5.1 Air Sealing Walls

SWS Detail: 3.0101.1 Air Sealing Holes;

Most wall air leakage involves the wall's discontinuities, joints, and irregularities.

See "Material and Sealant Specs" on page 96.

5.1.1 Multifamily Firewalls

SWS Detail:3.0102.4 Sealing Firewalls

Firewalls are structural walls between buildings or dwelling units that prevent the spread of fire from one unit to another. If a firewall isn't monolithic on all sides because of balloon framing, open-cavity CMU, open chases, attic bypasses, or other discontinuity, restore the firewall to code-compliance. Access attic- and floor penetrations, basement penetrations, and the vertical-edge penetrations throughout the firewall assembly and seal them.

- ✓ When air sealing, preserve existing fire ratings of materials and assemblies along with existing-material compatibility and comparable durability.
- ✓ Verify that non-monolithic fire walls, such as balloon-framed walls, are airtight assemblies both to air flowing horizontally and vertically.
- ✓ Seal air channels, created by furring strips or wall framing, against a monolithic firewall. At a minimum seal the top and bottom of each channel, and/or densepack the channels with fibrous insulation.
- ✓ Seal gaps and cracks with air-sealing materials and backing materials that are compatible with and similar to existing materials with fire-containment functionality.

5.1.2 Built-In Cabinets/Shelves

Built-in cabinets and shelves are a feature of older homes and present challenges for air sealing. Sealing these areas from inside the cabinet requires care and attention to appearances.

- ✓ If possible, establish both an air barrier and insulation behind the cabinet, out of sight of the occupants.
- ✓ Install drywall or wood wherever the cabinet is open to a wall cavity after insulating the cavity.

✓ Use caulking that is compatible with the colors of the surrounding wood if you seal its interior-facing side.

Built-ins and other connected air leaks: Built-in cabinets, a chimney chase, and recessed lights create a major air leakage problem in this living room.

5.1.3 Wall Framing Around Fireplaces and Chimneys

SWS Detail: 3.0102.11 Sealing Roof/Wall Connections; 3.0102.2 Sealing High-Temperature Devices

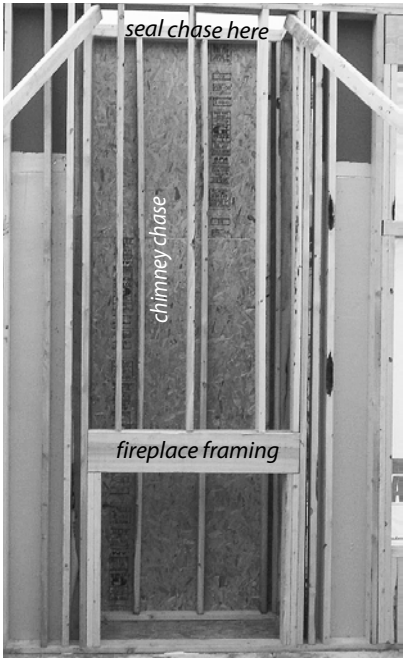
Leaks around fireplace chimneys are often severe air leaks. Use this procedure to seal air leaks through the chimney chase.

✓ Cut sheet metal to fit the gap that borders the chimney with overlaps connecting to nearby framing lumber.

✓ Bed the sheet metal air seal in sealant (ASTM E136), and then fasten the sheet metal to the framing with staples, nails, or screws.

✓ Seal the metal patch to chimney or flue with an ASTM 136 compliant, non-combustible sealant.

✓ For large chimney chases, cover the chase opening with structural material such as plywood. Maintain clearances between the structural seal and the metal or masonry chimney.



