2005 No. 20

TechnicalDataSheet

A Guide to Achieve the Secured Single- Ply Roof

Prevention of air filtration into the area beneath a loose-laid single-ply membrane is a key ingredient to its wind stability. Under certain wind conditions pressure can build up beneath the membrane which my cause it to expand or billow. This pressure build-up is due to the air infiltrating into the area below the membrane. If this air infiltration is eliminated, the membrane cannot billow or be lifted from a roof deck. A secondary benefit is improved thermal efficiency of the system.

Figure 1 on the following page shows different locations through which air can infiltrate to the area below the membrane. The following guidelines must be used when LIGHT**GUARD**® or HEAVY**GUARD**® (LG/HG) Protected Membrane Roof Insulation panels are installed over a loose-laid single-ply membrane.

NOTE: This is a general guideline and is not intended to be all inclusive. It is the responsibility of the designer, contractor, and membrane manufacturer to ensure that the provisions are made to limit air infiltration below the sheet membrane. Consult ANSI/SPRI RP-4 wind design guide for ballasted single-ply roofing systems to identify special conditions which may require additional securement.

Concrete or Other Monolithic Decks

The deck and wall must be sealed. If the deck/wall juncture is a monolithic pour or is already sealed against air infiltration, the the membrane need only be sealed to the wall or parapet. Typical roof/wall junctues require the full adhesion of the membrane to the wall with a nailer strip at the deck/wall juncture and a terminating bar at the top of the membrane.

Plywood Decks

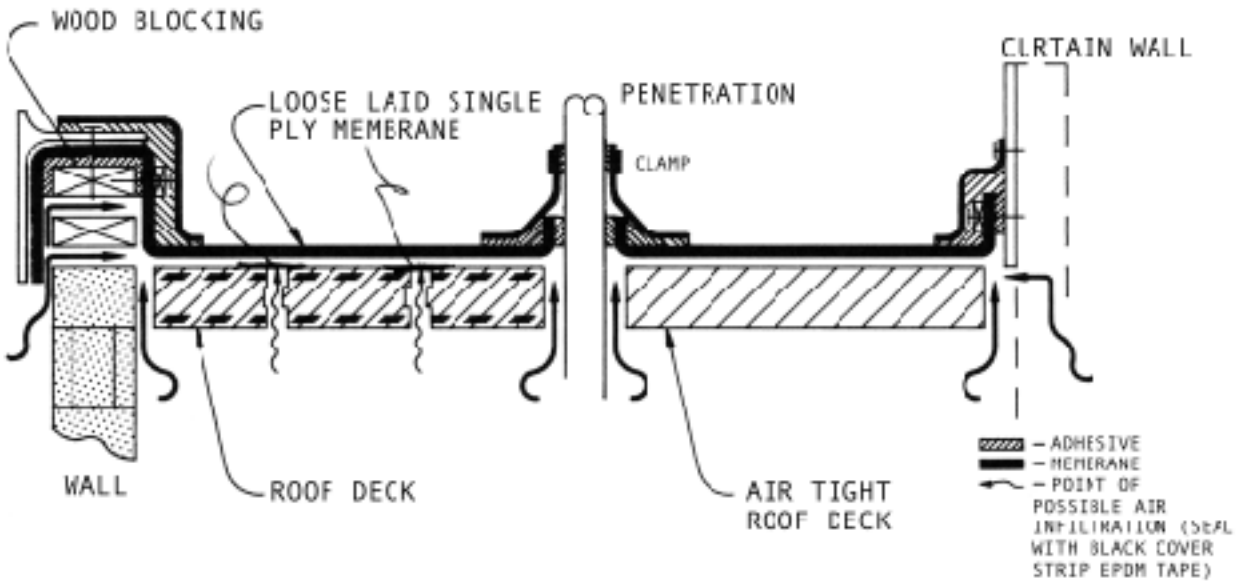
All deck joints must be sealed. The deck/wall juncture or deck/perimeter edge termination will often have air openings. The membrane flashing system will be required to prevent air infiltration in the deck/wall juncture and deck/perimeter edge termination.

