Construction Completion Report
Sub-Slab Depressurization System
144 State Street

Former Albany Laboratories Site
Albany, New York

NYSDEC Site No. 401061
CHA Project Number: 21645.1000.31000

Prepared for:

Columbia Eagle LLC
302 Washington Avenue Extension
Albany, New York 12203

Prepared by:

III Winners Circle
Albany, New York 12205
(518) 453-4500

May 9, 2016

V:\Projects\ANY\K2\21645\Reports\CCR - SSDS\Construction Completion Report - SSDS 144 State St_Final_4-22-16.docx

QUALIFICATIONS AND CERTIFICATION STATEMENT

I, Michael Hollowood, certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Remedial Work Plan was implemented and that all construction activities were completed in substantial conformance with the DER-approved Remedial Work Plan.

For Clough Harbour & Associates LLP:

(Professional Seal)

Michael E. Hollowood, P.E.
Printed Name of Certifying Engineer

Signature of Certifying Engineer

Date of Certification

068351
NYS Professional Engineer Registration Number

Clough Harbour & Associates LLP
Company

Senior Vice President
Title

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1.0 INTRODUCTION AND BACKGROUND

This Construction Completion Report (CCR) has been prepared to describe the activities that were implemented to mitigate soil vapor intrusion (SVI) concerns at the property located at 144 State Street (referred to in previous documents as 142 State Street), in the City of Albany, NY (the Site). A site location map is included as Figure 1. The 144 State Street property extends from State Street to Howard Street along the southeast side of Eagle Street, and is currently developed as a Marriott Renaissance Hotel. This property is situated to the northwest of, and adjacent to, a previously documented New York State Department of Environmental Conservation (NYSDEC) designated Class 2 Inactive Hazardous Waste Disposal Site, identified as Former Albany Laboratories Site, NYSDEC Site No. 401061, at 67 Howard Street, Albany, NY.

The Former Albany Laboratories Site, which was recently redeveloped as a multi-deck parking garage, was previously investigated by CHA and subsequently was the subject of an Interim Remedial Measure (IRM) for the removal of contaminated soil impacted by volatile organic compounds (VOCs). IRM activities and confirmatory soil sampling results were documented in CHA's CCR, dated October 3, 2011.

Based on the findings at the adjacent Former Albany Labs property, a Remedial Investigation (RI) was completed at the Site which focused on determining the potential for SVI into the building at 144 State Street, and provided the necessary field data to delineate the nature and extent of potential SVI impacts to the building. The RI was performed in accordance with CHA's Remedial Investigation Work Plan, dated June 13, 2011. The data derived from the RI were utilized to facilitate an evaluation of the potential migration or possible future migration of soil vapor into the existing building, and provided the data necessary to develop remedial recommendations. The findings of the RI indicated the presence of VOCs in sub-slab soil vapor beneath the eastern portion of the building at levels requiring mitigation in accordance with the New York State Department of Health's (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.

Columbia Development Companies (Columbia) acquired the subject property and building at 144 State Street, and renovated the building into the current hotel. As part of the renovation work for the building, Columbia agreed to install a sub-slab depressurization system (SSDS) within the basement level of the building in an effort to further address the off-site impacts associated with the Former Albany Laboratories Site. Based upon discussions with the NYSDEC, Columbia is

separately seeking a Record of Decision requiring no additional remedial action on the Albany Laboratories Site by mitigating the identified SVI issues at the Site.

A Remedial Action Work Plan (RAWP), dated June 5, 2013, was developed by CHA to present the investigation results of pre-design sub-slab testing and the system design, which was developed by Alpine Environmental Services, Inc. In addition, the RAWP presented the criteria for post-installation testing. The RAWP was approved by the NYSDEC on August 13, 2013.

2.0 SYSTEM INSTALLATION ACTIVITIES

BBL Construction Services (BBL), Columbia's construction contractor, retained the services of Aztech Technologies, Inc. (Aztech) to complete installation of the SSDS. Between the time of the initial testing/system design and system installation (summer of 2015), much of the floor slab was removed and replaced in connection with the installation of new sub-slab utilities. The new utilities were backfilled using native material, supplemented as necessary with material similar in soil/aggregate gradation prior to installation of new sections of floor slab. As shown by communication testing following SSDS installation (discussed in section 2.2), the floor slab/utility work did not hinder the system's ability, as designed, to achieve the required sub-slab negative pressure.

2.1 SYSTEM COMPONENTS

2.1.1 Extraction Points and Piping

define

The overall SSDS consists of seven sub-systems connected to a total of nineteen extraction points located throughout the footprint of the building's basement. Six of the sub-systems include three extraction points each manifolded to a single header pipe and plumbed to a vertical exhaust stack that is routed through a mechanical shaft to a dedicated extraction fan located on the roof of the building, using 3-inch diameter, Schedule 40 PVC pipe. The seventh sub-system includes a single extraction point located near the center of the building and is plumbed through the same elevator shaft to a dedicated fan using 4-inch diameter PVC pipe. This sub-system was constructed with larger diameter piping than the other sub-systems, and with a different fan (high flow/low pressure) due to the presence of more permeable sub-slab conditions in the area of the extraction point, as determined during pre-design testing. The layout of the extraction points and piping associated with each sub-system is shown on the figure prepared by Aztech included in their Installation Summary Report included as Appendix A. Additionally, photographs of key components of the SSDS system are also included in that report.

Each of the nineteen extraction points was installed by coring a 4-inch diameter hole through the concrete floor slab. Sub-slab material was cleared out to a depth of approximately 12 inches below the bottom of the slab. A perforated section of PVC pipe was placed vertically into the void. The annular space around the pipe was filled with graded stone up to the bottom of the floor slab. The remaining annulus was filled with cement grout to the top of the floor slab. Each of the extraction points was plumbed approximately 10 to 12 feet vertically, using schedule 40 PVC piping, and then laterally toward the centrally-located shaft. A detail of a typical extraction point is provided in Aztech's Installation Summary Report found in Appendix A.

Piping installed above the basement's drop ceiling was wrapped with FyreWrap fire-protectant insulation, per building code requirements. All lateral piping was hung with a minimum pitch to ensure any condensation will drain back to the closest extraction point. Lateral piping for each sub-system is connected to the vertical piping in the elevator shaft with a "Tee" fitting and a small length of pipe below to serve as a condensation collection sump, which can be manually drained.

Extraction piping was labeled at the basement level of the building, and on the floor level immediately below the roof, with permanent stick-on labels, reading "Vapor Mitigation System", corresponding to the sub-system number assigned at the time of installation. Pressure gauges and extraction fans were also labeled with their corresponding sub-system number.

2.1.2 Extraction Fans and Pressure Gauges

Sub-systems 1, 2, 4, 5, 6 and 7 include a Radonaway™ Model HS-5000 fan, while sub-system 3 includes a Radonaway™ Model RP-265 fan. Fan specification sheets are included in Aztech's Installation Summary Report found in Appendix A. Each fan was mounted to a prefabricated, galvanized steel support system, which was securely mounted to the roof of the building. Each fan was hard-wired to the building's electrical system by a licensed electrician. Electrical lines and connections were installed within appropriate conduits for exterior application. The PVC riser pipes for all seven sub-systems penetrate the building roof, and those penetrations were properly sealed by a roofing contractor.

Each riser pipe was connected to a pressure gauge (Dwyer Magnehelic Manometer) via polyethylene tubing to measure total vacuum for each sub-system and facilitate visual inspections of the vacuum drawn by the fans. The gauges are located adjacent to the riser pipes on the floor level immediately below the roof. Each riser pipe was also connected to an independent

differential pressure switch which is normally open under conditions of vacuum measuring 0.25 inches of water column or greater. In the event vacuum is measured below 0.25 inches of water column, the switch will close and activate an alarm which is tied into the building management system.

Ball valves were not installed on each sub-system; however, based on post-installation communication testing (discussed in section 2.2), the SSDS demonstrated adequate vacuum throughout the prescribed areas of influence.

2.1.3 System Activation and Baseline Monitoring

On June 25, 2015, representatives of CHA, Aztech, Columbia and the NYSDEC conducted a site visit and walk-through to review system installation progress and inspect the system components. At the time of the site visit, installation of the system was completed with the exception of the final electrical connections. During the site visit, a concern was raised regarding the proximity of the SSDS fan exhausts to the roof top smoke vents; however, BBL provided documentation confirming that the smoke vents are normally closed and sealed, and are designed to open only in the event of a building emergency (e.g. fire). This documentation is included as Appendix B.

The final electrical connections for the fans were completed in early to mid-July 2015, and the system was activated in late July 2015. CHA conducted a final walk-through inspection at the site on September 14, 2015, at which time the system was in operation and baseline operating vacuums for each sub-system were noted. The baseline vacuums, as measured by the gauges connected to the extraction piping, are shown in the following table.

Sub-System ID	Baseline Vacuum Reading (inches of water)
1	2
2	5.4
3	1.8
4	2
5	1.8
6	3.5
7	9

2.2 POST-INSTALLATION TESTING

Aztech conducted initial post-installation communication testing on August 5, 2016 and then additional communication testing on September 15, 2016, to confirm the presence of a pressure differential beneath the floor slab. To facilitate testing, a network of temporary monitoring points was created by drilling a 3/16-inch diameter hole through the floor slab at a total of 17 locations throughout the basement. Monitoring point locations identified as A through I were utilized to confirm adequate pressure differential throughout the center portion of the building footprint; monitoring point locations J through Q were utilized to confirm adequate pressure differential near the perimeter of the building footprint. Monitoring point locations are indicated by triangles on the figure prepared by Aztech and included in their Installation Summary Report found in Appendix A.

Testing consisted of placing a rubber tube into each hole and measuring the pressure differential using a digital micro-manometer connected to the other end of the tube. Following collection of the pressure differential measurement, each hole was filled with a crack-sealing grout. Post-installation testing results are shown in the table below:

Monitoring Point ID	Approximate Distance from Closest Extraction Point (ft)	Sub-Slab Pressure (inches of water column)
A	15	-0.035
B	20	-0.024
C	15	-0.153
D	10	-0.310
E	20	-0.008
F	15	-0.181
G	10	-0.082
H	15	-0.052
I	5	-0.392
J	15	-0.065
K	18	-0.073
L	20	-0.032
M	18	-0.122
N	18	-0.138

Monitoring Point ID	Approximate Distance from Closest Extraction Point (ft)	Sub-Slab Pressure (inches of water column)
O	24	-0.019
P	20	-0.350
Q	15	-0.100

As presented in the Remedial Action Work Plan, the system is designed to achieve the performance criteria of sub-slab negative pressures of greater than or equal to 0.002 inches of water column. The post-installation testing results, as shown in the table above, indicate that the established performance criteria were achieved by the SSDS.

3.0 OPERATION AND MAINTENANCE

Routine operational monitoring of each of the sub-systems will consist of confirming that each fan is operational and producing vacuum throughout its respective sub-system, indicated by the pressure gauges connected to the extraction piping.

The fans and piping require no routine maintenance. Recommended system maintenance is limited to draining any accumulated condensate from the bottom of each sub-system sump located below the "tee" fitting above the laundry shoot. Each sump is equipped with a ¼-inch ball valve that can be opened to allow condensate to be drained. This task should be completed once per month and continue as long as measurable amounts of condensate accumulate in the sumps.

In the event of a loss of vacuum, the power supply to the fans should be checked for a tripped circuit breaker. If a fan is receiving power, but is not operating, the fan should be evaluated by a qualified maintenance contractor for repair or replacement.

