



VAPOR INTRUSION MITIGATION SYSTEM POST-INSTALLATION VERIFICATION CHECKLIST

The purpose of this checklist is to provide the user with a selection of tools to verify that the appropriate system components for the vapor intrusion mitigation system (VIMS) were installed and the system is operating as designed. This information applies to the four most common active mitigation systems (SSD, SSV, SMD, and CSV) and passive systems that are described in the associated Fact Sheets and Technology Information Sheets. The user of this checklist should review the VIMS design or as-built documentation prior to completing this checklist.

This document was prepared in consideration of multiple types of VIMS. Not all the information presented below is necessary to document system operation for all types of systems on all types of buildings. The user should be able to identify which criteria below best represent effective operation for their specific mitigation system and which criteria will validate the conceptual site model for the VIMS that was implemented. Timing on when to collect post-installation verification data may vary and more than one event may be reasonable. See the *Post-Installation Verification Fact Sheet* for additional information on timing a post-installation verification site visit.

Instructions for Use: Major system components are grouped below for this checklist, and one or more of these groups may not apply to a particular VIMS design. Those groups can be marked as Not Applicable by selecting the ‘X’ box to the right of the group.

Design elements within these groups that **will** apply should be selected by checking the appropriate box included for this checklist as:

Yes—the design element was considered and documented

No—this item was not considered and may be relevant to the overall system performance, applicable guidance, and/or best practices

NA—not applicable to the system design or operation

This checklist is intended to serve as a guide for design considerations and as documentation for VIMS installation. This list can be modified for a specific project or program if needed or can be used as shown. The list should be submitted along with the final project as-builts and/or installation oversight verification documentation and reporting.

1. SITE INFORMATION

Address inspected: _____

Date of inspection: _____

Inspector(s): _____

Inspector’s company name: _____

Building contact: _____

Building contact phone number: _____

Note: As-built drawings & performance criteria are needed when conducting inspections of vapor intrusion mitigation systems.

2. BUILDING TYPE

Existing building

New construction

3. TYPE OF SYSTEM

Active

- Sub-slab depressurization (SSD)
- Sub-slab venting (SSV)
- Sub-membrane depressurization (SMD)
- Crawlspace ventilation (CSV)

Passive (Check all that apply)

- Epoxy floor coating (EFCs)
- Passive barrier system
- Passive sub-slab venting (PSSV)
- Aerated floors

4. SYSTEM DESIGN COMPONENTS AND INSTALLATION DOCUMENTATION

4.1. Site Conditions/Conceptual Site Model

- Contaminant concentrations at the site have been reviewed and compared to generic or building-specific screening levels. The level of applied effort (flow and vacuums) should be proportional to the magnitude of the concentrations. In large buildings, the VIMS target treatment area may not include the entire footprint, but should allow for adequate capture of vapors to mitigate the potential for unacceptable risk to the occupants of the building. Yes No NA
- Slab conditions should be verified/inspected for cracks/voids/utility penetrations/potential preferential pathways (if known/observed) and identified on a diagram, sealed to the extent practical, and visually inspected during post-installation verification event. Yes No NA

4.2. Extraction Point(s)

- Suction point location, diameter, and sealing are documented. Not applicable
- Pipe and manifold location, materials, diameter, slope, and sealing are documented. Yes No NA
- Sample port, shutoff valve, and access have been identified. Yes No NA
- U-tube manometer (or similar vacuum gauge) is installed and target vacuum level is clearly marked Yes No NA

4.3. Collection Piping

- As-built collection piping diagrams have been provided. Not applicable
- Riser pipe is located in an interior wall where possible and does not penetrate firewalls or shear walls. Yes No NA
- Fire collars are installed on pipes where firewalls are penetrated. Yes No NA
- Vent piping system was designed by a qualified individual with VIMS design experience. Yes No NA
- All vent stack piping is identified as solid, rigid pipe. Yes No NA
- All pipe joints and connections are permanently sealed. Yes No NA
- Foundation penetration sleeves are installed as approved by the structural engineer. Yes No NA
- All exhaust pipes are supported and secured in a permanent manner consistent with building codes. Yes No NA

- Horizontal piping runs are sloped to ensure that condensation drains into the ground beneath the slab. Yes No NA
- Vertical piping runs drain naturally or can be verified to be free of water or moisture. Yes No NA

4.4. Piping Completion Specifications

(Review the primary wind flow direction from nearby weather stations.)