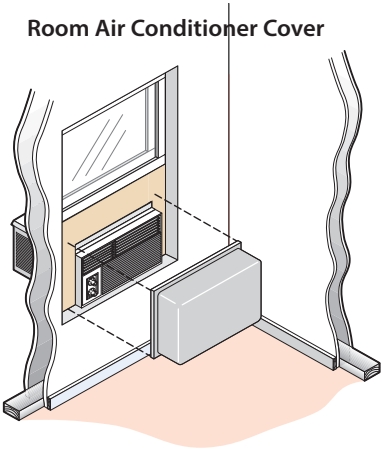
Chimney chase: Chimney chases can be multistory air-leak conduits if they're not sealed at floors and ceilings.

5.1.4 Pocket Door Cavities

When located on the second floor, cap the top of the entire wall cavity in the attic with rigid board, caulked and mechanically fastened.

Pocket doors connected to the exterior walls present difficult air sealing and insulating challenges. You may need to address these framing situations from the exterior in order to install a durable and efficient repair that provides a good air seal and allows you to install insulation into the exterior wall cavity

5.1.5 Cooling Appliances Installed through Walls or Windows



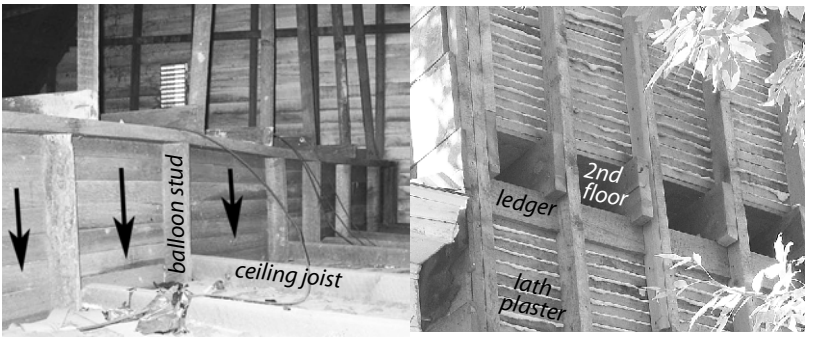
Room-air-conditioner cover: If you can't take the unit out for the winter, cover it with a room-air-conditioner cover.

- Remove window units in the fall and re-install in the spring.
- If the client doesn't want to remove the unit seasonally, cover the unit with a room-air-conditioner cover as shown here.
- Units installed through walls should have a sheet-metal sleeve that seals well to the surrounding framing and finish. This metal sleeve provides a smooth surface to seal to the room air conditioner or heat pump.
- Seal the unit's perimeter with one-part foam or caulking, depending on the width of the joint.

5.1.6 Balloon Framed Walls

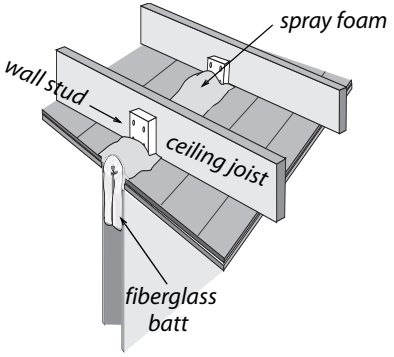
Balloon framed two-story walls are common in older homes. Some modern homes have balloon framed gable walls, where the studs rise above the level of the ceiling joists and are cut at an angle to frame the gable. Even when these balloon framed gable walls are full of insulation, air can convect through the insula-

tion. On occasion, windstorms have blown the insulation out of the wall cavity into the attic.



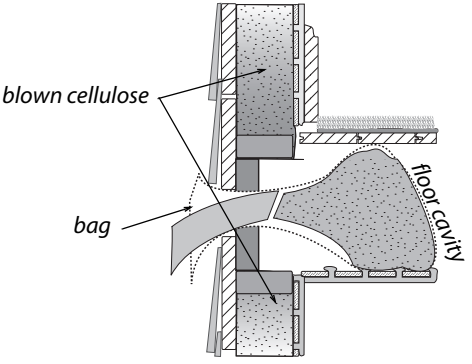
Balloon framed walls: Wall cavities, shown from outdoors at right and from the attic at left, are open to the floor cavity, the attic, and the crawl space.