Steel Decks

Where a fire-resistant underlayment material such as gypsum board is used as a 15-minute fire barrier, it must be mechanically fastend to the deck according to Factory Mutual I-60 design, as a minimum. The deck must be made airtight by using of of the following alternatives:

1. Placing wide (10') vinyl or polyehtylene sheets beneath the underlayment material. All film joints must be sealed or taped with duct tape (**Figure 2**).
2. Installing a minimum one-ply BUR (built-up roof) vapor retarder under or over the secured underlayment material that will act as an air seal. (Follow NRCA Guidelines).
3. If gypsum board or plywood under layment is used, tape all joints and openings in the boards with black cover strip EPDM tape and seal the membrane by adhesively bonding it to the perimeter boards (**Figure 3**).

Figure 1. Typical areas which must be sealed to prevent air infiltration from occurring under loose-laid single-ply membranes



Cementitious Wood Fiber Deck, Wood Plank Decks, Acoustical Steel Decks

A wide vinyl or polyehtylene film or one-ply BUR vapro retarder over the complete deck area is required to prevent air from penetrating through the deck material. All film joints must also be sealed or taped with duct tape. The plastic film must also be fastened to the deck by placing rigid sheet material such as wood fiberboard over the film and fastening the rigid material to the deck using a Factory Mutual I-60 pattern (or equivalent). Each perimeter edge detail must stop air from penetrating through the sides and ends of the decks (**Figure 6**).

Existing BUR or Other Fully-Adhered Membranes

When the existing membrane is in good condition, uncut and remains on the deck, the major new requirements will be to make sure the perimeter edge details are airtight. The wood blocking and old flashings may need to be removed around perimeters. This will require that the old membrane be resealed in these areas by suitable means to complete an airtight seal. The details at the perimeter shall correspond to similar details for new roofs over similar decks.

Basic Perimeter Edge Terminations

It is important to prevent air from infiltrating into the area between the membrane and deck. The field of the roof, the perimeter edges, and interior penetrations must be sealed to prevent air infiltration (**Figure 1**).

Once the deck is airtight, the roof deck/perimeter edge juncture must be sealed. The perimeter edge termination of the deck can be sealed in a variety of ways. These can be categorized into two groups:

1. Substrates to which membrane may be directly attached.

a. The membrane may be sealed at the perimeter by adhesively bonding the membrane to the deck for a minimum width of one foot (**Figure 3**).

b. The membrane may be sealed at the perimeter by applying a nailer in a horizontal position as per membrane manufacturer specifications (**Figure 4**).

