

# The Essential Role of Construction Quality Assurance in Vapor Barrier Installations



## Introduction

The installation of contaminant vapor barriers during new building construction on environmentally impacted sites is a critical step to protect the health and safety of future building occupants from contaminant vapor intrusion (VI). The effectiveness of these barriers heavily depends on factors such as chemical resistance, constructability, and rigorous Construction Quality Assurance or CQA processes. This guide delves into the essential role of CQA in contaminant vapor barrier installations, outlining the best practices, potential pitfalls, and solutions to achieve optimal outcomes in construction projects.





## Importance of CQA in Contaminant Vapor Barrier Installations

CQA is foundational to the successful installation of vapor barriers. CQA ensures that the VI mitigation system maintains structural integrity and performs its intended function effectively, providing long-term protection against potential contaminant vapor intrusion.

### Key Benefits of CQA

- ✓ **Effectiveness:** Ensures that the VI mitigation system adequately prevents the intrusion of contaminant vapors.
- ✓ **Durability:** Guarantees that installation can withstand the rigors of construction and will last the lifespan of the building.
- ✓ **Compliance:** Helps comply with regulatory requirements, avoiding legal and financial repercussions.

Through systematic monitoring and evaluation, CQA protocols protect the value of construction projects and enhance the safety of indoor environments.

# Evaluating Chemical Resistance and Constructability of Contaminant Vapor Barrier Systems


## Site Conditions That Can Impact the Installation

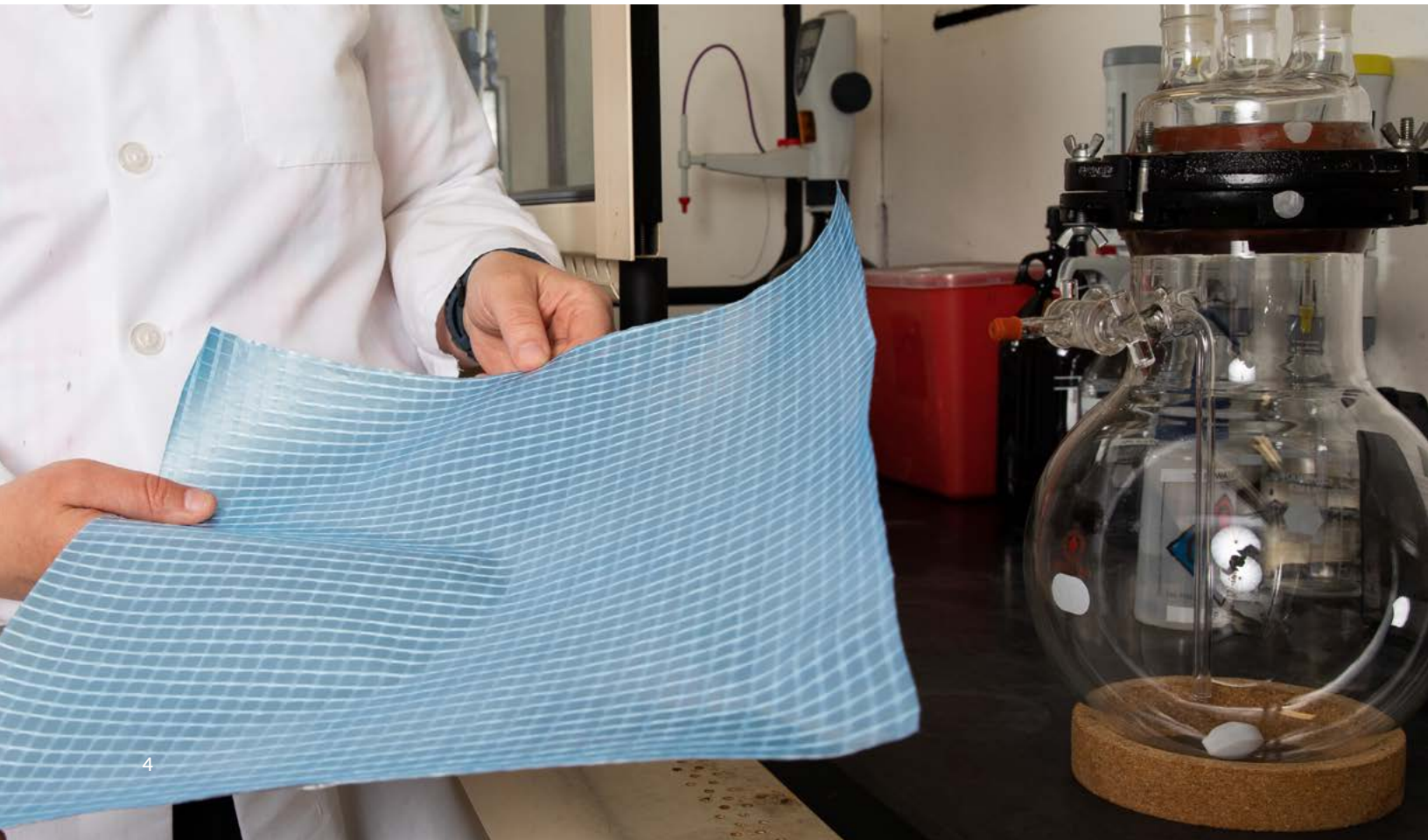
- Forms and Rebar
- Utility Penetrations
- Equipment and Vehicle Traffic
- Tenant Fit Outs

