



March 3, 2022

Mr. Greg Gehrig  
Remedial Project Manager  
U.S. Environmental Protection Agency Region 5  
77 W. Jackson Boulevard  
Chicago, Illinois 60604

**Subject: Vapor Intrusion Mitigation System Operation and Maintenance Plan  
Keystone Corridor Groundwater Contamination Site  
Indianapolis, Marion County, Indiana  
EPA Contract No. 68-HE-0519-D0005  
Task Order No. 68-HE-0520-F0095  
Document Tracking No. 0800**

Dear Mr. Gehrig:

Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) is submitting the enclosed Vapor Intrusion Mitigation System Operation and Maintenance Plan for the Keystone Corridor Groundwater Contamination Site (the Site) in Indianapolis, Marion County, Indiana. This plan provides a general overview of and summarizes the routine operation and maintenance tasks and potential operating problems for site-related vapor intrusion mitigation systems (VIMS).

If you have any questions or comments regarding this submittal, please contact me at (317) 419-5587 or at [Travis.Erny@tetrattech.com](mailto:Travis.Erny@tetrattech.com).

Respectfully,

A handwritten signature in blue ink that reads 'Travis Erny'.

Travis Erny, LPG  
Project Manager

Enclosure

cc: Chris Burns, Tetra Tech Program Manager  
TO-TOLIN File

**VAPOR INTRUSION MITIGATION SYSTEM OPERATION AND MAINTENANCE PLAN  
KEYSTONE CORRIDOR GROUNDWATER CONTAMINATION SITE  
INDIANAPOLIS, MARION COUNTY, INDIANA**

**Final Version**

*Prepared for*

**U.S. Environmental Protection Agency**  
Superfund and Emergency Management Division  
Region 5  
77 W. Jackson Boulevard  
Chicago, Illinois 60604

*Submitted by*

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Prepared by

A handwritten signature in blue ink that reads 'Travis Erny'.

Travis Erny, LPG  
Project Manager

Approved by

A handwritten signature in blue ink that reads 'Heather K. Wood'.

Heather K. Wood  
START QC Reviewer

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- B. VIMS Manual for Residential System (Property RP-065)
- C. VIMS Manual for Multi-fan Commercial System (Property CP-024)

### Attachment 2 Vapor Intrusion Mitigation System Example Layout and Design Documents

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### **Attachment 4 Vapor Intrusion Mitigation System O&M Inspection Form**

## **1.0 INTRODUCTION**

Vapor intrusion mitigation systems (VIMS) have been installed and may continue to be installed at the Keystone Corridor Groundwater Contamination Site (the Site). The following Vapor Intrusion Mitigation System Operation and Maintenance Plan (O&M Plan) has been prepared as a user manual for the current and possible future VIMSs associated with the Site. This O&M Plan identifies the routine O&M tasks and potential operating problems for the VIMSs.

Section 1.0 describes the Site and purpose of this plan. Section 2.0 provides background information concerning Site assessment activities and environmental concerns. Section 3.0 describes the remediation system components. Section 4.0 provides a description of maintenance activities, schedule, and reporting. Section 5.0 describes contingency procedures. Section 6.0 provides a list of cited references. Appendices and attachments follow the text and include: figures as Appendix A; examples of VIMS manuals as Attachment 1; the VIMS example layouts, design, and as-built documents as Attachment 2; the fan and gauge manufacturer specifications, instructions, and warranties as Attachment 3; and the inspection form as Attachment 4.

## **2.0 BACKGROUND**

### **2.1 SITE LOCATION AND HISTORY**

The Site involves tetrachloroethene (PCE) and trichloroethene (TCE) groundwater plumes within a mixed commercial and residential area of Indianapolis, Marion County, Indiana. The Site is in Sections 17 and 18, Township 16 North, Range 4 East of the Indianapolis East topographic quadrangle (Appendix A, Figure 1). The PCE and TCE groundwater plumes are centered immediately northwest of the intersection of Keystone Avenue and East Fall Creek Parkway North Drive (which is referred to as Binford Boulevard east of Keystone Avenue), with the approximate center of the plumes at 39.835517 degrees north latitude and -86.124325 degrees west longitude. The approximate Site boundaries are 45th Street to the north, Eastern Avenue to the east, south of 38th Street to the south, and Norwaldo Avenue to the west (Appendix A, Figure 2).

The Indiana Department of Environmental Management (IDEM) began addressing soil and groundwater contamination along Keystone Avenue in 1989, when elevated levels of chlorinated volatile organic compounds (CVOC) were detected in two soil borings advanced near an underground storage tank on the former Tuchman Cleaners property at 4401 North Keystone Avenue (CH2M HILL, Inc. [CH2M] 2019). The Tuchman Cleaners dry cleaning facility operated from 1952 through 2008. Operations included using PCE and generating PCE waste. There were PCE releases on the property of unknown volumes and undetermined times or frequencies (CH2M 2019). The former property owner installed a soil gas extraction system and groundwater pump-and-treat system in 1990, followed by a nonaqueous phase liquid (NAPL) recovery system in 2003, to address elevated concentrations of contaminants found on the property and remove PCE product that had accumulated below ground surface at the property (CH2M 2019).

Additional Site-related investigations occurred north of Fall Creek at the adjacent Vantage Point Cleaners property at 4405 Allisonville Road, the Purtee Plating facility at 2306 East 44th Street, and the Thomas Catering property at 4440 North Keystone Road (Appendix A, Figure 2). In early July 2008, National Drycleaners, Inc., the parent company of Tuchman and Tuchman Cleaners, Inc., declared Chapter 11 Bankruptcy and ceased remedial efforts at the Tuchman Cleaners property (CH2M 2019).

From September 2012 to December 2014, EPA and their contractors conducted a time-critical removal action at the former Tuchman Cleaners property. EPA contractors also conducted vapor intrusion pathway sampling within the residential neighborhood to the west and installed VIMSs at 22 residential properties as a result (CH2M 2019). An EPA remedial investigation and feasibility study began in fall 2015 and was completed in 2019. From December 2015 to March 2017, EPA contractors collected groundwater, soil gas,

sub-slab soil gas, crawl space, and indoor air samples to characterize Site conditions and determine the nature and extent of contamination (CH2M 2019, 2021). As a result of the remedial investigation, two residences and eight commercial buildings, encompassing 18 commercial addresses, were found to have both a complete vapor intrusion pathway and Site-related contamination in indoor air exceeding EPA Removal Management Levels (CH2M 2019). EPA identified those buildings for preemptive mitigation as described for Operable Unit 3 (OU-3) in the Record of Decision (ROD) for Interim Action (U.S. Environmental Protection Agency [EPA] 2018) and further specified in the remedial design document (CH2M 2019).

Preemptive mitigation began in February 2020, when EPA's Emergency and Rapid Response Services (ERRS) contractor, Environmental Restoration LLC, sub-contracted with Environmental Doctor of Dayton, Ohio, to install VIMSs at previously determined impacted properties. The VIMSs were installed with oversight and performance testing assistance provided by Tetra Tech START. Prior to system installation, START and ERRS conducted a pre-inspection and planning walkthrough of each location to observe building conditions, noting pre-existing damages, general layout, and potential issues. The systems include extraction points and an in-line fan mounted on the exterior wall. A pipe extends vertically from the fan to a point approximately 1-foot above the roofline. Environmental Doctor also used a sealant on cracks and openings in the building floors and internal walls. Following installation, Tetra Tech START tested the pressure field extension of the system at various points using a micromanometer. With assistance from Tetra Tech START, EPA prepared VIMS manuals and disseminated copies to property owners and tenants. Examples of the VIMS manuals from select commercial properties (CP) and a residential property (RP) are provided in Attachment 1. Sampling results and system installation and testing details from 2020 and 2021 will be documented in future Site reporting.

## **2.2 VAPOR INTRUSION**

The technical term for the subsurface migration of chemicals into overlying buildings is called "vapor intrusion." Contaminated soil and groundwater can emit vapors that may migrate upward through subsurface soils, accumulate beneath buildings, and potentially migrate into the indoor air spaces of overlying buildings in ways similar to that of radon gas seeping into homes. As shown in Exhibit 1, the vapor intrusion pathway may be viable for buildings both with and without a basement, as well as those with a crawl space.



**EXHIBIT 1 VAPOR INTRUSION PATHWAY**

## 2.3 VAPOR INTRUSION MITIGATION SYSTEM

Active sub-slab depressurization systems (SSDS), similar to radon mitigation systems, are the primary type of VIMS that have been installed at buildings suspected to be impacted within the area of concern for the Site. Active SSDSs are installed for buildings built on slab or that have a basement. Another type of VIMS typical of the Site is a sub-membrane depressurization system where a vapor barrier was installed in a crawl space. Both types of VIMSs are present in combination at buildings with a partial basement and a partial crawl space.

This O&M Plan will generally refer to the systems as VIMSs to include all types that exist at the Site or may be installed in the future, but the term SSDS will be used when discussing components and aspects specific to that type of VIMS. The VIMS vents CVOC vapors that accumulate beneath the property to above the roof, where the chemicals are then diluted in the atmosphere. The system is designed to create a negative pressure differential between the air below the building slab or crawl space membrane and the air inside the basement, which prevents vapors from migrating into the building and affecting the indoor air quality.



### **3.0 VAPOR INTRUSION MITIGATION SYSTEM DESCRIPTIONS**

#### **3.1 ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM DESCRIPTION**

As stated previously, the primary type of VIMSs at the Site are active SSDSs. A generalized diagram and Site examples for such a VIMS are provided in Attachment 2. The purpose of the active SSDS is to prevent migration of soil gas and groundwater vapors into buildings. An active SSDS is an engineering control to prevent vapor intrusion, but it may also lower subsurface CVOC concentrations over time.

The SSDS fan applies a low vacuum to the sub-slab environment to induce a negative pressure gradient or pressure field. The pressure field extension (PFE) represents the radius of negative pressure or vacuum attained by the fan through the sub-slab extraction point(s). The VIMS example layout in Attachment 2 provides a visual representation of PFE. A visual Initially, the PFE may be restricted by temporary sub-slab conditions such as excessive moisture or a cold outdoor temperature. The PFE may be inhibited over time by permanent features such as building footers, large cracks in the building slab, floor to wall joints, floor drains, or subsurface utility line penetrations. Some of these PFE inhibitors can be remedied by sealing cracks in the concrete slab or installing air-tight covers over floor drains or basement sump cavities that will allow water to enter when necessary.

Sub-slab vapors beneath the building are recovered from each of the extraction points. The system is designed to operate on a continuous basis with the exception of periodic shutdowns to conduct maintenance. For the Site, the minimum target sub-slab differential pressure for each vapor mitigation area was established at -0.02 inches water column (wc) in the remedial design document (CH2M 2019). Example system layouts and construction details are presented in Attachment 2. Manufacturer specifications, instructions for operation, and warranties for the fan assemblies that represent system fans installed at the Site are presented in Attachment 3.

The primary components of the VIMS used on-site are summarized below.

- **Extraction Points:** Each SSDS recovers sub-slab vapors via extraction or suction points. And in doing so, the sub-slab is depressurized creating the negative pressure field discussed above. A higher capacity fan or multiple extraction points should extend the pressure field for larger building footprints. The extraction points are designed for 6-inch-diameter pits installed up to approximately 30 inches beneath the concrete floor slab and sometimes backfilled with a granular material. Construction details for the extraction points are displayed on Attachment 2.
- **Extraction Risers:** Each extraction point is connected to an aboveground, 4-inch-diameter (3-inch-diameter in residential properties) vertical extraction riser. Each riser includes a vacuum pressure gauge and sample port. Construction details for the risers are displayed on Attachment 2.

- **Vent Piping:** Extraction risers for each VIMS are routed vertically to horizontal headers on to the building's rooftop. An example piping layout is presented in Attachment 2.
- **Fans:** The fans are manufactured specifically for use in building vapor mitigation systems. All fans shall have water-hardened motors with an internal condensate-bypass. Exterior fans are rated for exterior installation and are capable of producing a minimum vacuum of 0.02 inches wc. Manufacturer specifications, instructions for operation, and warranties for the fan assemblies at the Site are presented in Attachment 3.
- **Vacuum Monitoring Devices:** Vacuum monitoring (magnehelic gauges or liquid manometers) are devices that measure the vacuum in the suction pipe. The measurement range of the devices are 0 inches wc to at least 1.3 times the expected maximum vacuum at the mounting location. Manufacturer specifications for magnehelic gauges at the Site are presented in Attachment 3.

### **3.2 CRAWLSPACE VAPOR BARRIER DESCRIPTION**

If the property has a crawl space or other area of exposed sub-surface soil, a vapor barrier was installed in the crawl space or basement of the building which acts as a barrier to prevent chemical vapors, including CVOCs, from migrating through the dirt floor and into the indoor air of the building. The vapor barrier consists of polyethylene sheeting or membrane, at least 6-mil (0.15 millimeters) in thickness, sealed to the cinder block foundation of the crawlspace. Rather than a pit extraction point, a perforated pipe extraction point was installed under the vapor barrier in the crawlspace and connected to a fan to form a type of VIMS referred to as a sub-membrane depressurization system. This is done to actively depressurize the area beneath the vapor barrier to prevent soil vapors from migrating to indoor air.

## **4.0 OPERATION AND MAINTENANCE**

### **4.1 VAPOR INTRUSION MITIGATION SYSTEM INSPECTIONS AND MEASUREMENTS**

The following routine visual inspections of the VIMS components and documentation of system operational conditions should be conducted to confirm that the VIMS is effectively operating as designed. Depending on access being granted by the property owner, each VIMS will be inspected annually or at a frequency determined by EPA or IDEM, or whenever a property owner calls the provided contact numbers to report a system failure. Upon installation, property owners and tenants were briefed on System operational parameters will be recorded, along with the name of the inspector, date, time, and weather conditions, on the O&M inspection form provided as Attachment 4 (EPA 2020). During each inspection, the activities may include, but are not limited to, the following lists and again will be recorded on the O&M inspection form.

### **4.2 COMMERCIAL PROPERTY INSPECTION**

- Refer to the VIMS manual for the system layout and details, taking note of the potential for multiple VIMS fans and piping runs at buildings with large footprints or interior spaces that are disconnected (such as by a sub-slab footer). Each property owner was provided a copy of the VIMS manual following installation. VIMS manuals are also stored in EPA project files and provided to IDEM for their record keeping.
- Note visible alarm mounted near an extraction point and coupled with a fan vacuum pressure gauge. A green solid light means the fan is operating. A red solid light means the fan is not operating and requires maintenance.
- Record the vacuum pressure (inches wc) at the magnehelic gauge installed on extraction point risers.
- Conduct a visual inspection of system components as per the O&M inspection form provided in Attachment 4, including extraction risers, piping, seals, and equipment for damage or abnormal conditions. Some examples of VIMS operational issues are provided in Section 4.4.
- Measure pressure at accessible vapor pin locations to evaluate negative pressure to verify the PFE is adequate to be present over the entire building footprint.
- Listen to each fan assembly to verify it is operating. A low humming noise and/or rush of air out of the fan into the exhaust piping should be audible.
- Conduct visual inspections to ensure there are no significant changes to the building construction that would impact operation of the mitigation system (for example, foundational concerns, cracks, remodeled areas, or additions to the building).
- Periodically observe and record the vacuum pressure on the magnehelic/manometer gauges

installed at each extraction point and/or near the fan depending on the system configuration. These measurements should be collected anytime an inspection or performance testing is performed.

- Note the location of any moist spots that appear on basement walls and floors after rain events. The spots may indicate water seepage from the VIMS. When conditions become dry, seal the noted moist locations with a waterproof caulk.
- For commercial buildings with a crawl space or dirt floor basement, visually inspect the vapor barrier to look for signs of damage if accessible. The vapor barrier system will not function effectively if it is punctured, torn, or inadequately sealed to the surrounding foundation and interior walls.

### **4.3 RESIDENTIAL PROPERTY INSPECTION**

- Refer to the VIMS manual for the system layout and details. Each property owner was provided a copy of the VIMS manual following installation. VIMS manuals are also stored in EPA project files and provided to IDEM for their record keeping.
- Record the vacuum pressure (inches wc) at the magnehelic gauge or liquid manometer installed on extraction point risers or near the exterior-mounted fan.
- Conduct a visual inspection of system components as per the O&M inspection form provided in Attachment 4, including extraction risers, piping, seals, and equipment for damage or abnormal conditions. Some examples of VIMS operational issues are provided in Section 4.4.
- Measure vacuum pressure at available vapor pin locations to evaluate the sub-slab PFE.
- Listen to the fan assembly to verify it is operating. A low humming noise and/or rush of air out of the fan into the exhaust piping should be audible.
- Conduct visual inspections to ensure there are no significant changes to the building construction that would impact operation of the mitigation system (for example, foundational concerns, cracks, remodeled areas, or additions to the building).
- Periodically observe and record the vacuum pressure on the magnehelic/manometer gauges installed at each extraction point and/or near the fan depending on the system configuration. These measurements should be collected anytime an inspection or performance testing is performed.
- Note the location of any moist spots that appear on basement walls and floors after rain events. The spots may indicate water seepage from the VIMS. When conditions become dry, seal the noted moist locations with a waterproof caulk.
- For residences with a crawl space or dirt floor basement, visually inspect the vapor barrier to look for signs of damage if accessible. The vapor barrier system will not function effectively if it is punctured, torn, or inadequately sealed to the surrounding foundation and interior walls.

#### **4.4 POTENTIAL OPERATION PROBLEMS**

In the event mechanical problems cause the VIMS to become inoperable, the system should be repaired as quickly as possible. System O&M requires that system failure(s) be evaluated and repaired in a timely manner, particularly during winter months. The following are some potential operational problems that may be encountered and promptly repaired.

##### Obstruction or Blockage in System

The VIMS fans may experience low flow or other operational issue if an obstruction develops in the discharge piping and prevents extracted soil vapor from discharging to the atmosphere. Piping obstructions may include, but are not limited to, a clogged filter, debris, condensate, or ice buildup.

##### Break or Leak in System Piping

A break or leak in the extraction piping will cause the sub-slab vacuum pressure field to be diminished, potentially resulting in insufficient vapor mitigation.

##### Low Sub-Slab Differential Pressure

A sub-slab differential pressure less than the Site-specific target of -0.02 inches wc may be an indication of an insufficient PFE and therefore inadequate vapor intrusion mitigation. A low differential pressure may be the result of an “imbalanced” system caused by higher air flow from certain extraction points than others, indicating the manual flow control valves at each extraction point riser need to be adjusted to generate a near uniform vacuum field across the entire building footprint. A low sub-slab vacuum could also be caused by a fan malfunction or damage to system piping.

##### Power Loss

If an individual fan shuts down due to a power loss, the cause of the power loss should be investigated and repaired as quickly as possible.

#### **4.5 VAPOR INTRUSION MITIGATION SYSTEM REPAIR**

Alteration and repair of the VIMS should be performed, as necessary, by a certified VIMS or radon system installation contractor. Performance of such activities by anyone, other than a certified VIMS or radon system installation contractor, could result in damage to the VIMS and reduce its effectiveness. Alteration or attempted repair by others may result in voiding the manufacturer’s fan warranty.