Figure 2. Sealed deck using plastic sheet beneath underlayment board

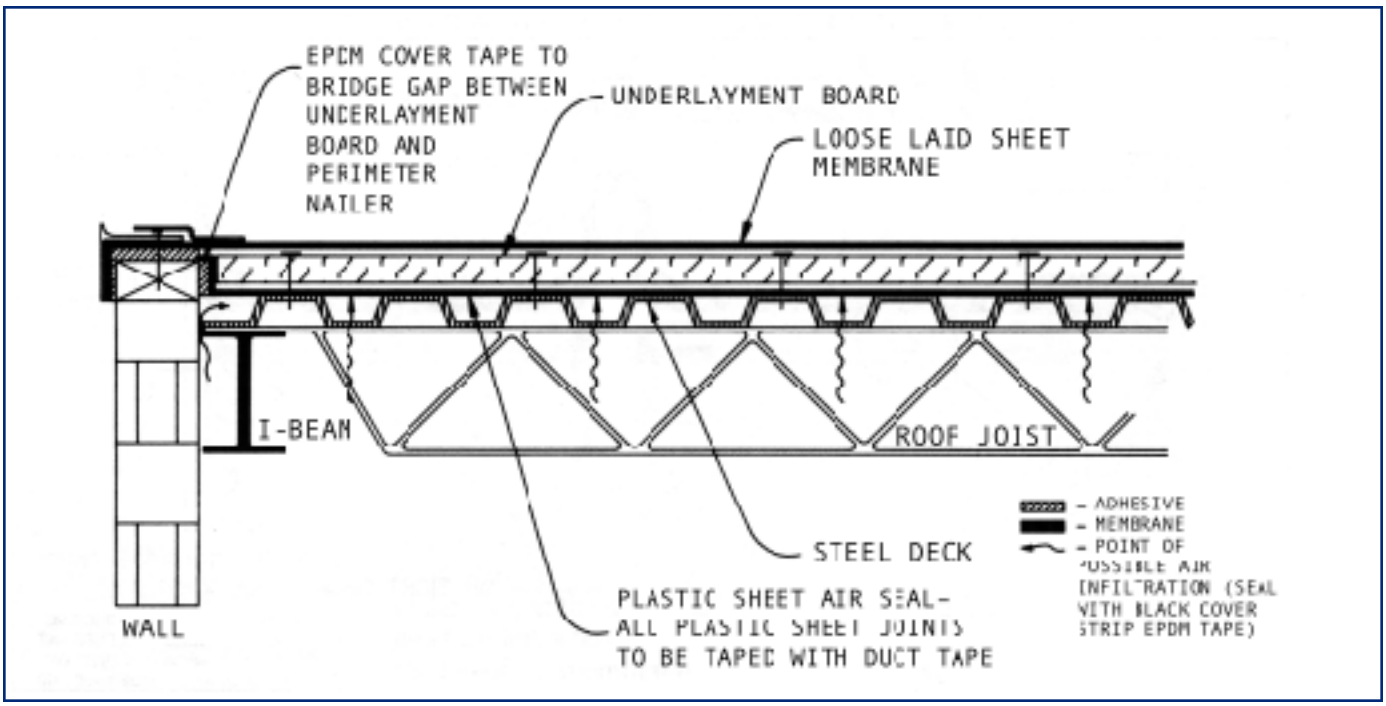


Figure 3. Prevention of air infiltration below sheet membrane over a sealed deck by adhering the membrane to the perimeter

