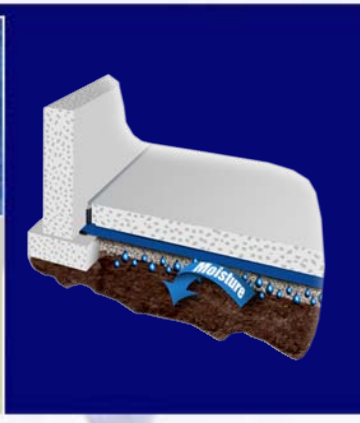
RAVEN INDUSTRIES

RAVEN VAPORBLOCK® VB15

COMPARED TO

STEGO® WRAP 15 MIL

UNDER-SLAB VAPOR BARRIERS

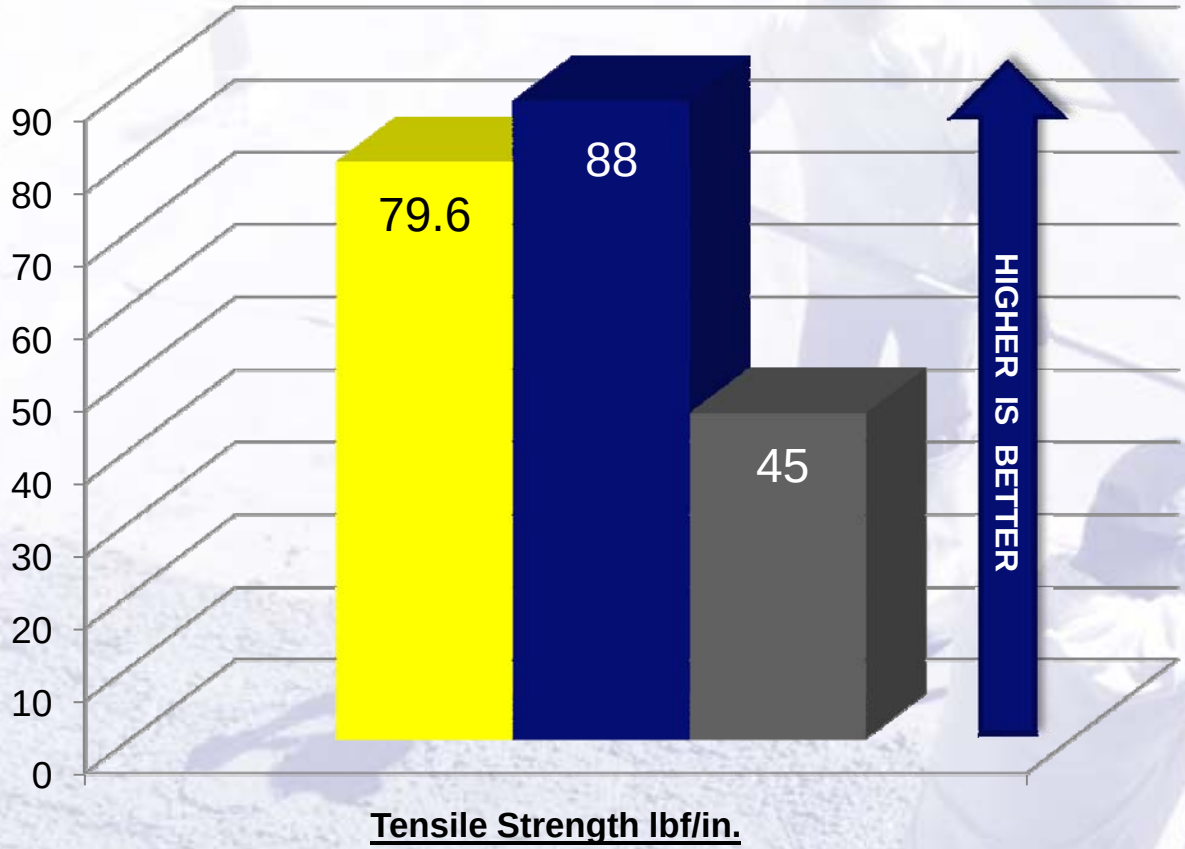


www.ravenefd.com

Based on Published Literature

Tensile Strength

Requirements Per ASTM E 1745-09



Both Raven VaporBlock® VB15 and Stego® Wrap 15 Mil Vapor Barriers Exceed the ASTM E1745 "Class A" Requirement of 45 lbf/in. of Tensile Strength.