The CQA process begins well before installation, focusing on assessing the chemical resistance and constructability of vapor barrier materials to determine the best fit for a specific project. This proactive approach ensures that selected barrier excels in both resisting harmful chemicals and being adaptable to installation requirements, crucial for long-term effectiveness and integrity.

## Chemical Resistance:

Critical in environments contaminated with volatile organic compounds (VOCs), petroleum, or other hazardous substances, chemical resistance prevents these contaminants from penetrating indoor spaces, safeguarding both occupant health and building integrity.


 **Selection Criteria:** Choose a VI barrier based on its proven effectiveness against site-specific contaminants, evaluated through rigorous material performance testing.





## Constructability:

Often overlooked, this aspect covers how the contaminant vapor barrier performs during installation. It encompasses ease-of-installation, durability, and the CQA measures put in place to ensure a quality installation. Specific factors include a material's flexibility, puncture resistance, tensile strength, thickness, and compatibility with other construction materials. Different installation methods—whether spray-applied, taped thin-mil plastic sheets, or roll-out composites—vary in ease, speed, and reliability.

 **Selection Criteria:** Select a contaminant vapor barrier that offers high resistance to tears and punctures, can effectively seal around penetrations, and allows for simple seam joining. Assessing tensile strength, elongation, and puncture resistance provides a reliable indication of a VI barrier's suitability for construction demands.

# Components of a CQA Plan

A comprehensive CQA plan is crucial for ensuring that vapor barrier installations are performed correctly and effectively. This plan should encompass these critical steps, each designed to address specific aspects of the installation process from start to finish.

