



Designation: E 1643 – 98 (Reapproved 2005)

Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs¹

This standard is issued under the fixed designation E 1643; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for installing flexible, prefabricated sheet membranes in contact with earth or granular fill used as vapor retarders under concrete slabs.

1.2 Conditions subject to frost and either heave or hydrostatic pressure, or both, are beyond the scope of this practice.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.4 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*²

C 33 Specification for Concrete Aggregates

D 224 Specification for Smooth-Surfaced Asphalt Roll Roofing (Organic Felt)³

E 631 Terminology of Building Constructions

2.2 *Other Standard:*⁴

ACI 302.1R Guide for Concrete Floor and Slab Construction

3. Significance and Use

3.1 Vapor retarders provide a method of limiting water vapor transmission upward through concrete slabs on grade, which can adversely affect moisture-impermeable or moisture-sensitive floor finishes.

¹ This practice is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Withdrawn.

⁴ Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333.

3.2 Adverse impacts include adhesion loss, warping, peeling, and unacceptable appearance of resilient flooring; deterioration of adhesives, ripping or separation of seams, air bubbles or efflorescence beneath seamed, continuous flooring; damage to flat electrical cable systems, buckling of carpet and carpet tiles, offensive odors, and growth of fungi.

4. Manufacturer's Recommendations

4.1 Where inconsistencies occur between this practice and the manufacturer's instructions, conform to the manufacturer's instructions for installation of vapor retarder.

5. Placement

5.1 Level and tamp or roll granular base.

5.2 Place vapor retarder sheeting with the longest dimension parallel with the direction of concrete pour.

5.3 Lap vapor retarder over footings or seal to foundation wall, or both, and seal around penetrations such as utilities and columns in order to create a monolithic membrane between the surface of the slab and moisture sources below the slab and at the slab perimeter (see [Figs. 1-3](#)).

5.4 Lap joints 6 in. (150 mm), or as instructed by the manufacturer, and seal with the manufacturer's recommended adhesive or pressure sensitive tape, or both.

6. Protection

6.1 Take precautions to protect vapor retarder from damage during installation of reinforcing steel and utilities and during placement of concrete.

6.2 Use only concrete brick type reinforcing bar supports, or provide 6 by 6 in. (150 by 150 mm) protective pads of asphaltic hardboard or other material recommended by the vapor retarder manufacturer to protect the vapor retarder from puncture.

6.3 Avoid use of stakes driven through vapor retarder.

6.4 Refer to [X2.2](#) and [X2.3](#) for discussion of aggregate for protection of vapor retarder.

7. Repair

7.1 Repair vapor retarder damaged during placement of reinforcing or concrete with vapor barrier material or as instructed by manufacturer.

