINCHIN LOCATION NUMBER
- X WATER STAINED CEILING TILE
- WET DRYWALL 2' IN HEIGHT
- WET DRYWALL 4' IN HEIGHT
- MOULD IMPACTED DRYWALL 4' IN HEIGHT
- CHARRED WOOD ROOF



LEGEND IS COLOUR DEPENDENT.
NON-COLOUR COPIES MAY ALTER
INTERPRETATION.

CLIENT:
THE REGIONAL MUNICIPALITY
OF NIAGARA
THOROLD, ONTARIO

LOCATION:
4267 BRIDGE STREET
NIAGARA FALLS, ONTARIO

TITLE:
MOULD INVESTIGATION
FIRST FLOOR

DATE: MARCH 2019	PROJECT # : 236564
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DRAWN BY: R.S.B.	DRAWING:
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CHECKED BY: E.F.	1 OF 2
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SCALE: NTS	
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LAZIED DRAWING TEMPLATE MARCH 2018

APPENDIX II
Results of Mould Samples



2470 Milltower Court
Mississauga, ON L5N 7W5
Tel: (905) 363-0678
Fax: (905) 363-0681

Certificate of Analysis

Pinchin Environmental Microbiology Laboratory



Laboratoire d'analyse
accrédité par le
gouvernement du Québec



CUSTOMER: Evan Faubert, Henry Laharnar
COMPANY: Pinchin Ltd.
ADDRESS: 6-875 Main Street West, Suite 200
Hamilton, ON L8S 4P9

PROJECT NAME: 4267 Bridge Street, Niagara Falls, ON
TYPE OF SAMPLES: AllergencoD
NO. OF SAMPLES: 5
DATE COLLECTED: March 26, 2019
DATE RECEIVED: March 27, 2019
DATE ANALYSED: April 1, 2019
DATE REPORTED: April 1, 2019

PROJECT NO: 236564
LAB REFERENCE NO: m207040
ANALYST: Rawah Naeem, M.Sc.
Environmental Microbiologist
REVIEWER: Lubov Beliakov, CMS (PhD)
Environmental Microbiologist

CONDITION OF SAMPLES ON RECEIPT: Acceptable

Method of Analysis: Analysis of Air Samples for Fungal Spores (SOP: DME-SPT-011, Rev 11, March 22, 2019)

This SOP is based on the method described in the AIHA's "Field Guide for the Determination of Biological Contaminants in the Environmental Samples" and also partially on the ASTM method D7391-09. The cassette slide with the trace (area impacted with air) facing upwards is fixed on a clean microscope slide. It is stained with lactophenol cotton blue or lactofuschin, and then scanned under low power magnification to locate the trace and to give the analyst an idea of the diversity of the spores. The final analysis is performed at X630/X600 magnification by counting the different spores along a number of traverses or fields of view to cover at least 25% of the sample. A lower percentage of the sample is counted if it is overloaded. Raw counts are converted to spores/m³ of air. Counts of fungal fragments and pollens are not computed in the total. Spores lacking unique characteristics for identification are reported as "Unidentified spores". Spores showing features of specific groups are recorded under the respective groups such as "Unidentified Basidiospores or Unidentified Ascospores". Spores occurring in chains are counted individually. Spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are indistinguishable.

A scale of 0 to 5 is used to rate abundance of non-fungal material, with 5 indicating the largest amount. Large amounts of non-fungal material may obscure small spores. Therefore, counts from samples with 4-5 non-fungal material may be treated as undercounts. Except for blanks, samples with no detected spores are recorded as "less than the analytical sensitivity" (AS). Results are not corrected for blanks. Estimation of the measurement of uncertainty is available upon request.

Comments/Observations (if any):

- Notes:**
1. The result(s) relate only to the sample(s) tested.
 2. This test report shall not be reproduced except in full, without written approval of the laboratory.
 3. Services are subject to Pinchin Ltd. Standard Terms and Conditions for Laboratory Services.