4.0 SYSTEM MONITORING

In accordance with the NYSDEC-approved Site Management Plan (June 20, 2014), a visual inspection of the SSDS will be conducted on a monthly basis by facility personnel and annually by a qualified environmental professional. System components to be monitored include, but are not limited to, the following:

- Fans;
- Vacuum and pressure gauges;

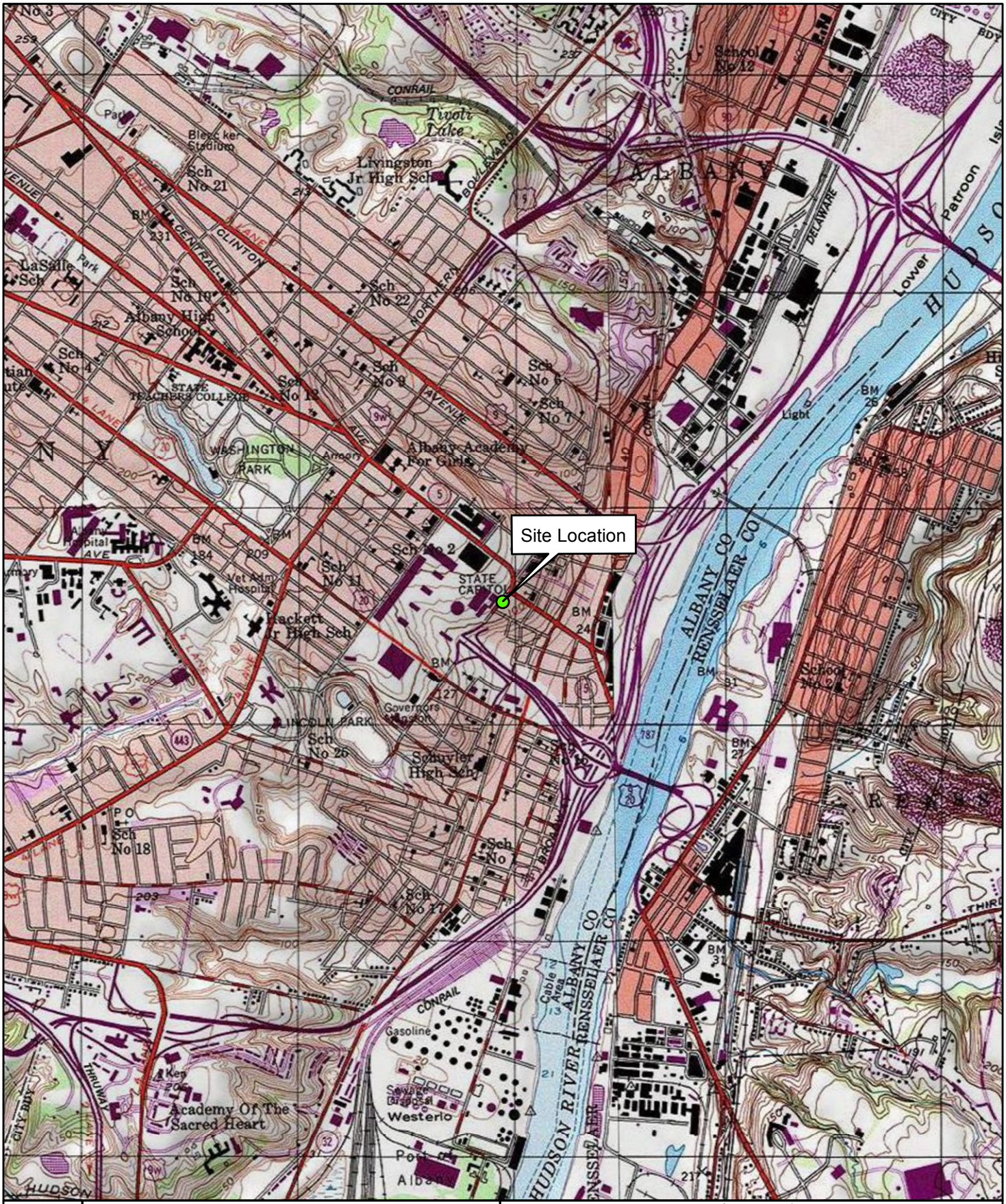
- Visible above-grade vacuum & discharge piping;
- Discharge piping above roof line
- Pipe support systems
- Labeling systems
- Alarm systems
- Floor joints, penetrations and cracks (e.g. checking of floors for potential leak points)

If any equipment is observed to be malfunctioning, or the system is not performing within specifications, maintenance and/or repair are required to be initiated immediately.

In addition to the monthly and annual system inspections, sub-slab vapor and indoor air quality testing will be performed periodically to verify successful operation of the system, as well as to facilitate an evaluation for the potential future shut-down of one or more of the SSDS sub-systems. Such testing will be performed at the following times in accordance with the requirements and protocols detailed in the Site Management Plan:

- At least one year following system installation and during the heating season (2016-2017 heating season);
- Once every five years, during the heating season (beginning in the 2020-2021 heating season)
- Prior to evaluating the potential shutdown of one or more of the SSDS sub-systems.

FIGURE



N

CHA
design/construction solutions

Figure 1
USGS Site Location Map

144 State Street
Albany, New York

Scale 1" = 2000'	CHA No. 21645

Service Layer Credits:
Copyright: © 2013 National Geographic Society, I-cubed
Albany & South Troy USGS Quadrangles, Date: 1994 & 1980

APPENDIX A

SSDS Installation Summary
(Prepared by Aztech Technologies, Inc.)

Aztech Technologies, Inc.

SSDS Installation Summary

Albany Renaissance Hotel

Albany, NY

REMEDIATION SOLUTIONS

ENVIRONMENTAL CONSULTING

DRILLING APPLICATIONS

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1. Introduction

1.1 Report Preface

The following report is intended to present pertinent information and data collected following the installation of the sub-slab depressurization system (SSDS) inside of the Albany Renaissance Hotel. The purpose of this report is to confirm that the SSDS installed at the site is functioning properly for the purpose of depressurizing the building's sub-slab. The content below is a combination of information provided during the bidding process and first hand site inspections and measurements collected by Aztech Technologies, Inc. (Aztech).

1.2 Site Background

Located on the corner of State Street and Eagle Street in Albany, NY the hotel is adjacent another property known to contain soils impacted by volatile organic compounds (VOCs). A Remedial Investigation conducted in 2012 concluded that the concentrations of trichloroethene, cis-1,2-dichloroethene, 1,1,1-trichloroethane, and carbon tetrachloride identified in the vapors below the sub-slab were elevated enough to require mitigation in accordance with the New York State Department of Health's (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York 2006*.

It was determined that prior to the completion of the building renovation and re-opening, an SSDS would need to be installed as an active approach to mitigate soil vapor intrusion within the structure. In 2013 a series of differential pressure tests were completed beneath the basement slab in order to measure the linear distance a fan will exert vacuum. Various sized fans were used to determine the most efficient means to depressurize the entire footprint of the building. This data was collected and used to complete the proposed design of the SSDS. The investigation, testing, and design of the mitigation system were conducted in accordance with the approved NYSDEC Remedial Action Work Plan (RAWP) dated June 5, 2015.

1.3 Scope of Work

In accordance with the RAWP design of the SSDS was completed by Alpine Environmental Services. The design consists of seven (7) SSDS's and included a total of 19 extraction points located throughout the footprint of the basement. Six of the systems consist of three (3) extraction points located near one another, manifolded to a single header pipe, and plumbed through a vertical elevator shaft to a fan located on the roof of the building using 3-inch Schedule 40 polyvinylchloride (PVC) pipe.

The seventh system consists of a single extraction point located near the center of the building and plumbed to a dedicated fan using 4" PVC pipe.

Extraction fans chosen for the six (6) – 3-inch systems are Radonaway® model HS-5000. The single – point 4-inch system utilizes a Radonaway® model RP265 fan. Specifications for each fan can be found in the attached Appendix.

2.0 System Installation

2.1 Extraction Points

Each extraction point was installed by coring a 4" diameter hole through the concrete floor. Sub-slab material was cleared out by hand to a depth of approximately 12-inches below the bottom of the slab. A perforate piece of PVC was placed into the void and backfilled with stone up to the bottom of the slab. The annulus around the pipe was filled with grout from the top of the crushed stone to the top of the slab. From the extraction wells, all pipe was plumbed approximately 10-12 feet vertically and then laterally towards the elevator shaft centrally located inside of the building. A detail of a typical extraction point can be found in the Appendix.

2.2 Lateral Piping

All pipe installed above the drop ceiling of the basement was wrapped with FyreWrap fire-protectant insulation manufactured by UniFrax. All lateral pipe was hung with a minimum pitch to ensure any condensation will drain back to the closest extraction point. Lateral piping is supported from anchors installed into the concrete ceiling above. All lateral is connected to the vertical shaft piping with a "Tee" fitting and a small length of pipe below to act as a sump to collect condensation from below the fans (see photo). These sumps can be manually drained into a container for disposal.

2.3 Fans

Per the approved system design provided, Sub-system 1, 2, 4, 5, 6, and 7 were equipped with Radonaway™ Model HS-5000 fan and Sub-system 3 was equipped with a Radonaway™ Model RP-265 fan (see attached specification sheets).

Each of the seven (7) system fans are mounted to a fabricated support system constructed from galvanized steel. The support system is securely mounted to the roof with multiple cross braces (see photo).

Each fan has been wired by an electrician with appropriate conduits for exterior application. All seven (7) systems penetrate the roof and have been properly seals by a roofing contractor. Specifications for each fan model can be found in the Appendix. Each HS-5000 model fan is equipped with an internal condensate bypass tube to allow moisture collected in the discharge stack to flow back into the extraction well and not back into the fan impeller. The RP-265 model has been equipped with an external condensate bypass coupling. All fans were capped with a Tee fitting to reduce infiltration of rain or snow into the exhaust stack.

3. Post Installation

3.1 Communication Testing

Subsequent to installing the SSDS, Aztech remobilized back to the site to conduct post-installation communication testing. This testing confirms the presence of a differential pressure beneath the slab. The communication tests consist of drilling a 3/16th inch hole through the basement slab at various locations between extraction points. These points were used for temporary measurement purposes and consist of placing a rubber tube into the hole to record the measurement. Once completed, the hole was filled with a crack-sealing grout.

A digital micro-manometer was inserted into the hole to measure the vacuum draw at each specific test location. Results from each test are displayed in the table below. Influence of an area is acceptable when a minimum of -0.002 inches of water column is measured through a communication test hole in the slab. Test point locations A through I confirm the presence of differential pressure throughout the center of the structure and test point locations J through Q confirm the presence of differential pressure around the perimeter of the structure. All measurements collected meet minimum allowable vacuum in accordance with the RWAP. Measurements collected can be seen in the table below. An as-built drawing of all lateral plumbing and test point locations can be found in the Appendix.

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Table of Differential Pressure Measurements Collected

Test Point	Approximate Distance From Closest Extraction Point (ft)	Micro Manometer Reading (Inches of WC)
A	15	-0.035
B	20	-0.024
C	15	-0.153
D	10	-0.310
E	20	-0.008
F	15	-0.181
G	10	-0.082
H	15	-0.052
I	5	-0.392
J	15	-0.065
K	18	-0.073
L	20	-0.032
M	18	-0.122
N	18	-0.138
O	24	-0.019
P	20	-0.350
Q	15	-0.100

3.2 Operation and Maintenance

Typical operation and maintenance on each SSDS consists of confirming that each fan is operational and exerting vacuum throughout each system. Each header pipe is connected to a Dwyer Magnehelic Manometer to measure total vacuum for each system. Each header is also connected to an independent differential pressure switch (Radonaway™ Checkpoint Alarm) which is normally open when more than -0.25-inches of water column is exerted. When vacuum is measured below -0.25 inches of water column, the switch closes and completes the circuit and sends an alarm to the building management system.

There is no typical maintenance to be conducted on the fans or the piping for an SSDS. The only recommended system maintenance is to drain any condensation accumulated at the bottom of each Sub-system sump located below the “tee” fitting above the laundry shoot.

During the first three (3) to six (6) months of operation, it is recommended that the fans be shut off at the circuit breaker and each condensate sump be drained if necessary.

Each condensate sump will be equipped with a ¼-inch ball valve that can be opened to allow condensation to be drained. This task should be completed once per month and shall continue as long as a measurable amount of condensate is drained from the sumps.

In the event of a loss of vacuum, check to see if the power supply to the fans have been interrupted by a tripped circuit breaker. If a fan is receiving power and is not operating, contact your remediation maintenance contractor to remove the fan and send to the manufacturer for troubleshooting.

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Appendix

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Import Sys Data

Mitigation System Installation Record

☒ Structure was sampled previously

System Information

Site No: 401061-offsite

System ID: Albany Renaissance

Site Name: Former Albany Labratories

Owner Name: Columbia Development

☐ Owner Occupied

System Address: 142 State Street

Telephone:

City: Albany Zip: 12207

Alt. Telephone:

Contractor Information

Installer Name: Carl Aldrich

Company: Aztech Technologies, Inc

Telephone: 518-885-5383

Building Conditions

Building Type: Other

Slab Integrity: ○ Poor ○ Average ◉ Good ○ Excellent

Slab Penetrations: ☐ Sump ☐ Floor drain ☐ Perimeter drain ☒ Other

Describe:

Various plumbing related penetrations. No major cracks or breaks.

Observed Water: ◉ Dry ○ Damp ○ Sump only ○ Standing

Describe:

None

System Installation

Installation Type: Sub-Slab Depressurization (Active)

Date Installed: 8/11/2014

Slab Thickess (inches): >5 in.

Subslab Material: Gravel

Subslab Moisture: Dry

Number of Suction Points: 3

Number of Fans Installed: 2

	☒ Fan #1 Operating	☒ Fan #2 Operating	☐ Fan #3 Operating
Fan Model No(s):	HS-5000	RP-265	
Fan Serial No(s):			
Final U-Tube Levels:			

Additional Mitigation Elements (check all that apply):

☐ Drainjer ☐ Membrane ☐ Sealed cracks ☐ New floor ☒ Rain cap ☒ Other

Comments:

A total of 19 extraction points were installed. Three points are connected to each of 6 HS-5000 fans. A single centrally located point is connected to a single RP-265 fan.

Export Data

Print Form

Photos

This Photo shows the sump for condensation collection at the bottom of the vertical pipe runs located above the laundry shoot in the basement. Each Sub-system is plumbed so that condensation accumulated in the lateral pipes flows back towards the closest extraction point.

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This photo shows the seven (7) Sub-system fans mounted on the roof. The fans are connected to a single junction box with a disconnect for maintenance purposes. The black tube on the Sub-system fan (RP-265) located on the far left is the condensate bypass tube which carries moisture collected in the stack around the fan impellor. The HS-5000 fans have an internal condensate bypass tube.