## 5.0 REFERENCES

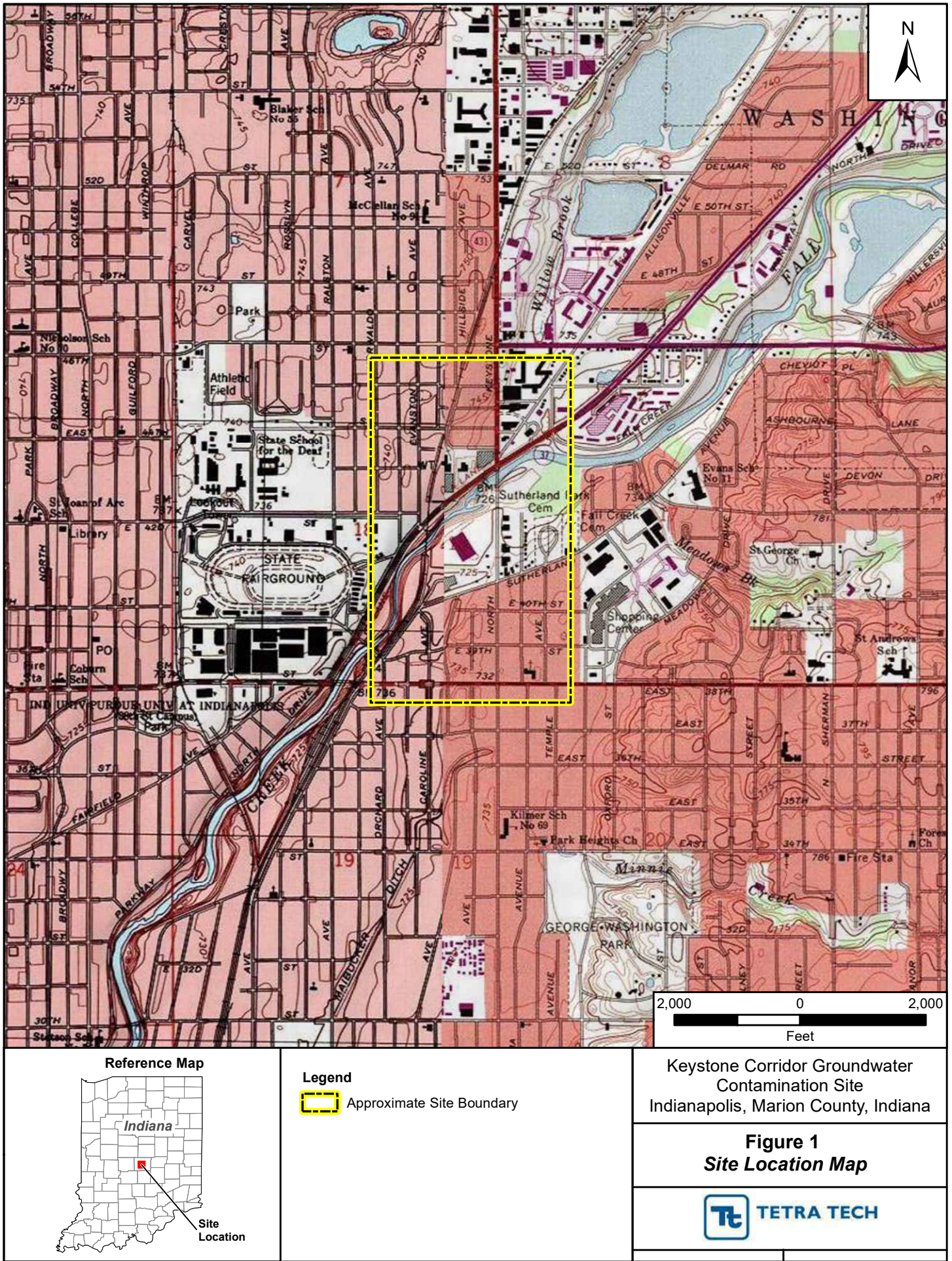
- CH2M Hill Inc. (CH2M). 2019. "Conceptual Performance-Based Vapor Intrusion Mitigation System Remedial Design for Keystone Corridor Groundwater Contamination Site, Indianapolis, Marion County, Indiana." Prepared for EPA under WA No. 257-RDRD-B5VX/Contract No. EP-S5-06-01. September.
- CH2M. 2021. "Vapor Intrusion Sampling at the Keystone Corridor Groundwater Contamination Site, Indianapolis, Marion County, Indiana." Prepared for EPA under WA No. 215-RICO-B5VX and WA No. 257-RDRD-B5VX/Contract No. EP-S5-06-01. January 29.
- U.S. Environmental Protection Agency (EPA). 2018. "EPA Superfund Program Record of Decision for Interim Action at Keystone Corridor Ground Water Contamination Superfund Site, Indianapolis, Marion County, Indiana." September.
- U.S. Environmental Protection Agency (EPA). 2020. Region 5 Vapor Intrusion Handbook. March.

## **APPENDIX A**

### **FIGURES**

1. Site Location Map
2. Site Layout Map









## **ATTACHMENT 1**

### **VAPOR INTRUSION MITIGATION SYSTEM EXAMPLE MANUALS**

- A. VIMS Manual for Single-fan Commercial System (Property CP-023-05)
- B. VIMS Manual for Residential System (Property RP-065)
- C. VIMS Manual for Multi-fan Commercial System (Property CP-024)

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# VAPOR INTRUSION MITIGATION SYSTEM MANUAL

for



Keystone Corridor Ground  
Water Contamination Site  
Indianapolis, IN

Prepared by  
U.S. Environmental Protection Agency



July 2020

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## Background

The Keystone Corridor Ground Water Contamination Site is located in Indianapolis, Marion County, Indiana. The site consists of a contaminated groundwater plume underlying industrial, commercial, and residential properties. The center of the site is the intersection of Keystone Avenue and East Fall Creek Parkway North Drive. The approximate site boundaries are 45th Street to the north, Eastern Avenue to the east, 38th Street to the south, and Norwaldo Avenue to the west. The municipal water supply Fall Creek Station Well Field, as well as multiple, independent potential sources of groundwater contamination are located within the site.

EPA determined that there is a potential for vapor intrusion at your property and other properties. Vapor intrusion occurs when there is migration of vapor-forming chemicals from soil or groundwater into an overlying building. The solution to preventing vapor intrusion is to install a vapor intrusion mitigation system (VIMS). A VIMS functions like a radon mitigation system. The VIMS creates a negative differential pressure beneath the foundation of the building to prevent contaminated soil vapors from entering indoor air. The VIMS removes the vapors before they can enter occupied space.



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## VIMS Information

EPA completed installation of a vapor intrusion mitigation system at your property on February 19, 2020. For maintenance related assistance, a contact number for the EPA contractor Environmental Doctor on a sticker label placed on each system node. The system consists of fan(s), vapor extraction nodes, real-time magnehelic gauge(s), and sampling ports. EPA used the materials listed below. Photos of system components are provided in this manual.

### Pipe and fittings

- 4" Schedule 40 PVC pipe and fittings were used for all solid portions of the system.

### Fans

- One (1) RadonAway HS-2000 fan. The fan manual is included in this manual. The fan comes with a one-year manufacturer's warranty.

### Electrical

- All electrical wiring was installed by a licensed electrician.
- Exterior rated electrical switches/power disconnects are mounted within 2 feet of the fan.
- Interior electrical switch is mounted by one of the extraction nodes.
- A visible alarm is mounted inside by an extraction node (audio disabled) where a green solid light means the system is functioning and a red solid light means the service is not operating and requires maintenance.
- The system fan is connected to an independent circuit breaker labeled 'Soil Gas Fan'.

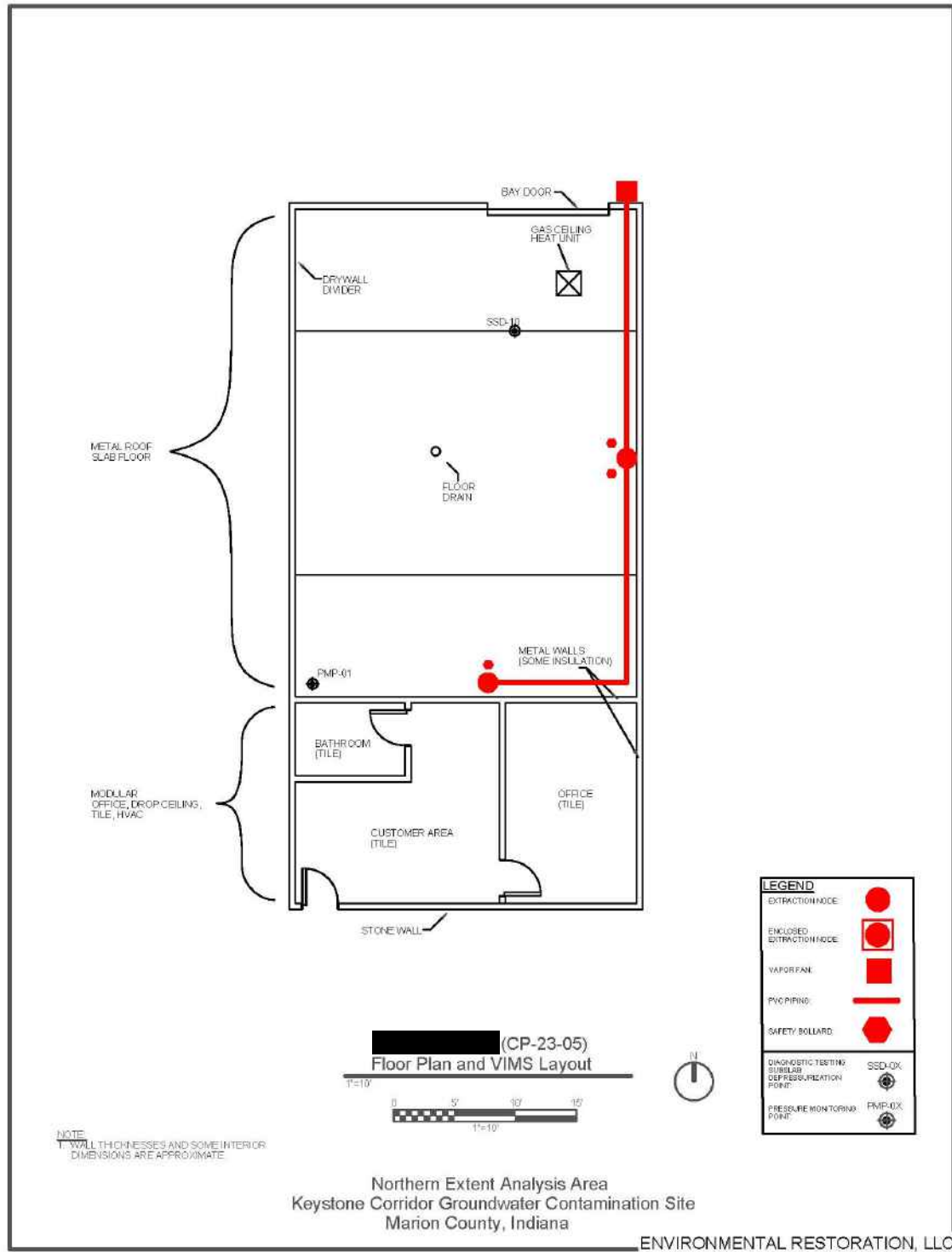
### Construction Information

- All system exhaust points are terminated above the building roofline at a minimum of 10 feet above ground level and 10 feet away from any opening in the building that is less than two (2) feet below the exhaust point.
- Each extraction node was fitted with a magnehelic pressure gauge and sampling port.
- Extraction points in garage or warehouse spaces have been constructed with bollards to prevent damage from vehicles or heavy equipment.
- Where the fan was placed on the building roof, that work was completed by a professional roofing service.

### Operation and Maintenance

The VIMS is designed to be maintenance free, for the life of the fan. All moving parts in the fan are sealed and should only be opened by the manufacturer. Any attempt to open the fan-housing will destroy the factory-installed seals and void the manufacturer's warranty. Annual inspection of the system components is required to ensure proper function of the system. Inspection procedures are provided in this manual.

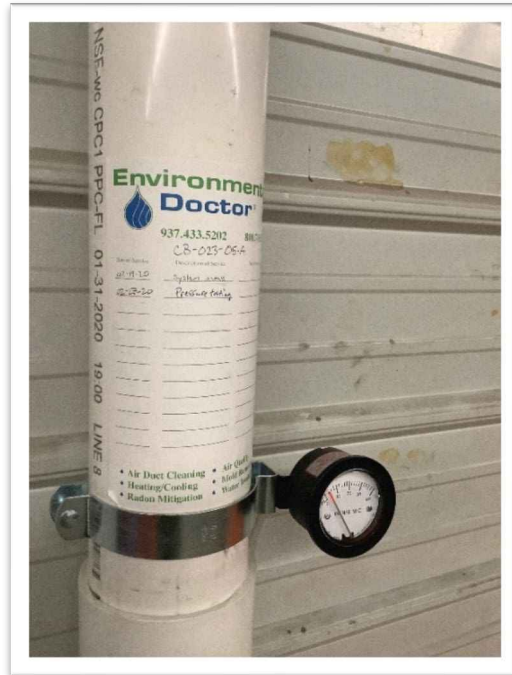
## As-Built Diagram



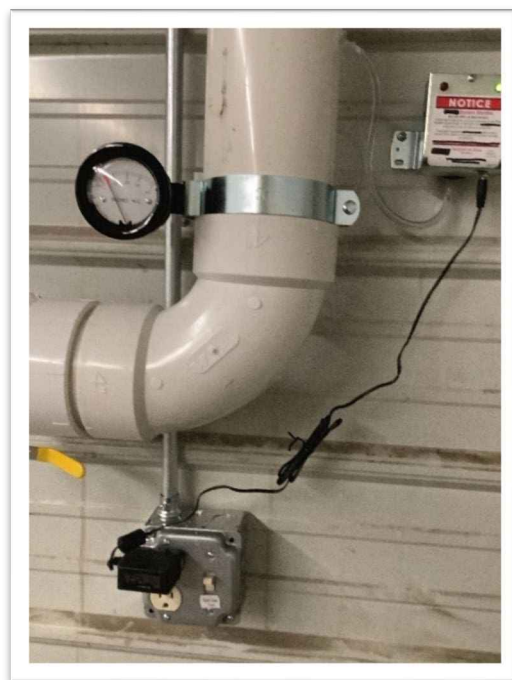
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## Photos

*An up-close view of system node A with pressure gauge and maintenance log and contact number label.*

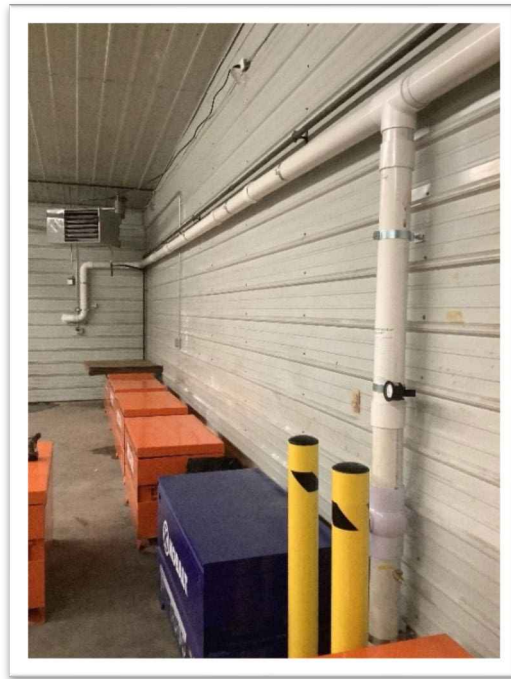


*A view of the fan visual alarm plugged in next to the fan pressure gauge.*



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*A north-facing view of system node A and piping to the exterior-mounted fan.*



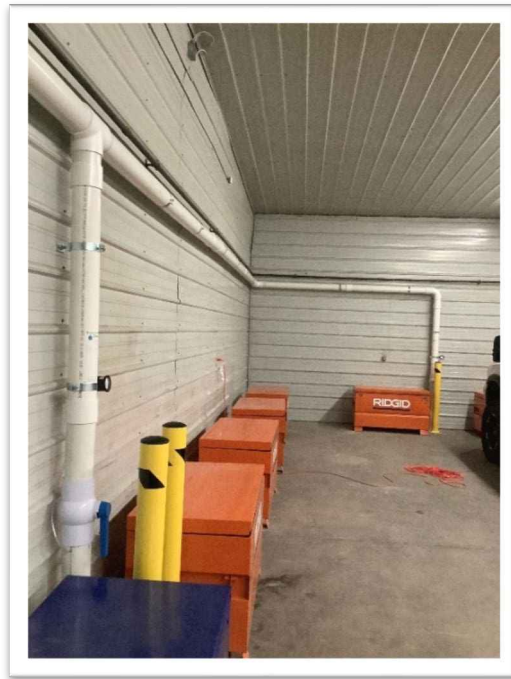
*A view of the system fan with the vent pipe terminating above the roofline.*





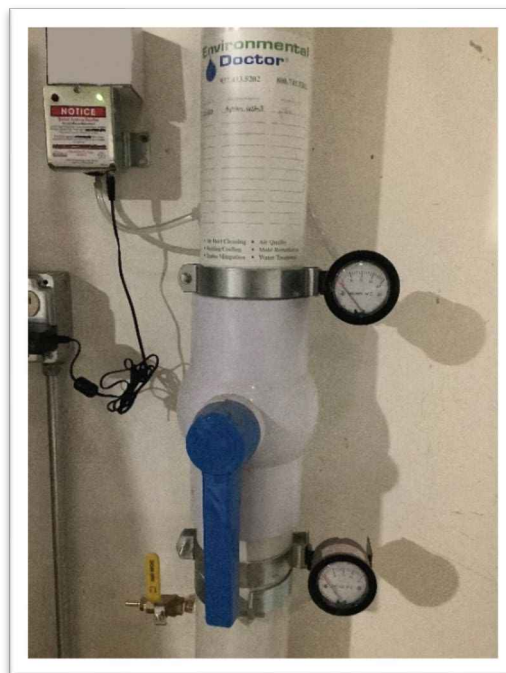
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*A south-facing view of system node A and in the background system node B with safety bollards.*



*Note: The following photograph was not taken at your property. It is representative of the type of system components installed.*

*An up-close view of system pressure gauges, ball valve, sample port, and the fan visual alarm (note the green light in the upper left indicates the fan is operating).*



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## Inspection Procedures

### **Annual Sub-Slab/Sub-Membrane Depressurization System Inspection Procedure Fans**

The vapor mitigation system fans are designed to be maintenance free, for the life of the fans. All moving parts in the fan are sealed and should only be opened by the manufacturer. Any attempt to open the fan-housing will destroy the factory-installed seals and void the manufacturer's warranty.

### **Piping and Fan Connections**

Visually inspect all exposed system piping, fans, and connections for damage. Repair or replace any observed damage affecting the system.

### **Slab to System Piping Connections**

Visually inspect caulk seal around all vacuum points connection to slab and listen for a rushing air noise. If any failure in the seal exists, caulk with polyurethane caulk.

### **System Pressure**

Observe the static pressure for each sub-system on the magnehelic gauge. Record the static pressures in the provided chart. If static pressure is outside of acceptable range, evaluate fan for problems and perform sub-slab pressure field extension testing to verify the system is still providing adequate pressure field extension under the current operating conditions. If pressure field extension is not adequate, replace system fan.

### **Electrical**

Visually inspect all electrical components for damage. Have properly trained personnel repair any damage found. Test all disconnects (breakers and switches) for proper function and repair/replace any dysfunctional components.

### **Record keeping**

Complete the "Annual O&M Inspection Form" and maintain a record of all annual inspections for the life of the mitigation system.

## MITIGATION SYSTEM ANNUAL O&M INSPECTION FORM

Property Address: _____	Temperature (ambient): _____ °F
Tenant's Name: _____	Temperature (house): _____ °F
Owner's Name: _____	Barometric pressure: _____ "Hg
Owner's Address (if different from property): _____	Weather conditions: _____
Inspector Name: _____	_____
Date: _____	_____
Time: _____	_____

### Exterior System Inspection

Is fan intact and operational?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any unusual fan vibrations?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is vent piping/downspout intact?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any caulking required around fan and piping connections?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Interior System Inspection

Any heaving or subsidence at suction point?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any whistling noise noted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Caulk seals inspected?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is alarm on and operational?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Owner/Tenant Observations

Any change in fan noise or vibration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any lack of differential pressure in the manometer?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has the fan been turned off for any period of time?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have there been any changes to the basement?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Reason \_\_\_\_\_

If so, what? \_\_\_\_\_

### Measurements

System manometer reading _____ "H <sub>2</sub> O	Initial system manometer reading _____ "H <sub>2</sub> O
Is the system manometer steady? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of initial reading _____

### Complete the following:

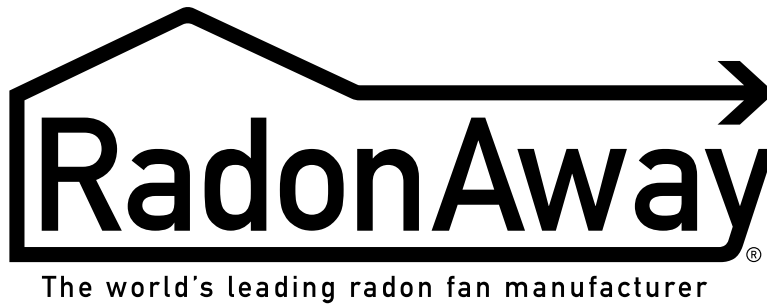
- ☐ Visual inspection of all visible components of the vapor intrusion mitigation system, inside and outside, including fans, piping, piping discharge points, seals, membranes and collection points, to ensure there are no signs of degradation or blockage. A crawl space membrane, or vapor barrier, for example, may warrant repair or replacement if its integrity is compromised.
- ☐ Compare on-site system to as-built drawing for the vapor intrusion mitigation system to verify the system configuration has not been modified.
- ☐ Visual inspection of the building to evaluate whether any significant changes were made (such as remodeled basement, new furnace, heating/cooling system altered such that it affects air distribution or pressure, extensive changes in building weatherization) that would affect the design of the vapor intrusion mitigation system or the general environment in which it is operated.
- ☐ Visual inspection of the area of concern (including basement floor and wall seals, floors generally, sumps, floor drains and utility penetrations, groundwater or slab surface water management systems added or altered) to ensure there are no significant changes in conditions that would warrant modification of the system design. Look for any sizable openings to soil in floor surface, potentially caused by settling, Integrity of lower level floors is critical to preventing vapor migration into structures.

- ☐ Compare current vacuum readings for ASSDS to prior.
  - ☐ Ensure manometers are still in place and filled. Ensure manometer reads at least 1 inch of water
- ☐ Evaluate pressure readings for both active and passive depressurization systems as well as positive pressurization systems (e.g., periodic verification of measurable pressure differences across the slab).
- ☐ Confirm that the extraction fan is operating. Feel the piping to ensure air is flowing through.
  - Inspection of the fan(s) is important throughout the operating period but may be particularly important near the end of its expected lifespan. Noisy fans typically indicate problems with ball bearings and warrant replacement on that basis.
  - ASSDS system fans generally can function well for prolonged periods without maintenance; however, EPA recommends fans be replaced periodically throughout the operating life of the system (e.g., every 4 to 10 years) to avoid breakdowns and associated problems.
- ☐ Monitor vent risers for flow rates and pressures generated by the fan to confirm the system is working and moisture is draining correctly.
- ☐ Complete routine maintenance, calibration and testing of functioning components of the venting system consistent with the manufacturers' specifications.
- ☐ Inspect external electrical components to identify undesirable conditions, such as excessive noise, vibration, moisture, or corrosion, and to verify that the fan cut-off switch is operable.
- ☐ Confirm adequate operation of the warning device or indicator (alarm), and presence of system labels.
- ☐ Confirm that building owner/occupants are knowledgeable about how to maintain system operation, whether they have made any alterations or repairs to the system and that they have been operating the system, if applicable.
- ☐ Discuss any questions or concerns about system operation with the building owner/occupants.
- ☐ Confirm that a copy of the O&M manual is present in the building and has been updated as necessary.
- ☐ Determine whether there has been any change in ownership/occupant. If such a change has occurred, EPA recommends the site manager brief the new owner/occupant on the building mitigation systems.