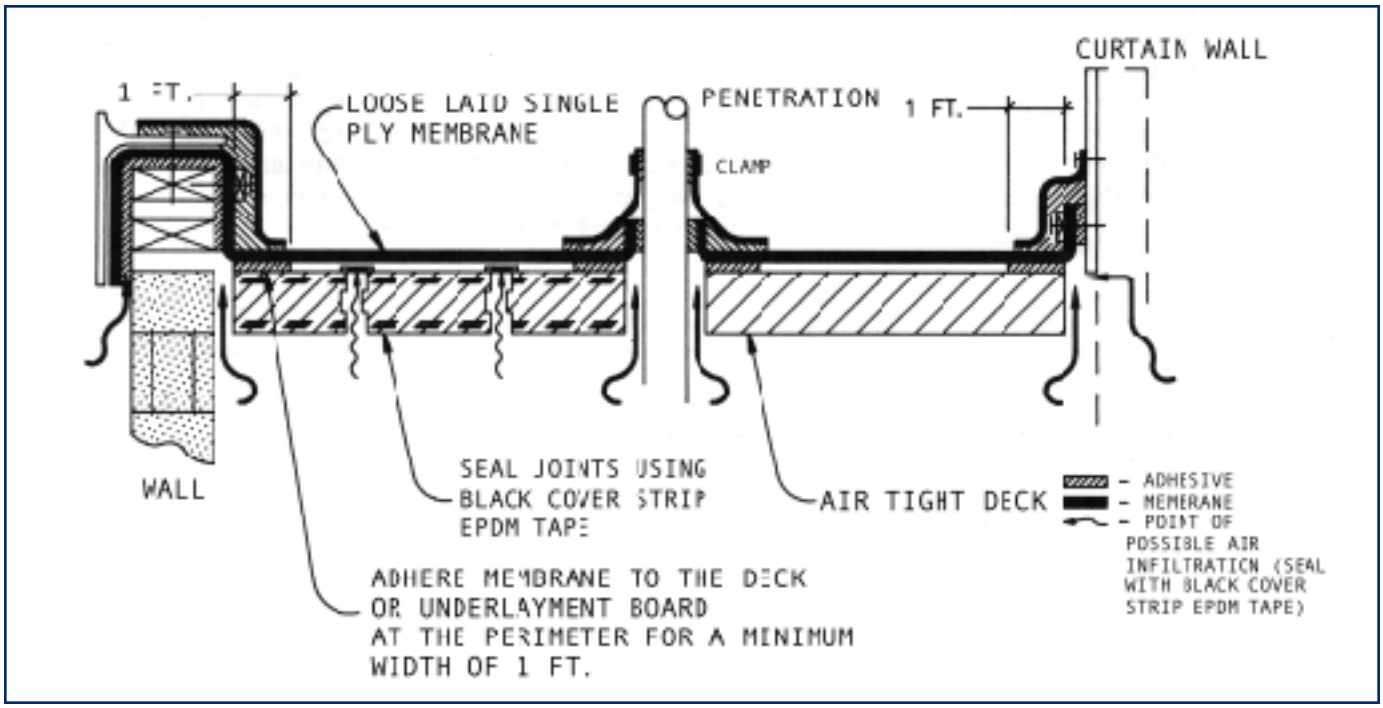
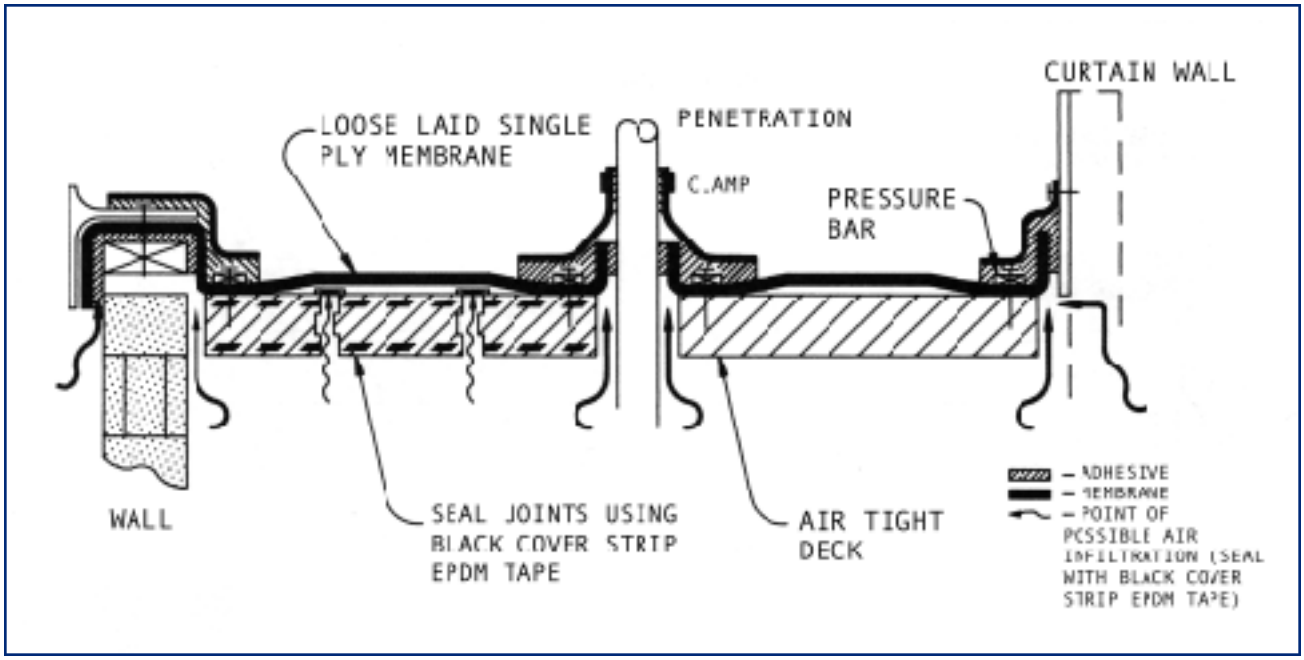