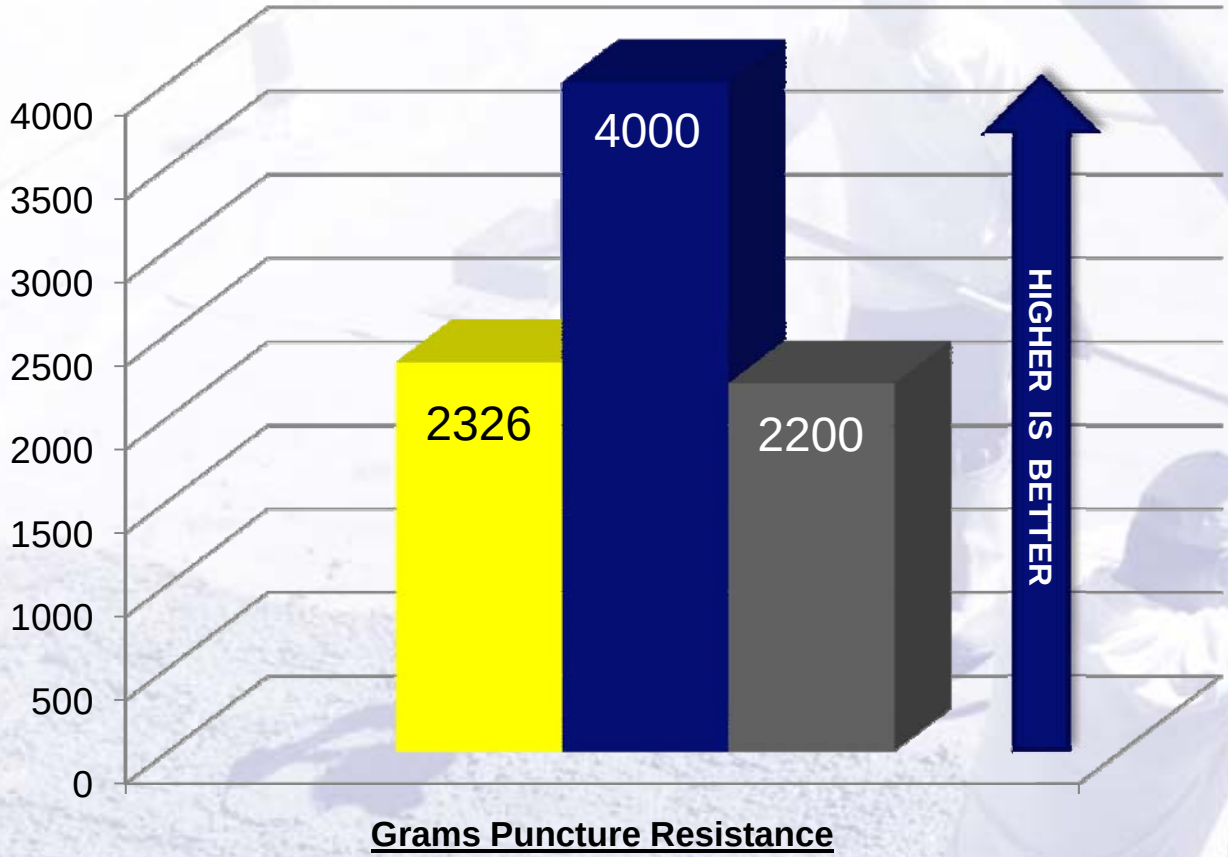
Raven Exceeds Stego Tensile Strength by 10%

Higher Tensile = Enhanced Durability

VaporBlock® is a trademark of Raven Industries. Values listed are from Raven published literature of 4/10.
Stego® is a trademark of Stego Industries. Values listed are from Stego Industries, LLC published literature of 8/09.

Puncture Resistance

Requirements Per ASTM E 1745-09



Raven VaporBlock ® VB15 and Stego ® Wrap 15 Mil Vapor Barriers Meet ASTM E1745 “Class A” Requirement of 2200 Grams of Puncture Resistance.