Comments (any repairs made while visiting, etc):

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## HS-2000 Installation & Operating Instructions and Warranty



# HS Series Installation & Operating Instructions



## 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!** Check voltage at the fan to ensure it corresponds with nameplate. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. [RadonAway.com/vapor-intrusion](http://RadonAway.com/vapor-intrusion)
3. **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.
4. **NOTICE!** There are no user serviceable parts located inside the fan unit.  
**Do NOT attempt to open.** Return unit to the factory for service.
5. 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.
6. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.
7. **WARNING!** Do not twist or torque fan inlet or outlet piping as leakage may result.
8. **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.
9. **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.



## HS Series Fan Installation & Operating Instructions

### High Suction Series

HS2000 p/n 23004-1  
HS3000 p/n 23004-2  
HS5000 p/n 23004-3  
HS2000E p/n 23004-4  
HS3000E p/n 23004-5  
HS5000E p/n 23004-6

## 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 always greater than 32°F or less than 100°F. The HS Series Fan is thermally protected such that it will shut off when the internal temperature is above 194°F +/- 9°F (90°C +/- 5°C). 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°F.

### 1.3 ACOUSTICS

The HS Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. Recommended system design and installation considerations to minimize noise: When installing the HS Series Fan above sleeping areas, select a location for mounting at the farthest possible distance. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Ensure 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, power down and disconnect the HS Series Fan until the water recedes allowing for return to normal operation; then reconnect and power on to turn the fan back on.


### 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 Diameter	Minimum Rise per 1 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:

HS2000 12 - 63 CFM  
 HS3000 19 - 39 CFM  
 HS5000 16 - 44 CFM

All exhaust piping should be 2" PVC.

## 1.6 SYSTEM MONITOR & 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

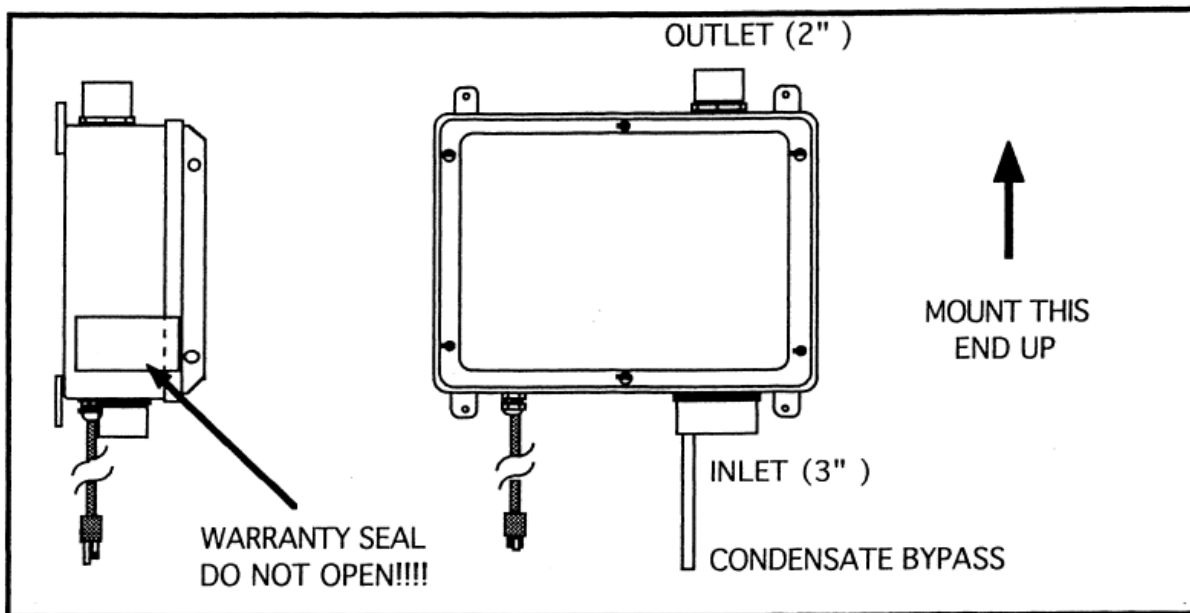
The HS Series Fan can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size; larger as needed) be created below the slab at each suction hole. When fine sand or dirt is present it is recommended that the pit be lined with a material such as clean gravel, size 4, 5, 56, or 6 as classified (ASTM C33).

## 1.8 ELECTRICAL WIRING

For models with a cord, the HS Series Fan plugs into a standard 120V outlet. The switch box models are hardwired. 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 UL 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). Ensure the HS Series Fan is both plumb and level.

### 2.2 DUCTING CONNECTIONS

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

NOTE: Do NOT solvent weld fittings to unit hubs.

### 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.

### 2.4 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

\_\_\_\_\_ **Verify** all connections are tight and **leak-free**.

\_\_\_\_\_ **Ensure** the HS Series Fan and all ducting is secure and vibration-free.

\_\_\_\_\_ **Verify** system vacuum pressure with Magnehelic. **Ensure** vacuum pressure is within normal operating range and **less than** the maximum recommended as shown below:

HS2000 14" WC

HS3000 21" WC

HS5000 35" 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 and applicable testing standards.

**Product Specifications**

Model	Maximum Static Suction	Recommended Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115VAC
			0"	10"	15"	20"	25"	35"	
HS2000	16"	14"	62	40	23	-	-	-	153-314
HS3000	24"	21"	39	30	25	19	-	-	120-250
HS5000	41"	35"	43	35	32	28	24	18	349-381
HS2000E	16"	14"	62	40	23	-	-	-	153-314
HS3000E	24"	21"	39	30	25	19	-	-	120-250
HS5000E	41"	35"	43	35	32	28	24	18	349-381

*\*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°F-100°F

**Thermal Cutout:** 194°F +/- 9°F (90°C +/- 5°C)

**Locked rotor protection**

**Internal condensate bypass**

## IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® 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.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** 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

RadonAway® warrants that the HS 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 repair or 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®.

### 1 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION

RadonAway® will extend the Warranty Term of the fan to twelve (12) months from date of installation or fifteen (15) 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. Proof of purchase and/or proof of professional installation may be required for service under this warranty. RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

**EXCEPT AS STATED ABOVE, THE HS SERIES FAN IS 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 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. 012003 (for CP-023-05)

Purchase Date: February 19, 2020

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# VAPOR INTRUSION MITIGATION SYSTEM MANUAL

for



Keystone Corridor Ground  
Water Contamination Site  
Indianapolis, IN

Prepared by  
U.S. Environmental Protection Agency



July 2020

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## Background

The Keystone Corridor Ground Water Contamination Site is located in Indianapolis, Marion County, Indiana. The site consists of a contaminated groundwater plume underlying industrial, commercial, and residential properties. The center of the site is the intersection of Keystone Avenue and East Fall Creek Parkway North Drive. The approximate site boundaries are 45th Street to the north, Eastern Avenue to the east, 38th Street to the south, and Norwaldo Avenue to the west. The municipal water supply Fall Creek Station Well Field, as well as multiple, independent potential sources of groundwater contamination are located within the site.

EPA determined that there is a potential for vapor intrusion at your property and other properties. Vapor intrusion occurs when there is migration of vapor-forming chemicals from soil or groundwater into an overlying building. The solution to preventing vapor intrusion is to install a vapor intrusion mitigation system (VIMS). A VIMS functions like a radon mitigation system. The VIMS creates a negative differential pressure beneath the foundation of the building to prevent contaminated soil vapors from entering indoor air. The VIMS removes the vapors before they can enter occupied space.

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## VIMS Information

EPA completed installation of a vapor intrusion mitigation system at your property on March 19, 2020. For maintenance related assistance, a contact number for the EPA contractor Environmental Doctor on a sticker label placed on each system node. The system consists of fan(s), vapor extraction nodes, real-time magnehelic gauge(s), and sampling ports. EPA used the materials listed below. Photos of system components are provided in this manual.

### Pipe and fittings

- 3" Schedule 40 PVC pipe and fittings were used for all solid portions of the system.

### Fans

- One (1) FanTech Rn3 fan. The fan manual is included in this manual. The fan comes with a five-year manufacturer's warranty.

### Electrical

- All electrical wiring was installed by a licensed electrician.
- Exterior rated electrical switches/power disconnects are mounted within 2 feet of the fan.
- Interior electrical switch is mounted by one of the extraction nodes.
- A visible alarm is mounted inside by an extraction node (audio disabled) where a green solid light means the system is functioning and a red solid light means the service is not operating and requires maintenance.
- The system fan is connected to an independent circuit breaker labeled 'Soil Gas Fan'.

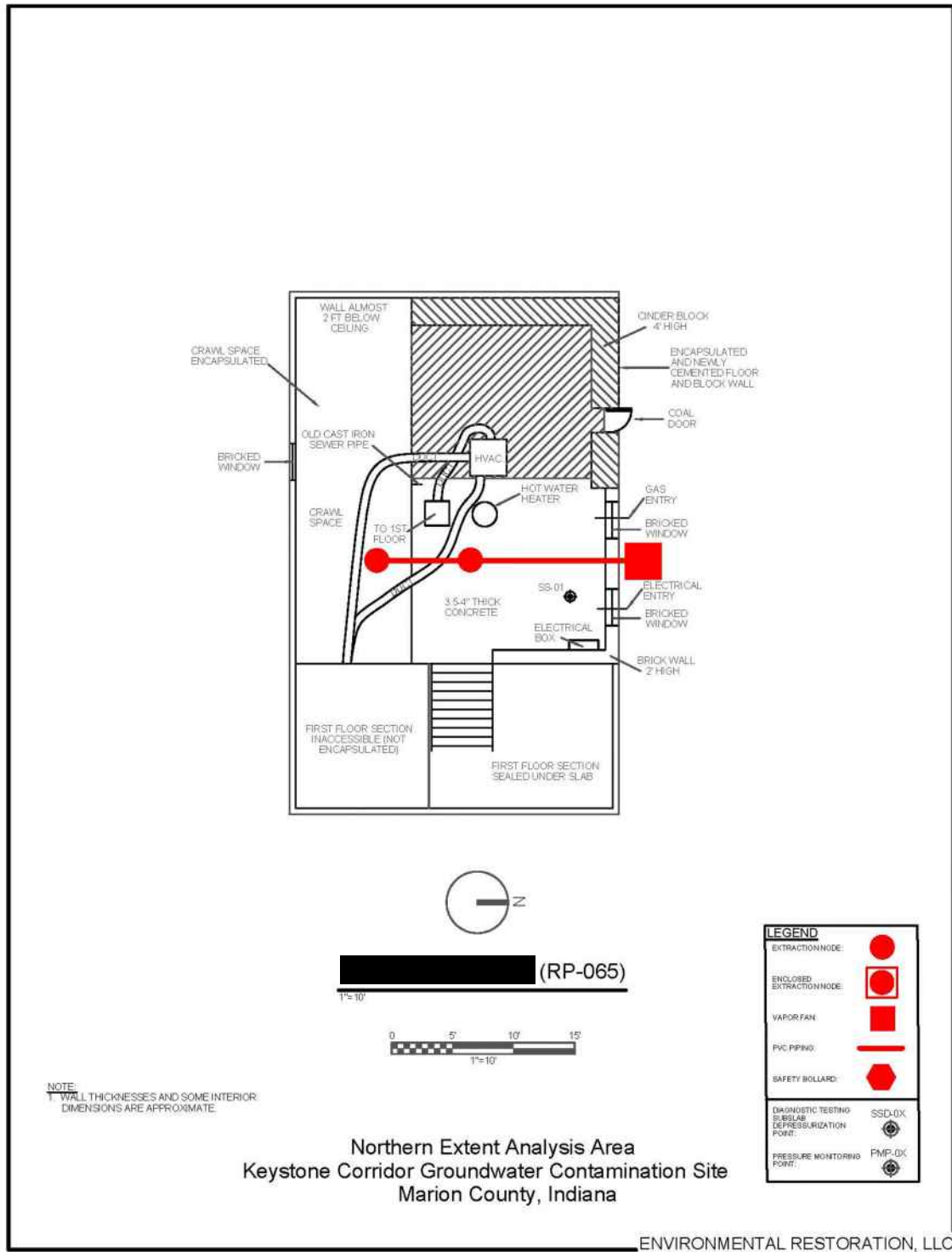
### Construction Information

- All system exhaust points are terminated above the building roofline at a minimum of 10 feet above ground level and 10 feet away from any opening in the building that is less than two (2) feet below the exhaust point.
- Each extraction node was fitted with a magnehelic pressure gauge and sampling port.
- Extraction points in garage or warehouse spaces have been constructed with bollards to prevent damage from vehicles or heavy equipment.
- Where the fan was placed on the building roof, that work was completed by a professional roofing service.

### Operation and Maintenance

The VIMS is designed to be maintenance free, for the life of the fan. All moving parts in the fan are sealed and should only be opened by the manufacturer. Any attempt to open the fan-housing will destroy the factory-installed seals and void the manufacturer's warranty. Annual inspection of the system components is required to ensure proper function of the system. Inspection procedures are provided in this manual.

## As-Built Diagram





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## Photos

*A view of where an area of exposed soil was covered with concrete to seal the basement.*



*A view of the white plastic barrier or liner used to seal areas where soil was exposed in the basement.*



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*A view of the concrete floor that was installed to cover the previous bare soil area.*



*Another view of the vapor barrier liner that was also used in the crawl space that adjoins the basement.*



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*A view of the system extraction node in the basement.*



*A view of the U-tube manometer. Note the red fluid levels being different indicates the system fan is operating. If the red fluid levels are the same, the fan is not operating properly.*



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*A view of the secure power switch for the exterior mounted fan.*



*A view of the system fan located on the exterior of the building.*



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## Inspection Procedures

### **Annual Sub-Slab/Sub-Membrane Depressurization System Inspection Procedure Fans**

The vapor mitigation system fans are designed to be maintenance free, for the life of the fans. All moving parts in the fan are sealed and should only be opened by the manufacturer. Any attempt to open the fan-housing will destroy the factory-installed seals and void the manufacturer's warranty.

### **Piping and Fan Connections**

Visually inspect all exposed system piping, fans, and connections for damage. Repair or replace any observed damage affecting the system.

### **Slab to System Piping Connections**

Visually inspect caulk seal around all vacuum points connection to slab and listen for a rushing air noise. If any failure in the seal exists, caulk with polyurethane caulk.

### **System Pressure**

Observe the static pressure for each sub-system on the magnehelic gauge. Record the static pressures in the provided chart. If static pressure is outside of acceptable range, evaluate fan for problems and perform sub-slab pressure field extension testing to verify the system is still providing adequate pressure field extension under the current operating conditions. If pressure field extension is not adequate, replace system fan.

### **Electrical**

Visually inspect all electrical components for damage. Have properly trained personnel repair any damage found. Test all disconnects (breakers and switches) for proper function and repair/replace any dysfunctional components.

### **Record keeping**

Complete the "Annual O&M Inspection Form" and maintain a record of all annual inspections for the life of the mitigation system.

## MITIGATION SYSTEM ANNUAL O&M INSPECTION FORM

Property Address: _____	Temperature (ambient): _____ °F
Tenant's Name: _____	Temperature (house): _____ °F
Owner's Name: _____	Barometric pressure: _____ "Hg
Owner's Address (if different from property): _____	Weather conditions: _____
Inspector Name: _____	_____
Date: _____	_____
Time: _____	_____

### Exterior System Inspection

Is fan intact and operational?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any unusual fan vibrations?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is vent piping/downspout intact?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any caulking required around fan and piping connections?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Interior System Inspection

Any heaving or subsidence at suction point?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any whistling noise noted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Caulk seals inspected?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is alarm on and operational?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Owner/Tenant Observations

Any change in fan noise or vibration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any lack of differential pressure in the manometer?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has the fan been turned off for any period of time?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have there been any changes to the basement?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Reason \_\_\_\_\_

If so, what? \_\_\_\_\_

### Measurements

System manometer reading _____ "H <sub>2</sub> O	Initial system manometer reading _____ "H <sub>2</sub> O
Is the system manometer steady? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of initial reading _____

Complete the following:

- ☐ Visual inspection of all visible components of the vapor intrusion mitigation system, inside and outside, including fans, piping, piping discharge points, seals, membranes and collection points, to ensure there are no signs of degradation or blockage. A crawl space membrane, or vapor barrier, for example, may warrant repair or replacement if its integrity is compromised.
- ☐ Compare on-site system to as-built drawing for the vapor intrusion mitigation system to verify the system configuration has not been modified.
- ☐ Visual inspection of the building to evaluate whether any significant changes were made (such as remodeled basement, new furnace, heating/cooling system altered such that it affects air distribution or pressure, extensive changes in building weatherization) that would affect the design of the vapor intrusion mitigation system or the general environment in which it is operated.
- ☐ Visual inspection of the area of concern (including basement floor and wall seals, floors generally, sumps, floor drains and utility penetrations, groundwater or slab surface water management systems added or altered) to ensure there are no significant changes in conditions that would warrant modification of the system design. Look for any sizable openings to soil in floor surface, potentially caused by settling, Integrity of lower level floors is critical to preventing vapor migration into structures.

- 
- ☐ Compare current vacuum readings for ASSDS to prior.
    - ☐ Ensure manometers are still in place and filled. Ensure manometer reads at least 1 inch of water
  - ☐ Evaluate pressure readings for both active and passive depressurization systems as well as positive pressurization systems (e.g., periodic verification of measurable pressure differences across the slab).
  - ☐ Confirm that the extraction fan is operating. Feel the piping to ensure air is flowing through.
    - Inspection of the fan(s) is important throughout the operating period but may be particularly important near the end of its expected lifespan. Noisy fans typically indicate problems with ball bearings and warrant replacement on that basis.
    - ASSDS system fans generally can function well for prolonged periods without maintenance; however, EPA recommends fans be replaced periodically throughout the operating life of the system (e.g., every 4 to 10 years) to avoid breakdowns and associated problems.
  - ☐ Monitor vent risers for flow rates and pressures generated by the fan to confirm the system is working and moisture is draining correctly.
  - ☐ Complete routine maintenance, calibration and testing of functioning components of the venting system consistent with the manufacturers' specifications.
  - ☐ Inspect external electrical components to identify undesirable conditions, such as excessive noise, vibration, moisture, or corrosion, and to verify that the fan cut-off switch is operable.
  - ☐ Confirm adequate operation of the warning device or indicator (alarm), and presence of system labels.
  - ☐ Confirm that building owner/occupants are knowledgeable about how to maintain system operation, whether they have made any alterations or repairs to the system and that they have been operating the system, if applicable.
  - ☐ Discuss any questions or concerns about system operation with the building owner/occupants.
  - ☐ Confirm that a copy of the O&M manual is present in the building and has been updated as necessary.
  - ☐ Determine whether there has been any change in ownership/occupant. If such a change has occurred, EPA recommends the site manager brief the new owner/occupant on the building mitigation systems.

Comments (any repairs made while visiting, etc):

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## FanTech Rn3 Installation & Operating Instructions and Warranty



# Installation and Operation Manual Manuel d'installation et d'opération

Item #: 484840  
Rev Date: 2019-07-11

## Rn Series • Série Rn

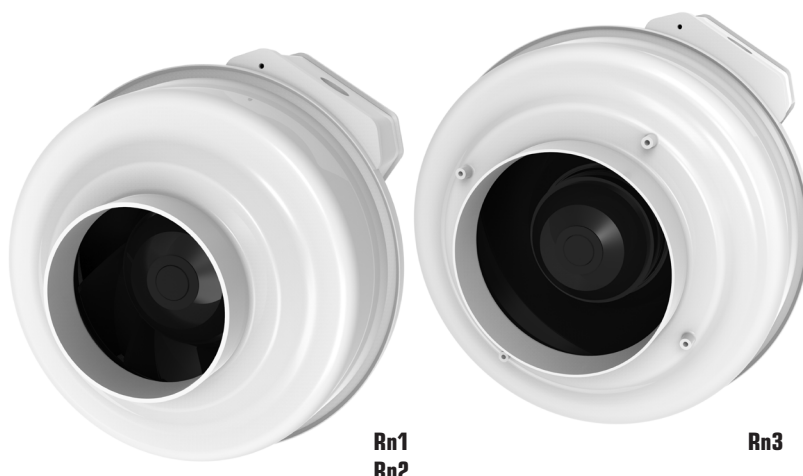
Inline Radon Fans • Ventilateur pour radon en ligne

### THIS BOX INCLUDES:

Inline Radon Fan Rn, 1 pc  
Operation and Installation Manual, 1 pc

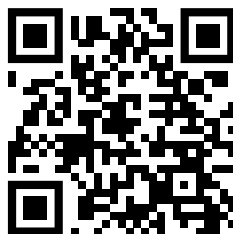
### CETTE BOÎTE COMPREND:

Ventilateur pour radon en ligne Rn, 1 pc  
Manuel d'installation, 1 pc



REGISTER\* THIS PRODUCT TO  
INCREASE YOUR PRODUCT  
WARRANTY BY AN EXTRA YEAR

[registration.fantech.app](https://registration.fantech.app)



\* in USA only

### Technical / Customer Support:






Support technique et service à la clientèle

United States / États-Unis Tel.: 800.747.1762

Canada Tel.: 800.565.3548



**fantech**<sup>®</sup>  
a systemair company

				
Note	Warning / Important note	Information	Technical information	Practical tip



**DO NOT CONNECT POWER SUPPLY until fan is completely installed.**  
**Make sure electrical service to the fan is in the locked "OFF" position.**

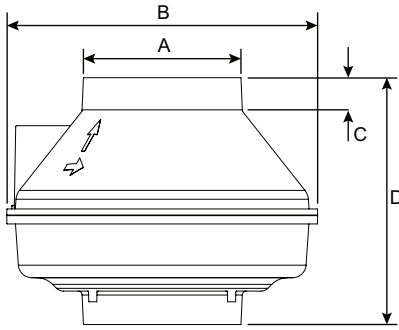
1. These fans have rotating parts and safety precaution should be exercised during installation, operation and maintenance.
2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
  - a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.
  - b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the 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. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.
  - e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.
  - f. Ducted fans must always be vented to the outdoors.
3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.
4. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.
5. Do not use these fans with any solid state speed control device.

**GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.**



The ducting from this fan to the outside of the building has a strong effect on the air flow, 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 air flow.

## DIMENSIONS



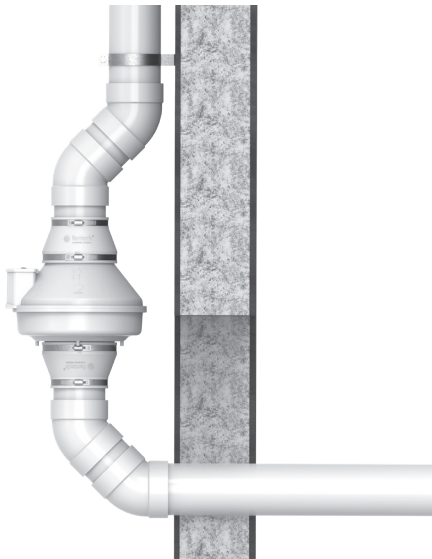
Model/Modèle	A	B	C	D
Rn1	4 15/32 (114)	10 (254)	1 1/4 (32)	9 1/4 (235)
Rn2	4 15/32 (114)	10 (254)	1 1/4 (32)	9 1/4 (235)
Rn3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)

Dimensions in inches (mm).  
Dimensions en pouces (mm)

## INSTALLATION

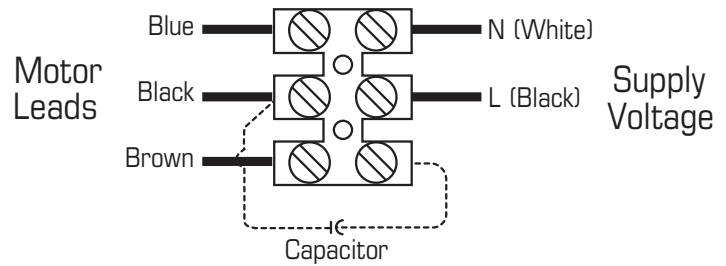
The Rn1, Rn2, and Rn3 are designed for use with 3" and 4" schedule 40 PVC pipe, when appropriate LDVT™ coupling is used.

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.



**DO NOT** connect fan directly to building structure

## WIRING DIAGRAM



There are typically three wires to be connected to an electrical fan; Load, Neutral and Ground. Load provides power to the fan, Neutral is for returning current and closing the electrical circuit, and Ground is for an additional path to safely return current to the ground, in case of an accidental electrical short in the fan and/or discharging of fan metal components.

Fantech radon fans are permanently connected appliances employing a reinforced polymeric construction. The non-conductive construction functions as a "Double Insulated" protective System (Complies with Standard for Double Insulation Systems for Use in Electrical Equipment, UL 1097), thus eliminating the need for a grounding conductor. All Fantech radon fans are tested and reviewed by Underwriter Laboratories, a 3rd party independent safety governing body, and deemed suitable for outdoor use (Standard for Safety-Electric Fans, UL 507).

Please contact Fantech Technical Support if additional information is needed regarding this matter.

	Voltage	Max Amp	Max Watts	Phase	RPM	CFM/Watts	Energy Star	CFM @ Static Pressure						Max
								0.00	0.20	0.50	1.00	1.50	2.00	
Rn1	120	0.17	19.7	1	3100	7.30	Yes	160	130	80	-	-	-	0.89
Rn2	120	0.48	58.0	1	2700	2.59	No	160	150	120	80	40	-	1.97
Rn3	120	1.20	141.2	1	2700	2.42	No	370	340	280	180	120	50	2.36

# WARRANTY

## Five (5) Year Warranty

**This warranty supersedes all prior warranties**

### **DURING ENTIRE WARRANTY PERIOD:**

Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

### **FOR FACTORY RETURN YOU MUST:**

- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

### **OR**

The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE

END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

### **THE FOLLOWING WARRANTIES DO NOT APPLY:**

- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
  1. Improper maintenance
  2. Misuse, abuse, abnormal use, or accident, and
  3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

### **WARRANTY VALIDATION**

- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

## Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged

negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

## Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a

life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Fantech reserves the right to make technical changes.  
For updated documentation please refer to [www.fantech.net](http://www.fantech.net)

Fantech se réserve le droit de faire des changements techniques. Pour de la documentation à jour, s'il vous plaît se référer au [www.fantech.net](http://www.fantech.net)

Fantech®

SN: 1004866655 (for RP-065)  
Purchase date: March 2020

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# VAPOR INTRUSION MITIGATION SYSTEM MANUAL

for



Keystone Corridor Ground  
Water Contamination Site  
Indianapolis, IN

Prepared by  
U.S. Environmental Protection Agency



July 2020

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## Background

The Keystone Corridor Ground Water Contamination Site is located in Indianapolis, Marion County, Indiana. The site consists of a contaminated groundwater plume underlying industrial, commercial, and residential properties. The center of the site is the intersection of Keystone Avenue and East Fall Creek Parkway North Drive. The approximate site boundaries are 45th Street to the north, Eastern Avenue to the east, 38th Street to the south, and Norwaldo Avenue to the west. The municipal water supply Fall Creek Station Well Field, as well as multiple, independent potential sources of groundwater contamination are located within the site.

EPA determined that there is a potential for vapor intrusion at your property and other properties. Vapor intrusion occurs when there is migration of vapor-forming chemicals from soil or groundwater into an overlying building. The solution to preventing vapor intrusion is to install a vapor intrusion mitigation system (VIMS). A VIMS functions like a radon mitigation system. The VIMS creates a negative differential pressure beneath the foundation of the building to prevent contaminated soil vapors from entering indoor air. The VIMS removes the vapors before they can enter occupied space.

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## VIMS Information

EPA completed installation of a vapor intrusion mitigation system at your property on March 6, 2020. For maintenance related assistance, a contact number for the EPA contractor Environmental Doctor on a sticker label placed on each system node. The system consists of fan(s), vapor extraction nodes, real-time magnehelic gauge(s), and sampling ports. EPA used the materials listed below. Photos of system components are provided in this manual.

### Pipe and fittings

- 4" Schedule 40 PVC pipe and fittings were used for all solid portions of the system.

### Fans

- Two (2) RadonAway HS-2000 fans. The fan manual is included in this manual. Each fan comes with a one-year manufacturer's warranty.

### Electrical

- All electrical wiring was installed by a licensed electrician.
- Exterior rated electrical switches/power disconnects are mounted within 2 feet of the fan.
- Interior electrical switch is mounted by one of the extraction nodes.
- A visible alarm is mounted inside by an extraction node (audio disabled) where a green solid light means the system is functioning and a red solid light means the service is not operating and requires maintenance.
- The system fan is connected to an independent circuit breaker labeled 'Soil Gas Fan'.

### Construction Information

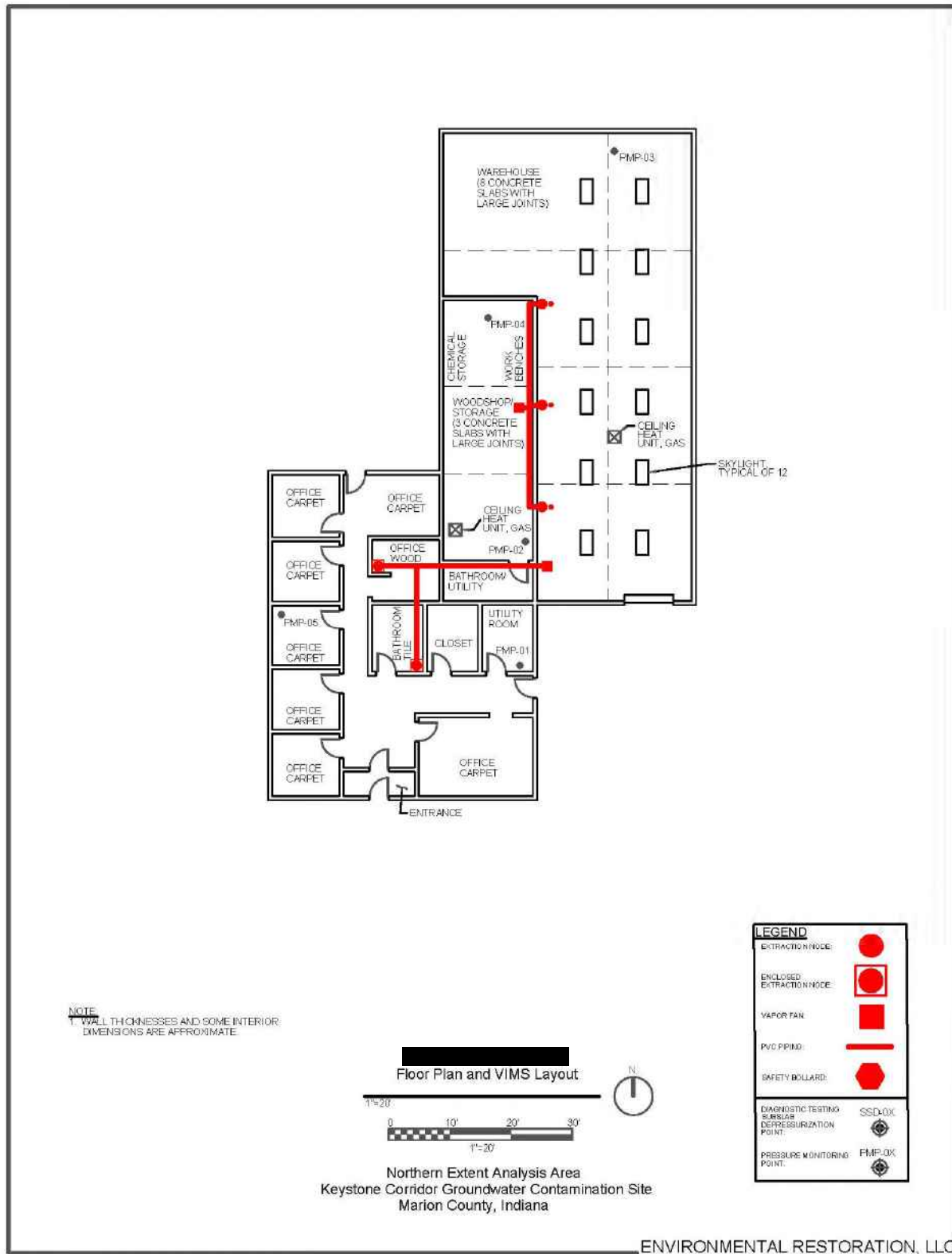
- All system exhaust points are terminated above the building roofline at a minimum of 10 feet above ground level and 10 feet away from any opening in the building that is less than two (2) feet below the exhaust point.
- Each extraction node was fitted with a magnehelic pressure gauge and sampling port.
- Extraction points in garage or warehouse spaces have been constructed with bollards to prevent damage from vehicles or heavy equipment.
- Where the fan was placed on the building roof, that work was completed by a professional roofing service.

### Operation and Maintenance

The VIMS is designed to be maintenance free, for the life of the fan. All moving parts in the fan are sealed and should only be opened by the manufacturer. Any attempt to open the fan-housing will destroy the factory-installed seals and void the manufacturer's warranty. Annual inspection of the system components is required to ensure proper function of the system. Inspection procedures are provided in this manual.



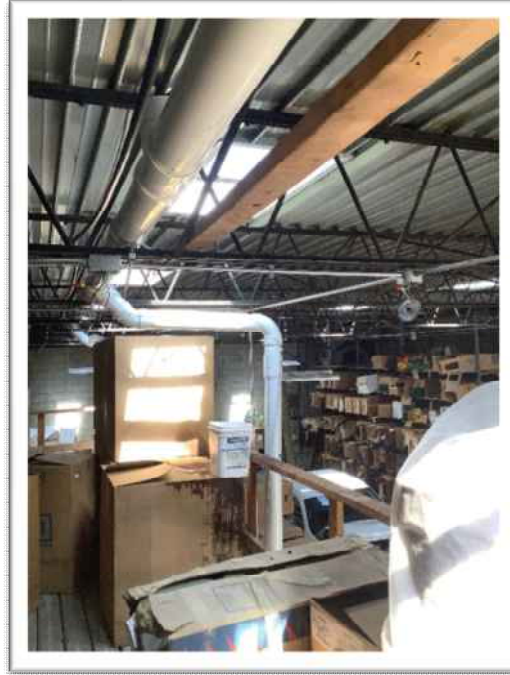
## As-Built Diagram



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## Photos

*A view of the system PVC piping connecting the nodes for the East system.*



*A view of system node East-C with safety bollard.*



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*A view of system node East-B where the fan pressure gauge and fan visual alarm are located.*



*A view of system node East-A with pressure gauge and safety bollard.*



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*A view of system node West-A prior to the enclosure construction.*



*A view of system node West-A with wooden enclosure.*



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*A view of system node West-B prior to the enclosure construction.*



*A view of system node West-B with wooden enclosure.*



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*HS-2000 fans prior to being installed on the building rooftop.*



*Note: The following photograph was not taken at your property. It is representative of the type of system components installed.*

*An up-close view of system pressure gauges, ball valve, sample port, and the fan visual alarm (note the green light in the upper left indicates the fan is operating).*



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## Inspection Procedures

### **Annual Sub-Slab/Sub-Membrane Depressurization System Inspection Procedure Fans**

The vapor mitigation system fans are designed to be maintenance free, for the life of the fans. All moving parts in the fan are sealed and should only be opened by the manufacturer. Any attempt to open the fan-housing will destroy the factory-installed seals and void the manufacturer's warranty.

### **Piping and Fan Connections**

Visually inspect all exposed system piping, fans, and connections for damage. Repair or replace any observed damage affecting the system.

### **Slab to System Piping Connections**

Visually inspect caulk seal around all vacuum points connection to slab and listen for a rushing air noise. If any failure in the seal exists, caulk with polyurethane caulk.

### **System Pressure**

Observe the static pressure for each sub-system on the magnehelic gauge. Record the static pressures in the provided chart. If static pressure is outside of acceptable range, evaluate fan for problems and perform sub-slab pressure field extension testing to verify the system is still providing adequate pressure field extension under the current operating conditions. If pressure field extension is not adequate, replace system fan.

### **Electrical**

Visually inspect all electrical components for damage. Have properly trained personnel repair any damage found. Test all disconnects (breakers and switches) for proper function and repair/replace any dysfunctional components.

### **Record keeping**

Complete the "Annual O&M Inspection Form" and maintain a record of all annual inspections for the life of the mitigation system.



## MITIGATION SYSTEM ANNUAL O&M INSPECTION FORM

Property Address: _____	Temperature (ambient): _____ °F
Tenant's Name: _____	Temperature (house): _____ °F
Owner's Name: _____	Barometric pressure: _____ "Hg
Owner's Address (if different from property): _____	Weather conditions: _____
Inspector Name: _____	_____
Date: _____	_____
Time: _____	_____

### Exterior System Inspection

Is fan intact and operational?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any unusual fan vibrations?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is vent piping/downspout intact?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any caulking required around fan and piping connections?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Interior System Inspection

Any heaving or subsidence at suction point?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any whistling noise noted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Caulk seals inspected?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is alarm on and operational?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Owner/Tenant Observations

Any change in fan noise or vibration?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Any lack of differential pressure in the manometer?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has the fan been turned off for any period of time?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have there been any changes to the basement?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Reason \_\_\_\_\_

If so, what? \_\_\_\_\_

### Measurements

System manometer reading _____ "H <sub>2</sub> O	Initial system manometer reading _____ "H <sub>2</sub> O
Is the system manometer steady? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of initial reading _____

### Complete the following:

- ☐ Visual inspection of all visible components of the vapor intrusion mitigation system, inside and outside, including fans, piping, piping discharge points, seals, membranes and collection points, to ensure there are no signs of degradation or blockage. A crawl space membrane, or vapor barrier, for example, may warrant repair or replacement if its integrity is compromised.
- ☐ Compare on-site system to as-built drawing for the vapor intrusion mitigation system to verify the system configuration has not been modified.
- ☐ Visual inspection of the building to evaluate whether any significant changes were made (such as remodeled basement, new furnace, heating/cooling system altered such that it affects air distribution or pressure, extensive changes in building weatherization) that would affect the design of the vapor intrusion mitigation system or the general environment in which it is operated.
- ☐ Visual inspection of the area of concern (including basement floor and wall seals, floors generally, sumps, floor drains and utility penetrations, groundwater or slab surface water management systems added or altered) to ensure there are no significant changes in conditions that would warrant modification of the system design. Look for any sizable openings to soil in floor surface, potentially caused by settling, Integrity of lower level floors is critical to preventing vapor migration into structures.

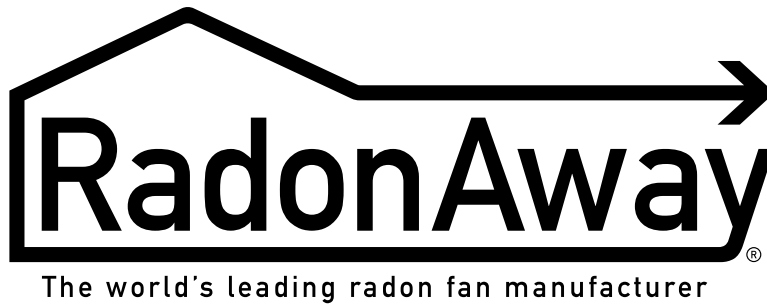


- 
- ☐ Compare current vacuum readings for ASSDS to prior.
    - ☐ Ensure manometers are still in place and filled. Ensure manometer reads at least 1 inch of water
  - ☐ Evaluate pressure readings for both active and passive depressurization systems as well as positive pressurization systems (e.g., periodic verification of measurable pressure differences across the slab).
  - ☐ Confirm that the extraction fan is operating. Feel the piping to ensure air is flowing through.
    - Inspection of the fan(s) is important throughout the operating period but may be particularly important near the end of its expected lifespan. Noisy fans typically indicate problems with ball bearings and warrant replacement on that basis.
    - ASSDS system fans generally can function well for prolonged periods without maintenance; however, EPA recommends fans be replaced periodically throughout the operating life of the system (e.g., every 4 to 10 years) to avoid breakdowns and associated problems.
  - ☐ Monitor vent risers for flow rates and pressures generated by the fan to confirm the system is working and moisture is draining correctly.
  - ☐ Complete routine maintenance, calibration and testing of functioning components of the venting system consistent with the manufacturers' specifications.
  - ☐ Inspect external electrical components to identify undesirable conditions, such as excessive noise, vibration, moisture, or corrosion, and to verify that the fan cut-off switch is operable.
  - ☐ Confirm adequate operation of the warning device or indicator (alarm), and presence of system labels.
  - ☐ Confirm that building owner/occupants are knowledgeable about how to maintain system operation, whether they have made any alterations or repairs to the system and that they have been operating the system, if applicable.
  - ☐ Discuss any questions or concerns about system operation with the building owner/occupants.
  - ☐ Confirm that a copy of the O&M manual is present in the building and has been updated as necessary.
  - ☐ Determine whether there has been any change in ownership/occupant. If such a change has occurred, EPA recommends the site manager brief the new owner/occupant on the building mitigation systems.

Comments (any repairs made while visiting, etc):

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## HS-2000 Installation & Operating Instructions and Warranty



# HS Series Installation & Operating Instructions



## 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!** Check voltage at the fan to ensure it corresponds with nameplate. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. [RadonAway.com/vapor-intrusion](http://RadonAway.com/vapor-intrusion)
3. **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.
4. **NOTICE!** There are no user serviceable parts located inside the fan unit.  
**Do NOT attempt to open.** Return unit to the factory for service.
5. 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.
6. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.
7. **WARNING!** Do not twist or torque fan inlet or outlet piping as leakage may result.
8. **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.
9. **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.



## HS Series Fan Installation & Operating Instructions

### High Suction Series

HS2000 p/n 23004-1  
HS3000 p/n 23004-2  
HS5000 p/n 23004-3  
HS2000E p/n 23004-4  
HS3000E p/n 23004-5  
HS5000E p/n 23004-6

## 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 always greater than 32°F or less than 100°F. The HS Series Fan is thermally protected such that it will shut off when the internal temperature is above 194°F +/- 9°F (90°C +/- 5°C). 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°F.

