

Technical Data Sheet



Description

TerraShield® is the premier under-slab vapor intrusion barrier designed to mitigate contaminant vapor intrusion at sites with environmental impacts.

The patented TerraShield system is comprised of three defined layers to create a robust, redundant, seamless membrane: TerraBase+, Nitra-Core, and Land Science Protection Fabric. TerraShield is an advancement over single-sheet membranes and historical spray-applied composite vapor barriers due to:

1. an encapsulated layer of metallized film embedded within the TerraBase+ sheet
2. a nitrile co-polymer in the Nitra-Core spray-applied component
3. a signature reinforced ripstop grid in the TerraBase+ layer for enhanced tear resistance

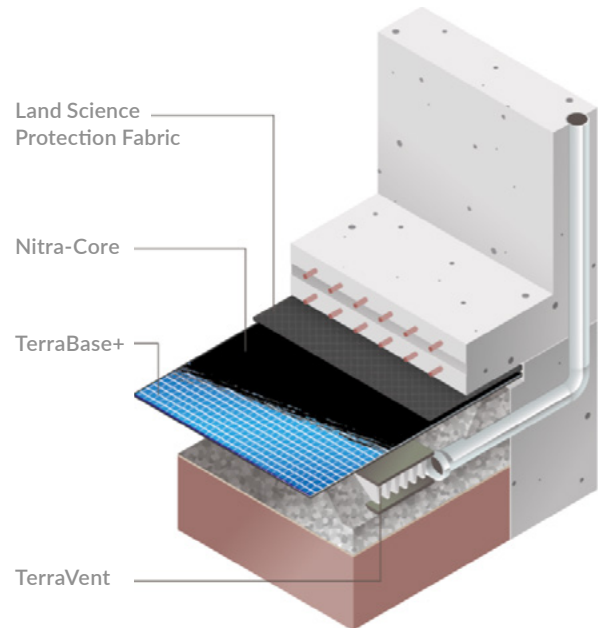
These proprietary features of TerraShield offer the greatest resistivity to contaminant vapor permeation through the building foundation while remaining practical for construction timelines and budgets. The installation of TerraShield usually occurs after the site substrate has been prepared and the utilities placed, and prior to concrete slab placement.

Developed to meet and exceed the most stringent regulatory requirements across the nation, TerraShield is proven to protect building occupants from chlorinated solvents, petroleum compounds, methane, radon, and other volatile organic compounds by physically encapsulating the building foundation to prevent contaminant migration through the concrete slab.

TerraShield System Summary

| | | | | |
|-----------------------------|-----------------------------|-----------------------------|--------------|----------------------|
| Barrier Thickness: | 65 mil | Composite Thickness: | 105-125 mil | |
| Components: | Venting System ¹ | Base Layer | Middle Layer | Top Layer |
| Product Name: | TerraVent | TerraBase+ | Nitra-Core | LS Protection Fabric |
| Component Thickness: | 1" | 25 mil | 40 mil | 40-60 mil (8 oz/sy) |

1. Venting system is an optional system component



Advantages

Chemical Resistance

The reinforced encapsulated metallized film base layer of TerraShield, TerraBase+, offers over 100x greater protection to VOC permeation versus traditional polyethylene base layers.

Speed of Installation

Construction friendly with a nominal, uniform spray-applied thickness of 40-mil due to the unique nitrile co-polymer within Nitra-Core. Historic spray-applied membranes comprised of neoprene and styrene butadiene require a 60-mil application to meet comparable chemical resistance performance.

Durability

Puncture resistant with high tensile strength to withstand construction activity post-installation.

Proven

Verified by extensive third-party testing to exceed the most stringent regulatory requirements for vapor intrusion barrier systems.

TerraShield System Properties

| Property | Test Method | Typical Value |
|-------------------------------|--------------------------|---|
| Tensile Strength ¹ | ASTM D751 | 131 lbs |
| | ASTM D7004 | 136 lbs |
| Elongation ¹ | ASTM D751 | 19% |
| | ASTM D7004 | 18% |
| Puncture Resistance | ASTM D4833 | 52 lbs |
| Water Vapor Transmission | ASTM E96 ³ | 0.0014 grains/(hr·ft ²) |
| Water Permeance | ASTM E96 ³ | 0.0023 US Perms |
| Methane Gas Permeance | ASTM 1434 ⁴ | <0.12 mL(STP)/(m ² ·d·atm) ⁵ |
| Benzene Diffusion Coefficient | GeoKinetics ² | 3.4 x 10 ⁻¹⁸ m ² /s |
| PCE Diffusion Coefficient | GeoKinetics ² | 1.8 x 10 ⁻¹⁷ m ² /s |
| Radon Permeability | K124/02/95 ⁶ | <0.4 x 10 ⁻¹² m ² /s ⁵ |

1. Values are an average of the machine direction and the transverse direction test results.

2. A method comparable to ISO 15105-2, performed by GeoKinetics, Inc., Irvine, CA.

3. Tested by equivalent method, EN1931.

4. Tested by equivalent method, ISO 15105-1.

5. Test results were below the method detection limit.

6. Test method equivalent to ISO/TS 11665-13

Design Considerations

TerraShield is generally implemented at sites with moderate to high vapor intrusion risk where a best-in-class, high-performance solution is desired to prevent vapor exposure. Common applications include sites with sensitive receptors, such as schools, senior living communities, and hospitals, or sites with exceedances to residential or commercial screening levels.

TerraVent can be implemented in an active or passive mitigation capacity in conjunction with TerraShield to alleviate the buildup of vapors beneath the building structure. Combining a sub-slab ventilation network in the permeable substrate with TerraShield offers the highest level of protection from contaminant vapor intrusion.

Service & Support

Land Science representatives are available for site data analysis, mitigation system recommendations, barrier and venting design support, and budgetary estimates. Site conditions, project objectives, and regulatory requirements will dictate which mitigation solution is appropriate.

Weather Limitations

- Nitra-Core should be sprayed at temperatures >45°F. Contact Land Science for requirements in colder temperatures.
- Nitra-Core should not be sprayed when raining or during weather conditions that create ponding water on the membrane.
- Any ponding water on the surface of TerraBase+ needs to be removed prior to applying Nitra-Core.

Warranty

Land Science offers industry-leading warranty options for the full suite of vapor intrusion barrier systems. All installations come with a 1-year material warranty free of charge. To qualify for extended warranty terms, the project must be reviewed and approved by the Land Science Engineering Department prior to any product installation by a Land Science Certified Applicator.

TerraShield warranty options include Material and System warranties up to 30 Years. Contact Land Science for more information to meet your site's warranty requirements.