- ✓ Dense-pack insulation into the wall cavities to reduce air leakage and convection.
- ✓ Dense-pack insulation into an air-permeable bag inserted with the fill tube into the balloon-wall floor cavity.
- ✓ Seal stud cavities from the attic, basement, or crawl space with an insulation plug, covered with a 2-part-foam air seal.
- ✓ Or seal the tops and bottoms of cavities with a rigid barrier, such as drywall or plywood, sealed and bonded to surrounding materials with 2-part foam.



Balloon framed interior walls: Fiberglass insulation covered by a 1-inch layer of two-part foam seals wall cavities.

Balloon framed gable: Studs extend above the ceiling allowing convection from the attic.



Sealing wall-floor junction: Blown insulation reduces convection through walls and floors. A bag helps contain and pack the blown insulation that extends into the floor cavity.

5.2 Air-Sealing Small Openings

SWS Detail: 3.0101.1 Air Sealing Holes; 3.0201 Windows; 3.0202 Doors; 3.0102.3 Sealing Tongue and Groove Surfaces; 3.0103.1 Access Doors and Hatches

Minor air sealing includes sealing small openings with such materials as caulk or weather stripping.

5.2.1 Window and Door Frames

SWS Detail: 3.0202.1 Door Air Sealing; 3.0201.1 Window Air Sealing

Sealing from the exterior serves to keep bulk water out and protect the building. If the crack is deeper than $^{5}/_{16}$-inch, it should be backed with a material such as backer rod and then sealed with caulk. Any existing loose or brittle material should be removed before the crack is re-caulked.

Silicone bulb weatherstrip: Silicone bulb has its own adhesive or is adhered to surfaces with silicone caulking.

5.2.2 Rim Joist Area

SWS Detail: 3.0104.1 Closed Crawlspace Air Sealing

The rim joist area is composed of several joints. They can be sealed from the basement or crawl space with caulk or foam. Remove dust before applying sealant.

5.2.3 Masonry Surfaces

Brick and various types of masonry block aren't air barriers. Seal masonry surfaces with a masonry-patching compound, mortar mix, or polyurethane caulking. For cement-based patches, buy a

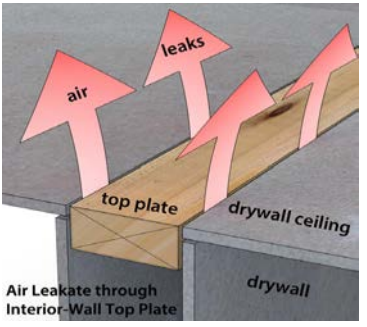
mix designed for patching. Prime the damaged areas with a masonry primer/adhesive. Liquid water resistive barriers (WRB) are often excellent air barriers.

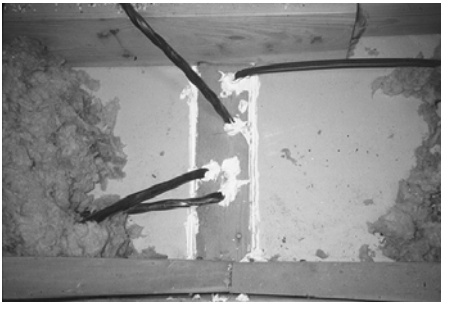
Stucco over brick: This retrofit serves two purposes: air sealing and structural reinforcement.

Liquid water-resistant barrier: This retrofit serves two purposes: water proofing and air sealing.

5.2.4 Interior Wall Top Plates

Workers install drywall on ceilings after they build interior walls. Thus the top plates of interior walls are open to the attic. Top plates shrink, opening cracks that run the entire length of the interior wall. Move insulation and seal the cracks with caulking or two-part foam.





Leaky top plates: The cracks along top plates are from lumber shrinkage. They are small cracks but there are long lengths of them.