### 1.3 ACOUSTICS

The HS Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. Recommended system design and installation considerations to minimize noise: When installing the HS Series Fan above sleeping areas, select a location for mounting at the farthest possible distance. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Ensure 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, power down and disconnect the HS Series Fan until the water recedes allowing for return to normal operation; then reconnect and power on to turn the fan back on.

### 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 Diameter	Minimum Rise per 1 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:

HS2000 12 - 63 CFM  
 HS3000 19 - 39 CFM  
 HS5000 16 - 44 CFM

All exhaust piping should be 2" PVC.

## 1.6 SYSTEM MONITOR & 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

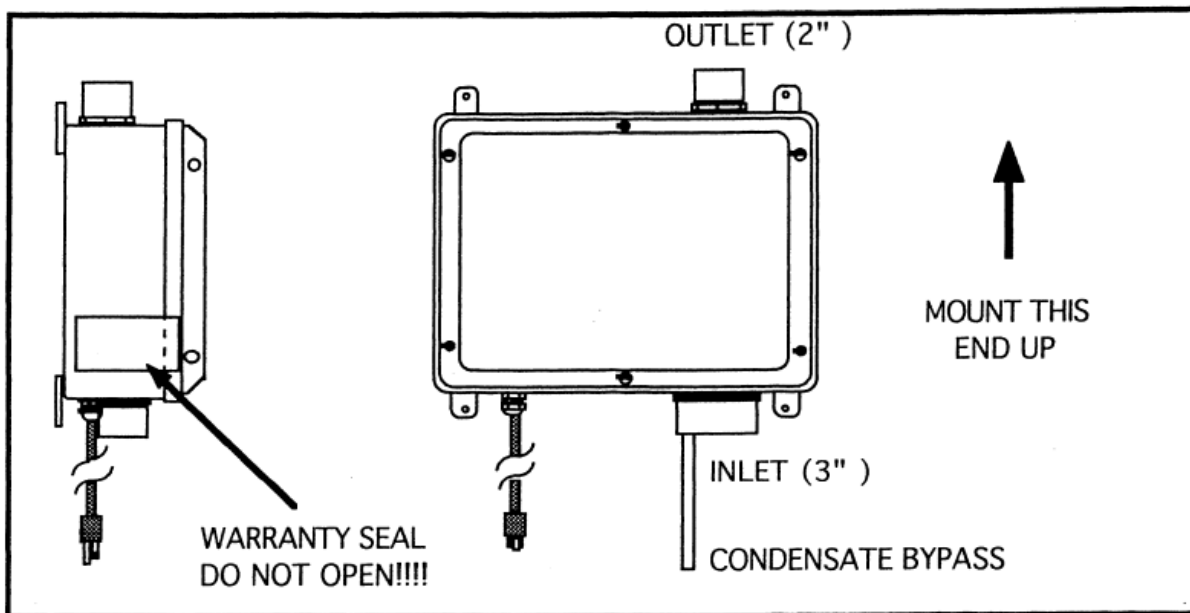
The HS Series Fan can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size; larger as needed) be created below the slab at each suction hole. When fine sand or dirt is present it is recommended that the pit be lined with a material such as clean gravel, size 4, 5, 56, or 6 as classified (ASTM C33).

## 1.8 ELECTRICAL WIRING

For models with a cord, the HS Series Fan plugs into a standard 120V outlet. The switch box models are hardwired. 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 UL 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). Ensure the HS Series Fan is both plumb and level.

### 2.2 DUCTING CONNECTIONS

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

NOTE: Do NOT solvent weld fittings to unit hubs.

### 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.

### 2.4 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

\_\_\_\_\_ **Verify** all connections are tight and **leak-free**.

\_\_\_\_\_ **Ensure** the HS Series Fan and all ducting is secure and vibration-free.

\_\_\_\_\_ **Verify** system vacuum pressure with Magnehelic. **Ensure** vacuum pressure is within normal operating range and **less than** the maximum recommended as shown below:

HS2000 14" WC

HS3000 21" WC

HS5000 35" 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 and applicable testing standards.

**Product Specifications**

Model	Maximum Static Suction	Recommended Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115VAC
			0"	10"	15"	20"	25"	35"	
HS2000	16"	14"	62	40	23	-	-	-	153-314
HS3000	24"	21"	39	30	25	19	-	-	120-250
HS5000	41"	35"	43	35	32	28	24	18	349-381
HS2000E	16"	14"	62	40	23	-	-	-	153-314
HS3000E	24"	21"	39	30	25	19	-	-	120-250
HS5000E	41"	35"	43	35	32	28	24	18	349-381

*\*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°F-100°F

**Thermal Cutout:** 194°F +/- 9°F (90°C +/- 5°C)

**Locked rotor protection**

**Internal condensate bypass**



## IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® 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.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** 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

RadonAway® warrants that the HS 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 repair or 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®.

### 1 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION

RadonAway® will extend the Warranty Term of the fan to twelve (12) months from date of installation or fifteen (15) 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. Proof of purchase and/or proof of professional installation may be required for service under this warranty. RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

**EXCEPT AS STATED ABOVE, THE HS SERIES FAN IS 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 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. 012011

Purchase Date: March 6, 2020 (for CP-024 East)

## IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® 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.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** 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

RadonAway® warrants that the HS 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 repair or 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®.

### 1 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION

RadonAway® will extend the Warranty Term of the fan to twelve (12) months from date of installation or fifteen (15) 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. Proof of purchase and/or proof of professional installation may be required for service under this warranty. RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

**EXCEPT AS STATED ABOVE, THE HS SERIES FAN IS 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 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:**

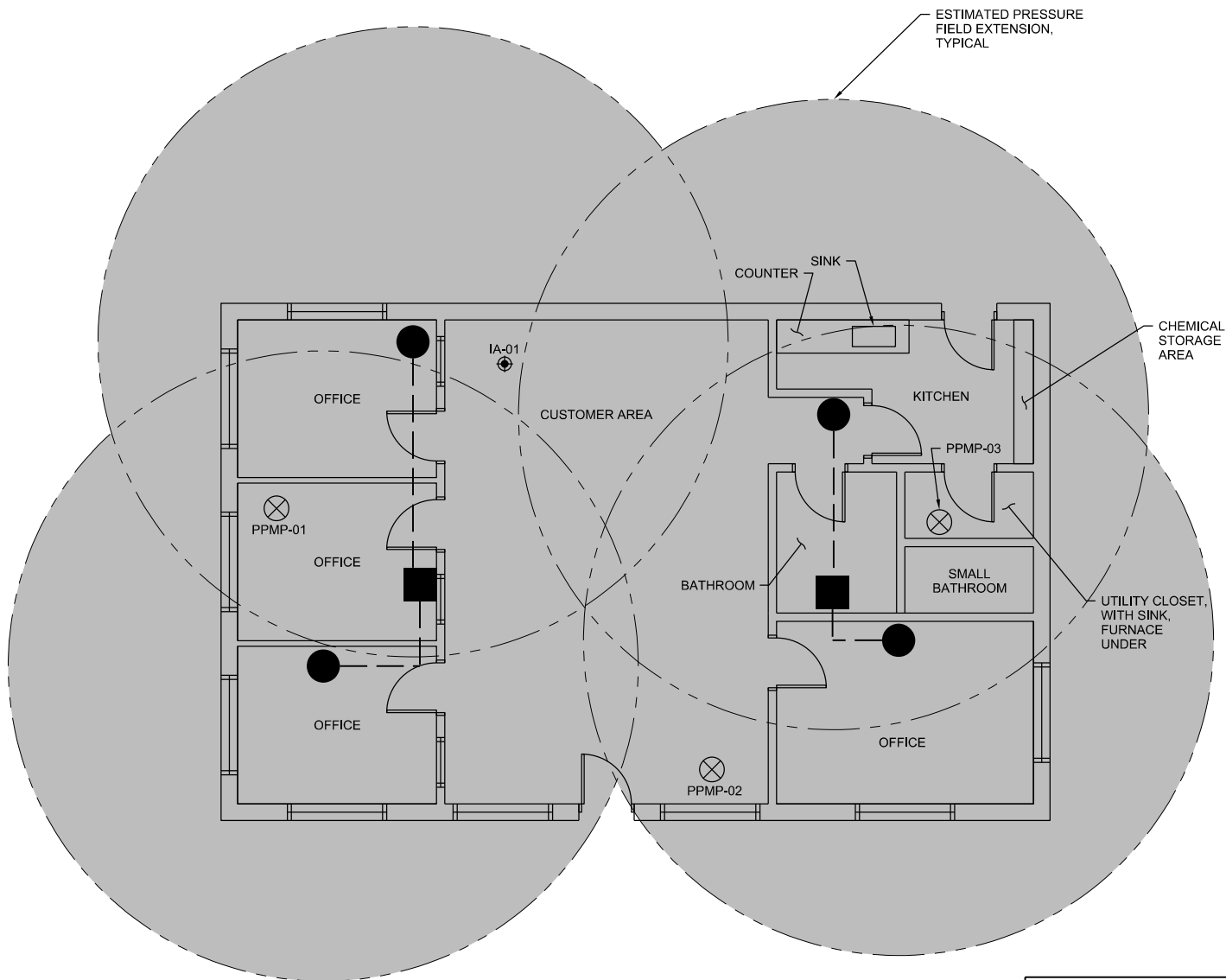
Serial No. 012009 (for CP-024 West)

Purchase Date: March 6, 2020

## **ATTACHMENT 2**

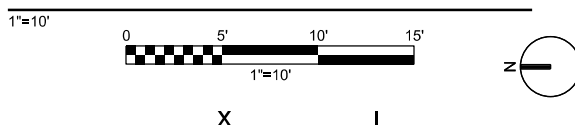
### **VAPOR INTRUSION MITIGATION SYSTEM EXAMPLE LAYOUT, CONCEPTUAL DESIGN, AND AS-BUILT DOCUMENTS**

- A. VIMS Example Layout
- B. VIMS Conceptual Design Specifications
- C. VIMS Example As-built Diagrams (Properties RP-065 and CP-017-03)



- NOTE:**
1. WALL THICKNESSES AND SOME INTERIOR DIMENSIONS ARE APPROXIMATE.
  2. DROPPED CEILING THROUGHOUT ENTIRE BUILDING.
  3. TILE FLOORS THROUGHOUT BUILDING.

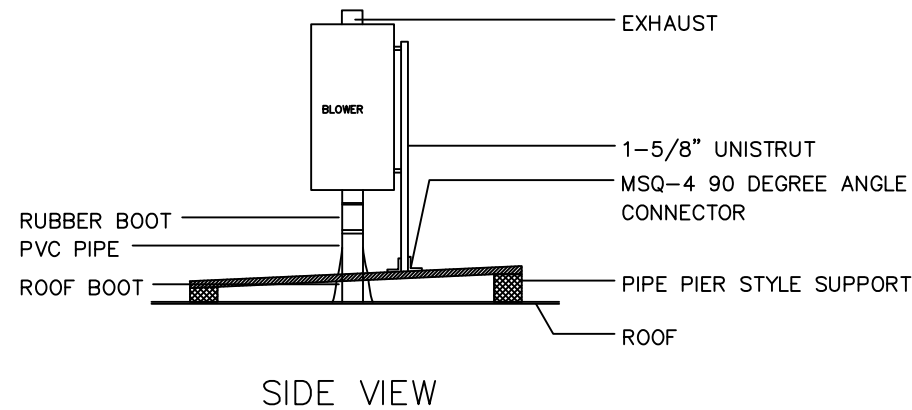
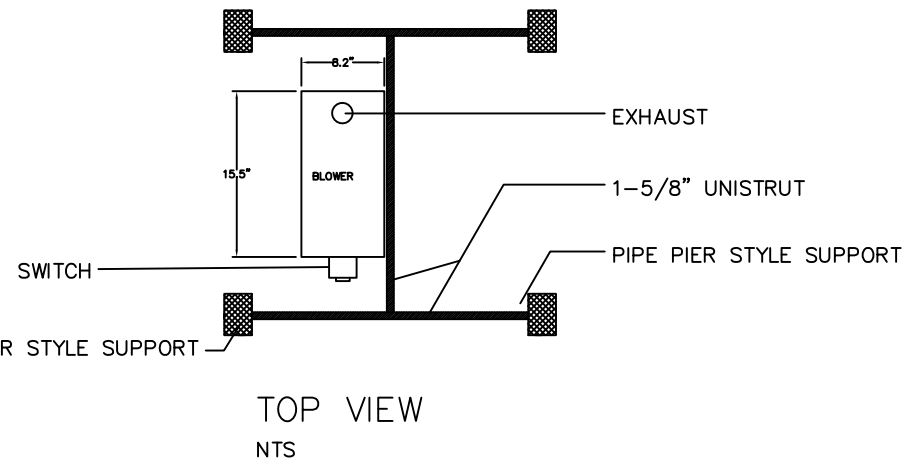
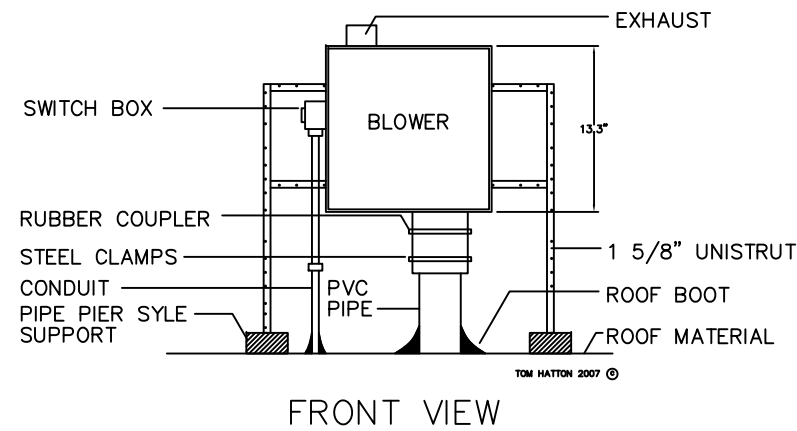
## VIMS Example Layout



Keystone Corridor Groundwater Contamination Site  
Marion County, Indiana

LEGEND	
<b>PROPOSED</b>	
NODE:	●
FAN:	■
CONVEYANCE:	---
ESTIMATED PRESSURE FIELD EXTENSION:	○
PROPOSED PRESSURE MONITORING POINT:	⊗
	PPMP-0X
<b>EXISTING</b>	
DIAGNOSTIC TESTING SUBSLAB DEPRESSURIZATION POINT:	SSD-0X
PRESSURE MONITORING POINT:	PMP-0X
INDOOR AIR SAMPLE LOCATION:	IA-0X

RADONAWAY SERIES FANS

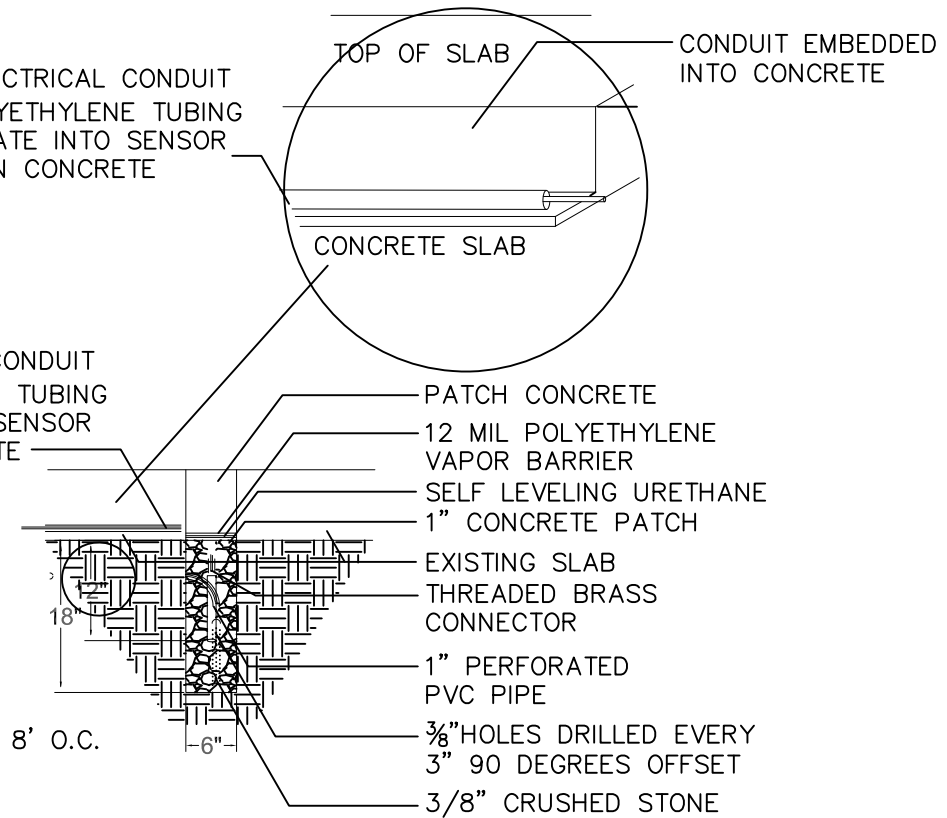


3/4" PVC ELECTRICAL CONDUIT  
W/ 1/4" POLYETHYLENE TUBING  
TO TERMINATE INTO SENSOR  
EMBEDDED IN CONCRETE

3/4" EMT ELECTRICAL CONDUIT  
W/ 1/4" POLYETHYLENE TUBING  
TO TERMINATE INTO SENSOR  
EMBEDDED IN CONCRETE

NOTE:  
ELECTRICAL CONDUIT  
FASTENED TO FLOOR  
W/ CONDUIT CLAMPS 8' O.C.

SUB SLAB PRESSURE  
PROBE DETAIL



EQUIPMENT SCHEDULE

- I. Vapor Vent Piping
  - a. Schedule 80 PVC ASTM D-2467
  - b. PVC Schedule 40 pipe and fittings ASTM D-2665
    - i. Hollow Core PVC is not permissible
  - c. PVC cement clear primer will comply with ASTM F-656
  - d. PVC cement adhesive will comply with ASTM D-2564
  - e. 3 inch inline PVC slide valves (Valterra Bladex)
- II. Piping Support and Hardware
  - a. 3" Hanging Pipe Supports
  - b. Adjustable swivel ring or standard bolt type clevis hangers
  - c. Adjustable band hangers
  - d. 3/8" threaded rod
  - e. 1/2" threaded rod
  - f. Conduit clamps
  - g. Assorted bolts, nuts, & washers
  - h. 1 5/8" C-Profile Galvanized Unistrut
  - i. 1 3/16" C-Profile galvanized Unistrut

- III. Vapor Blower
  - a. RadonAway HS2000 Series Fans
- IV. Blower Support Frames
  - a. 1 5/8" C-Profile Galvanized Unistrut
  - b. Dura Block Block™ Unistrut supports
- V. Visual Pressure Indicator and Protective Enclosure
  - a. Dwyer Magnetic (range to be determined)
  - b. Hoffman Enclosures
- VI. Sealing Materials
  - a. Gun Grade Urethane Caulk (Vulkem 116)
  - b. Flowable Urethane Caulk (Vulkem 45SSL)