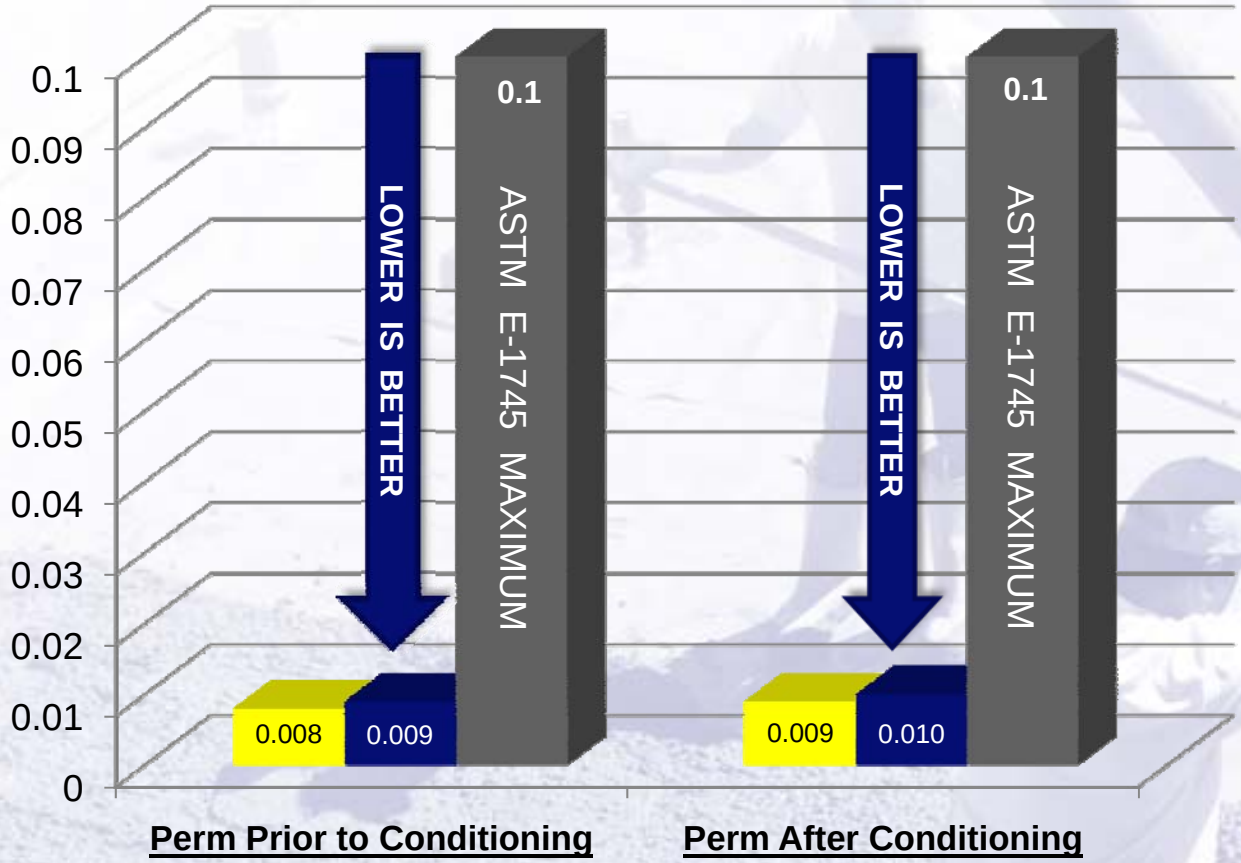
Raven Exceeds Stego Puncture Resistance by 72%

Higher Puncture = More Resistant to Installation Stress

VaporBlock® is a trademark of Raven Industries. Values listed are from Raven published literature of 4/10.
Stego ® is a trademark of Stego Industries. Values listed are from Stego Industries, LLC published literature of 8/09.