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This photo shows the system control panel which displays the total vacuum for each system. Each manometer is connected to a differential pressure alarm which has been wired to send a signal to the building management system in the vent a system's vacuum falls below 0.25 inches of water column.

This picture shows where the vacuum tube from each Sub-system connects to the control panel.

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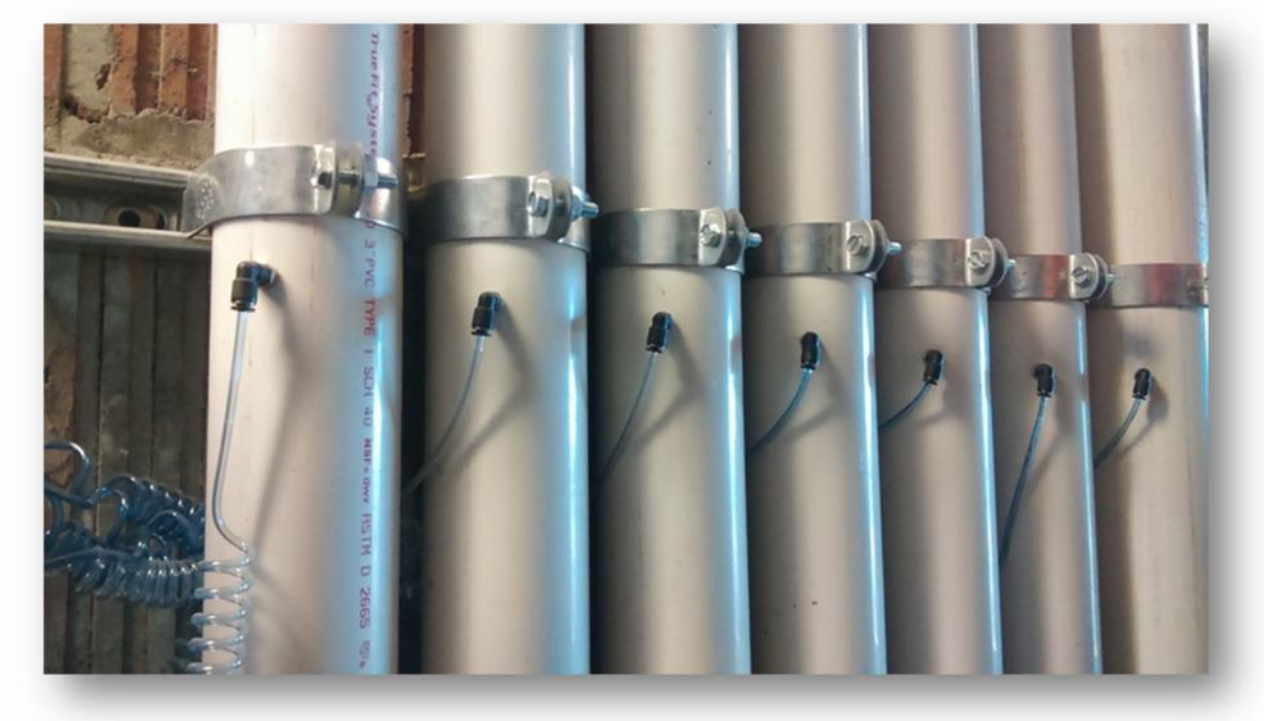

This picture show where each vacuum tube connects to each sub-system header pipe. The seven (7) Sub-systems are shown in the following order from left to right: Sub-System 1, Sub-System 2, Sub-System 4, Sub-System 5, Sub-System 6, Sub-System 7, Sub-System 3.

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PLAN NOTES

1. SEE SHEET A-500 FOR PARTITION TYPES.

2. ALL WALL TYPES TO BE 1A UNLESS OTHERWISE NOTED.

3. WHERE EXISTING CONSTRUCTION IS NOT DISTURBED, IT WILL BE DEEMED ACCEPTABLE CONSTRUCTION PER THE EXISTING BUILDING CODE. USE WALL MARKINGS AND RATINGS LISTED HERE AND ON CODE PLANS FOR NEW WALL CONSTRUCTION AND WALL REPAIR OR INFILL AT EXISTING CONSTRUCTION.

4. SEE A-400 SHEETS FOR ENLARGED FLOOR PLANS OF PUBLIC AND BACK OF HOUSE AREAS

5. SEE A-600 SHEETS FOR ENLARGED FLOOR PLANS OF GUESTROOMS.

6. WHERE EXISTING STRUCTURAL STEEL COLUMNS WILL BE EXPOSED BY THE WORK OF THIS CONTRACT, APPLY SPRAY FIREPROOFING TO ACHIEVE ONE HOUR FIRE RESISTIVE RATING.

7. WALL TYPES 6 AND 7 ARE INTERCHANGEABLE. USE WALL TYPE THAT IS MOST APPROPRIATE TO FIELD CONDITION.

8. PROVIDE MOLD RESISTANT GYP. BD. ON INTERIOR OF WALLS AT LAUNDRY ROOM, LOCKER ROOMS, BATHROOMS, SAUNA HOT SINKS, AND ALL WET LOCATIONS.

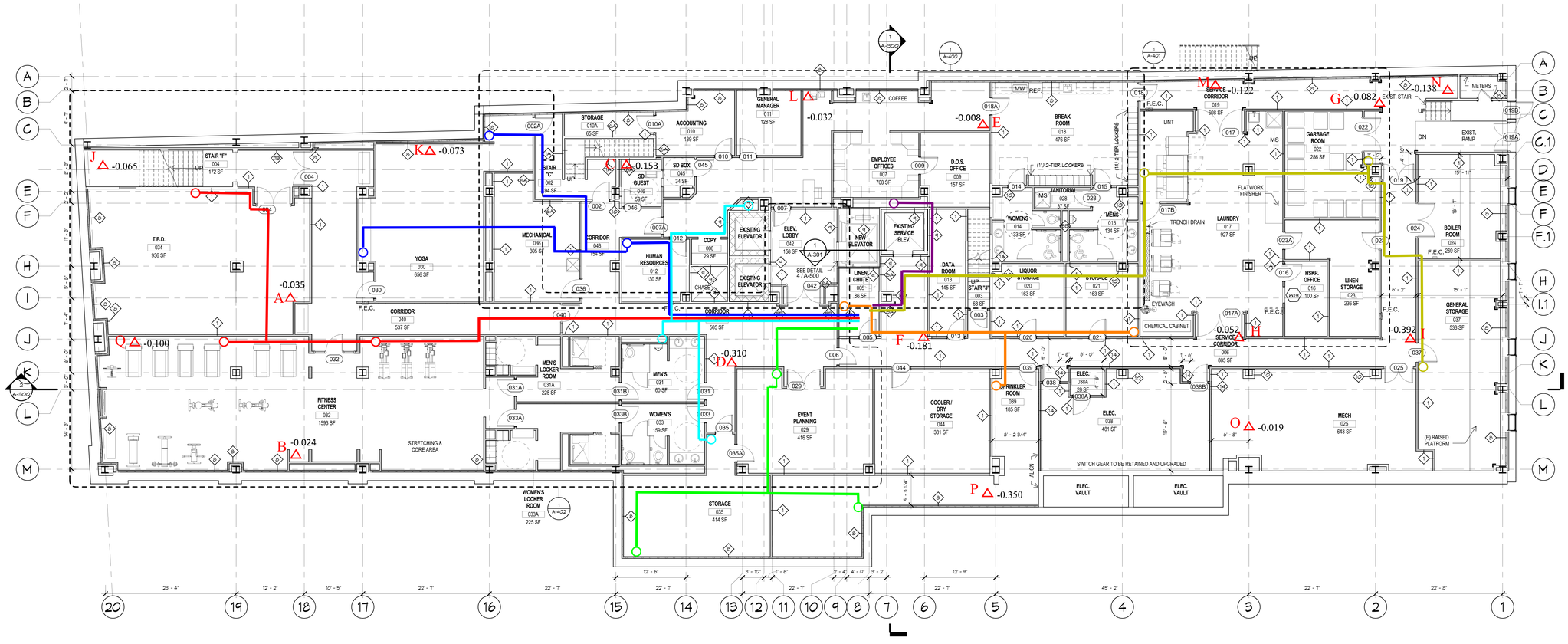
DRAWING LEGEND

- EXISTING WALL TO REMAIN
- NEW WALL
- EXISTING DOOR LOCATION TO REMAIN
- NEW DOOR
- NEW CORNER GUARD

hbt ARCHITECTS
2 ELTON STREET, ROCHESTER NY 14607
PHONE : (585) 586-0490

Columbia Development Companies

BBL Construction Services



Sub-System 1
Sub-System 2
Sub-System 3
Sub-System 4
Sub-System 5
Sub-System 6
Sub-System 7

1 BASEMENT FLOOR PLAN
1/8" = 1'-0"

N

0' 4' 8' 16' 32'

REVISIONS:

Number	Date	Issued by	Description
1	2013-12-09	HBT	ALTERATIONS FROM PERMIT SET

PROJECT:
MARRIOTT RENAISSANCE | ALBANY, NY

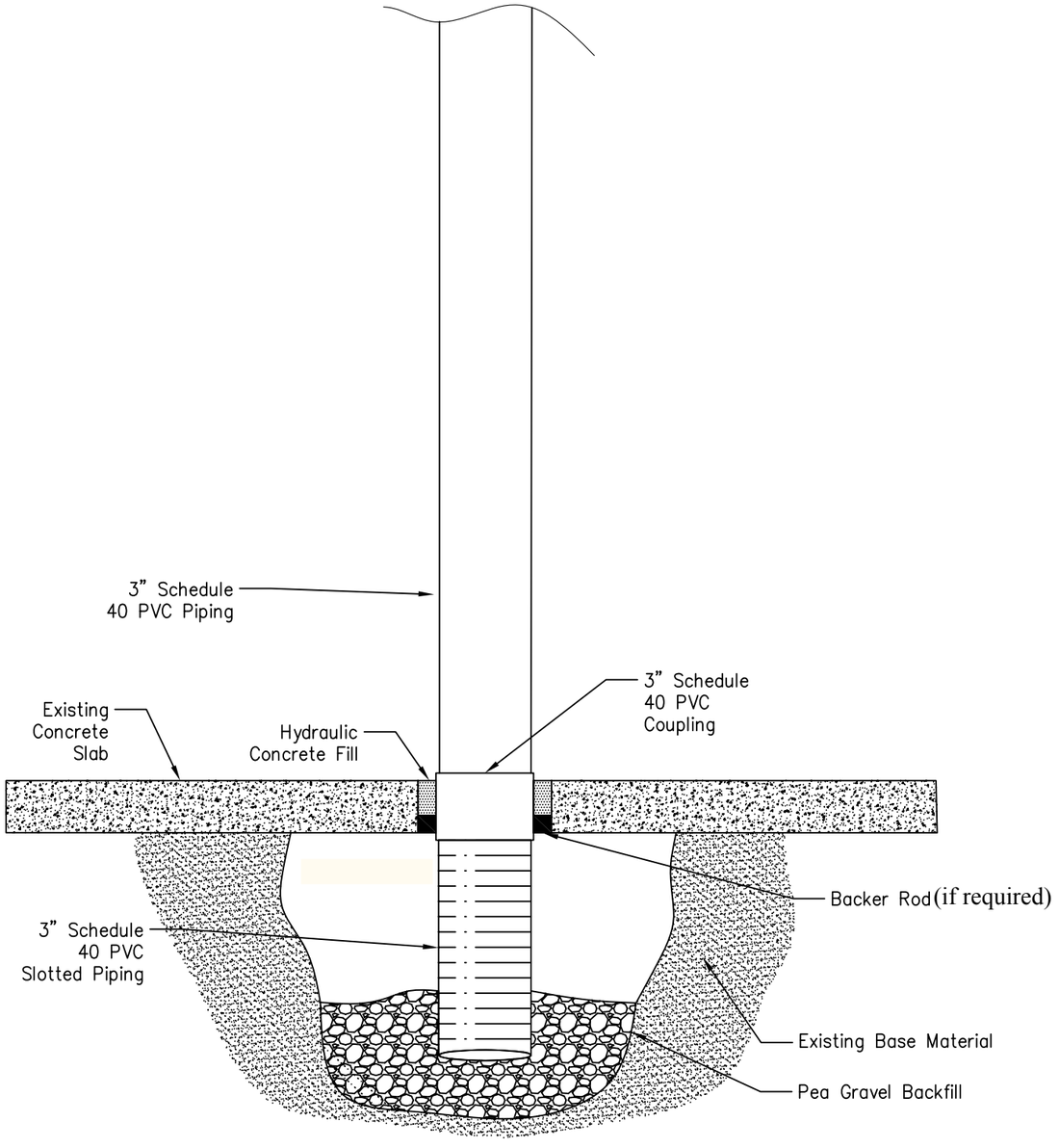
DRAWING TITLE:
BASEMENT

PROJECT NO.
2013-03-04

DATE:
FEBRUARY 27, 2015

NOTICE:
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ARCHITECT, TO ALTER ANY ITEM ON THIS DOCUMENT IN ANY WAY. ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS OR HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE AND A SPECIFIC DESCRIPTION OF ALTERATIONS.

