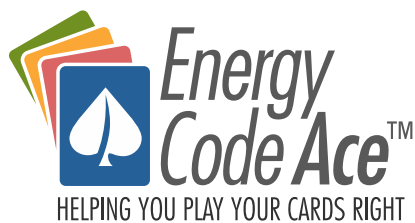




Nonresidential







This stamp shows which installation practices are required by code. The code reference is included for more detail.



This stamp shows which installation practices are Best Practices, above and beyond code requirements.



This stamp shows items that are purely informational. These are intended to help broaden your understanding of the topic.

## !! SUBMIT PICTURES !!

Thank you for using the Installation Ace, and providing feedback to keep this tool up to date, and as useful as possible.

If you have pictures of correct installations you've taken in the field that you think would be useful to include in this tool, please send them to [installation.feedback@energycodeace.com](mailto:installation.feedback@energycodeace.com)

Please include a short description of what's shown in the photo. We will give your department, organization or firm photo credit.

Thanks!

The California Statewide Codes & Standards Program offers free training, tools and resources designed to improve compliance with the state's energy code. The program aims to advance the adoption and effective implementation of energy efficiency measures and building practices to lock in long-term energy savings.

The program is funded by California utility customers under the auspices of the California Public Utilities Commission and implemented by Pacific Gas and Electric Company, San Diego Gas and Electric, Southern California Edison and Southern California Gas Company in support of the California Energy Commission.

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## Instructions for Use

The Installation Ace is intended to be used as a cost-effective field guide, that can be updated, added to and replaced easily. For best use, print pages double-sided and add to a 3-ring binder.

Each section of the guide is color-coded for easy identification, and a separate file of printable matching tab inserts is also available. A printable binder spine label is also provided in a separate file.

To find or suggest updates or to print additional field guides, please visit [www.energycodeace.com](http://www.energycodeace.com) or email us at [installation.feedback@energycodeace.com](mailto:installation.feedback@energycodeace.com)

## DUCTS - SEALING

**CODE**

PLACEHOLDER

### Mechanically Fasten Duct

Sections of metal duct should be mechanically fastened together after taping seams with UL 181 duct tape. Use sheet metal screws for rigid duct seams and compression straps for flex duct. Duct tape sealed with mastic is also acceptable.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(a)

**CODE**



NR-H-DS2

### Sealed Openings

All openings need to be sealed with mastic, tape, aerosol sealant, or other duct-closure systems meeting requirements. Sealants should be non-toxic and water resistant, and must comply with UL 181.

Particularly check traverse joints, longitudinal seams and duct wall penetrations. Air handlers and filter boxes should also be checked.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(a) and 120.4(b)

**CODE**



NR-H-DS3

### Drawbands

Drawbands on flexible ducts must be stainless steel worm-drive hose clamps or UV resistant nylon duct ties. Tighten as recommended by the manufacturer with adjustable tensioning tool.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(b)2B

**CODE**



NR-H-DS4

### Reinforce Gaps and Seams with Mesh

Openings greater than ¼" must be sealed with either duct tape and mastic, or mesh and mastic. Duct tape may not be used to seal plenums or junction box joints.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(a) and 120.4(b)

## DUCTS – SEALING

**CODE**

CEC Form NR-H-DS5 (Revised 06/13)	
CERTIFICATE OF ACCEPTANCE	
DUCT LEAKAGE	
Project Name:	Enforcement Agency:
Project Address:	City:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance. HERS verification required. This form used for duct pressure test and to certify low leakage air handlers. Fill out to determine if this is a New Duct System (fill out Section B), an Altered Space Condition (Section C), or if the compliance software requires Low Leakage Air-Handling Unit Verification.	
A. System Information	
01	HVAC System Identification or Name:
02	HVAC System Location or Area Served:
03	Was Low Leakage Air-handling Unit Credit taken on MECH-1C?
04	Duct System Construction Type:
05	Condenser Nominal Cooling Capacity (ton)
06	Heating Capacity (kBtu/h)

NR-H-DS5

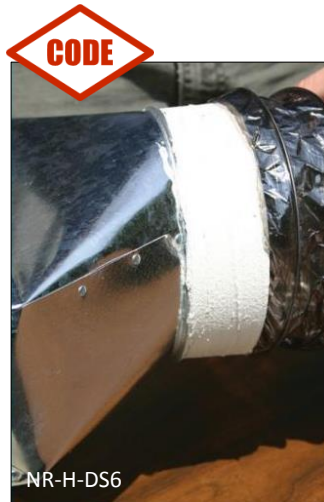
### Acceptance Testing

Acceptance Testing is required when new duct systems, or additions to ducts systems are installed.