Water Vapor Permeance

Requirements Per ASTM E 1745-09



Both Raven VaporBlock® VB15 and Stego® Wrap 15 Mil Vapor Barriers Greatly Exceed ASTM E1745 (7.1.1 to 7.1.5) Maximum Requirements of a **0.1 Perm** (Class A, B & C)

Both Exceed Perm Requirements by 10 Times

Lower Perm = Less Moisture Vapor Emission

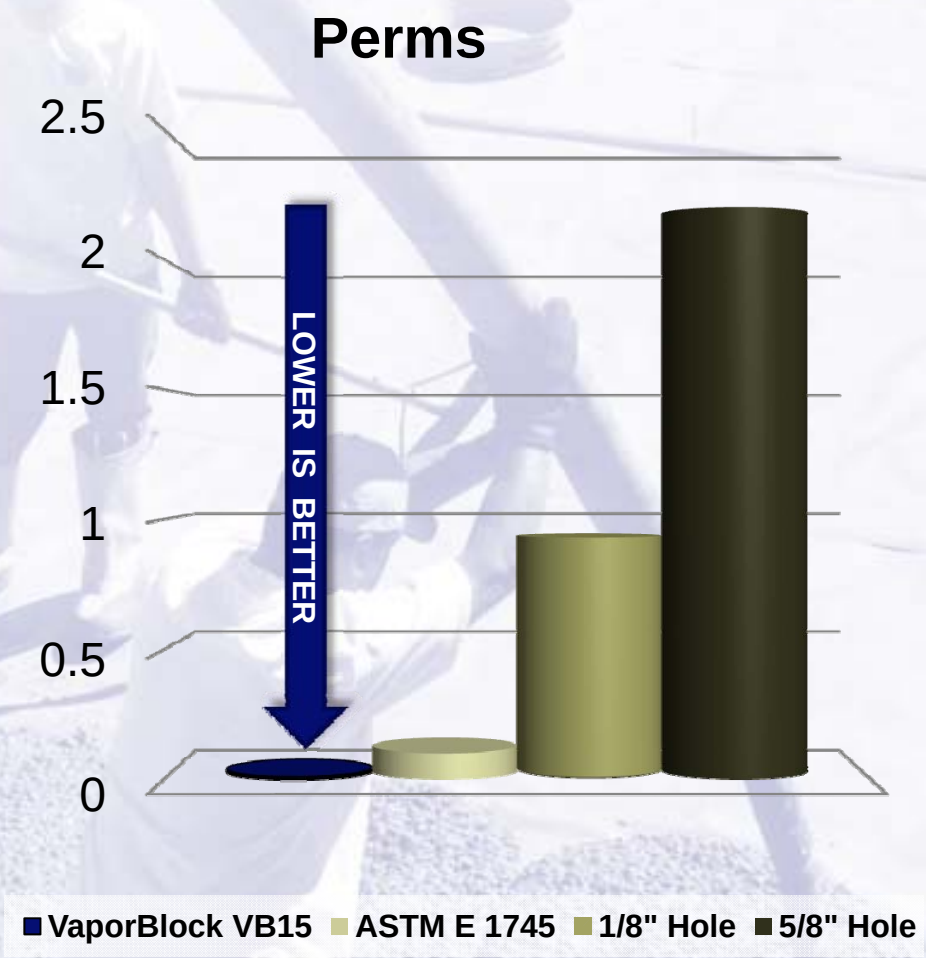
VaporBlock® is a trademark of Raven Industries. Values listed are from Raven published literature of 4/10.
Stego® is a trademark of Stego Industries. Values listed are from Stego Industries, LLC published literature of 8/09.

Interesting Facts About Under-Slab Vapor Barriers

(Based on *ACI 302.2R-06)

A vapor barrier with a low perm rating is vital. However, it is just as important to select a durable material that will withstand typical installation stress as mentioned by ACI below:

- A 1/8" in. dia. nail hole allows an average MVER (moisture vapor emission rate) of 1.3 lb/1000 ft²/24 h (Equal to a Vapor Retarder with only a .93 Perm Rating!)
- A 5/8" in. dia. stake hole left un-repaired, increased the average MVER (moisture vapor emission rate) to 3 lb/1000 ft²/24 h (Equal to a Vapor Retarder with only a 2.2 Perm Rating!)