A-100



EXPERTISE YOU CAN COUNT ON

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New York 12020

Phone: 518-885-5383
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www.aztechtech.com

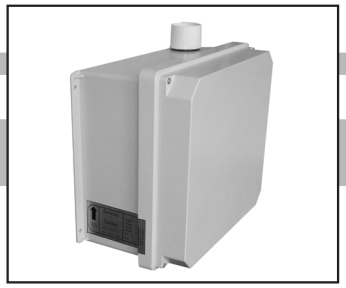
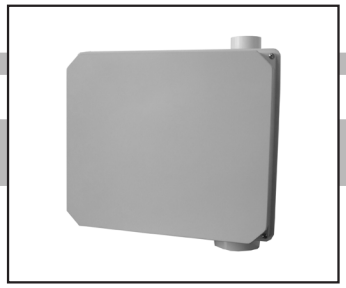
FIGURE 1 - EXTRACTION WELL DETAIL

DATE: 11-8-2011

SCALE: NTS

RadonAway™

The World's Leading
Radon Fan Manufaturer

HS Series

Installation & Operating Instructions

RadonAway
3 Saber Way | Ward Hill, MA 01835
www.radonaway.com

P/N IN007-REV J 9/13

RadonAway Ward Hill, MA.

HS Series Fan Installation & Operating Instructions

Please Read and Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible or flammable materials.
2. **WARNING!** Do not use fan to pump explosive or corrosive gases.
   See Vapor Intrusion Application Note #AN001 for important information on VI applications. RadonAway.com/vapor-intrusion
3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.
5. **NOTICE!** There are no user serviceable parts located inside the fan unit.
   Do NOT attempt to open. Return unit to the factory for service.
6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.

□□ **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.

□□ **WARNING!** Do not twist or torque fan inlet or outlet piping as Leakage may result.

□□ **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

□□□**WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.

b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

INSTALLATION & OPERATING INSTRUCTIONS (Rev J)
for High Suction Series
HS2000 p/n 23004-1
HS3000 p/n 23004-2
HS5000 p/n 23004-3

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The HS Series Fan is intended for use by trained, certified/licensed, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of the HS Series Fan. This instruction should be considered as a supplement to EPA/Radon Industry standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The HS Series Fan is designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the HS Series Fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F. The HS Series Fan is thermally protected such that it will shut off when the internal temperature is above 104 degrees F. Thus if the HS Series Fan is idle in an area where the ambient temperature exceeds this shut off, it will not restart until the internal temperature falls below 104 degrees F.

1.3 ACOUSTICS

The HS Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. There are, however, some considerations to be taken into account in the system design and installation. When installing the HS Series Fan above sleeping areas, select a location for mounting which is as far away as possible from those areas. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Insure a solid mounting for the HS Series Fan to avoid structure-borne vibration or noise.

The velocity of the outgoing air must also be considered in the overall system design. With small diameter piping, the "rushing" sound of the outlet air can be disturbing. The system design should incorporate a means to slow and quiet the outlet air. The use of the RadonAway Exhaust Muffler, p/n 24002, is strongly recommended.

1.4 GROUND WATER

Under no circumstances should water be allowed to be drawn into the inlet of the HS Series Fan as this may result in damage to the unit. The HS Series Fan should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the HS Series Fan with water in installations with occasional high water tables.

In the event that a temporary high water table results in water at or above slab level, water will be drawn into the riser pipes thus blocking air flow to the HS Series Fan. The lack of cooling air will result in the HS Series Fan cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the HS Series Fan be disconnected until the water recedes allowing for return to normal operation.

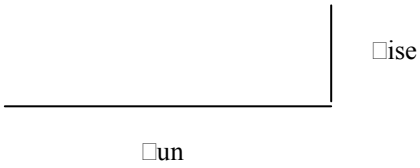
1.5 CONDENSATION & DRAINAGE

(WARNING!: Failure to provide adequate drainage for condensation can result in system failure and damage the HS Series Fan).

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation.

The use of small diameter piping in a system increases the speed at which the air moves. The speed of the air can pull water uphill and at sufficient velocity it can actually move water vertically up the side walls of the pipe. This has the potential of creating a problem in the negative pressure (inlet) side piping. For HS Series Fan inlet piping, the following table provides the minimum recommended pipe diameters as well as minimum pitch under several system conditions. Use this chart to size piping for a system.

Pipe Diam.	Minimum Rise per Foot of Run*		
	@ 25 CFM	@ 50 CFM	@ 100 CFM
4"	1/32 "	3/32 "	3/8 "
3"	1/8 "	3/8 "	1 1/2 "



*Typical operational flow rates:

HS3000, or HS5000	20 - 40 CFM
HS2000	50 - 90 CFM

All exhaust piping should be 2" PVC.

1.6 SYSTEM MONITOR AND LABEL

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A Magnehelic pressure gauge is recommended for this purpose. The indicator should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the gauge with water in installations with occasional high water tables. A System Label (P/N 15022) with instructions for contacting the installing contractor for service and also identifying the necessity for regular radon tests to be conducted by the building occupants, must be conspicuously placed where the occupants frequent and can see the label.

1.7 SLAB COVERAGE

The HS Series Fan can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (2 to 10 gallons in size) be created below the slab at each suction hole.

1.8 ELECTRICAL WIRING

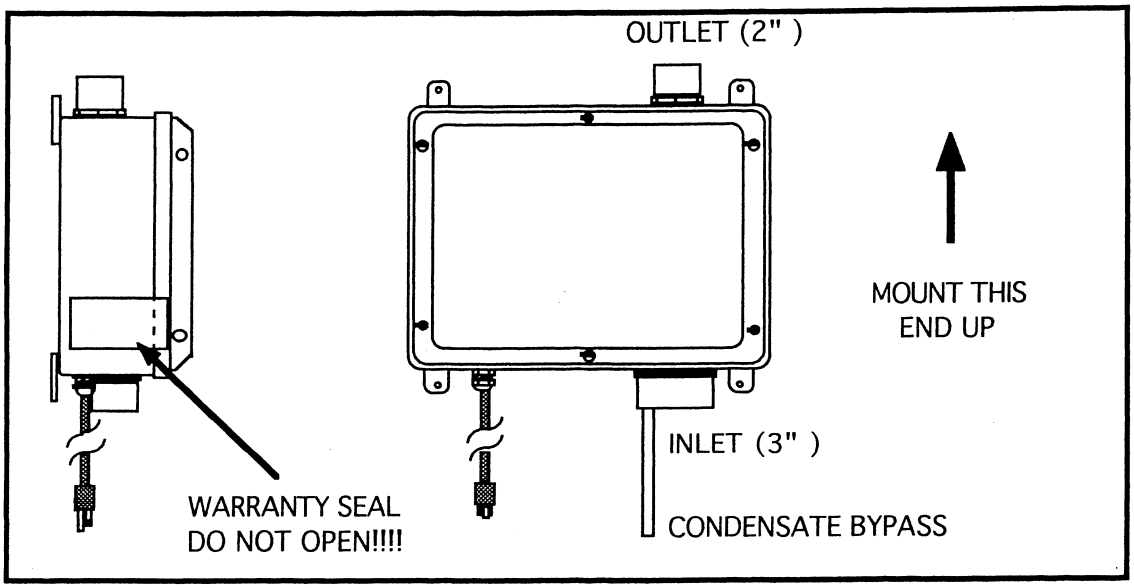
The HS Series Fan plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly caulked to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weather tight box with switch for outdoor hardwire connection. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly caulked to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.9 SPEED CONTROLS

Electronic speed controls can **NOT** be used on HS Series units.



2.0 INSTALLATION

2.1 MOUNTING

Mount the HS Series Fan to the wall studs, or similar structure, in the selected location with (4) 1/4" x 1 1/2" lag screws (not provided). Insure the HS Series Fan is both plumb and level.

2.2 DUCTING CONNECTIONS

Make final ducting connection to HS Series Fan with flexible couplings. Insure all connections are tight. Do not twist or torque inlet and outlet piping on HS Series Fan or leaks may result.

2.3 VENT MUFFLER INSTALLATION

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed above the roofline at the end of the vent pipe.

2.5 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

____ Make final operation checks by verifying all connections are tight and leak-free.

____ Insure the HS Series Fan and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is within normal operating range and less than the maximum recommended as shown below:

HS2000	14" WC
HS3000	21" WC
HS5000	40" WC

(Above are based on sea-level operation, at higher altitudes reduce above by about 4% per 1000 Feet.) If these are exceeded, increase number of suction points.

____ Verify Radon levels by testing to EPA protocol.

Addendum

PRODUCT SPECIFICATIONS

Model	Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115 VAC
		0"	10"	15"	20"	25"	35"	
HS2000	18"	110	72	40	-	-	-	150-270
HS3000	27"	40	33	30	23	18	-	105-195
HS5000	50"	53	47	42	38	34	24	180-320

*Power consumption varies with actual load conditions

Inlet: 3.0" PVC

Outlet: 2.0" PVC

Mounting: Brackets for vertical mount

Weight: Approximately 18 lbs.

Size: Approximately 15"W x 13"H x 8"D

Minimum recommended inlet ducting (greater diameter may always be used):

HS3000, HS5000 --- 2.0" PVC Pipe

HS2000 --- Main feeder line of 3.0" or greater PVC Pipe

Branch lines (if 3 or more) may be 2.0" PVC Pipe

Outlet ducting: 2.0" PVC

Storage temperature range: 32 - 100 degrees F.

Thermally protected

Locked rotor protection

Internal Condensate Bypass

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the HS Series Fan for shipping damage within 15 days of receipt. Notify **RadonAway of any damages immediately**. RadonAway is not responsible for damages incurred during shipping. However, for your benefit, RadonAway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the HS Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the HS Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of one (1) year from the date of manufacture (the "Warranty Term"). Outside the Continental United States and Canada the Warranty Term is one (1) year from the date of manufacture.

RadonAway will repair any fan which fails due to defects in materials or workmanship. The Fan must be returned (at owner's cost) to the RadonAway factory. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE HS SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

Record the following information for your records:

Serial No. 061505, 061506, 061507, 061508, 061509, and 061510
Purchase Date 06/10/15

RadonAway®

The World's Leading
Radon Fan Manufacturer



RP Series

Installation & Operating Instructions

RadonAway
3 Saber Way | Ward Hill, MA 01835
www.radonaway.com

P/N IN020-REV R 08/15

RadonAway Ward Hill, MA.

Series Fan Installation & Operating Instructions

Please Read and Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** WARNING! For General Ventilating Use Only. Do Not Use to Exhaust Hazardous, Corrosive or Explosive Materials, Gases or Vapors. See Vapor Intrusion Application Note #AN001 for important information on VI applications. RadonAway.com/vapor-intrusion
2. **WARNING!** NOTE: Fan is suitable for use with solid state speed controls however use of speed controls is not generally recommended.
3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.
5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.
6. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.
7. **WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

   a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.

   b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

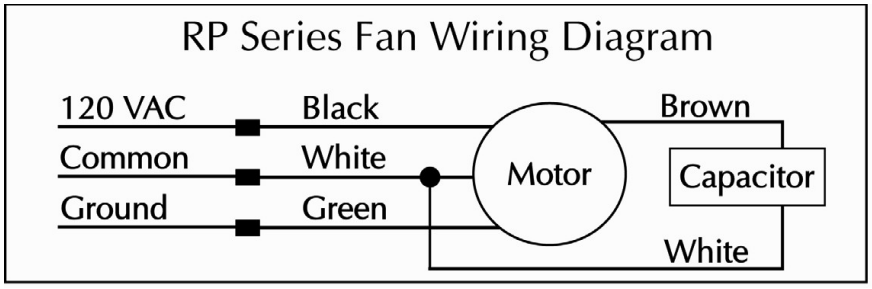
   c) Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.

   d) Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent back drafting. Follow the heating equipment manufacturers guideline and safety standards such as those published by the National Fire Protection Association, and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.

   e) When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.

   f) Ducted fans must always be vented to outdoors.

   g) If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) - protected branch circuit.



RP Series

RP140	**p/n 23029-1**
RP145	**p/n 23030-1**
RP260	**p/n 23032-1**
RP265	**p/n 23033-1**
RP380	**p/n 28208**

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1. INTRODUCTION

The RP Series Radon Fans are intended for use by trained, professional, certified/licensed Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of an RP Series Fan. This instruction should be considered as a supplement to EPA/radon industry standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2. FAN SEALING

The RP Series Fans are factory sealed, no additional caulk or other materials are required to inhibit air leakage.

1.3. ENVIRONMENTALS

The RP Series Fans are designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F.

1.4. ACOUSTICS

The RP Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the "rushing" sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

(To ensure quiet operation of ENERGY STAR qualified in-line and remote fans, each fan shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall be installed between the exhaust or supply grille(s) and the fan). RP Series fans are not suitable for kitchen range hood remote ventilation applications.

1.5. GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes thus blocking air flow to the RP Series Fan. The lack of cooling air may result in the fan cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the fan be turned off until the water recedes allowing for return to normal operation.