## 1. Manufacturer Peer Review of VIMS Design and Barrier Selection

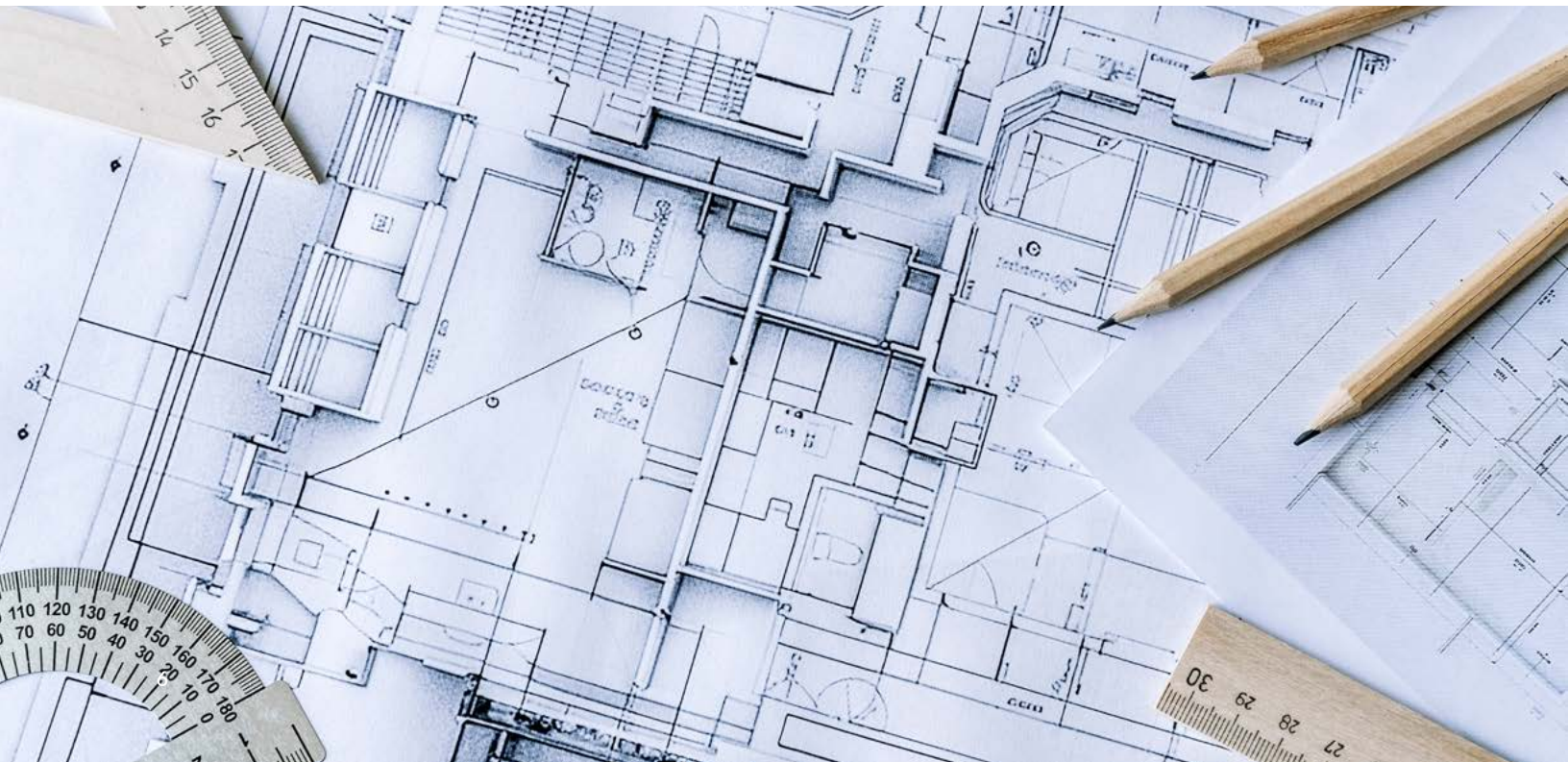
**Purpose:** Review analytical data, offer site-specific recommendations, review construction specifications and venting layout.

**Process:** Engage with the VI mitigation design engineer and other project team members to review designs and ensure that the right contaminant VI barrier solution is selected.

## 2. Pre-Construction Meeting(s)

**Purpose:** Define the scope, responsibilities, timeframe and strategies for addressing contingencies like inclement weather during the vapor barrier installation.

**Process:** Coordinate with the general contractor, manufacturer's certified applicator, design engineer, manufacturer's representative and concrete subcontractor prior to construction to ensure expectations are communicated and the installation is successful.






### 3. Manufacturer's Certified Applicator

**Purpose:** To oversee the actual installation process by experienced, qualified and trained personnel to ensure the vapor barrier installation adheres to the manufacturer's specifications and the VI mitigation system design.


**Process:** Employ installation personnel who are certified for the specific VI mitigation system being installed. These personnel should be able to provide onsite direction and adjustments as necessary to accommodate real-time conditions and challenges.