Exceptions:

- When asbestos is present
- Previously sealed and tested ducts.

**Code Reference:** 2013 Title 24, Part 6 Standards §140.4(l)



### CMC Compliance

All air distribution system ducts and plenums are to be installed, sealed, and insulated to meet requirements of 2010 CMC.

**Code Reference:** California Mechanical Code §120.4.



### Seal Duct Boot to Subfloor

Duct boots can be completely sealed with mesh and mastic. Sealing is required around register boots if air could escape to unconditioned space. Foil tapes, butyl backed tapes or caulks can also be used.

### Notes:

## DUCTS - DISTRIBUTION

**CODE**

PLACEHOLDER

NR-H-DD1

### Factory Fabricated Duct Systems

Closure systems including collars, connections, and splices must comply with UL 181 and include a label showing compliance.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(b)

**CODE**

PLACEHOLDER

NR-H-DD2

### Pressure Sensitive Closure Systems

All pressure sensitive tapes, heat-activated tapes, mastics, aerosol sealants used in the manufacture or field fabrication of duct systems must be UL 181 compliant.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(b)

**CODE**



NR-H-DD3

### Securing Metal Ducts

**Horizontal:** Ducts need to be fastened in place at each change of direction.

**Code Reference:** 2013 California Mechanical Code §602.4

**CODE**

PLACEHOLDER

NR-H-DD4

**Vertical:** Ducts need to be held in place by means of metal straps or angles and channels to secure the riser to the structure.

**Code Reference:** 2013 California Mechanical Code §602.4

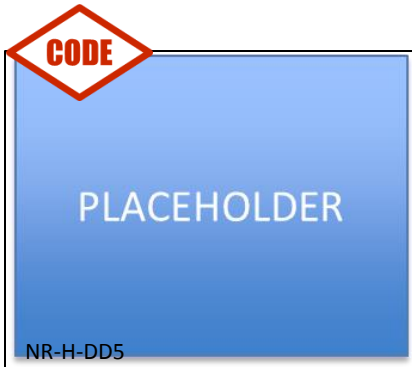
NR-H-DD1: © PLACEHOLDER

NR-H-DD2: © PLACEHOLDER

NR-H-DD3: © DOE Office of Energy Efficiency & Renewable Energy

NR-H-DD4: © PLACEHOLDER

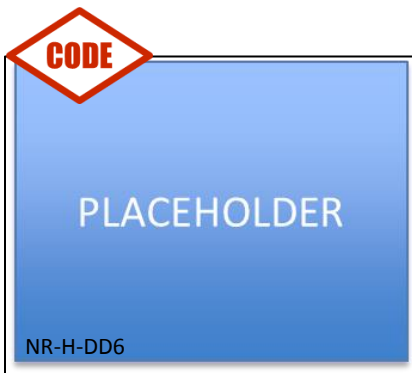
## DUCTS - DISTRIBUTION



### Joining Round Ducts

Crimp joints for round ducts need a contact lap of 1.5 inches or more and need to be secured by three or more mechanically fastened by 3 or more sheet-metal screws equally spaced around the joint (or equivalent fastening method).

**Code Reference:** 2013 California Mechanical Code §602.4



### Automatic Dampers

Motorized or gravity dampers installed on large exhaust systems reduce infiltration by closing when the system is not in use. Dampers are required for exhaust systems with a design capacity greater than 300 cfm that operate intermittently.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.1(e)1



### Short Duct Runs

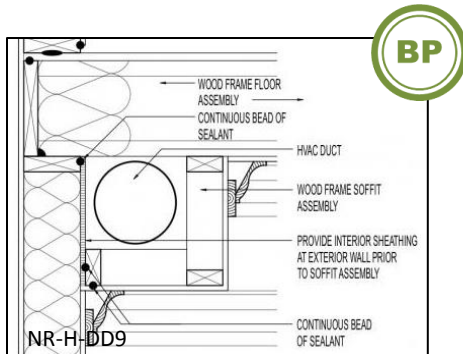
Keep supply duct runs short and as straight as possible. Avoid sharp turns (such as around framing), which can cause a kink in ductwork. When using flex duct, use rigid elbows for sharp bends and seal appropriately to the flex duct. The more turns and longer the duct runs, the less efficient the system is at delivering conditioned air.