1.6. SLAB COVERAGE

The RP Series Fan can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the RP Series Fan best suited for the sub-slab material can improve the slab coverage. The RP140/145/155 are best suited for general purpose use. The RP260 can be used where additional airflow is required and the RP265/380 is best suited for large slab, high airflow applications. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.7. CONDENSATION & DRAINAGE

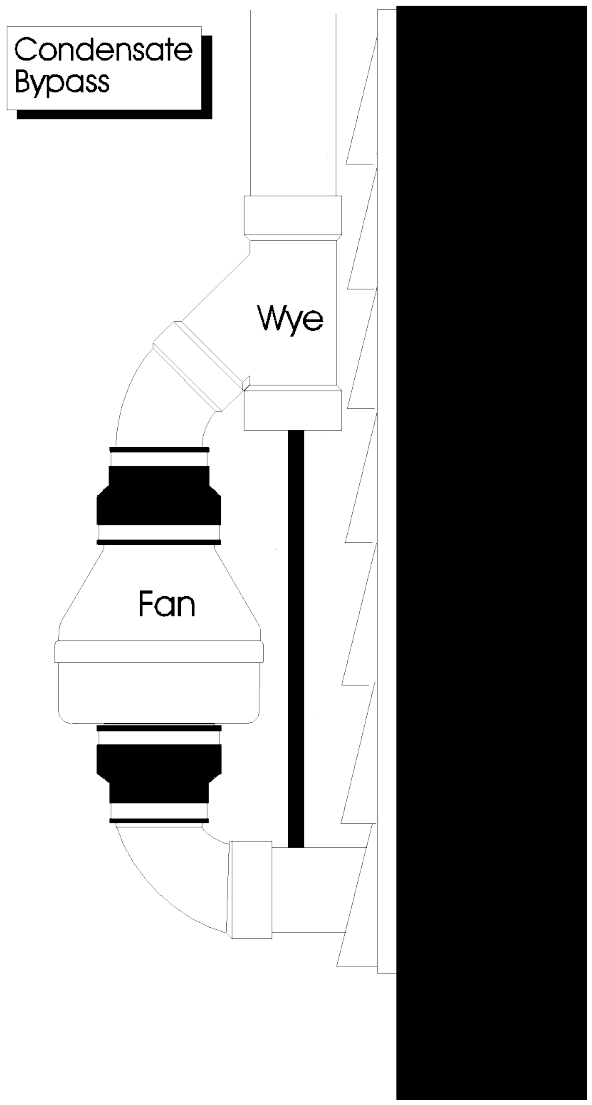
Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation. The RP Series Fan **MUST** be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The RP Series Fans are **NOT** suitable for underground burial.

For RP Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Dia.	Minimum Rise per Ft of Run*				
	@25 CFM	@50 CFM	@100 CFM	@200 CFM	@300 CFM
6"	-	3/16	1/4	3/8	3/4
4"	1/8	1/4	3/8	2 3/8	-
3"	1/4	3/8	1 1/2	-	-

*Typical RP1xx/2xx Series Fan operational flow rate is 25 - 90 CFM 0n 3" and 4" pipe. (For more precision, determine flow rate by measuring Static Pressure, in WC, and correlate pressure to flow in the performance chart in the addendum.)

Under some circumstances in an outdoor installation a condensate bypass should be installed in the outlet ducting as shown. This may be particularly true in cold climate installations which require long lengths of outlet ducting or where the outlet ducting is likely to produce large amounts of condensation because of high soil moisture or outlet duct material. Schedule 20 piping and other thin-walled plastic ducting and Aluminum downspout will normally produce much more condensation than Schedule 40 piping. Schedule 40 piping is preferred for radon mitigation, all joints should fully sealed using the appropriate pipe cement on socket type fittings or flexible coupling firmly attached via worm drive screw clamps. Sealing ducting or pipe with duct tape is not acceptable on radon mitigation installations. No pipe penetrations are permitted, other than the condensation bypass. Silicon caulk is permitted for sealing purposes.



The bypass is constructed with a 45 degree Wye fitting at the bottom of the outlet stack. The bottom of the Wye is capped and fitted with a tube that connects to the inlet piping or other drain. The condensation produced in the outlet stack is collected in the Wye fitting and drained through the bypass tube. The bypass tubing may be insulated to prevent freezing.

1.8. SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2) is required to notify the occupants of a fan system malfunction. A System Label (provided with Manometer P/N 50017) with instructions for contacting the installing contractor for service and also identifying the necessity for regular radon tests to be conducted by the building occupants, must be conspicuously placed where the occupants frequent and can see the label.

1.9. VENTILATION

If used as a ventilation Fan any type of ducting is acceptable, however, flexible nonmetallic ducting is recommended for easy installation and quieter operation. Insulated flexible ducting is highly recommended in cold climates to prevent the warm bathroom air from forming condensation in the ducting where it is exposed to colder attic air. The outlet of the fan should always be ducted to the outside. Avoid venting the outlet of the fan directly into an attic area. The excess moisture from the bathroom can cause damage to building structure and any items stored in the attic. Multiple venting points may be connected together using a "T" or "Y" fitting. Ideally Duct should be arranged such that equal duct lengths are used between intake and "T" or "Y" fitting, this will result in equal flow rates in each intake branch. If adjustable intake grilles are used on multi-intake systems then the opening on each grill should be equal in order to minimize noise and resistance. Straight smooth runs of rigid metal ducting will present the least resistance and maximize system performance. The Equivalent Length of Rigid Metal Ducting resulting in .2" WC pressure loss for each Fan Model is provided in the specification section of these Instructions. Flexible ducting, if used, must always be as close to being fully extended as possible. Formed rigid metal duct elbows will present the least resistance and maximize system performance, recommended bend radius of elbow is at least 1.5 x duct diameter.

RP Series fans are not suitable for kitchen range hood remote ventilation applications. For quietest performance, the fan should be mounted further away from the inlet duct, near the outside vent. A minimum distance of 8 feet is recommended between the fan or T/Y of a multi-intake system and intake grille(s).

Backdraft dampers allow airflow in only one direction preventing cold/hot drafts from entering the vented area and minimize possible condensation and icing within the system while the fan is not operating. Backdraft dampers are highly recommended at each intake grille for bathroom ventilation in all cold climate installations. Installation instructions are included with Spruce backdraft dampers.

The ducting from this fan to the outside of the building has a strong effect on the airflow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated airflow.

1.10. ELECTRICAL WIRING

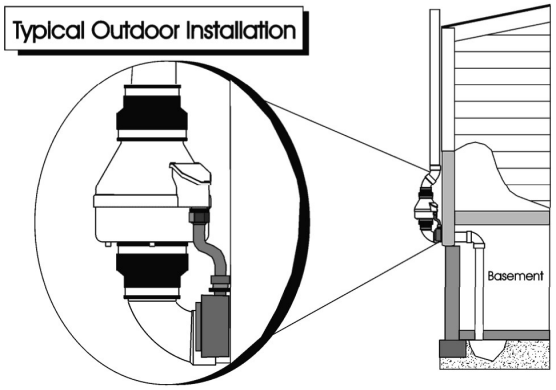
The RP Series Fans operate on standard 120V 60 Hz. AC. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly sealed to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.11. SPEED CONTROLS

The RP Series Fans are rated for use with electronic speed controls, however, they are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control Cat. No. 94601-I.

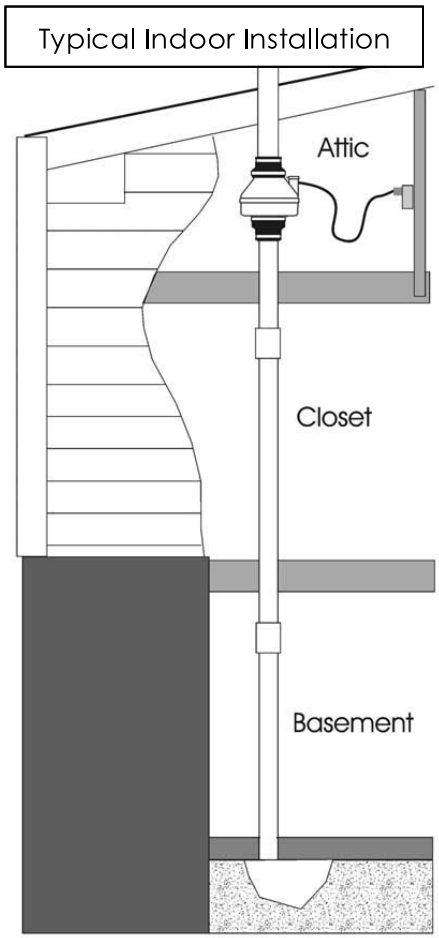
2.0 INSTALLATION

The RP Series Fan can be mounted indoors or outdoors. (It is suggested that EPA recommendations be followed in choosing the fan location.) The RP Series Fan may be mounted directly on the system piping or fastened to a supporting structure by means of optional mounting bracket



2.1 MOUNTING

Mount the RP Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.



2.2 MOUNTING BRACKET (optional)

The RP Series Fan may be optionally secured with the RadonAway P/N 25007 (25033 for RP385) mounting bracket. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

2.3 SYSTEM PIPING

Complete piping run, using flexible couplings as means of disconnect for servicing the unit and vibration isolation. Used as a Radon Fan the fan is typically outside of the building thermal boundary, and is venting to the outside, installation of insulation around the fan is not required. If used as a ventilation fan insulation may be installed around the fan and duct work, insulation should be sized appropriately for the duct size used and secured with duct tape.

2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.10). Note that the fan is not intended for connection to rigid metal conduit.

Fan Wire	Connection
Green	Ground
Black	AC Hot
White	AC Common

2.5 VENT MUFFLER (optional)

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed at the end of the vent pipe.

2.6 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

_____**Verify** all connections are tight and **leak-free**.

_____**Insure** the RP Series Fan and all ducting is secure and vibration-free.

_____**Verify** system vacuum pressure with manometer. **Insure** vacuum pressure is within normal operating range and **less than** the maximum recommended operating pressure.

(Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 Feet.)
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments)
See Product Specifications. If this is exceeded, increase the number of suction points.

_____**Verify Radon levels by testing to EPA protocol.**

RP SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the RP Series Fan:

Typical CFM Vs Static Pressure "WC									
	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
RP140	135	103	70	14	-	-	-	-	-
RP145	166	146	126	104	82	61	41	21	3
RP260	272	220	176	138	103	57	13	-	-
RP265	334	291	247	210	176	142	116	87	52
RP380*	497	401	353	281	220	176	130	80	38

* Tested with 6" inlet and discharge pipe.

Power Consumption 120 VAC, 60Hz 1.5 Amp Maximum		Maximum Recommended Operating Pressure* (Sea Level Operation)**	
RP140	17 - 21 watts	RP140	0.8" W.C.
RP145	41 - 72 watts	RP145	1.7" W.C.
RP260	52 - 72 watts	RP260	1.5" W.C.
RP265	91 - 129 watts	RP265	2.2" W.C.
RP380	95 - 152 watts	RP380	2.0" W.C.

**Reduce by 10% for High Temperature Operation*
***Reduce by 4% per 1000 feet of altitude*

	Size	Weight	Inlet/Outlet	L.2
RP140	8.5H" x 9.7" Dia.	5.5 lbs.	4.5" OD (4.0" PVC Sched 40 size compatible)	25
RP145	8.5H" x 9.7" Dia.	5.5 lbs.	4.5" OD (4.0" PVC Sched 40 size compatible)	15
RP260	8.6H" x 11.75" Dia.	5.5 lbs.	6.0" OD	48
RP265	8.6H" x 11.75" Dia.	6.5 lbs.	6.0" OD	30
RP380	10.53H" x 13.41" Dia.	11.5 lbs.	8.0" OD	57

L.2 = Estimated Equivalent Length of Rigid Metal Ducting resulting in .2in WC pressure loss for Duct Size listed. Longer Equivalent Lengths can be accommodated at Flows Lower than that at .2in WC pressure loss (see CFM Vs Static Pressure "WC Table).

Recommended ducting: 3" or 4" RP1xx/2xx, 6" RP380, Schedule 20/40 PVC Pipe

Mounting: If used for Ventilation use 4", 6" or 8" Rigid or Flexible Ducting

Mount on the duct pipe or with optional mounting bracket.

Storage temperature range: 32 - 100 degrees F.

Normal operating temperature range: -20 - 120 degrees F.

Maximum inlet air temperature: 80 degrees F.

Continuous Duty

Class F Insulation [RP140 Class B]

Class B Insulation

Thermally Protected

3000 RPM

Rated for Indoor or Outdoor Use

LISTED
Electric Fan

Intertek
77728

Conforms to
UL STD. 507

Certified to
CAN/CSA STD.
C22.2 No.113

ENERGY STAR
RP140 Only

TESTED/CERTIFIED
2100
Home Ventilating Institute

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the GP/XP/XR/RP/SF Series Fan for shipping damage within 15 days of receipt. Notify **RadonAway® of any damages immediately**. RadonAway® is not responsible for damages incurred during shipping. However, for your benefit, RadonAway® does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the GP/XP/XR/RP/SF Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

WARRANTY

RadonAway® warrants that the GPX01/XP/XR/RP/SF Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 90 days from the date of purchase (the "Warranty Term").