 **Note:** Land Science requires a certified applicator on every contaminant VI mitigation system installation.

### 4. Third-Party Inspectors

**Purpose:** To observe the installation, record site conditions, and verify the quality of the materials and installation techniques throughout the project.

**Process:** Implement checkpoints at various stages of the installation for quality control inspections, including thickness verification, coupon samples, and smoke tests..

 **Note:** Third-party inspection of Land Science vapor barriers is required to qualify for an extended warranty program.

## 5. Smoke Tests and Thickness Verification

**Purpose:** To verify the integrity and completeness of the vapor barrier system and to ensure it meets the VI mitigation system design.

**Process:** Conduct smoke tests to detect deficiencies in the system and ensure all seams and penetrations are sealed properly. Use thickness verification techniques to ensure the spray-applied core meets the required specifications for effective performance.

**Figure 1**

### Smoke Testing

Smoke testing is conducted. The image on the right shows where additional repairs are needed.



## 6. Final Pre-Pour Inspection

**Purpose:** To ensure that all aspects of the vapor barrier installation are complete and correct before the concrete pour begins.

**Process:** Conduct a comprehensive review of the entire vapor barrier installation

Implementing these components in a CQA plan not only enhances the reliability and effectiveness of vapor barrier installations but also contributes to the overall durability and safety of the building structure. These measures ensure that contaminant VI mitigation systems function as needed to protect indoor air from contaminant vapor intrusion.

## Potential Pitfalls in Vapor Barrier Installations

Contaminant VI mitigation system installations are critical to maintaining the integrity of building environments, but several pitfalls can compromise their effectiveness. Awareness and proactive management of these risks are key to ensuring successful outcomes:

### Taped Systems Often Provide Inadequate Sealing

Taped vapor barrier systems require clean, moisture-free surfaces for optimal adherence. As a result, they often provide inadequate sealing at seams, termination points, or around penetrations, which can lead to leaks and potential vapor intrusion. Completing common QAQC procedures, like smoke tests, can be difficult with taped systems and can increase the installation time of the system.

**Figure 2**

### Taped Vapor Barrier Systems

Taped vapor barrier systems.



### Avoiding VI Mitigation System Damage During Concrete Pouring

Monitoring the sequencing of the concrete pour is crucial. It is essential to ensure that the concrete form stakes do not puncture the vapor barrier during the pour. If punctures occur, they must be promptly sealed and repaired. Additionally, taking note of how the concrete pour will occur and how that may impact the contaminant vapor barrier is important.

## Choosing the Right Product for the Right Site

Selecting the appropriate contaminant vapor barrier is crucial. If only chemical resistance is considered, you may choose a product that effectively counters site-specific contaminants but fails to suit the construction needs of the project.

There are significant differences between projects, such as those involving new buildings with many underground utilities and other complex foundational elements, compared to slab-on-grade warehouses. Understanding all facets of a project, including the contaminants, the building type, and the construction environment beforehand enables better decision-making when selecting a vapor barrier.

## Inclement Weather

Weather conditions can greatly influence the installation of contaminant vapor barrier systems. It is important to refer to the manufacturer's specifications and to rely on the experience of the project team when dealing with inclement weather.





## Conclusion

Effective vapor barrier installation hinges on several key practices:

**Implement a Complete CQA Plan:** Site-specific Construction Quality Assurance plans help ensure the vapor barrier functions as intended.

**Focus on Quality Installation:** Proper installation is crucial; a poorly installed barrier is ineffective and compromises the entire project.

**Select Appropriate Materials:** Balance chemical resistance and constructability when choosing your vapor barrier to ensure durability and ease of installation.

**Commitment and Expertise:** The project's success depends on a committed team and the expertise of certified installers who adhere to regulatory and manufacturer standards.

When these factors are aligned — a dedicated project team, a complete CQA plan, and expert installation contractor — a vapor barrier can be installed efficiently, cost-effectively, and correctly. This approach not only meets but often exceeds the expected performance standards, safeguarding your construction investment.



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