- As-built collection piping diagrams have been provided. Yes No NA
- Pipes are completed with an exhaust stack and are an appropriate height above the roof. Yes No NA
- Point(s) of discharge are an appropriate distance away from any air intake location, opening (door, chimney flue, window, vent, etc.), or occupied spaces, including adjacent structures. Yes No NA
- To reduce the risk of vent stack blockage, confirm that the point of discharge from vent stack pipes is vertical and upward, outside the structure. Consider wire mesh to deter birds and small animals Yes No NA

4.5. Blower/Fan

- Blower/fan number, location, size, model number, and performance specifications are documented. Yes No NA
- Blower/fan is securely mounted with discharge locations far from building intake locations. Yes No NA
- Electrical components and wiring were installed by a licensed electrician in accordance with applicable building codes. Yes No NA
- Intrinsically safe or explosion-proof components installed where specified in the project plans. Yes No NA
- Diagnostic testing and results are documented and summarized to meet design criteria. Yes No NA
- Audible and/or visual low vacuum alarm is installed, tested, and separately powered (e.g., battery). Yes No NA
- Controller system (where present): model number, location, OM&M manual are documented. Yes No NA
- Telemetry system (where present): model number, location, OM&M manual are documented. Yes No NA

4.6. Monitoring Probes

- Sub-slab vapor probes, if needed, are installed in accordance with design (appropriate number and location(s)). Yes No NA
- Surface completion provides a seal to the subsurface and a leak check test was passed. Yes No NA
- Probes and surface completions are level to grade to minimize trip hazard. Yes No NA

4.7. Post-Installation Diagnostic Testing

- System flow and vacuum are documented in vent pipe(s) and data meet design criteria. Yes No NA

- Pressure field extension (PFE) testing is documented to meet design criteria across targeted areas. Yes No NA
- Additional diagnostics were performed as appropriate where data do not meet expectations. Yes No NA
- Effluent concentrations were measured and calculated discharge meets design criteria/permit limits, if needed. Yes No NA
- Nonsealed combustion appliances were checked for back drafting/CO₂ levels. Yes No NA

4.8. System Monitors and Labeling

- System labels are placed on the mitigation system, riser piping, electrical panel breaker and junction box, and other prominent locations, including the exterior venting locations. Not applicable Yes No NA
- Description of signage and locations is provided. Yes No NA
 - signage contains language indicating that the mitigation vent may contain volatile organic compounds Yes No NA
 - figure provided, if needed, identifying locations of signs Yes No NA
 - name and contact information for operator clearly visible with instructions to notify operator in the event of alarm conditions, damage to any system component, power failure, etc. Yes No NA
- Documentation states that a notice has or will be provided to tenants that will be occupying the structure. Yes No NA

4.9. System Design and Specification

- Mitigation system design has been reviewed by a vapor intrusion mitigation specialist, professional engineer, or professional with demonstrated mitigation design experience. Not applicable Yes No NA
- As-built project plans and specifications have been prepared and reviewed by the designer. Yes No NA
- Electrical one-line diagrams have been prepared and reviewed by a licensed electrician. Yes No NA
- Dewatering has been considered and, if necessary, incorporated into the design. Yes No NA
- Engineer or design firm is identified. Yes No NA
- Building/fire codes: Document states that mitigation systems is designed and installed to conform to applicable building and fire codes and to maintain the function and operation of existing equipment and building features, including doors, windows, access panels, etc. Yes No NA
- Permits: Documentation is provided that the system passed required permit inspections. Yes No NA

4.10. Sumps

- Floor drains are designed to allow water to flow into sumps while sealing out soil gases from entering the indoor air space from the sub-floor area (e.g., Drainjer-style drain). Not applicable Yes No NA

5. NEW CONSTRUCTION

Not applicable

5.1. Aggregate Layer

- Delivered sub-slab aggregate grain size gradation matches project design specifications.
- Aggregate is uniformly compacted and rolled flat and is free of protrusions or debris that may be a puncture hazard.
- Aggregate thickness was measured and documented to meet project specifications.