RadonAway® will replace any Fan which fails due to defects in materials or workmanship during the Warranty Term. The Fan must be returned (at Owner's cost) to the RadonAway® factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway®.

5 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to five (5) years from date of purchase or sixty-three (63) months from the date of manufacture, whichever is sooner, if the Fan is installed in a professionally designed and professionally installed active soil depressurization system or installed as a replacement fan in a professionally designed and professionally installed active soil depressurization system by a qualified installer. Proof of purchase and/or proof of professional installation may be required for service under this warranty. Outside the Continental United States and Canada the extended Warranty Term is limited to one (1) year from the date of manufacture.

RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

LIMITATION OF WARRANTY

EXCEPT AS STATED ABOVE, THE GPx01/XP/XR/RP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping costs, including insurance, to and from factory.

RadonAway® 3 Saber Way
Ward Hill, MA 01835 USA TEL (978) 521-3703
FAX (978) 521-3964
Email to: Returns@RadonAway.com

Record the following information for your records:

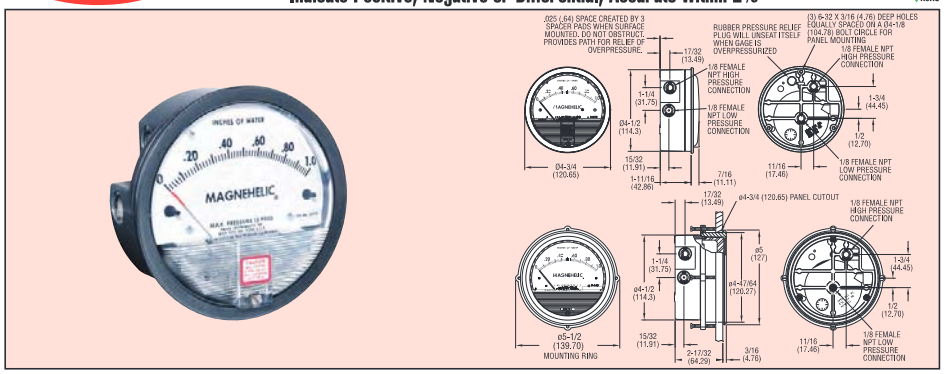
Serial No. 162846
Purchase Date 6/10/15

Series 2000

Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%

RoHS



Select the Dwyer® Magnehelic® gage for high accuracy – guaranteed within 2% of full-scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

Mounting

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Although calibrated for vertical position, many ranges above 1″ may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4-9/16″ hole is required for flush panel mounting. Complete mounting and connection fittings, plus instructions, are furnished with each instrument. See page 7 for more information on mounting accessories.

Flush, Surface or Pipe Mounted

Enclosure Mounted

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available).
Note: May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% of FS (±3% on -0, -100 Pa, -125 Pa, 10MM and ±4% on -00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig† (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. See Overpressure Protection Note on next page.
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapter, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Agency Approval: RoHS. **Note:** -SP models not RoHS approved.
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

ACCESSORIES

Model A-432 Portable Kit
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder.

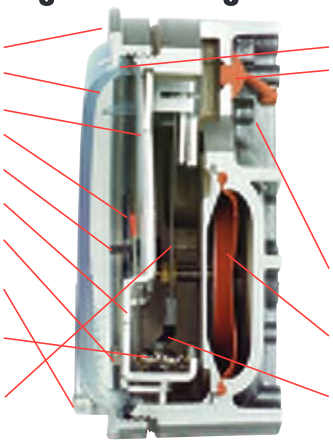
Model A-605 Air Filter Gage Accessory Kit
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.

A-605B Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange

A-605C Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange

Series 2000

Magnehelic® Gage Models & Ranges



Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0,023" clearance when gage is surface mounted. Do not obstruct the gap created by these pads. The blowout plug is not used on models above 180" of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm. The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings or any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

Model	Range Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30

Model	Range, CM of Water
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
•• Accuracy +/-4%
*MP option standard
**HP option standard

Model	Range MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10

Model	Range, Pa
2000-60NPA†••	10-0-50
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

Model	Range in W.C./ Velocity F.P.M.
2000-00AV†••	0-.25/300-2000
2000-0AV†•	0-.50/500-2800
2001AV	0-1.0/500-4000
2002AV	0-2.0/1000-5600
2005AV	0-5.0/2000-8800
2010AV	0-10/2000-12500

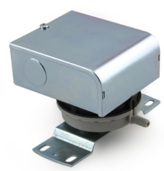
Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure. Example: 0.5 in w.c. = 16,000 CFM.

ACCESSORIES
A-321, Safety Relief Valve
A-448, 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
A-135, Rubber gasket for panel mounting
A-401, Plastic Carry Case

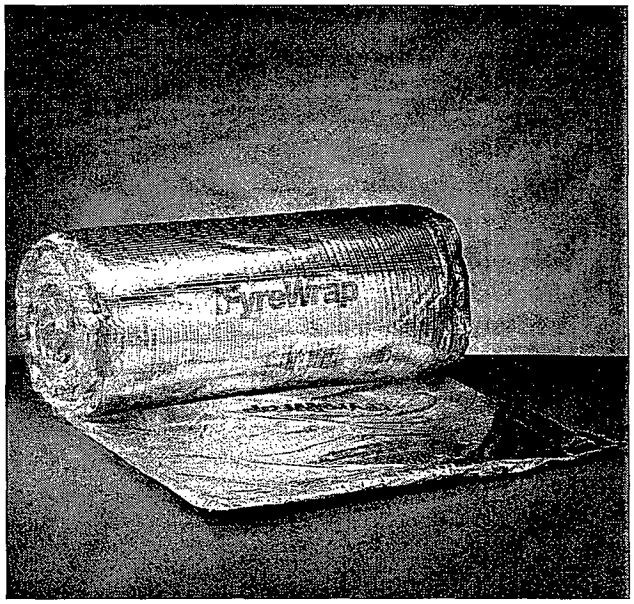
A-310A 3-Way Vent Valves
In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.



UNIFRAX

Product Information Sheet

FyreWrap® 0.5 Plenum Insulation



FyreWrap 0.5 Plenum Insulation

Introduction

Unifrax's FyreWrap® 0.5 Plenum Insulation is a high-temperature insulation blanket specifically designed to provide a single layer, flexible enclosure around combustible items located within fire-rated return air plenums. New construction, building renovations or modifications to the electrical and mechanical systems may result in the installation of plastic pipe or plastic-coated cables that cannot meet the minimum combustibility requirements defined in the Mechanical Code. FyreWrap 0.5 Plenum Insulation provides fire protection for these installed items by preventing flame propagation and smoke development in the plenum area. FyreWrap 0.5 Plenum Insulation offers the following product features:

- Lightweight, flexible product form
- Scrim encapsulated
- Easy to cut, fabricate, wrap around pipes or cables
- Thin, single layer design
- High-temperature, biosoluble fiber

Product Components

Core Material: FyreWrap 0.5 Plenum Insulation incorporates Insulfrax® Thermal Insulation as its core material. Insulfrax is a high-temperature insulation made from a calcia, magnesia, silica chemistry designed to enhance biosolubility. It provides excellent insulation in a noncombustible blanket product form.

Encapsulating Material: The core insulation blanket is completely encapsulated in an aluminum foil, fiberglass reinforced scrim covering. This scrim provides additional handling strength as well as protection from moisture absorption and tearing.

Typical System Properties

Intertek Laboratories (OPL) Listed	Applied Fire Protection, File 16341-3	
UL 1887 – modified results	Passes; Intertek Design Nos. UNI/BI 20-03, UNI/BI 20-04	
Plastic Pipe and Cable Sheathing	PVC, CPVC, PB, PE, PP, PVDF and ABS	
Plastic Pipe Size (minimum)	1" or larger individual pipes or pipe bundles	
Plastic Coated Cable Groupings	3 or more multi-stranded telecommunication wires.	
ASTM E136 Non-combustibility	Passes	
ASTM E84, UL 723, ULC S102.2	UL File No. R14514	
	Unfaced Blanket	Encapsulated
Flame Spread Rating:	Zero	<25
Smoke Developed Rating:	Zero	<50

Intertek

CLASSIFIED c UL us

Member IFC International FireStop Council

Data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.

Refer to the product Material Safety Data Sheet (MSDS) No. M0200 for recommended work practices and other product safety information.

Typical Product Parameters

Thickness	½"
Density	8pcf
Covering	Scrim Encapsulated
Product Availability	24"w x 25LF
	48"w x 25LF

Installation

FyreWrap 0.5 Plenum Insulation consists of a single layer system applied directly on to the surface of the combustible item. Cut the insulation to a length sufficient to wrap around the combustible item(s) plus provide a minimum 1" perimeter overlap. Seal all cut edges with aluminum foil tape to ensure there is no exposed fiber. Cut the adjacent piece of Plenum Insulation long enough to wrap around the circumference of the item plus a 1" perimeter overlap. This piece shall also be installed with a minimum 1" longitudinal overlap on to the previously installed piece.

To temporarily secure the Plenum Insulation, optional use of 1" wide filament tape is permitted. Space the tape within ½" of the blanket edge and approximately 11" on center. 24 ga. steel tie wire or ½" steel banding should be utilized as a permanent attachment. Locate the wire or banding ½" from the blanket edge and on 11½" centers. Twist tension the wire or tighten banding to firmly hold the wrap system in place, but not so tight as to cut or damage the blanket. Hand tightening of wire is adequate.

Installation drawings are provided below for additional illustration.

Unifrax has a wide range of FyreWrap fire protection materials available to provide passive fire protection solutions in a variety of applications in the commercial building, industrial facility and transportation industries.

For additional information about product performance or for assistance identifying the recommended product for your fire protection application, please contact Unifrax at 716-768-6500 and ask for Fire Protection Application Engineering.

FyreWrap® 0.5 Plenum Insulation System **FP-389**

Figure 1: 4" Single Plastic Pipe

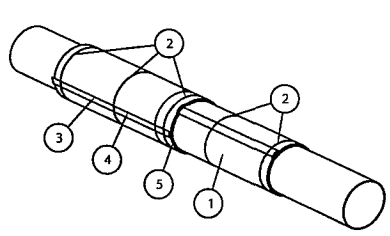


Figure 2: 4" Plastic Pipe Bundle

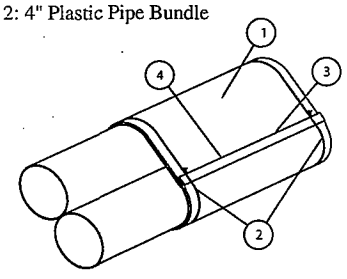


Figure 3: 1" Plastic Pipe Bundle

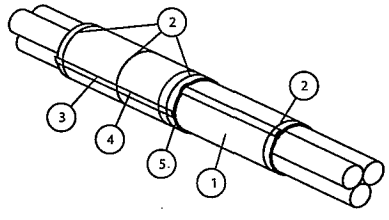
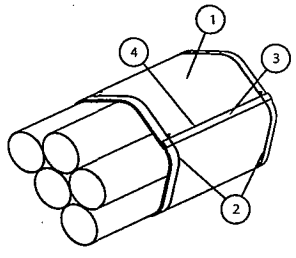


Figure 4: 1" Plastic Pipe Bundle



Legend:	
1	FyreWrap® 0.5 Plenum Insulation, One Layer
2	Steel Tie wire or banding
3	Aluminum foil tape to seal cut edges
4	Longitudinal overlap 1" min.
5	Perimeter overlap 1" min.

Note: Seal all cut edges with Aluminum foil tape.

Intertek

FyreWrap

Form C-1433
Effective 3/14
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The test data shown are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.

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Telephone: 716-768-6500
Canada: 1-800-635-4464
Internet: www.unifrax.com
Email: info@unifrax.com

APPENDIX B

Documentation from Huston Engineering, LLC for Roof-top Smoke Vents

Huston Engineering, LLC
Building Systems Consultants

251 River St., Suite 301, Troy, NY 12180
Tel./Fax (518) 326-0369
Info@HustonEngineering.com

August 19, 2015

Attn: Frank Emmer

Re: Gravity Intake Louver Position

Dear Mr. Emmer,

The two gravity intake openings on the Penthouse B roof contain a normally closed motorized damper immediately below the opening. The position of this damper is monitored by the BMS to ensure that the damper is closed at all times and will alarm if out of position.

The dampers are controlled to open when the elevator pressurization system is called to run. This system will activate upon detection of smoke in any of the elevator lobbies and will pressurize the elevator shaft with outdoor air.