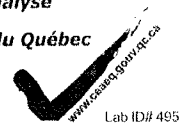
2470 Milltower Court
Mississauga, ON L5N 7W5
Tel: (905) 363-0678
Fax: (905) 363-0681

Certificate of Analysis

Pinchin Environmental Microbiology Laboratory



Laboratoire d'analyse
accrédité par le
gouvernement du Québec



DATE ANALYSED: April 1, 2019 ANALYST: Rawah Naeem, M.Sc. PROJECT NO: 236564
LAB REFERENCE NO: m207040

Customer Sample No:	2766575	2424135	2766567	2766574	2766578													
Lab Sample ID:	m207040-1	m207040-2	m207040-3	m207040-4	m207040-5													
Description	Blank	Outside	Ticket booth	1 st Floor women's washroom	2 nd Floor open area													
Total Air Volume (L)	N/A	150	150	150	150													
% of Sample Counted	25.4	25.4	25.4	6.9	25.4													
Fungal spores identified	raw ct.	%	ct./m ³	raw ct.	%	ct./m ³	raw ct.	%	ct./m ³	raw ct.	%	ct./m ³	raw ct.	%	ct./m ³	raw ct.	%	ct./m ³
<i>Alternaria</i>										2	20	52						
Ascospores non- specified																		
Aspergillus/ Penicillium-like				3	60	79	4	57	110	570	84	55000						
Basidiospores non- specified				1	20	26	2	29	52	17	3	1600	2	20	52			
<i>Botrytis</i>																		
<i>Chaetomium</i>																		
<i>Cladosporium</i>				1	20	26				8	1	770	5	50	130			
<i>Coprinus</i>																		
Drechslera/Bipolaris Group																		
<i>Epicoccum</i>																		
<i>Fusarium</i>																		
<i>Ganoderma</i>																		
Non-specified spores													1	10	26			
<i>Oidium</i>																		
<i>Periconia</i> /Myxomycetes							1	14	26									
<i>Pithomyces</i>																		
<i>Polythrincium</i>																		
Rusts																		
<i>Stachybotrys</i>										80	12	7700						
<i>Ulocladium</i>																		
Pollens																		
Fungal fragments				1		26	1		26	2		190						
Non-fungal material				3			4			3			3					
Spores/sample				5			7			675			10					
TOTAL SPORES/M³	No fungal spores					130			190			65000			260			
A.S. (SPORES/M³)						26			26			96			26			

Note: 1. Samples analysed at 630X or 600X magnification. 2. A.S. = Analytical Sensitivity
3. Total spores/m³ and counts/m³ reported to two significant figures where applicable



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 Mississauga, ON L5N 7W5
 tel: 905.363.0678 fax: 905.363.0681
 1.855.PINCHIN www.pinchin.com

Environmental Microbiology Laboratory
 Chain of Custody Form

M207040

REPORT RESULTS TO	Contact: Evan Faubert, Henry Laharnar,			Dept: Mid/IAQ	
	Company: Pinchin Ltd – Hamilton			Tel:	Fax:
	Mailing Address: 6-875 Main St W Suite 200 ✓			Email: efaubert@pinchin.com, hlaharnar@pinchin.com	
	City: Hamilton	Prov: ON	Postal Code: L8S4P9	Customer Job / P.O. #: 236564 ✓	
Special Instructions:				Project: 4267 Bridge Street, Niagara Falls, Ontario	
Report Language: English <input checked="" type="checkbox"/> French <input type="checkbox"/>		No. Samples Submitted: 5		Invoice To:	

ANALYSIS TYPES	
1. Total Fungal Particulate (Spore count and Identification)	5. Bacteria (Quantification/Gram staining)
2. Direct Microscope Examination (Fungal)	6. Heterotrophic Plate Counts (HPC)
3. Direct Microscope Examination (Particulate): a. Quantitative b. Qualitative	7. E.coli/Total Coliforms
4. Fungal Quantification & Identification (Anderson/RCS)	8. Other: _____

Sample#	Description	Analysis Requested (e.g. 3a)	Date Sampled	Volume (L)	TAT		FOR LAB USE ONLY LAB #
					REG.	RUSH	
2766575 ✓	Blank	1	3/26/2019	N/A	X		M207040-1
2424135 ✓	Outside	1	3/26/2019	150	X		-2
2766567 ✓	Ticket Booth	1	3/26/2019	150	X		-3
2766574 ✓	1 st floor Women's washroom	1	3/26/2019	150	X		-4
2766578 ✓	2 nd Floor Open Area	1	3/26/2019	150	X		-5
		✓	✓	✓	✓		