Not applicable

Yes No NA

Yes No NA

Yes No NA

5.2. Engineered Plenums (e.g., drainage mats)

- Engineered plenums were supplied and documented to meet project specifications.
- Plenum was uniformly laid flat across target treatment area to meet project specifications.

Not applicable

Yes No NA

Yes No NA

5.3. Collection and Manifold Piping

- Delivered vapor collection piping matches project design specifications.
- Vapor collection piping is laid and pipe joints and connections are permanently sealed.
- Solid piping is used in areas adjacent to utilities or trenches or where short circuiting may occur

Not applicable

Yes No NA

Yes No NA

Yes No NA

5.4. Membrane Installation Documentation

- Membrane manufacturer installation requirements are provided.
- System was installed by a certified installation vendor, if required by the manufacturer.
- Mitigation system as-built drawings are provided.
- Photographic log is provided for seals/repairs at the following locations:
 - along foundation edge
 - around foundation penetrations
 - along vertical exterior walls
 - around elevator shafts
 - coupon/smoke testing repairs

Not applicable

Yes No NA

Yes No NA

Yes No NA

Yes No NA

Yes No NA

Yes No NA

Yes No NA

Yes No NA

Yes No NA

Yes No NA

- **Trench Dams:** Utility trench dams were installed in all utility trenches leading to the building.

Yes No NA

- **Conduit Seals:** Conduit seals were installed in all electrical conduits that extend below the membrane.

Not applicable

Yes No NA

- Membrane selection and/or thickness was considered for potential contaminant concentrations in the subsurface (i.e., chemical compatibility).

- Sub-slab screening levels protective of diffusive transport across the slab have been calculated and monitoring is specified to document sub-slab concentrations after the membrane is placed. Contingencies are in place to modify the system (i.e.,

Yes No NA

potentially activate a passive system) if diffusive transport may become an issue.

- Documentation provides details for areas that require specialized completion, including all penetrations and terminations. Yes No NA
- Drains that perforate the barrier are designed to allow water to flow into sumps and floor drains while sealing out soil gases from entering the indoor air space from the sub-floor area (e.g., Drainjer-style drain). Yes No NA
- Membrane selection and/or thickness was considered for potential contaminant concentrations in the subsurface (i.e., chemical compatibility). Yes No NA

5.6. Quality Assurance/Quality Control Installation Plan Requirements Identified in the Design Document

Not applicable

- Products and materials installed meet the project design specifications. Yes No NA
- Material Safety Data Sheets (MSDS) for potential background contaminants (e.g., adhesives, glues, etc.) were reviewed. Yes No NA
- Installation was conducted in accordance with manufacturer's specifications (e.g., weather, curing time). Yes No NA
- Estimated quantities of the product to be used are provided. Yes No NA
- Engineer of record or barrier manufacturer identifies steps to document the effectiveness of the mitigation system. Yes No NA
 - Coupon sampling Yes No NA
 - Sample frequency is appropriate to assess integrity of entire barrier. Yes No NA
 - Smoke testing Yes No NA
 - Locations are appropriate to assess integrity of entire barrier. Yes No NA
 - Assessment of barrier integrity is based on visual observation of where smoke has migrated and/or where membrane repairs were made. Yes No NA
- On-site installation oversight and documentation by the design firm is noted. Yes No NA
- Documentation is present verifying that the installation and repairs have been completed per project specifications and manufacturer's installation instructions. Yes No NA
- Verification sampling was performed in accordance with the system design plan. Yes No NA
 - Field sampling procedures specified were followed. Yes No NA
 - The correct number and locations of verification samples were collected. Yes No NA
 - Verification samples were collected at the appropriate frequency. Yes No NA
 - Verification samples were analyzed using the appropriate analytical method. Yes No NA

- Results of the verification samples indicate that the VIMS is effectively mitigating the vapor intrusion risk present at the site. Yes No NA
- Deviations in the verification sampling plan, if needed, are documented with rationale for the change. Yes No NA