Sincerely,

Anthony Flynn, PE
Senior Engineer

BBL Construction Services, LLC

302 Washington Avenue Ext.
Albany, NY 12203

Phone: 518-452-8200

TRANSMITTAL
No. 00147

Project No: 131043
BBL Job No: 131043

PROJECT: Renaissance Albany

DATE: 7/30/2014

TO: MCD Metals, LLC
20 Corporate Circle
Albany, NY 12203

REF: Returned Damper Submittals

ATTN: Brian LaRose Phone: (518) 456-9694 Fax: (518) 456-9664

WE ARE SENDING:	SENT FOR:	ACTION TAKEN:
☑ Submittals	☐ Approval	☑ Approved as Submitted
☐ Letter	☑ Your Use	☐ Approved as Noted
☐ Prints	☐ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	**SENT VIA:**	☐ Returned
☐ Specifications	☑ Attached	☐ Returned for Corrections
☑ Other: Made from Submittal	☐ Separate Cover Via: Mail	☐ Due Date:

Item	Copies	Date	Type	Description	Submittal	Rev	Status
1	1	7/30/2014	SUT	Title: Fire Damper Desc: Fire Damper	15800-014	001	APP
2	1	7/30/2014	SUT	Title: Fire/Smoke Damper Desc: Fire/Smoke Damper	15800-015	001	APP
3	1	7/30/2014	SUT	Title: Motorized Control Damper Desc: Motorized Control Damper	15800-017	001	APP
4	1	7/30/2014	SUT	Title: Volume Damper Desc: Volume Damper	15800-018	001	APP

< < < Distribution > > >

BBL Construction Services, LLC	Chris Hawks, 144 State Street, Job trailer, Albany, NY 12207
BBL Construction Services, LLC	Rodney LaVarnway, 144 State Street, Job trailer, Albany, NY 12207
Schenectady Hardware & Electric Co.	Kevin Finn, PO Box 338, Schenectady, NEW YORK 12301 Phone:518-346-2369 FAX:518-372-7549
Schenectady Hardware & Electric Co.	Lewis Hatch, PO Box 338, Schenectady, NY 12301

CC: File

Signed: _____
Andy Howe

Huston Engineering, LLC
Building Systems Consultants

251 River St., Suite 201, Troy, NY 12180
Tel./Fax (518) 326-0369
Info@HustonEngineering.com

SUBMITTAL REVIEW

Project Name: Renaissance Albany
HE Project #: 13-108

Submittal #: 15800-017

Submittal Description
Motorized Control Damper

HUSTON ENGINEERING, LLC
251 River St. Suite 301
Troy, New York 12180

- [x] Conforms
- [ ] Conforms as Noted
- [ ] Revise and Resubmit
- [ ] Rejected
- [ ] Not Reviewed
- [ ] As Noted Below

Review is for general conformance with the design concept and contract documents only, and does not alleviate the Design/Build contractor from design responsibilities in accordance with the contract. The Design/Build contractor is responsible for quantities, dimensions, relationships, field conditions, coordination, and for furnishing materials and workmanship in accordance with the contract documents. The Design/Build contractor shall address all comments included in this review, perform additional internal design reviews, and assume final responsibility for design that is fully complete and functional and in accordance with applicable codes, standards, and owner requirements.

Date: 7/29/2014 Reviewed By: Anthony Flynn

Submittal Comments:

RF PECK
Commercial HVAC Equipment
22 Computer Drive West
Albany, NY 12205
PHONE (518) 869-3541

Equipment Submittal

project	Marriott Renaissance Albany, New York
engineer	Huston Engineering, LLC Troy, New York
contractor	MCD Metals, Inc. Albany, New York
submitted by	Joseph Mara R. F. Peck Co., Inc. Date: June 30, 2014 Albany, New

Manufacturer's Representatives for
Heating, Ventilating and
Air Conditioning Equipment

Contents:

MOTORIZED CONTROL DAMPER TYPES

Sales Person:	Joe Mara		
Project Location:	Albany, New York		
Project Name:	Marriott Renaissance		
Engineer:	Huston Engineering, LLC		
Date:	June 27, 2014		
TYPE	**MODEL**	**DRWG REF**	
1) Rectangular - Low Leakage Opposed	1020	1000-1_A	
NOTE:			
Quanities and sizes per approved contractor shop drawings.			

SUBMITTAL INDEX

Project Name: Marriott Renaissance

Date: June 27, 2014

Schedule Type	Drawing Name	Model	Description
MOD	1000-1_A	1020	Low Leakage Control Damper - Opposed

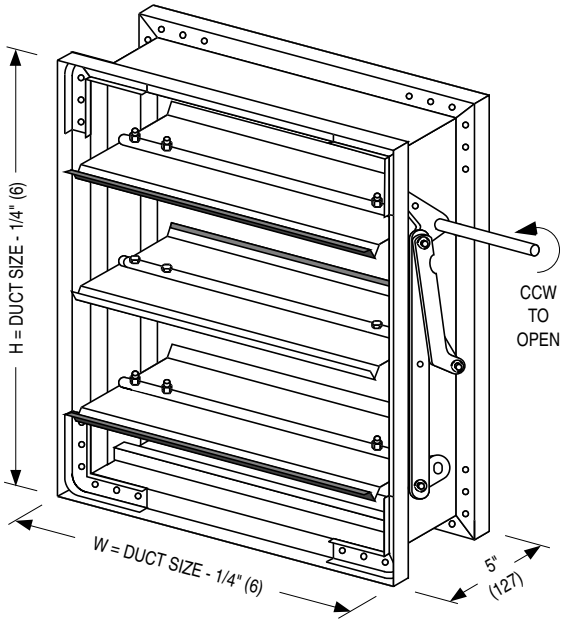
Accessory Codes Description

1020 - Low Leakage Control Damper - Opposed

GLV	Construction = *Galvanized Steel*
HC	Frame Type = *Hat Channel Frame*
16G	Frame Gauge = *16 Gauge*
LC	Blade Linkage Style = *Concealed*
BC	Bearings = *Celcon Bearings*
BPV	Blade Seals = *Extruded PVC Seal*
JSS	Jamb Seals = *Stainless Steel*
FMEN	Factory Actuator Mtg = *Ext. Supplied By Nailor*
DSR	Driveshaft = *Rigid*
DR	Drive Location = *Right or Left Hand*
SMP	Side Mounting Plate = *Side Mounting Plate*
AUTO	Actuator Selected By = *Least Cost (Auto-Select)*
120	Power Requirement = *120 VAC*
SPR	Spring Return = *Spring Return*
2POS	Control Type = *Two Position*
CL	Fail Position = *Close*
HL1	Actuator = *MS4104F10 - Honeywell 120Vac*

LOW LEAKAGE CONTROL DAMPER
STEEL • STANDARD PERFORMANCE
MODELS: ~~1010 &~~ 1020

The 1010/20 Series are Nailor's most widely used low leakage dampers and are the standard choice for use in the majority of low to medium velocity and pressure commercial HVAC systems. They are low cost, high quality dampers that meet or exceed the majority of standard specification requirements. They meet the frequently specified leakage criteria of less than 10 cfm per sq. ft at 4" w.g. (0.5% at 2000 fpm). The design features include a sturdy hat channel frame with die-formed corner gussets for reinforcement and structural strength equivalent to 13 gauge channel type frames, a vee groove blade design that maximizes strength and zero maintenance concealed linkage (out of the air stream) for reduced pressure drop and air turbulence.



STANDARD CONSTRUCTION:

Frame: 5" x 7/8" x 16 ga. (127 x 22 x 1.6) galvanized steel hat channel with die-formed corner gussets. Low profile (flat top and bottom) on dampers 10" (254) high and under.

Blades: 6" (152) wide on 5 1/2" (140) centers. 16 ga. (1.6) galv. steel vee groove design. Parallel or opposed action.

Linkage: Concealed type totally enclosed within the frame and out of the airstream. Plated steel.

Bearings: 1/2" (13) dia. Celcon®.

Axles: 1/2" (13) dia. plated steel double bolted to blades.

Drive Shaft: 6" (152) long x 1/2" (13) dia. rigid drive shaft on all single section dampers. A 1/2" (13) or 1" (25) dia. factory installed jackshaft is standard on all multiple section dampers. See multi-section detail 1000 MSI.

Blade Seals: Dual durometer bulb type extruded PVC.

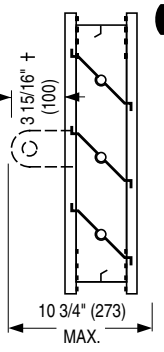
Jamb Seals: Compression type cambered metal.

Temperature Range: -50°F to +180°F (-46°C to +82°C).

Sizes (Duct W x H):

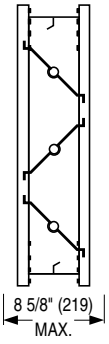
Minimum		Maximum	
Single Section		Single Section	Multiple Section
Single Blade 6" x 4" (152 x 102)	Two Blades (parallel or opposed) 8" x 10" (203 x 254)	48" x 72" (1219 x 1829)	Unlimited

❑ ~~**MODEL 1010** PARALLEL BLADE~~



~~† jackshaft standard on multiple section dampers. Jackshaft securely bolted to frame.~~

● **MODEL 1020** OPPOSED BLADE



OPTIONS:

❑ **BO** Oilite bearings

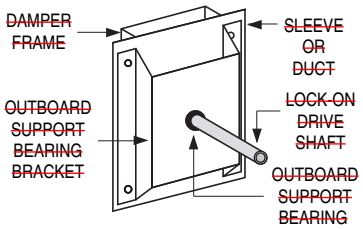
❑ **304** Stainless Steel construction

● **AMP** Actuator mounting side plate

❑ **DLO** Lock-on drive shaft

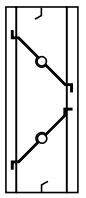
❑ Other _____.

Nailor offers a wide selection of pneumatic and electric actuators for factory or field installation.



~~Optional lock-on drive shaft support bracket detail~~.

The low profile frame illustrated is used to maximize free area available on units 10" (254) high and under.



Performance Data - Air Leakage (Damper Closed)

Damper Width	Maximum System Pressure	Maximum System Velocity	Leakage*	
			% of Max. Flow	Cfm/ Sq. Ft.
48" (1219)	2.5" w.g.	2000 fpm	.18	3.5
36" (914)	3.0" w.g.	2000 fpm	.20	4.0
24" (610)	4.0" w.g.	2000 fpm	.23	4.5
12" (305)	5.0" w.g.	2000 fpm	.33	6.6

* Leakage information is based upon a pressure differential of 1" w.g. tested per AMCA Standard 500-D, Fig. 5.5.

Pressure Drop (in. w.g.)

Damper Size	Approach Velocity (fpm)			
	750	1000	1500	2000
24" x 24" (610 x 610)	.016	.030	.07	.14
36" x 36" (914 x 914)	.013	.023	.05	.09
48" x 48" (1219 x 1219)	.010	.020	.03	.07

Tested per AMCA Standard 500-D, Fig. 5.3.

Dimensions are in inches (mm).

SCHEDULE TYPE:	Motorized Control Dampers
PROJECT:	Marriott Renaissance
ENGINEER:	Huston Engineering, LLC
CONTRACTOR:	MCD Metals, LLC

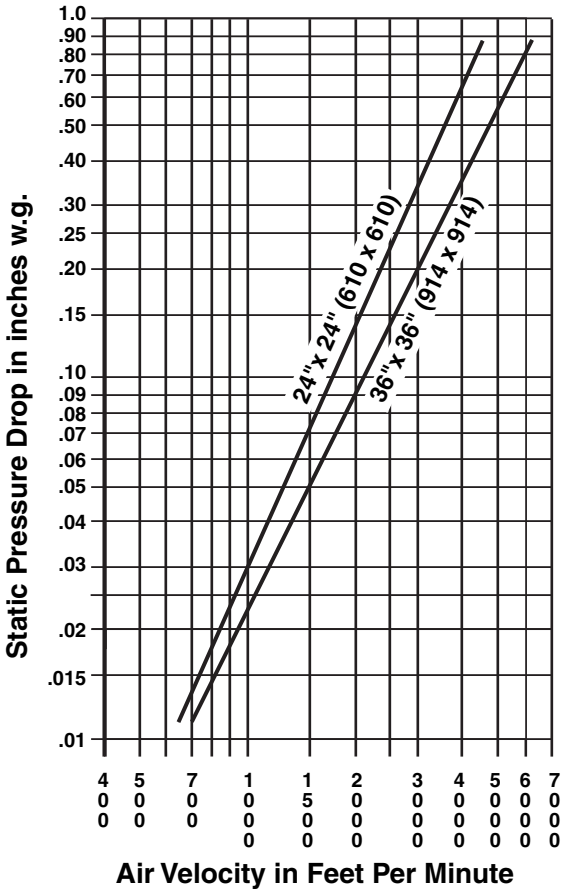
DATE	A SERIES	SUPERSEDES	DRAWING NO.
12 - 4 - 12	1000	6 - 30 - 04	1000-1

Nailor Industries Inc. reserves the right to change any information concerning product or pricing without notice.

MODELS: ~~1010~~/1020

PERFORMANCE DATA:

PRESSURE DROP (damper fully open)



Tested per AMCA standard 500-D, Fig. 5.3.