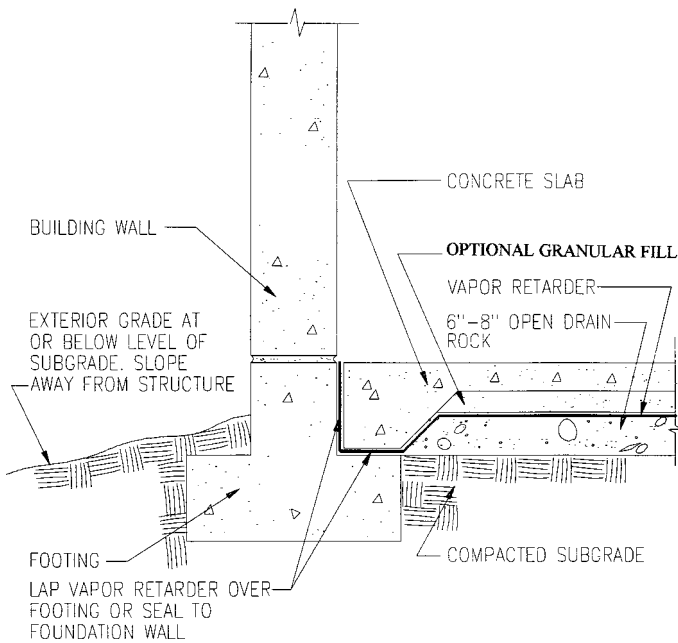


FIG. 1 Concrete Slab on Grade: Optimum Relationship of Vapor Retarder Components

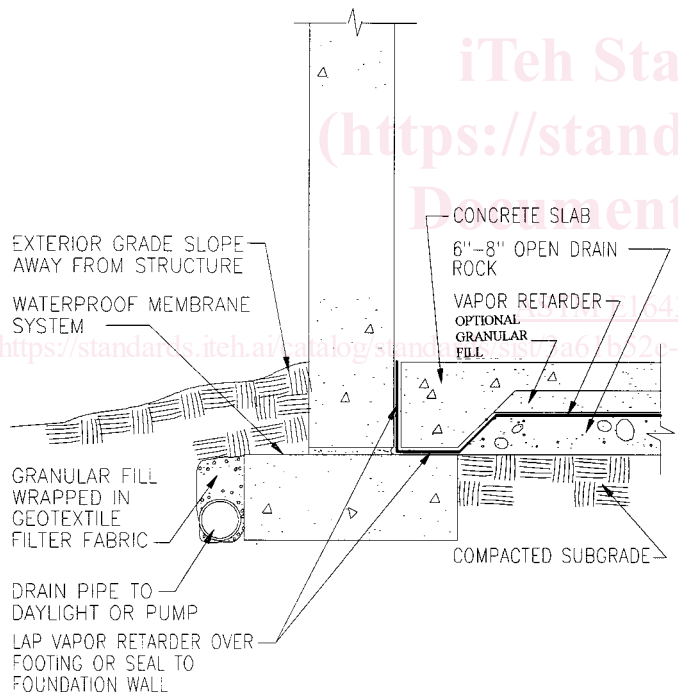


FIG. 2 Concrete Slab on Grade: Solution for Subgrade Slightly Below Exterior Grade

7.2 Lap beyond damaged areas a minimum of 6 in. and seal as prescribed for sheet joints.

8. Suggested Field Check List

8.1 *Moisture Entrapment Due to Rainfall or Ground Water Intrusion*—Moisture entrapment can occur with tilt-up construction or other construction methods where exterior walls are erected before the concrete slab and underlying subgrade, base, or sand/small aggregate layer, or combination thereof, are

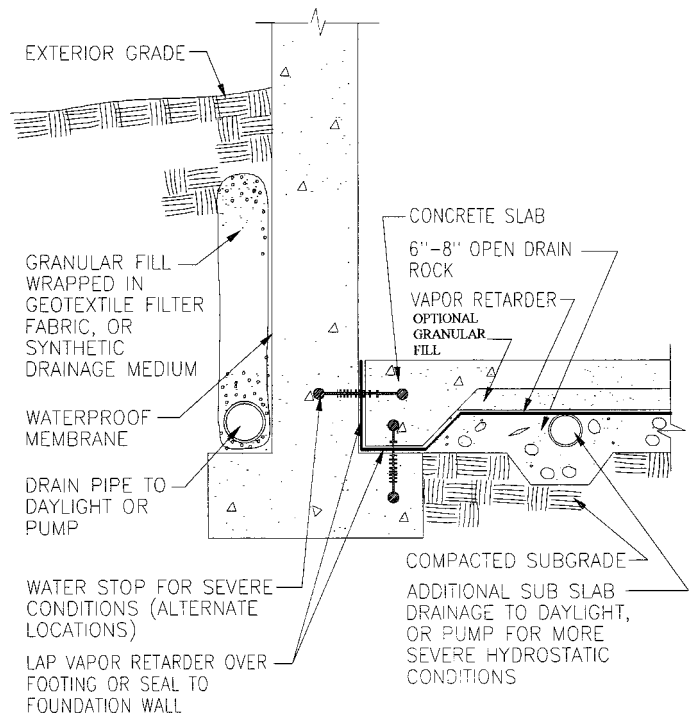


FIG. 3 Concrete Slab on Grade: Solution for Subgrade Up to One Story below Grade with No Hydrostatic Pressure on Vapor Retarder

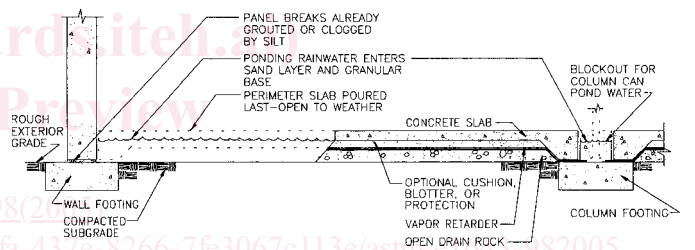


FIG. 4 How Moisture Can Be Retained in Base or Cushion, Blotter, or Protection Course During Construction

protected from precipitation. This can be avoided by appropriate construction scheduling and sealing of any entry points in uncompleted slabs⁵ (see Fig. 4).

8.2 *Integrity of Vapor Retarder*—Check seams and penetrations at columns and utilities to look for discontinuities in the vapor retarder.

8.3 *Damage and Repair*—After installation of reinforcement (if used) but before pouring concrete, check for damage. Do not pour concrete until repairs are made, if required, in vapor retarder. This is particularly difficult if covered with sand or granular fill.

8.4 *Moisture Conditions of Slab*—Following placement of concrete and climatization of building, check to see that any specified tests for moisture emission have been made and a written report submitted prior to floor covering or coating installation.

⁵ Collins, F. Thomas, *Manual of Tilt-Up Construction*, Berkeley, Know-How Publications, 1965, pp 78–81.