Figure 4. Prevention of air infiltration below sheet membrane by attaching the membrane to the sealed deck with a horizontal nailer and pressure bar around the perimeter



2. Substrates to which the membrane may not be directly attached.

a. A wood nailer(s) may be laid onto the airtight deck set in mastic or caulk (or other gasket material such as DOW Sill Seal) to prevent air infiltration. The nailer must be securely fastened to the deck and it should be built up flush to the top of the underlayment board. The membrane should then be firmly bonded to the nailer to achieve an airtight seal (**Figure 5**).

b. Other alternatives involve completely sealing any areas at the deck/perimeter edge juncture which would allow air to infiltrate under the membrane. (**Figure 6** shows typical areas through which air can access the area below the membrane.)

i. Walls at the perimeter of the roof should be sealed. Particular care must be taken with curtain walls.

ii. Perimeter roof edges using wood blocking should have the wood blocks properly set, securely fastened, and sealed to prevent air infiltration.

iii. Gaps between deck and perimeter walls/blocking should be sealed.

This area can be sealed by using a black cover strip EPDM tape and fully adhering it across the gaps (**Figure 7**).

Figure 5. Prevention of air infiltration below the sheet membrane by using wood nailers to seal the membrane at the perimeter

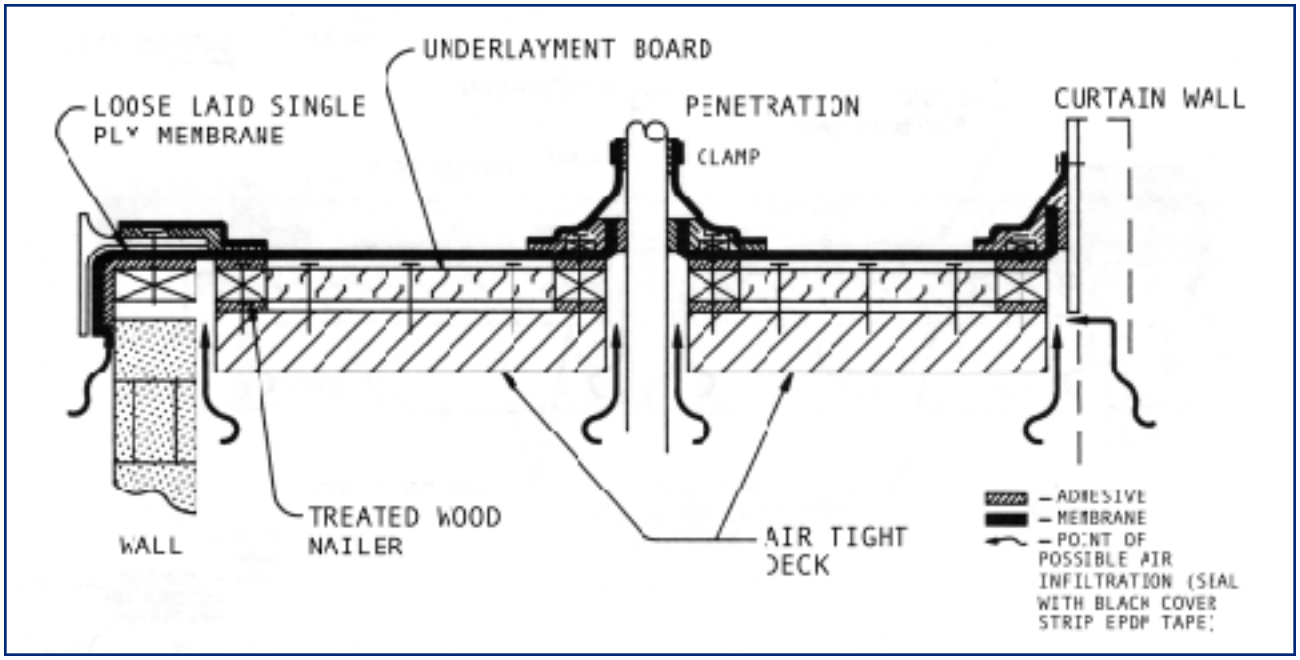


Figure 6. Typical deck/perimeter edge junctures which must be sealed to prevent air infiltration from occurring under loose-laid single-ply membranes