CHAIN OF CUSTODY	Collected by: EMF	FOR LAB USE ONLY:			
	Relinquished by: EMF	Date/Time: 3/26/2019	Received by: <i>SL</i>	Date/Time: 3/27/19 3:44	
	Method of Shipment: Courier	Sample Condition Upon Receipt:	Acceptable <input checked="" type="checkbox"/>	Other (explain) <input type="checkbox"/>	

Rev. on 4/1/10

Authorized by: _____ **Date:** _____
 Customer Signature MUST Accompany Request. Customer accepts Pinchin Ltd. Standard Terms and Conditions for Laboratory Services (see over)

Pinchin Ambient Mould Index (PAMI) ©

Region:	Southwestern Ontario
Month:	March
# Samples:	254
Period:	2006 – 2016

Mould/Groups Recorded	Frequency of detects (%)	Min (spores/m³)	5th percentile (spores/m³)	50th percentile (spores/m³)	95th percentile (spores/m³)	Max (spores/m³)
<i>Aspergillus/Penicillium-like</i>	68.50	26	26	79	588	1424
<i>Cladosporium</i>	64.57	26	26	132	1234	4747
Basidiospores non-specified	59.06	26	26	180	10260	20000
Ascospores non-specified	47.64	26	26	185	1954	5966
Non-specified spores	33.07	26	26	52	181	791
Periconia/Myxomycetes/Smuts	10.24	26	26	26	73	110
<i>Alternaria</i>	8.66	26	26	26	53	264
<i>Epicoccum</i>	5.51	26	26	26	229	264
<i>Coprinus</i>	4.33	26	26	26	66	79
<i>Arthrinium</i>	1.97	26	26	53	116	132
Rusts	1.57	26	26	39	120	132
<i>Fusicladium</i>	0.39	53	53	53	53	53
Helicospores	0.39	26	26	26	26	26
<i>Scopulariopsis</i>	0.39	26	26	26	26	26
<i>Torula</i>	0.39	53	53	53	53	53
<i>Cercospora</i>	0.39	26	26	26	26	26
<i>Nigrospora</i>	0.39	26	26	26	26	26
<i>Stemphylium</i>	0.39	26	26	26	26	26
<i>Ulocladium</i>	0.39	110	110	110	110	110

Based on detection limit of 26 spores per cubic metre of air.

The Pinchin Ambient Mould Index (PAMI) ©, is a measure of "typical" outdoor mould air quality, and can assist in the interpretation of indoor mould air samples. PAMI is derived from over 30,000 outdoor mould spore trap air samples analysed in the Pinchin Environmental Microbiology Laboratory over the period shown above. This data is analysed on a monthly basis for 18 regions across Canada, based on a minimum of 30 samples per region per month.

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Laboratoire d'analyse
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gouvernement du Québec



Pinchin Environmental Microbiology Laboratory *Certificate of Analysis*

CUSTOMER: Evan Faubert, Henry Laharnar
COMPANY: Pinchin Ltd.
ADDRESS: 6-875 Main Street West, Suite 200
Hamilton, ON L8S 4P9

PROJECT NAME: 4267 Bridge Street, Niagara Falls, Ontario
PROJECT NO.: 236564
TYPE OF SAMPLE(S): TAPE-LIFT
DATE COLLECTED: March 26, 2019
DATE ANALYSED: April 1, 2019
ANALYST: Marian Tang B.Sc. *MT*
TITLE: Environmental Microbiologist
REVIEWER: Rawah Naeem, M.Sc. *RN*
TITLE: Environmental Microbiologist

LAB REFERENCE NO.: m207043
SAMPLE CONDITION: Acceptable
DATE RECEIVED: March 27, 2019
DATE REPORTED: April 1, 2019

Method of Analysis: Analysis of Bulk and Tape-lift Samples by Direct Microscope Examination (SOP: DME-BLK-006, January 31, 2017)