* Cited Reference: ACI 302.2R-06 “Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials

Interesting Facts About Under-Slab Vapor Barriers

(Based on *ACI 302.2R-06)

- Based on the amount of moisture vapor emission that is released through small 1/8" to 5/8" diameter holes in the vapor barrier (See ACI 302.2R-06 - 7.3.2), it appears that punctures caused by construction traffic & normal installation stress as well as un-repaired stake holes should be as important as a vapor barrier with very low permeability.

- To assure the best performing vapor barrier after installation, the industry cannot overlook the importance of impact resistance as determined by ASTM D 1709 & E 1745! Class “A” vapor barriers must withstand the impact of a 4.85 lb. (2200 g) 2” diameter dart dropped 60” above the barrier. VaporBlock ® VB15 withstands the impact of an 8.8 lb. (4000 g) 2” diameter dart!

- The higher the impact resistance of the vapor barrier the more resistance to installation stress! ACI 302.2R-06 - 7.3.3 states: "Concrete-truck traffic, use of laser-guided screeds, presence of pump hoses, and reinforcing bar placement are just some of the activities that can cause punctures when concrete is placed directly on the vapor retarder/barrier. The specifier should consider these activities when selecting the appropriate vapor retarder/barrier."

Cited References:

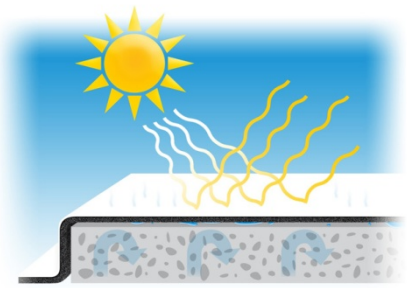
- ACI 302.2R-06 “Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials”
- ASTM D 1709 – 04 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method
- ASTM E 1745 – 09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

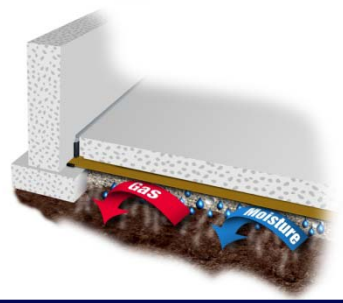
Other Questions Concerning Underslab Moisture or Gas Barriers?

- Please call Raven Industries, Inc. at 800-635-3456 for more information or:
- Visit our web site at: www.vaporblock.com
  - Drop-in Specifications
  - Installation Instructions
  - Product Data Sheets
  - Brochures
  - Underslab Gas Barriers

Other Excellent Resources:

- ACI 302.2R-06 “Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials”
- ASTM E 1745-09 “Standard for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs”
- ASTM E 154-08a “Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
- ASTM E-1643 “Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs





For more than 20 years Raven has designed and manufactured quality engineered materials for construction applications. Our innovative technologies provide products with superior quality and long-lasting durability. You will find a Raven product for everything from commercial buildings to residential homes. Products range from Wet Concrete Curing Blankets to Underslab Vapor & Gas Barriers to Housewraps providing air and weather resistance to name a few, all manufactured in the USA.

RAVEN
INDUSTRIES

Recent Announcements

- **Raven Engineered Films Division receives "GAI-LAP" accreditation**
  - June 2009 - Raven Engineered Films Quality Assurance Laboratory has been granted accreditation from the Geosynthetic Institute for designated geosynthetic test methods in accordance with the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP). Raven is one of only forty-nine laboratories currently granted with the "GAI-LAP" accreditation worldwide.
- **Raven Engineered Films Division – Gains Recertification for Newest ISO 9001:2008 Standard**
  - December 2009 - Raven Engineered Films Division became ISO 9001:2000 certified in early 2007, and has just recently been recertified under the latest ISO 9001:2008 standard. The ISO 9001:2008 certification is for Raven Engineered Films entire quality and management system.
- **Raven Industries, Inc. Named to Forbes Top 200 Best Small Companies**
  - SIOUX FALLS, S.D., Oct. 19 – Raven Industries, Inc. (NASDAQ: RAVN), today announced it was named to the 2009 Forbes' list of the 200 Best Small Companies in America, available at http://www.forbes.com/200best. Forbes ranked Raven as the 109th top U.S. small company and 30th based on return on equity. This is the fourth consecutive year Raven has made the list.