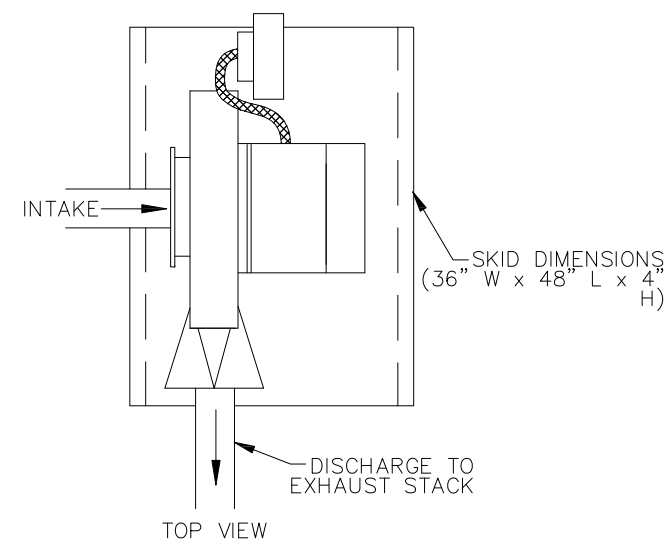
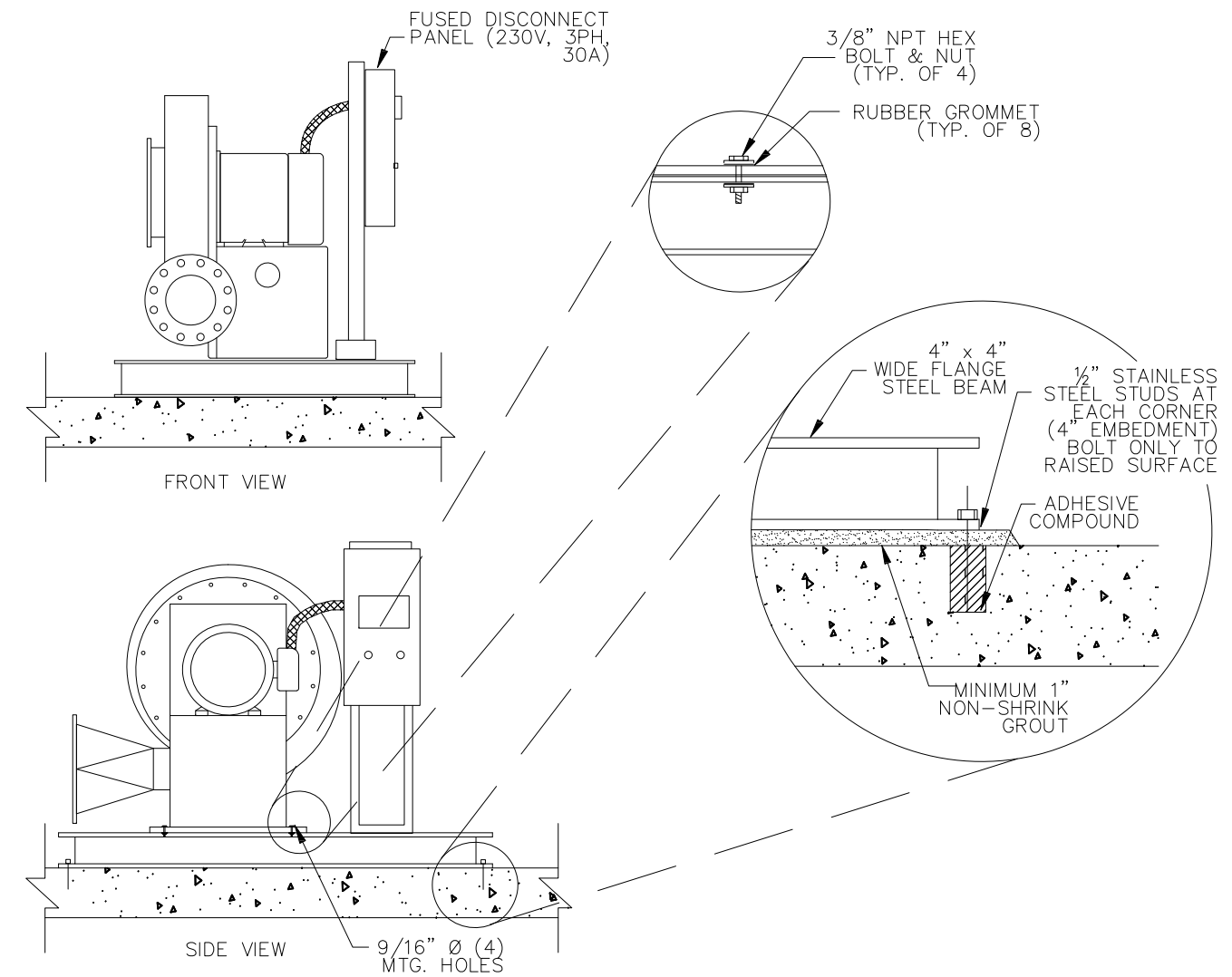
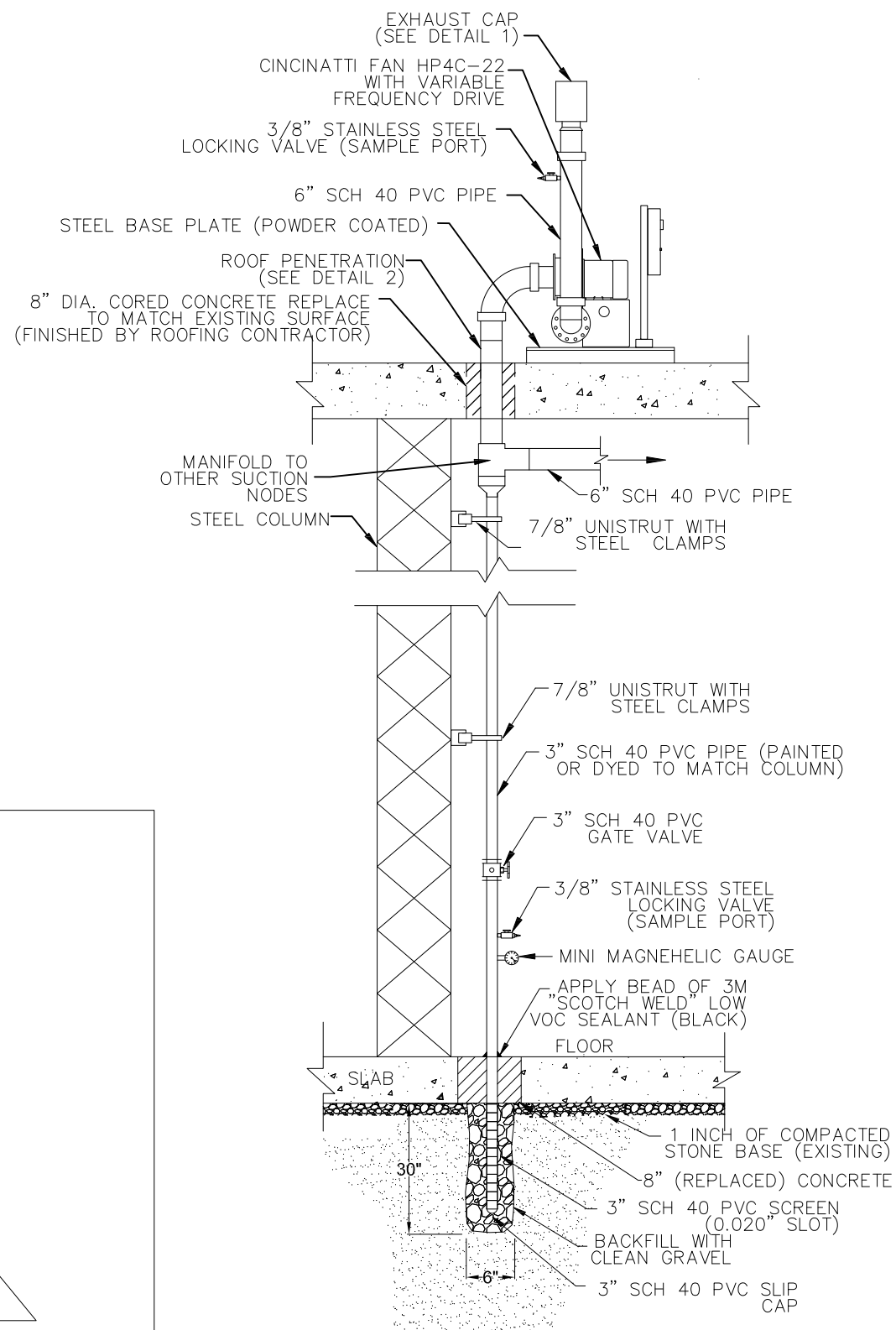
Note: Hilti is the suggested manufacturer of fastening products and fire collars

\*Original drawing – Clean Vapor LLC

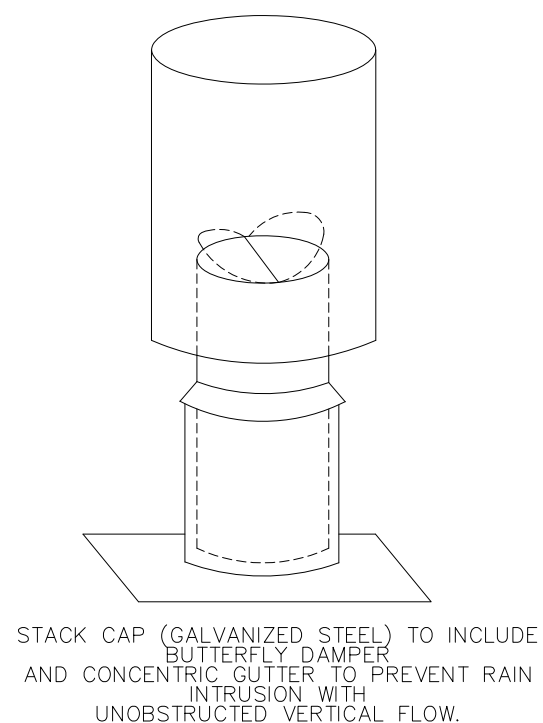
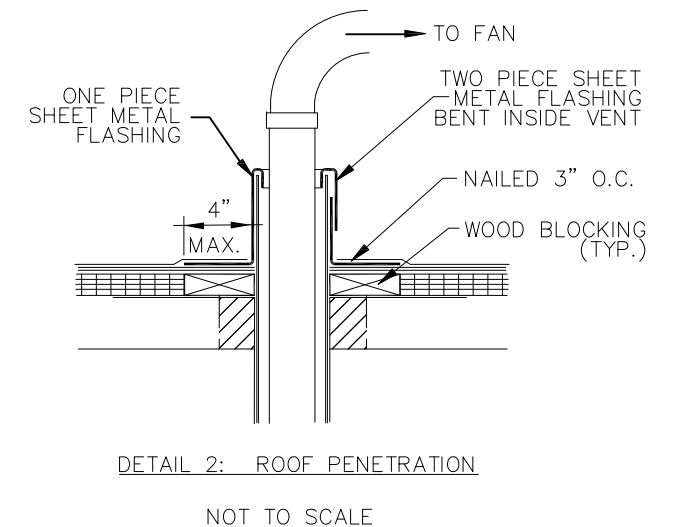
CONCEPTUAL PERFORMANCE-BASED  
VAPOR INTRUSION MITIGATION SYSTEM REMEDIAL DESIGN  
KEYSTONE CORRIDOR GROUNDWATER CONTAMINATION SITE  
MARION COUNTY INDIANA

REVISION AS-BUILTS	DATE
DRAWN BY	
APPROVED	
SCALE	
CHECKED BY	
SHEET TITLE	MECHANICAL DETAILS

SHEET NO.



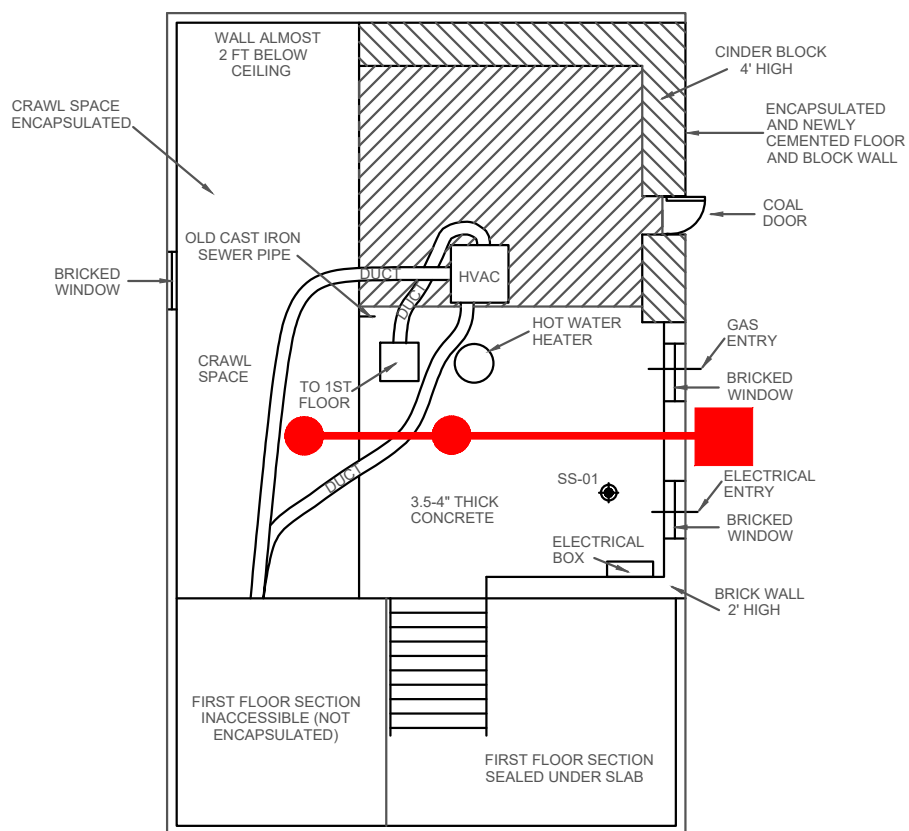
FAN ROOF MOUNTING  
NOT TO SCALE



DETAIL 1: EXHAUST CAP  
NOT TO SCALE

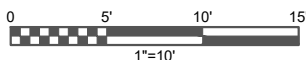
CONCEPTUAL PERFORMANCE-BASED  
VAPOR INTRUSION MITIGATION SYSTEM REMEDIAL DESIGN  
KEYSTONE CORRIDOR GROUNDWATER CONTAMINATION SITE  
MARION COUNTY INDIANA

REVISION AS-BUILTS	DATE
DRAWN BY	
APPROVED	
SCALE	
CHECKED BY	
SHEET TITLE	MECHANICAL DETAILS



(RP-065)

1"=10'

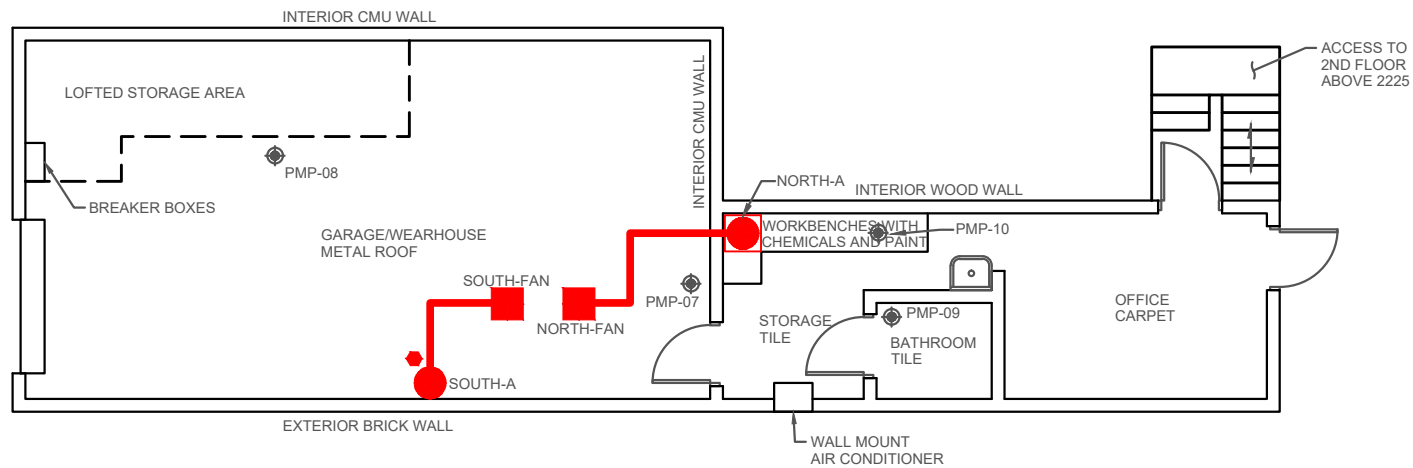


**NOTE:**

1. WALL THICKNESSES AND SOME INTERIOR DIMENSIONS ARE APPROXIMATE.

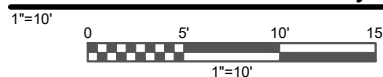
LEGEND	
EXTRACTION NODE:	
ENCLOSED EXTRACTION NODE:	
VAPOR FAN:	
PVC PIPING:	
SAFETY BOLLARD:	
DIAGNOSTIC TESTING SUBSLAB DEPRESSURIZATION POINT:	SSD-0X 
PRESSURE MONITORING POINT:	PMP-0X 

# Northern Extent Analysis Area Keystone Corridor Groundwater Contamination Site Marion County, Indiana



NOTE:  
1. WALL THICKNESSES AND SOME INTERIOR  
DIMENSIONS ARE APPROXIMATE.

**(CP-017-03)**  
**Floor Plan and VIMS Layout**



LEGEND	
EXTRACTION NODE:	
ENCLOSED EXTRACTION NODE:	
VAPOR FAN:	
PVC PIPING:	
SAFETY BOLLARD:	
DIAGNOSTIC TESTING SUBSLAB DEPRESSURIZATION POINT:	
PRESSURE MONITORING POINT:	

Northern Extent Analysis Area  
Keystone Corridor Groundwater Contamination Site  
Marion County, Indiana



### **ATTACHMENT 3**

#### **FAN AND GAUGE MANUFACTURER SPECIFICATIONS, INSTRUCTIONS, AND WARRANTIES**

- A. RadonAway HS Series Fans
- B. FanTech RN Series Fans
- C. RadonAway GX5 Pro Series Fan
- D. RadonAway RP, GP, XY Pro Series Fans
- E. Dwyer Series 2000 Magnehelic Differential Pressure Gauges
- F. Dwyer Series 2-5000 Minihelic II Differential Pressure Gauge



# HS Series Installation & Operating Instructions



## 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!** Check voltage at the fan to ensure it corresponds with nameplate. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. [RadonAway.com/vapor-intrusion](http://RadonAway.com/vapor-intrusion)
3. **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.
4. **NOTICE!** There are no user serviceable parts located inside the fan unit.  
**Do NOT attempt to open.** Return unit to the factory for service.
5. 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.
6. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.
7. **WARNING!** Do not twist or torque fan inlet or outlet piping as leakage may result.
8. **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.
9. **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.



## HS Series Fan Installation & Operating Instructions

### High Suction Series

HS2000 p/n 23004-1  
HS3000 p/n 23004-2  
HS5000 p/n 23004-3  
HS2000E p/n 23004-4  
HS3000E p/n 23004-5  
HS5000E p/n 23004-6

## 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 always greater than 32°F or less than 100°F. The HS Series Fan is thermally protected such that it will shut off when the internal temperature is above 194°F +/- 9°F (90°C +/- 5°C). 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°F.

### 1.3 ACOUSTICS

The HS Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. Recommended system design and installation considerations to minimize noise: When installing the HS Series Fan above sleeping areas, select a location for mounting at the farthest possible distance. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Ensure 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, power down and disconnect the HS Series Fan until the water recedes allowing for return to normal operation; then reconnect and power on to turn the fan back on.

### 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 Diameter	Minimum Rise per 1 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:

HS2000 12 - 63 CFM  
 HS3000 19 - 39 CFM  
 HS5000 16 - 44 CFM

All exhaust piping should be 2" PVC.

## 1.6 SYSTEM MONITOR & 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

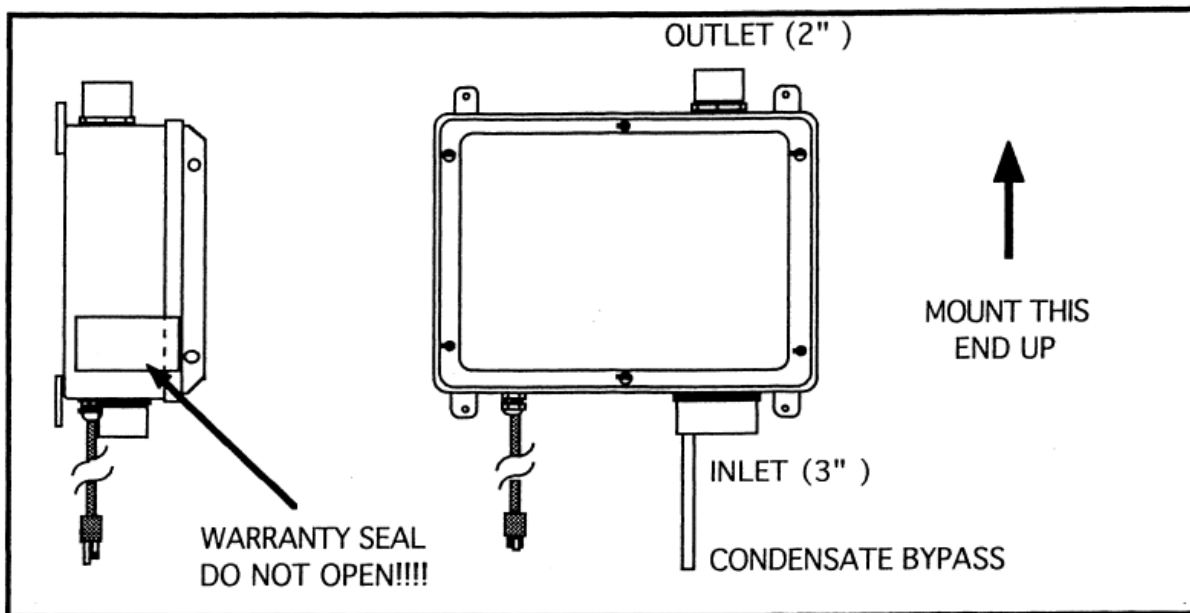
The HS Series Fan can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size; larger as needed) be created below the slab at each suction hole. When fine sand or dirt is present it is recommended that the pit be lined with a material such as clean gravel, size 4, 5, 56, or 6 as classified (ASTM C33).

## 1.8 ELECTRICAL WIRING

For models with a cord, the HS Series Fan plugs into a standard 120V outlet. The switch box models are hardwired. 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 UL 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). Ensure the HS Series Fan is both plumb and level.

### 2.2 DUCTING CONNECTIONS

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

NOTE: Do NOT solvent weld fittings to unit hubs.

### 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.

### 2.4 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

\_\_\_\_\_ **Verify** all connections are tight and **leak-free**.

\_\_\_\_\_ **Ensure** the HS Series Fan and all ducting is secure and vibration-free.

\_\_\_\_\_ **Verify** system vacuum pressure with Magnehelic. **Ensure** vacuum pressure is within normal operating range and **less than** the maximum recommended as shown below:

HS2000 14" WC

HS3000 21" WC

HS5000 35" 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 and applicable testing standards.