### Support Ducts

**Flex Ducts:** Horizontal flex duct runs should be supported every 4ft and vertical flex runs every 6 ft. There should not be more than 2in of sag.

## DUCTS - DISTRIBUTION



### Conditioned Space

Keep ducts within the conditioned space if possible. Rather than run ducts in the unconditioned space, locate ducts in a fully enclosed dropped soffit or run ductwork through interim floor cavities with well sealed rim joists.



### Do Not Use Building Cavities used as Plenums

Do not use building cavities as plenums. Properly insulate and seal cavities if used for supply or return air.

## DUCTS – DISTRIBUTION

**Notes:**

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## DUCTS - INSULATION



### Insulation Protection

Protect duct insulation from damage, including sunlight, moisture, equipment maintenance and wind. When insulation will be exposed to weather, physically protect with aluminum, sheet metal, painted canvas, or plastic cover.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(f)



### R-Values

Verify that supply and return ducts and plenums have been insulated to the specified R-value in accordance with the approved mechanical plans/schedule.

Use a minimum installed level of R-8 when supply-air and return-air ducts are located outdoors, between the roof and insulated ceiling, directly under a roof with fixed vents or openings to the outside or unconditioned spaces, unconditioned crawlspace, or other unconditioned spaces.

A value of R-4.2 is acceptable when supply air ducts are not in one of the above spaces, such as ducts buried in slab. Otherwise ducts must be enclosed in directly conditioned space.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(a)



### Cellular Foam Insulation

Cellular foam insulation – Needs to be protected like other insulation or painted with a coating that is water retardant and provides shielding from solar radiation.

**Code Reference:** 2013 Title 24, Part 6 Standards §120.4(f)

## DUCTS – INSULATION

**Notes:**

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## EQUIPMENT

BP

PLACEHOLDER

NR-H-E1

### Programmable Thermostats

When a central energy management system is not included in the design of an HVAC system, then thermostat with setback capabilities shall be installed. This applies to all unitary heating or cooling systems, which includes heat pumps, to have a thermostat capable of at least 4 setpoints in a 24 hour period.

EXCEPTIONS: systems serving zones that must have constant temperatures to protect a process or product (e.g. a laser laboratory or a museum), gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliance, wood stoves, room air conditioners, room heat pumps

**Code Reference:** 2013 Title 24, Part 6 Standards §110.2(c) and §120.2(b)4

FYI

PLACEHOLDER

NR-H-E2

### Optimum Start Controls

The goal of optimum start controls is to bring buildings to desired occupied temperature each day just before occupancy by adjusting the start time of the HVAC system.

BP

PLACEHOLDER

NR-H-E3

### Refrigerant Lines

Refrigerant line pipe insulation must be protected from the elements. Some options include water and UV resistant paint and sheet metal.

# HVAC

## EQUIPMENT

**Notes:**

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# Envelope

## INSULATION – BATT

FYI

PLACEHOLDER

NR-E-IB1

BP



NR-E-IB2

BP



NR-E-IB3

(1)



NR-E-IB4

(2)

### Avoid Using Batt Insulation With Metal Framing

Batt insulation *should not* be used with metal framing systems. Although it is common to see fiberglass batt insulation installed between steel studs, there is significantly increased risk of moisture infiltration and thermal bridging. The best practice for insulating metal framing is to install rigid insulation inside the exterior wall; more detailed information can be found in the section Envelope, INSULATION – RIGID / SIPS.

### Pressure or Friction Fit

Insulation should be cut to fit snugly against studs on all sides, and should completely fill the cavity with no air gaps. Cut lengths of insulation should be butted together with no gaps. Friction fit batts are slightly wider than the stud cavity and so held in place by friction, not stapling. Friction fit batts should not be used in walls over 8 feet tall.