Imperial figures shown.
To convert to SI (metric) system:

Multiply:

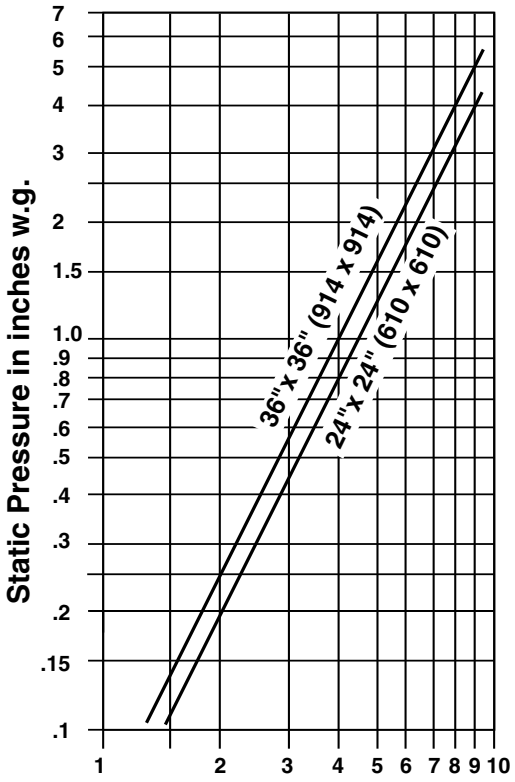
CFM x .4719 = liters per second

inches w.g. x .2486 = kilopascals

fpm x .00508 = meters per second

cfm per sq. ft. x 5.08 = liters/second per sq. meter.

LEAKAGE (damper fully closed)



Tested per AMCA standard 500-D, Fig. 5.5.

PRESSURE DROP (in. w.g.)

DAMPER SIZE	APPROACH VELOCITY (FPM)			
	750	1000	1500	2000
24" x 24" (610 x 610)	.016	.030	.07	.14
36" x 36" (914 x 914)	.013	.023	.05	.09
48" x 48" (1219 x 1219)	.010	.020	.03	.07

Tested per AMCA standard 500-D, Fig. 5.3.

DYNAMIC LIMITATIONS / LEAKAGE

DAMPER WIDTH	MAXIMUM SYSTEM PRESSURE	MAXIMUM SYSTEM VELOCITY	LEAKAGE *	
			% OF MAX. FLOW	CFM/ SQ. FT.
48" (1219)	2.5" w.g.	2000 FPM	0.18	3.5
36" (914)	3.0" w.g.	2000 FPM	0.20	4.0
24" (610)	4.0" w.g.	2000 FPM	0.23	4.5
12" (305)	5.0" w.g.	2000 FPM	0.33	6.6

* Leakage information is based upon a pressure differential of 1" w.g. tested per AMCA standard 500-D, Fig. 5.5.

Temperature Range: -50°F to 180°F (-45°C to 82°C)

BBL Construction Services, LLC

302 Washington Avenue Ext.
Albany, NY 12203

Phone: 518-452-8200

TRANSMITTAL No. 00263

Project No: 131043
BBL Job No: 131043

PROJECT: Renaissance Albany

DATE: 9/22/2014

TO: MCD Metals, LLC
20 Corporate Circle
Albany, NY 12203

REF: Misc Duct Submittals

ATTN: Brian LaRose Phone: (518) 456-9694 Fax: (518) 456-9664

WE ARE SENDING:	SENT FOR:	ACTION TAKEN:
☑ Submittals	☐ Approval	☑ Approved as Submitted
☐ Letter	☑ Your Use	☑ Approved as Noted
☐ Prints	☐ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	**SENT VIA:**	☐ Returned
☐ Specifications	☑ Attached	☐ Returned for Corrections
☑ Other: Made from Submittal	☐ Separate Cover Via: Mail	☐ Due Date:

Item	Copies	Date	Type	Description	Submittal	Rev	Status
1	1	9/22/2014	SUT	Title: Smoke Control Damper Desc: Smoke Control Damper	15800-016	002	AAN
2	1	9/22/2014	SUT	Title: Louvers - Product Data Desc: louvers	15800-023	001	AAN
3	1	9/22/2014	SUT	Title: Duct Construction Desc: Duct Construction	15800-024	001	APP
4	1	9/22/2014	SUT	Title: Gravity Intake Desc: Gravity Intake	15800-026	001	AAN

Remarks: See comments from Huston Engineering on returned submittals.

< < < Distribution > > >

BBL Construction Services, LLC	Chris Hawks, 144 State Street, Job trailer, Albany, NY 12207
BBL Construction Services, LLC	Rodney LaVarnway, 144 State Street, Job trailer, Albany, NY 12207
MCD Metals, LLC	Ray Gargett, 20 Corporate Circle, Albany, NY
Schenectady Hardware & Electric Co.	Kevin Finn, PO Box 338, Schenectady, NEW YORK 12301 Phone:518-346-2369 FAX:518-372-7549
Schenectady Hardware & Electric Co.	Lewis Hatch, PO Box 338, Schenectady, NY 12301

CC: File

Signed: _____
Andy Howe

Huston Engineering, LLC
Building Systems Consultants

251 River St., Suite 201, Troy, NY 12180
Tel./Fax (518) 326-0369
Info@HustonEngineering.com

SUBMITTAL REVIEW

Project Name: Renaissance Albany
HE Project #: 13-108

Submittal #: 15800-026

Submittal Description
Gravity Intake

HUSTON ENGINEERING, LLC
251 River St. Suite 301
Troy, New York 12180

- [x] Conforms
- [ ] Conforms as Noted
- [ ] Revise and Resubmit
- [ ] Rejected
- [ ] Not Reviewed
- [ ] As Noted Below

Review is for general conformance with the design concept and contract documents only, and does not alleviate the Design/Build contractor from design responsibilities in accordance with the contract. The Design/Build contractor is responsible for quantities, dimensions, relationships, field conditions, coordination, and for furnishing materials and workmanship in accordance with the contract documents. The Design/Build contractor shall address all comments included in this review, perform additional internal design reviews, and assume final responsibility for design that is fully complete and functional and in accordance with applicable codes, standards, and owner requirements.

Date: 9/20/2014 Reviewed By: Anthony Flynn

Submittal Comments:

1. Please verify sizing of this equipment. We do not have all the relevant information available to us, so give a call if you would like to discuss further.
2. For the (2) large intakes for elevator press:
    a. From the mfr's website, it suggest sizing at a maximum of 600 fpm. We are currently sized at around 350 fpm. I don't mind pushing these a little since they will never run, but not comfortable going above 600 fpm without verifying associated pressure losses.
    b. Flow: 25,000 cfm each.
    c. At 600 fpm, we need approximately 56"x56" throat area.
    d. Please remove insect screen. We have a damper right behind this intake which should help, and we are afraid the insect screen will clog and prevent operation down the road.
3. For the ERU-2 intake:
    a. No issue with submitted, but could reduce to 36"x42"throat area if desired.
    b. Remove insect screen.
4. Smoke control intake. No issue. Remove insect screen.

22 □□□ □u□er □ri□e - □ es□
□□any, NY 12205
Pho ıe (518) 869-3541

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ACME MANUFACTURING CORP.
6532 TOWER LANE, CLAREMORE, OK 74019
ENGINEERED PRODUCTS BY CRAFTSMEN

Trimline™ Intake Vent
Type TIV

STANDARD FEATURES

Free area at perimeter equals 200% of throat area.

Hood constructed of .050" aluminum. Base constructed of .080" aluminum.

Hood reinforced and braced for extra strength with wide overhang for storm protection.

Hood assembled with standing and snap back seams secured with spot welds.

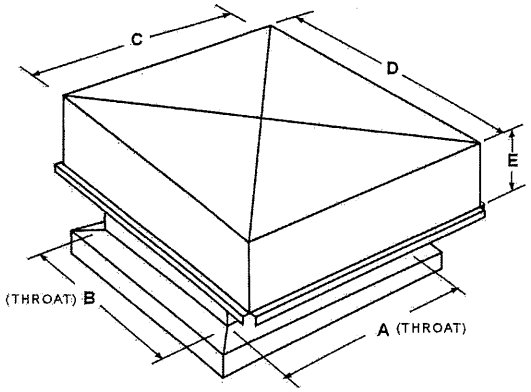
All curb cap corners miter cut and continuous welded.

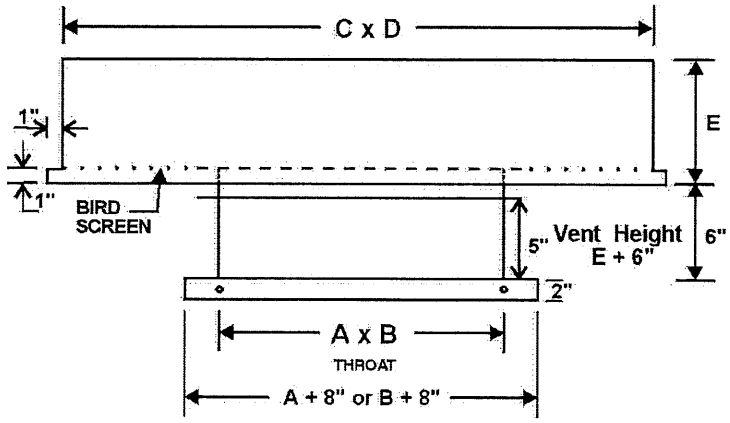
Bird screen of ½" x ½" mesh galvanized welded wire.

PROJECT	
LOCATION	
ENG/ARCHIT.	
CONTRACTOR	
SUBMITTED BY:	
DATE:	PO#

OPTIONS

1) Hinged hood.
2) Anti-condensate coating.
3) 1" fiberglass insulation.
4) Aluminum bird screen.
5) Aluminum insect screen.
6) Aluminum mesh cleanable filters, 1" or 2" thick.
7) 100 MPH construction.
8) Snow screen: bird screen plus insect screen.
9) Air dry enamel decorative or protective coating.





REF. (Tag)	QUAN.	Throat Width A	Throat Length B	Hood Width C	Hood Length D	Hood Height E	OPTIONS
TIV	1	36	48	67	79	15	
TIV	1	24	18	34	40	10	
TIV	2	72	72	117	137	25	

©Acme Mfg. Corp. 1999-2009

ACME MANUFACTURING CORP.
6532 TOWER LANE, CLAREMORE, OK. 74019
ENGINEERED PRODUCTS BY CRAFTSMEN

Roof-Over-Flashing Curb
Custom Sized
Type RFC

PROJECT	
LOCATION	
ARCHITECT	
ENGINEER	
CONTRACTOR	
SUBMITTED BY	
DATE	PO#

STANDARD FEATURES

Constructed of 18 ga. galv. steel with continuous welded seams and integral base plate for water tightness and extra strength.

Large 3" built-in 45° cant to accommodate roofing to top of curb. Welded corners have beveled cants for better lay of roofing material at corners.

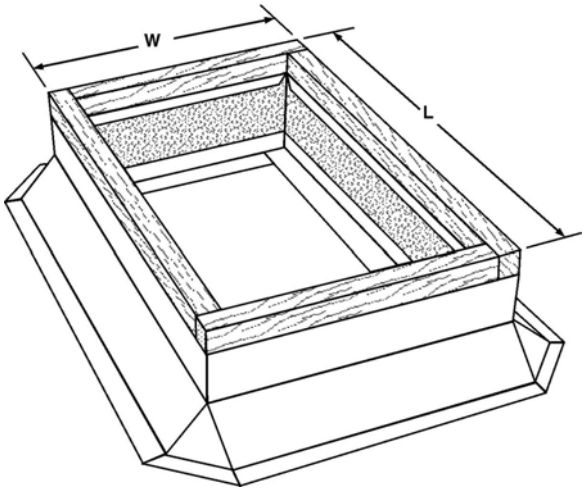
Lined with 1½" fiberglass fire proof sound attenuating thermal insulation.

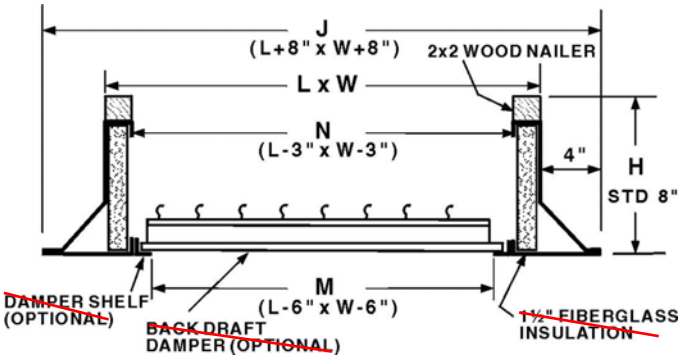
2 x 2 wood nailer secured to top ledge of curb.

Custom sizes to meet any dimensional requirement or roof opening.

OPTIONS

- Constructed of .063" aluminum.
- Interior metal liner.
- Standard heights of 12, 14, 16, 18, 20, 24", or any special height.
- Damper shelf – standard or custom size opening.
- Back draft damper.
- Damper motor, 120, 240, or 480 vac.
- Protective or decorative coatings.
- Treated wood nailer.
- Heavy-gage construction.





SPECIFICATIONS AND DIMENSIONS

REFERENCE	QUAN.	MAT'L	L	W	M	H	OPTIONS
RFC	1	Galv.	55	43		24	
RFC	1	Galv.	31	25		24	
RFC	2	Galv.	79	79		24	

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