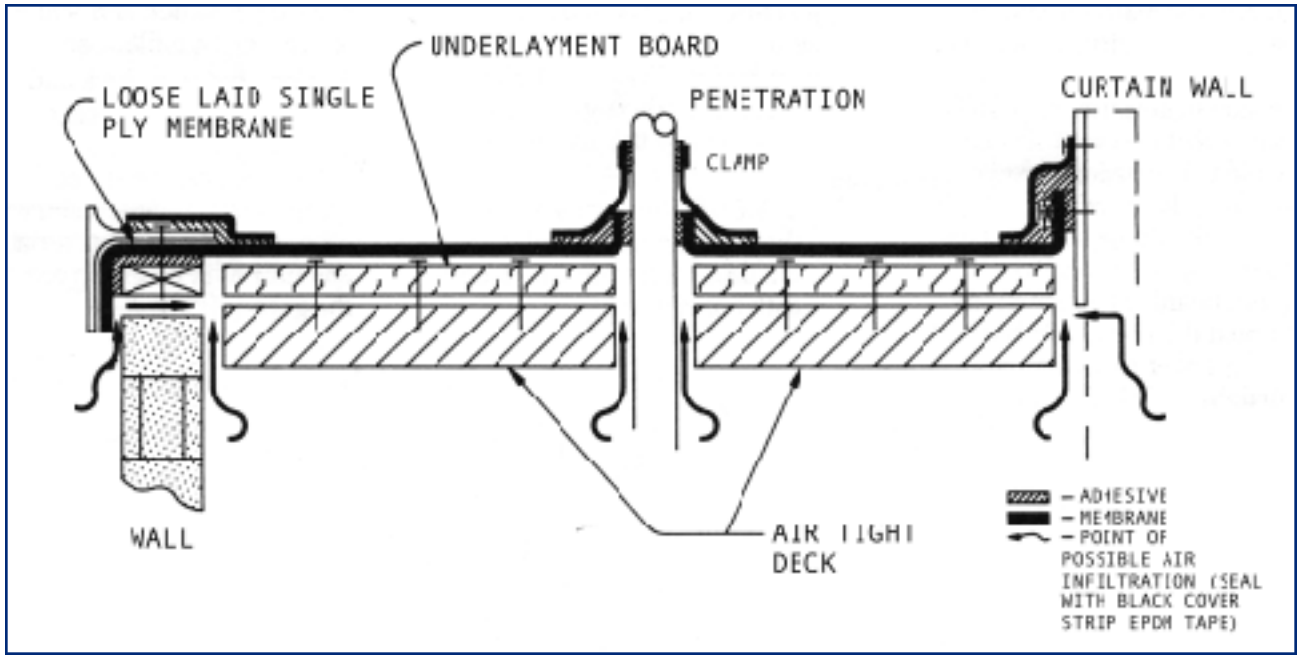
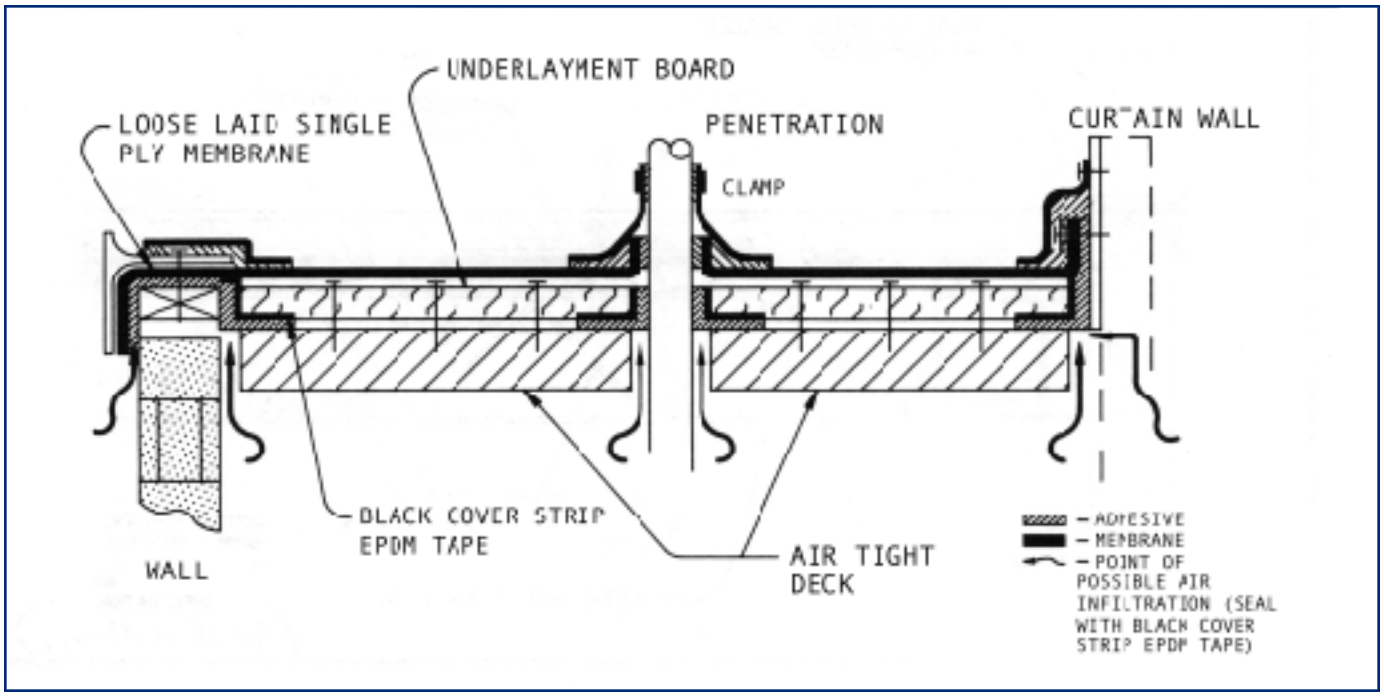


Figure 7. Prevention of air infiltration under sheet membrane by utilizing black cover strip EPDM tape



WARNING:

LIGHT**GUARD**® and HEAVY**GUARD**® brand roof insulation is combustible and may constitute a fire hazard if improperly used or installed. It should be adequately protected. Use only as directed by the specific instructions for this product.

During shipping, storage, installation and use, this material should not be exposed to flame or other ignition sources. All roof deck systems over which LG/HG brand insulation is installed should provide an adequate fire barrier or have passed a code accepted diversified test. For proper protection of LG/HG brand insulation during storage, consult your insurer, your local fire department, or other authority having jurisdiction.

T CLEAR
Protected Membrane Roof Systems

3255 Symmes Road
Hamilton, OH 45015
1-800-544-7398

www.tclear.com