This SOP is based on methods described in: "AIHA's Field Guide for Determination of Biological Contaminants in Environmental Samples", "Samson et al's Food and Indoor Fungi", and the "IRRSST method 360". Bulk samples are scanned under a stereomicroscope for the presence of mould growth; cello tape samples taken from these are mounted on glass slides and examined under light microscope at X400, X600 (630) or X1000 magnifications as appropriate. Moulds are identified to the genus using keys in relevant books and literature. Mould growth is assessed as Heavy, Moderate or Slight by examining the mycelium cover on the sample and/or the slide preparations. Some moulds may be difficult to identify from bulk samples and these are reported as "Unidentified mould". Spores observed in the absence of an established mycelium are identified whenever possible and rated as "few" for 5-50 spores or "masses" for >50 spores. Results are not corrected for blanks. Estimation of uncertainty is provided upon request.

COMMENTS/OBSERVATIONS (IF ANY):

- Notes:**
1. The result(s) relate only to the sample(s) tested.
 2. This test report shall not be reproduced except in full, without written approval of the laboratory.
 3. Services are subject to Pinchin Ltd. Standard Terms and Conditions for Laboratory Services.



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CUSTOMER: Evan Faubert, Henry Laharnar

PROJECT NAME: 4267 Bridge Street, Niagara Falls, Ontario

LAB REFERENCE NO: m207043

PROJECT NO.: 236564

DATE ANALYSED: April 1, 2019

ANALYST: Marian Tang B.Sc.

RESULTS FOR TAPE-LIFT DME ANALYSIS

Customer Sample No.	Lab Sample ID.	Description	Mould Identified, in Rank Order	Comments (if any)
TL-00	m207043-1	Blank	No mould detected	
TL-01	m207043-2	Women's washroom - first floor	<i>Stachybotrys</i> sp <i>Aspergillus/Penicillium</i> sp (a few spores)	Heavy growth
TL-02	m207043-3	Janitor's closet	<i>Stachybotrys</i> sp <i>Aspergillus</i> sp <i>Cladosporium</i> sp	Heavy growth

Signature of Analyst: 



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Environmental Microbiology Laboratory
 Chain of Custody Form

M257043

REPORT RESULTS TO	Contact: Evan Faubert, Henry Laharnar,			Dept: Mid/IAQ	
	Company: Pinchin Ltd – Hamilton			Tel:	Fax:
	Mailing Address: 6-875 Main St W Suite 200			Email: efaubert@pinchin.com, hlaharnar@pinchin.com	
	City: Hamilton	Prov: ON	Postal Code: L8S4P9	Customer Job / P.O. #: 236564	
Special Instructions:				Project: 4267 Bridge Street, Niagara Falls, Ontario	
Report Language: English <input checked="" type="checkbox"/> French <input type="checkbox"/>		No. Samples Submitted: 3	Invoice To:		

ANALYSIS TYPES	
1. Total Fungal Particulate (Spore count and Identification)	5. Bacteria (Quantification/Gram staining)
2. Direct Microscope Examination (Fungal)	6. Heterotrophic Plate Counts (HPC)
3. Direct Microscope Examination (Particulate): a. Quantitative b. Qualitative	7. E.coli/Total Coliforms
4. Fungal Quantification & Identification (Anderson/RCS)	8. Other: _____

Sample#	Description	Analysis Requested (e.g. 3a)	Date Sampled	Volume (L)	TAT		FOR LAB USE ONLY LAB #
					REG.	RUSH	
TL-00	Blank	2	3/26/2019	N/A	X		M257043-1
TL-01	Women's Washroom - First Floor	2	3/26/2019	N/A	X		-2
TL-02	Janitor's Closet	2	3/26/2019	N/A	X		-3

CHAIN OF CUSTODY	Collected by: EMF	FOR LAB USE ONLY:		
	Relinquished by: EMF Date/Time: 3/26/2019	Received by: SL	Date/Time: 3/27/19 3:45	
	Method of Shipment: Courier	Sample Condition Upon Receipt:	Acceptable <input checked="" type="checkbox"/>	Other (explain) <input type="checkbox"/>

Reviewed
4/11/19

Authorized by: _____ **Date:** _____
 Customer Signature MUST Accompany Request. Customer accepts Pinchin Ltd. Standard Terms and Conditions for Laboratory Services (see over)