**Product Specifications**

Model	Maximum Static Suction	Recommended Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115VAC
			0"	10"	15"	20"	25"	35"	
HS2000	16"	14"	62	40	23	-	-	-	153-314
HS3000	24"	21"	39	30	25	19	-	-	120-250
HS5000	41"	35"	43	35	32	28	24	18	349-381
HS2000E	16"	14"	62	40	23	-	-	-	153-314
HS3000E	24"	21"	39	30	25	19	-	-	120-250
HS5000E	41"	35"	43	35	32	28	24	18	349-381

*\*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°F-100°F

**Thermal Cutout:** 194°F +/- 9°F (90°C +/- 5°C)

**Locked rotor protection**

**Internal condensate bypass**

## IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® 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.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** 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

RadonAway® warrants that the HS 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 repair or 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®.

### 1 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION

RadonAway® will extend the Warranty Term of the fan to twelve (12) months from date of installation or fifteen (15) 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. Proof of purchase and/or proof of professional installation may be required for service under this warranty. RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

**EXCEPT AS STATED ABOVE, THE HS SERIES FAN IS 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 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. \_\_\_\_\_

Purchase Date: \_\_\_\_\_



# Installation and Operation Manual Manuel d'installation et d'opération

Item #: 484840  
Rev Date: 2019-07-11

## Rn Series • Série Rn

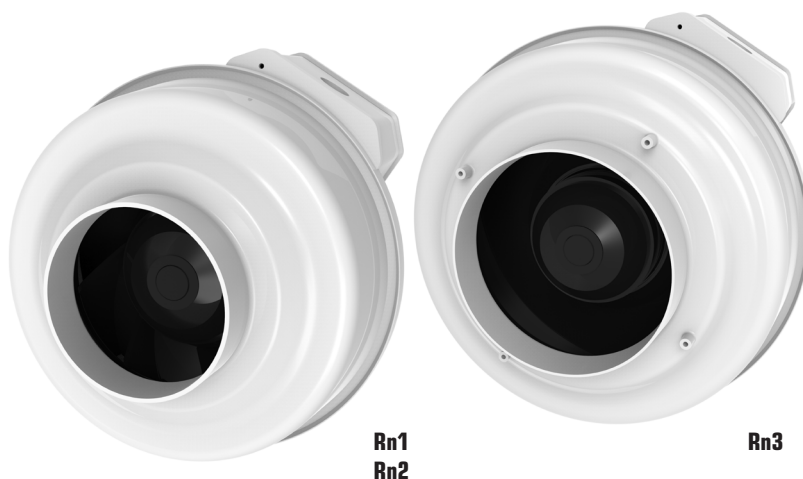
Inline Radon Fans • Ventilateur pour radon en ligne

### THIS BOX INCLUDES:

Inline Radon Fan Rn, 1 pc  
Operation and Installation Manual, 1 pc

### CETTE BOÎTE COMPREND:

Ventilateur pour radon en ligne Rn, 1 pc  
Manuel d'installation, 1 pc

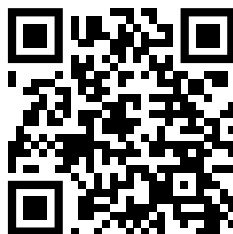


Rn1  
Rn2

Rn3

REGISTER\* THIS PRODUCT TO  
INCREASE YOUR PRODUCT  
WARRANTY BY AN EXTRA YEAR

[registration.fantech.app](https://registration.fantech.app)



\* in USA only

### Technical / Customer Support:






Support technique et service à la clientèle

United States / États-Unis Tel.: 800.747.1762

Canada Tel.: 800.565.3548



**fantech**<sup>®</sup>  
a systemair company

				
Note	Warning / Important note	Information	Technical information	Practical tip



**DO NOT CONNECT POWER SUPPLY until fan is completely installed.**  
**Make sure electrical service to the fan is in the locked "OFF" position.**

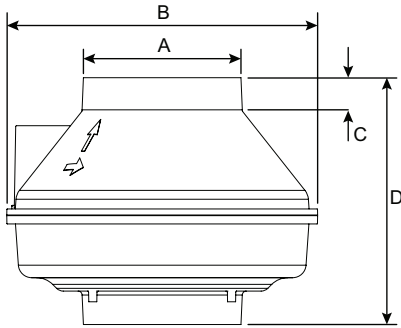
1. These fans have rotating parts and safety precaution should be exercised during installation, operation and maintenance.
2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
  - a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.
  - b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the 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. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.
  - e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.
  - f. Ducted fans must always be vented to the outdoors.
3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.
4. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.
5. Do not use these fans with any solid state speed control device.

**GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.**



The ducting from this fan to the outside of the building has a strong effect on the air flow, 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 air flow.

# DIMENSIONS



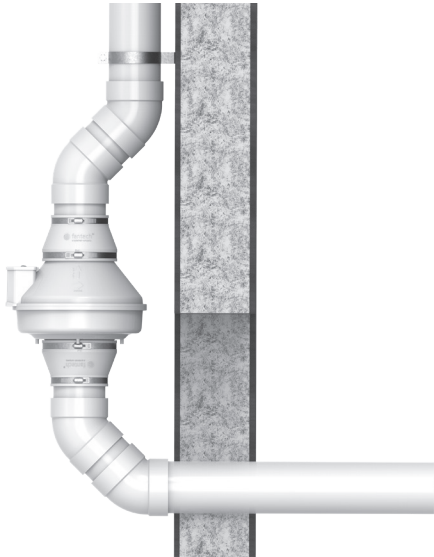
Model/Modèle	A	B	C	D
Rn1	4 15/32 (114)	10 (254)	1 1/4 (32)	9 1/4 (235)
Rn2	4 15/32 (114)	10 (254)	1 1/4 (32)	9 1/4 (235)
Rn3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)

Dimensions in inches (mm).  
Dimensions en pouces (mm)

# INSTALLATION

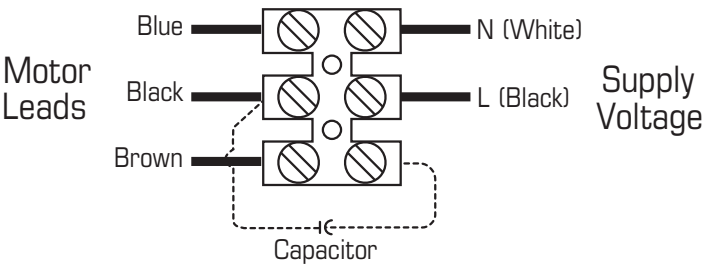
The Rn1, Rn2, and Rn3 are designed for use with 3" and 4" schedule 40 PVC pipe, when appropriate LDVT™ coupling is used.

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.



DO NOT connect fan directly to building structure

# WIRING DIAGRAM



There are typically three wires to be connected to an electrical fan; Load, Neutral and Ground. Load provides power to the fan, Neutral is for returning current and closing the electrical circuit, and Ground is for an additional path to safely return current to the ground, in case of an accidental electrical short in the fan and/or discharging of fan metal components.

Fantech radon fans are permanently connected appliances employing a reinforced polymeric construction. The non-conductive construction functions as a "Double Insulated" protective System (Complies with Standard for Double Insulation Systems for Use in Electrical Equipment, UL 1097), thus eliminating the need for a grounding conductor. All Fantech radon fans are tested and reviewed by Underwriter Laboratories, a 3rd party independent safety governing body, and deemed suitable for outdoor use (Standard for Safety-Electric Fans, UL 507).

Please contact Fantech Technical Support if additional information is needed regarding this matter.

	Voltage	Max Amp	Max Watts	Phase	RPM	CFM/Watts	Energy Star	CFM @ Static Pressure						Max
								0.00	0.20	0.50	1.00	1.50	2.00	
Rn1	120	0.17	19.7	1	3100	7.30	Yes	160	130	80	-	-	-	0.89
Rn2	120	0.48	58.0	1	2700	2.59	No	160	150	120	80	40	-	1.97
Rn3	120	1.20	141.2	1	2700	2.42	No	370	340	280	180	120	50	2.36

# WARRANTY

## Five (5) Year Warranty

**This warranty supersedes all prior warranties**

### **DURING ENTIRE WARRANTY PERIOD:**

Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

### **FOR FACTORY RETURN YOU MUST:**

- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

### **OR**

The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE

END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

### **THE FOLLOWING WARRANTIES DO NOT APPLY:**

- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
  1. Improper maintenance
  2. Misuse, abuse, abnormal use, or accident, and
  3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

### **WARRANTY VALIDATION**

- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

## Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged

negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

## Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a

life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Fantech reserves the right to make technical changes.  
For updated documentation please refer to [www.fantech.net](http://www.fantech.net)

Fantech se réserve le droit de faire des changements techniques. Pour de la documentation à jour, s'il vous plaît se référer au [www.fantech.net](http://www.fantech.net)

Fantech®



# GX5 Pro Series Fan Installation Instructions



**Fan Installation & Operating Instructions**  
**GX5 Pro Series Fan**  
*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!** 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](http://RadonAway.com/vapor-intrusion)
2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.
2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
3. **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.
4. **NOTICE!** There are no user serviceable parts located inside the fan unit.  
**Do NOT attempt to open.** Return unit to the factory. (See Warranty, p. 7, for details.)
5. **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.
6. **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. (See p. 7.)
  - 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 backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating 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.



## 1.0 SYSTEM DESIGN CONSIDERATIONS

### 1.1 INTRODUCTION

The GX5 Pro Series Radon Fan is intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of GX Pro Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

### 1.2 FAN SEALING

The GX5 Pro Series Fan is factory sealed; no additional caulk or other materials are required to inhibit air leakage.

### 1.3 ENVIRONMENTALS

The GX5 Pro 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 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 GX5 Pro Series Fan, when installed properly, operate 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 inline 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(s). The GX5 Pro Series Fan is 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 GX5 Pro 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. 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 GX5 Pro 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 Radon Fan best suited for the sub-slab material can improve the slab coverage. The GX5 Fan is best suited for tighter soils where higher suction is needed. Consider using the RP260 where additional airflow is required, and the RP265 and RP380 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 GX5 Pro 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 GX5 Pro Series Fan is NOT suitable for underground burial.

For GX5 Pro Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Diameter	Minimum Rise per Ft of Run*		
	@25 CFM	@50 CFM	@100 CFM
4"	1/8"	1/4"	3/8"
3"	1/4"	3/8"	1 1/2"

RISE

RUN

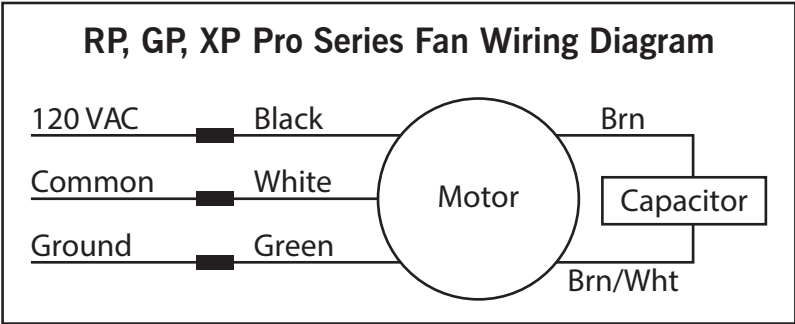
See p. 6 for detailed specifications.

1.8 SYSTEM MONITOR & LABEL

A System Monitor is required to notify the occupants of a fan system malfunction. The GX5 Fan requires a U-tube Manometer >5.5" max. (such as P/N 50036). You may choose to also use an audible alarm (P/N 28001-2, 28001-4, 28421 or 28535). A System Label (provided with Manometers P/N 50036 and 50017) with instructions for contacting the installing contractor for service and identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

1.9 ELECTRICAL WIRING

The GX5 Pro Series Fan operates on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (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 UL 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.



## 2.0 INSTALLATION

The GX5 Pro Series Fan can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GX5 Fan may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.

The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. 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.

### 2.1 MOUNTING

Mount the GX5 Pro Series Fan vertically with outlet up. Ensure 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 GX5 Pro Series Fan may be optionally secured with the RadonAway P/N 25007 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 a means of disconnect for servicing the unit and for vibration isolation. As 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.

### 2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

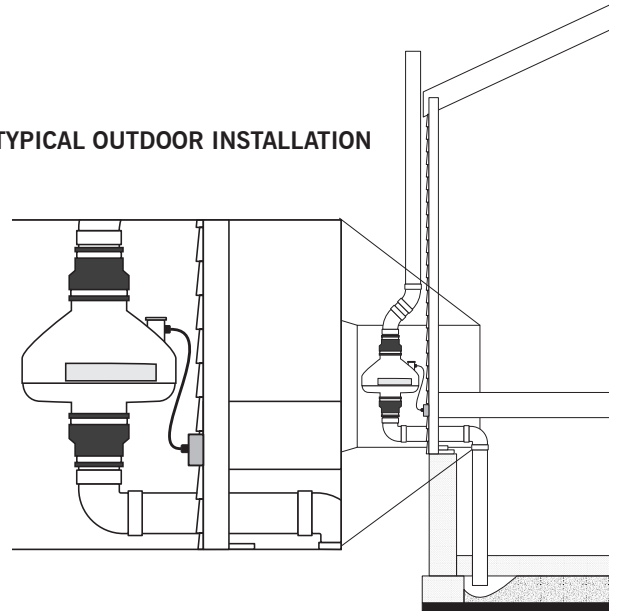
### 2.5 VENT MUFFLER (optional)

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.

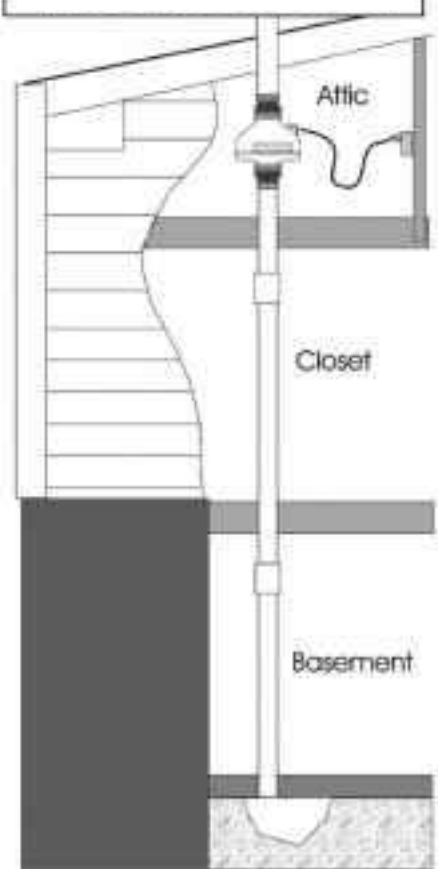
### 2.6 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

- \_\_\_\_\_ **Verify** all connections are tight and **leak-free**.
- \_\_\_\_\_ **Ensure** the GX5 Pro Series Fan and all ducting are **secure and vibration-free**.
- \_\_\_\_\_ **Verify system vacuum pressure** with manometer. **Ensure** 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 and applicable testing standards.

TYPICAL OUTDOOR INSTALLATION



TYPICAL INDOOR INSTALLATION



## THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE GX5 PRO SERIES FAN

### GX5 PRO SERIES FAN Product Specifications

Typical CFM Vs. Static Pressure "WC						
Model	0"	1.0"	2.0"	3.0"	4.0"	5.0"
GX5	174	150	121	87	50	8

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
GX5	77-133 watts	5.00" WC

\*Reduce by 10% for High Temperature Operation \*\*Reduce by 4% per 1000 ft. of altitude.

Model	Size	Weight	Inlet/Outlet	L.2
GX5	11.1"H x 11.9" Dia.	9 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)	25

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

### GX5 Pro Series Fan Additional Specifications

Model	Recommended Duct	PVC Pipe Mounting	Thermal Cutout	Insulation Class
GX5	3" or 4" Schedule 20/40 PVC	Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4", 6" or 8" Rigid or Flexible Ducting.	150°C/302°F	Class F Insulation

Continuous Duty  
3000 RPM  
Thermally Protected  
Residential and Commercial  
Rated for Indoor or Outdoor Use

LISTED  
Electric Fan



Conforms to  
UL STD. 507  
Certified to  
CAN/CSA STD.  
C22.2 No.113

## IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® GX5 Pro 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 the housing.** Return unit to factory. (See Warranty below).

Install the GX Pro Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and 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 GX5 Pro Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the "Warranty Term").

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. 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®.

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.

#### 5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner.

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

#### LIMITATION OF WARRANTY

**EXCEPT AS STATED ABOVE, THE GX5 PRO SERIES FAN IS 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.**

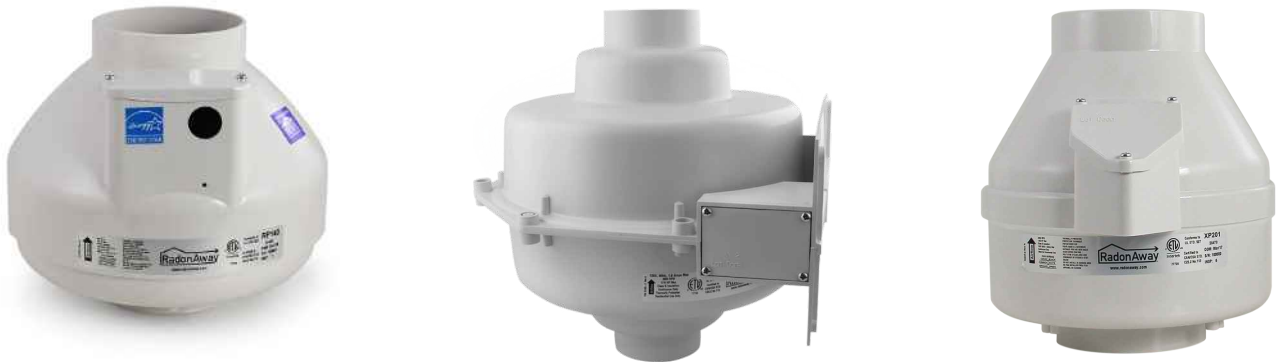
For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping costs, including insurance, to and from factory.

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 Number: 1521(for CP-018 North)

Purchase Date: March 2020



# RP, GP, XP Pro Series Installation Instructions



**Fan Installation & Operating Instructions**  
**RP, GP, XP Series Fans**  
***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!** 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](http://RadonAway.com/vapor-intrusion)
2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.
2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
3. **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.
4. **NOTICE!** There are no user serviceable parts located inside the fan unit.  
**Do NOT attempt to open.** Return unit to the factory. (See Warranty, p. 8, for details.)
5. **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.
6. **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. (See p. 8.)
  - 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 backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating 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.



## Fan Installation & Operating Instructions

RP Series		GP Series		XP Series	
RP140	P/N 28460	GP201	P/N 28465	XP151	P/N 28469
RP145	P/N 28461	GP301	P/N 28466	XP201	P/N 28470
RP260	P/N 28462	GP401	P/N 28467		
RP265	P/N 28463	GP501	P/N 28468		
RP380	P/N 28464				

## 1.0 SYSTEM DESIGN CONSIDERATIONS

### 1.1 INTRODUCTION

The RP, GP and XP Series Radon Fans are intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of RP, GP and XP Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

### 1.2 FAN SEALING

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

### 1.3 ENVIRONMENTALS

The RP, GP and XP 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, GP and XP Series Fans, when installed properly, operate 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 inline 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(s). RP, GP and XP 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, GP and XP 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. 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, GP and XP Series Fans 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, GP and XP Series Fan best suited for the sub-slab material can improve the slab coverage. The RP, GP and XP Series have a wide range of models to choose from to cover a wide range of sub-slab materials. The RP140 and 145 are best suited for general purpose use. The RP 260 can be used where additional airflow is required, and the RP265 and RP 380 are 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, GP and XP 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, GP and XP Series Fans are NOT suitable for underground burial.

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

Pipe Diameter	Minimum Rise per Ft of Run*		
	@25 CFM	@50 CFM	@100 CFM
4"	1/8"	1/4"	3/8"
3"	1/4"	3/8"	1 1/2"

RISE

RUN

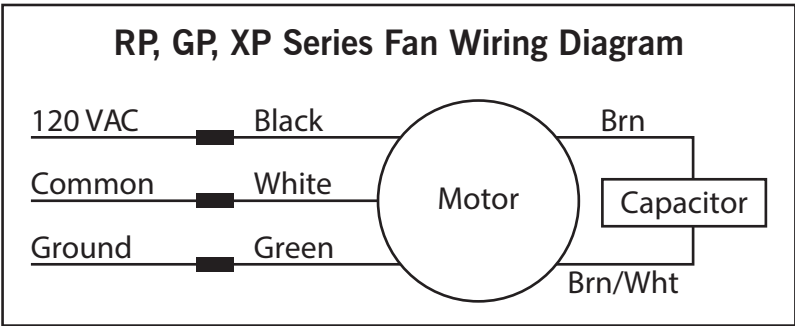
See p. 7 for detailed specifications.

1.8 SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2, 28001-4 or 28421), 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 identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

1.9 ELECTRICAL WIRING

The RP, GP and XP Series Fans operate on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (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 UL 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.



1.10 SPEED CONTROLS

The RP, GP and XP Series Fans are rated for use with electronic speed controls; however, speed controls are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control (Cat. No. 94601-1).