### Face & Inset Stapling

Push batt into stud cavity so that it makes contact with framing, especially at corners and sides. Then pull batt forward to full loft so that it fills the whole cavity.

**(1) Face Stapling:** Paper flanges are stapled to stud face. This method of installation is best practice and avoids loss of performance from air gap channels created with inset stapling.

**(2) Inset Stapling:** Insulation should be compressed only as far as is required to staple the flange to the inside of the stud. Extra compression will result in loss of performance therefore **this method is NOT RECOMMENDED.**

# Envelope

## INSULATION – BATT



### Obstructions

Junction boxes that back to outside walls should have insulation cut to fit snugly around them, and behind them, to fill the cavity. Similarly, insulation should be cut to fit around ceiling exhaust fans. All holes in junction boxes whether there are wires entering the boxes there or not should be air sealed.



### Split , Don't Stuff

Take the time to split insulation to fit snugly around electrical wires and plumbing. Do not stuff the batt in front of or behind the wire; this compresses the insulation and leaves an air gap.



### Proper Support

Wire struts or laced wire can be used to support fiberglass to keep it in touch with the floor above. Wire should not compress the insulation but also should not let it sag.

### Notes:

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# Envelope

## INSULATION – BLOWN

FYI

PLACEHOLDER

NR-E-IB2

### Avoid Using Blown Insulation With Metal Framing

Blown insulation *should not* be used with steel framing systems. The best practice for insulating metal framing is to install rigid insulation inside the exterior wall; more detailed information can be found in the section Envelope, INSULATION – RIGID / SIPS.

BP

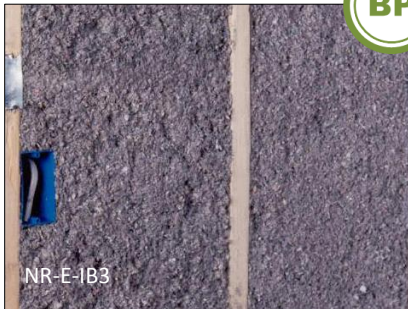


NR-E-IB2

### Dry Blown

Dry blown cellulose can be blown into walls through holes in netting fixed to the studs. The insulation should be packed firmly but not bulging. Rolling the packed insulation helps evenly distribute the cellulose in the stud cavity and leaves it flat ready for drywall installation.

BP



NR-E-IB3

### Wet Blown

Wet blown cellulose is typically used in new construction or major renovations and sticks to the framing to fill the cavity. It is “shaved off” so that it aligns with the face of the studs.

The wall should not be covered until the insulation is totally dry (follow manufacturer instructions for approximate dry times).

BP



NR-E-IB4

### Spray

Open-cell foam sprayed into walls fully fills the stud cavity with no voids. Properly installed foam will not shrink away from framing members. Pay attention to the rim joist area, where blocking and other obstructions, in addition to nozzles used to spray the foam, make it hard to cover the lower edge of that space. Closed cell foam has a higher R value per inch and adds shear strength to the building. Thickness of more than 1.5 inches of closed-cell foam can act as an air and moisture barrier.

# Envelope

## INSULATION – BLOWN



### When Installed in an Unconditioned Space

Attic blown insulation should be installed uniformly and reach the outside edge of the exterior walls.

**Notes:**

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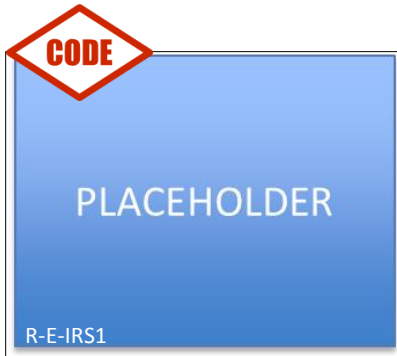
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## INSULATION – EXTERIOR AND RIGID/ SIPS



### Urea Formaldehyde Foam

When using urea formaldehyde foam insulation it may only be installed in exterior side walls. A 4 mil thick plastic polyethylene vapor retarder must separate the foam from the interior space.

**Code Reference:** 2013 Title 24, Part 6 Standards §110.8(b)



### Metal Framing

A wall assembly consisting of exterior veneer, a reflective air space, two inches of R-8 rigid foiled faced insulation, a vapor barrier, exterior gypsum board, topped with metal framing and interior drywall provides a calculated R-value around R-22. This approach prevents the risk moisture infiltration found with fiberglass batt, and allows the stud cavity to more easily be used for electrical and communications wiring.