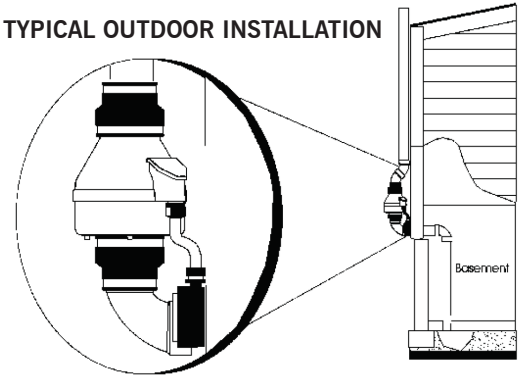


## 2.0 INSTALLATION

The RP, GP and XP Series Fans can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GP fans have an integrated mounting bracket; RP and XP Series Fans may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.

The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. 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.

TYPICAL OUTDOOR INSTALLATION



### 2.1 MOUNTING

Mount the RP, GP and XP 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 and XP Series Fans may be optionally secured with the RadonAway P/N 25007 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 a means of disconnect for servicing the unit and for vibration isolation. As 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.

### 2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

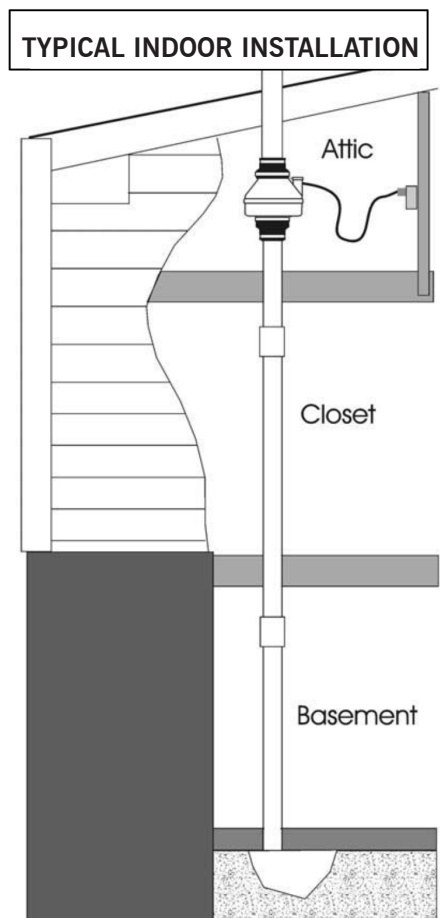
### 2.5 VENT MUFLER (optional)

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**.
- \_\_\_\_\_ **Ensure** the RP, GP and XP Series Fan and all ducting are **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 and applicable testing standards.

TYPICAL INDOOR INSTALLATION



## THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE RP, GP and XP SERIES FANS

### RP Series Product Specifications

Typical CFM Vs. Static Pressure "WC									
Model	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	251	209	157	117	70	26	-	-	-
RP265	375	330	282	238	204	170	140	108	70
RP380	531	490	415	340	268	200	139	84	41

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
RP140	15 - 21 watts	0.7" WC
RP145	41 - 72 watts	1.7" WC
RP260	47-65 watts	1.3" WC
RP265	95 - 139 watts	2.3" WC
RP380	96 - 138 watts	2.0" WC

\*Reduce by 10% for High Temperature Operation \*\*Reduce by 4% per 1000 ft. of altitude.

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

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

### XP Series Product Specifications

Typical CFM Vs. Static Pressure "WC						
	0"	.5"	1.0"	1.5"	1.75"	2.0"
XP151	150	115	69	-	-	-
XP201	112	95	70	40	-	-

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
XP151	45 - 60 watts	1.3" WC
XP201	45 - 66 watts	1.7" WC

\*Reduce by 10% for High Temperature Operation \*\*Reduce by 4% per 1000 ft. of altitude.

Model	Size	Weight	Inlet/Outlet
XP151	9.5"H x 8.5" Dia.	6 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)
XP201	9.5"H x 8.5" Dia.	6 lbs	4.5" OD

## GP Series Product Specifications

Typical CFM Vs. Static Pressure "WC							
	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP201	54	42	11	-	-	-	-
GP301	64	54	41	4	-	-	-
GP401	-	61	52	44	22	-	-
GP501	-	-	66	58	50	27	4

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
GP201	31-65 watts	1.8" WC
GP301	56-100 watts	2.3" WC
GP401	62-128 watts	3.0" WC
GP501	68 - 146 watts	3.8" WC

*\*Reduce by 10% for High Temperature Operation \*\*Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
GP201	13"H x 12.5" Dia.	12 lbs	3.5"OD (3.0" PVC Sched 40 size compatible)
GP301	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP401	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP501	13"H x 12.5" Dia.	12 lbs	3.5" OD

## RP, XP and GP Series Additional Specifications

Model	Recommended Duct	PVC Pipe Mounting	Thermal Cutout	Insulation Class
RP140	3" or 4" Schedule 20/40 PVC	Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4", 6" or 8" Rigid or Flexible Ducting.	130°C/266°F	Class B Insulation
RP145			130°C/266°F	Class F Insulation
RP260			150°C/302°F	
RP265			150°C/302°F	
RP380	6" Schedule 20/40 PVC Pipe		150°C/302°F	
XP151	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
XP201				
GP201	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
GP301				
GP401				
GP501				

**Continuous Duty**  
**3000 RPM**  
**Thermally Protected**  
**RP, GP Residential and Commercial**  
**XP Residential Only**  
**Rated for Indoor or Outdoor Use**

LISTED  
Electric Fan



Conforms to  
UL STD. 507  
 Certified to  
CAN/CSA STD.  
C22.2 No.113

## IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® RP, GP and XP 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 the housing.** Return unit to factory. (See Warranty below).

Install the RP, GP and XP Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and 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 RP, GP (excluding GP500) and XP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the "Warranty Term").

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. 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®.

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.

#### 5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner.

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

#### LIMITATION OF WARRANTY

**EXCEPT AS STATED ABOVE, THE RP, GP (excluding GP500) and XP 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 Number: \_\_\_\_\_

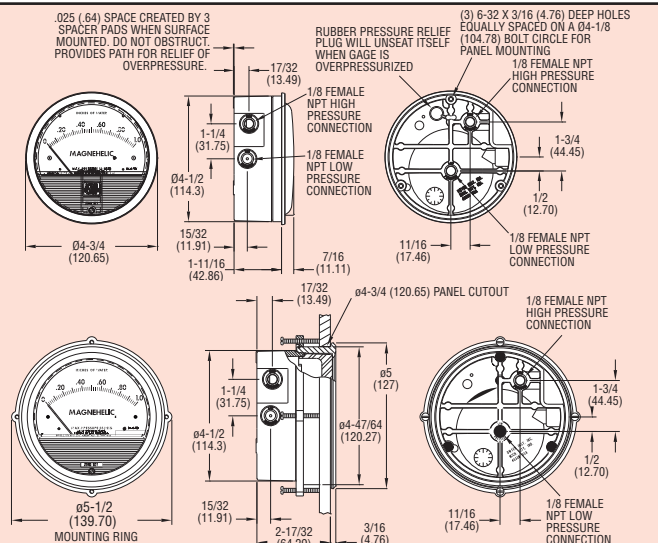
Purchase Date: \_\_\_\_\_



Series  
2000

# Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%



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.

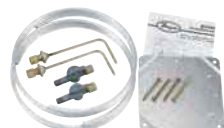
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

## 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, standhanger 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.

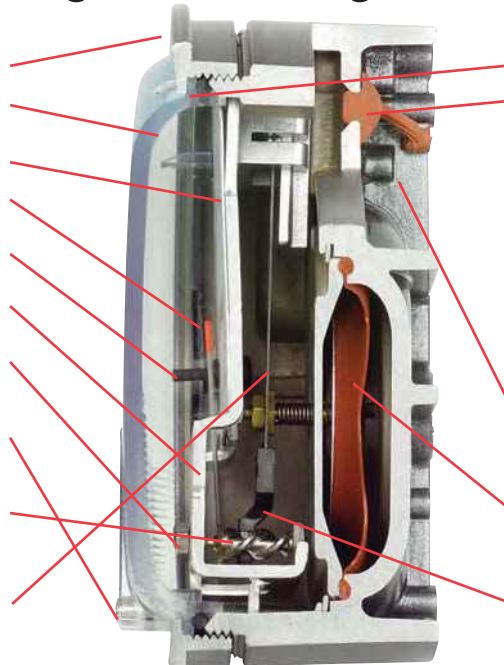
**"Wishbone" assembly** provides mounting for helix, helix bearings and pointer shaft.

**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	Model	Range PSI	Model	Range MM of Water	Model	Range, kPa	Dual Scale Air Velocity Units For use with pitot tube	
								Model	Range in W.C./ Velocity F.P.M.
2000-00N†	0.05-0.2	2201	0-1	2000-6MM†	0-6	2000-0.5KPA	0-0.5	2000-00AV†	0-.25/300-2000
2000-00†	0-.25	2202	0-2	2000-10MM†	0-10	2000-1KPA	0-1		
2000-0†	0-50	2203	0-3	2000-15MM	0-15	2000-1.5KPA	0-1.5		
2001	0-1.0	2204	0-4	2000-25MM	0-25	2000-2KPA	0-2		
2002	0-2.0	2205	0-5	2000-30MM	0-30	2000-2.5KPA	0-2.5		
2003	0-3.0	2210*	0-10	2000-50MM	0-50	2000-3KPA	0-3		
2004	0-4.0	2215*	0-15	2000-80MM	0-80	2000-4KPA	0-4		
2005	0-5.0	2220*	0-20	2000-100MM	0-100	2000-5KPA	0-5		
2006	0-6.0	2230**	0-30	2000-125MM	0-125	2000-8KPA	0-8		
2008	0-8.0			2000-150MM	0-150	2000-10KPA	0-10		
2010	0-10			2000-200MM	0-200	2000-15KPA	0-15	2001AV	0-1.0/500-4000
2012	0-12			2000-250MM	0-250	2000-20KPA	0-20	2002AV	0-2.0/1000-5600
2015	0-15			2000-300MM	0-300	2000-25KPA	0-25	2005AV	0-5.0/2000-8800
2020	0-20					2000-30KPA	0-30	2010AV	0-10/2000-12500
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		Zero Center Ranges		Zero Center Ranges		Zero Center Ranges		Zero Center Ranges	
2300-00†	0.125-0-0.125	2300-4CM	2-0-2	2300-6MM†	3-0-3	2300-1KPA	0.5-0.5	Dual Scale English/Metric Models	
2300-0†	.25-0-.25	2300-10CM	5-0-5	2300-10MM†	5-0-5	2300-2KPA	1-0-1	Model	Range, Pa or kPa
2301	.5-0-.5	2300-30CM	15-0-15	2300-20MM†	10-0-10	2300-2.5KPA	1.25-0-1.25	2000-00D†	0-.25
2302	1-0-1					2300-3KPA	1.5-0-1.5	2000-0D†	0-0.5
2304	2-0-2							2001D	0-1.0
2310	5-0-5							2002D	0-2.0
2320	10-0-10							2003D	0-3.0
2330	15-0-15							2004D	0-4.0
								2005D	0-5.0
								2006D	0-6.0
								2008D	0-8.0
								2010D	0-10
								2015D	0-15
								2020D	0-20
								2025D	0-25
								2050D	0-50
								2060D	0-60

## VELOCITY AND VOLUMETRIC FLOW UNITS

Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m³/s, m³/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



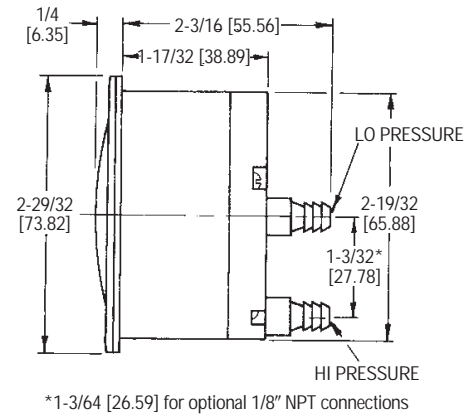
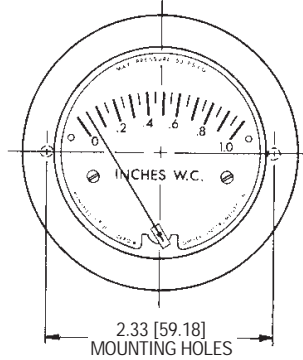
## A-310A 3-Way Vent Valves

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.



## Series 2-5000 Minihelic® II Differential Pressure Gage

Specifications: Installation & Operating Instructions



Dimensions, Series 2-5000 Minihelic® II Gage.

**Series 2-5000 Minihelic® II Differential Pressure Gages** have clean design, small size, low cost and sufficient accuracy for all but the most demanding applications. With housing molded from mineral- and glass-filled nylon and a lens molded from polycarbonate, this gage will withstand rough use and exposure, as well as high total pressure up to 30 psig [2.067 bar]. Over-pressure is accommodated by a blow-out membrane molded in conjunction with the diaphragm.

### INSTALLATION

1. Select a location free from excessive vibration and where ambient temperature will be between 20°F to 120°F (-6.7°C to 49°C). Sensing lines may be any length necessary without affecting accuracy. However, long runs of tubing will dampen readings slightly and cause a minor increase in response time. If pulsing pressure or vibration cause excessive pointer oscillation, please contact factory for ways to provide additional damping.

2. This gage is calibrated and zeroed in the vertical position at the factory. If the gage is used in any other position, it must be re-zeroed each time the position is changed. Gages with ranges under 5 inches w.c. (1.24 kPa), or the equivalent, should be used only in the vertical position unless special calibration was specified when ordering.

### SPECIFICATIONS

**Dimensions:** 2-29/32" (73.82 mm) x 2- 7/16" (61.93 mm).

**Weight:** 6 oz. [170 gr].

**Rated Total Pressure:** 50 psig (3.445 bar) surge; 30 psig (2.067 bar) continuous to either pressure connection.

**Ambient Temperature Range:** 20°F to 120°F (- 6.7°C to 49°C).

**Accuracy:** ± 5% of full scale at 70°F (21.1°C).

**Connections:** standard, barbed for 3/16" I.D. tubing; optional, 1/8" NPT(M).

**Housing:** glass-filled nylon, polycarbonate lens.

**Finish:** black

**Standard Accessories:** (2) 4-40 x 1-5/8" mounting studs, (2) 4-40 hex nuts, (1) .050" hex allen wrench, (1) panel mounting bracket.

### CAUTION:

Use only with air or compatible non-corrosive gases.

**PANEL MOUNTED INSTALLATION**

3. To surface-mount the gage, drill two 5/32" [3.97 mm] holes on a horizontal line, 2-1/3" [59.26 mm] apart for mounting screws. Next, drill two 7/16" [11.11 mm] holes 1-1/32" [26.19 mm] apart on a vertical line for pressure connections. Install mounting studs in back of the gage, insert through holes in the panel, and secure with hex nuts provided. Be careful not to block the slotted hole near the right-hand mounting hole. This provides a path for pressure relief in the event of over-pressurization.

4. To panel-mount gage, cut a 2-5/8" diameter hole. Install the mounting studs in the back of gage, position gage in the panel, and place bracket over the studs. Thread hex nuts over studs and tighten.

5. After installation, the gage may need to be zeroed before placing in operation. If re-zeroing is required, firmly hold the case of gage with one hand and unscrew the front cover with the palm of the other hand in a counterclockwise direction. If difficult to loosen, place a small sheet of rubber between the cover and the palm of the hand. Zero-adjust screw is located behind the scale at the pair marked

"zero." Use the hex allen wrench supplied and adjust until pointer is on zero. This must be done with both pressure connections vented to atmosphere and the gage oriented in the final mounting position. Replace cover.

6. To measure positive pressure, connect tubing to port marked "HI" and vent "LO" port to atmosphere. For negative pressure (vacuum), connect to port marked "LO" and vent "HI" port to atmosphere. For differential pressure, connect higher pressure to port marked "HI" and lower to "LO" port. If gage is supplied with 1/8" NPT connections, be careful not to over-tighten fittings to avoid damage to the gage.

**CALIBRATION CHECK**

Select a second gage or manometer of known accuracy and in an appropriate range. Use short lengths of rubber or vinyl tubing to connect the high-pressure side of the Miniheric® II gage and the test gage to two legs of a tee. Very slowly, apply pressure through the third leg. Allow enough time for pressure to equalize throughout the system and for fluid to drain, if a manometer is being used. Compare readings. If the gage being tested exceeds rated accuracy, it should be returned to the factory for recalibration.

**MAINTENANCE**

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally, disconnect pressure lines to vent both sides of the gage to atmosphere and re-zero per paragraph 5.



**ATTACHMENT 4**

**VAPOR INTRUSION MITIGATION SYSTEM O&M INSPECTION FORM**

## VAPOR INTRUSION MITIGATION SYSTEM O&M INSPECTION FORM

Property Address: \_\_\_\_\_ Temperature (ambient): \_\_\_\_\_ ° F  
Tenant's Name: \_\_\_\_\_ Temperature (building): \_\_\_\_\_ ° F  
Owner's Name: \_\_\_\_\_ Barometric pressure: \_\_\_\_\_ " H g  
Owner's Address (if different from property): \_\_\_\_\_ Weather conditions: \_\_\_\_\_  
Inspector Name: \_\_\_\_\_  
Date: \_\_\_\_\_  
Time: \_\_\_\_\_

### Exterior System Inspection

Is fan intact and operational? ☐ Yes ☐ No  
Any unusual fan vibrations? ☐ Yes ☐ No  
Is vent piping/downspout intact? ☐ Yes ☐ No  
Any caulking required around fan and piping connections? ☐ Yes ☐ No

### Interior System Inspection

Any heaving or subsidence at suction point? ☐ Yes ☐ No  
Any whistling noise noted? ☐ Yes ☐ No  
Caulk seals inspected? ☐ Yes ☐ No  
Is alarm on and operational? ☐ Yes ☐ No

### Owner/Tenant Observations

Any change in fan noise or vibration? ☐ Yes ☐ No  
Any lack of differential pressure in the manometer? ☐ Yes ☐ No  
Has the fan been turned off for any period of time? ☐ Yes ☐ No  
Have there been any changes to the basement? ☐ Yes ☐ No

Reason \_\_\_\_\_

If so, what? \_\_\_\_\_

### Measurements

System manometer reading \_\_\_\_\_ "H<sub>2</sub>O

Initial system manometer reading \_\_\_\_\_ "H<sub>2</sub>O

Date of initial reading \_\_\_\_\_

Is the system manometer steady? ☐ Yes ☐ No

Complete the following:

- ☐ Visual inspection of all visible components of the vapor intrusion mitigation system, inside and outside, including fans, piping, piping discharge points, seals, membranes and collection points, to ensure there are no signs of degradation or blockage. A crawl space membrane, or vapor barrier, for example, may warrant repair or replacement if its integrity is compromised.
- ☐ Compare on-site system to as-built drawing for the vapor intrusion mitigation system to verify the system configuration has not been modified.
- ☐ Visual inspection of the building to evaluate whether any significant changes were made (such as remodeled basement, new furnace, heating/cooling system altered such that it affects air distribution or pressure, extensive changes in building weatherization) that would affect the design of the vapor intrusion mitigation system or the general environment in which it is operated.
- ☐ Visual inspection of the area of concern (including basement floor and wall seals, floors generally, sumps, floor drains and utility penetrations, groundwater or slab surface water management systems added or altered) to ensure there are no significant changes in conditions that would warrant modification of the system design. Look for any sizable openings to soil in floor surface, potentially caused by settling, Integrity of lower level floors is critical to preventing vapor migration into structures.

- ☐ Compare current vacuum readings for vapor intrusion mitigation system to prior readings.
  - Ensure manometers are still in place and filled. Ensure manometer reads at least 1 inch of water
- ☐ Evaluate pressure readings for both active and passive depressurization systems as well as positive pressurization systems (e.g., periodic verification of measurable pressure differences across the slab).
- ☐ Confirm that the extraction fan is operating. Feel the piping to ensure air is flowing through.
  - Inspection of the fan(s) is important throughout the operating period but may be particularly important near the end of its expected lifespan. Noisy fans typically indicate problems with ball bearings and warrant replacement on that basis.
  - Vapor intrusion mitigation system fans generally can function well for prolonged periods without maintenance; however, EPA recommends fans be replaced periodically throughout the operating life of the system (e.g., every 4 to 10 years) to avoid breakdowns and associated problems.
- ☐ Monitor vent risers for flow rates and pressures generated by the fan to confirm the system is working and moisture is draining correctly.
- ☐ Complete routine maintenance, calibration and testing of functioning components of the venting system consistent with the manufacturers' specifications.  
 Calibration results: \_\_\_\_\_ Other measurements/notes: \_\_\_\_\_
- ☐ Inspect external electrical components to identify undesirable conditions, such as excessive noise, vibration, moisture, or corrosion, and to verify that the fan cut-off switch is operable.
- ☐ Confirm adequate operation of the warning device or indicator (alarm), and presence of system labels.
- ☐ Confirm that building owner/occupants are knowledgeable about how to maintain system operation, whether they have made any alterations or repairs to the system and that they have been operating the system, if applicable.
- ☐ Discuss any questions or concerns about system operation with the building owner/occupants.
- ☐ Confirm that a copy of the O&M manual is present in the building and has been updated as necessary.
- ☐ Determine whether there has been any change in ownership/occupant. If such a change has occurred, EPA recommends the site manager brief the new owner/occupant on the building mitigation systems.

Comments (any repairs made while visiting, etc):