### SIPs

Structural Insulated Panels sandwich rigid foam insulation between layers of sheathing. Air seal electrical wiring channels in exterior walls. Seal connections between panels, sill and top plates when assembling to reduce water vapor and air transmission. Where appropriate, use SIPs with splines, allowing insulation to remain as continuous as possible. Some panels are produced with rough sawn plywood to speed up installation for board and batt siding.



### Loading Dock Weather Sealing

Reduce air infiltration when loading and unloading at cargo dock doors by using weather seals meant to reduce air flow.

R-E-IRS1: PLACEHOLDER  
R-E-IRS2: PLACEHOLDER  
R-E-IRS3: PLACEHOLDER  
R-E-IRS4: PLACEHOLDER

## INSULATION – EXTERIOR AND RIGID/ SIPS



### Exterior Insulation

Insulation on the exterior of a building must be protected from wind, sun, and moisture as well as maintenance or landscape activities. Brick, stucco and metal siding are examples of cladding that protect exterior wall insulation.

**Notes:**

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## INSULATION – WALL SYSTEMS



### Concrete Columns

Carefully follow the specifications for connection, air sealing and insulation details where concrete columns meet interior and exterior walls. These areas often leave gaps that are difficult to access.



### Insulating Concrete Forms (ICF)

With careful installation and proper air sealing, ICFs can create continuous insulation and an air barrier. Avoid using metal ties to connect the layers of foam to minimize heat transfer through the ICF system.

# Envelope

## INSULATION – WALL SYSTEMS

**Notes:**

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# Envelope

## CURTAIN WALLS



### Flashing

Pay special attention to the interface between the curtain wall and other building elements. Carefully installation of flashing at the perimeter is critical to prevent leaks.



### Sealing

Seal moisture and air from between panes which can compromise thermal performance. Gaskets or structural sealant can be used to seal the glazing to the frame and should not be loose or dried out.

NR-E-WCW1: PLACEHOLDER  
NR-E-WCW2: PLACEHOLDER

# Envelope

## CURTAIN WALLS

**Notes:**

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## CONCRETE WALLS

**FYI**

PLACEHOLDER

R-E-CW1

### Tilt-up Concrete Panels

Tilt up concrete panels can be insulated on the inside with furring strips, on the outside with EIFS or in the middle with two concrete layers.

**FYI**

PLACEHOLDER

R-E-CW2

### Concrete Sandwich

The goal for this construction type is to keep the insulation layer as continuous as possible with no thermal breaks.

**BP**

PLACEHOLDER

R-E-CW3

### Fastening

The method of fastening the panels together effects the insulation effectiveness. To benefit from as much continuous insulation as possible use fasteners to connect the concrete panels. In some cases concrete itself is used to connect the panels at intervals along the wall, breaking the continuity of the insulation.

R-E-CW1: PLACEHOLDER  
R-E-CW2: PLACEHOLDER  
R-E-CW3: PLACEHOLDER

# Envelope

## CONCRETE WALLS

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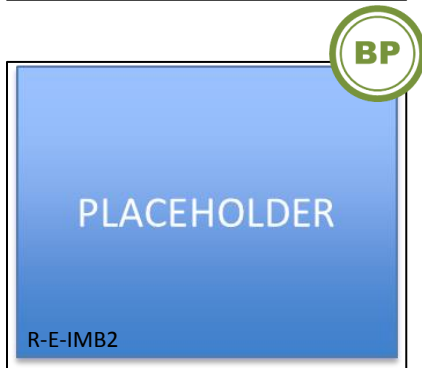
# Envelope

## METAL BUILDINGS



### Metal Buildings

Metal buildings are insulated by stretching vinyl backed fiberglass insulation over metal girts/purlins. The metal siding/roofing is attached over the insulation and fastened to the girts/purlins. At these connections, the insulation is compressed and providing very little R value. To avoid thermal bridging and improve the R value, a 2<sup>nd</sup> layer of insulation can be added over or between girts. To reduce thermal bridging at girts/purlins, install thermal spacer blocks.



### Fiberglass Installation Over Purlins

Fiberglass insulation that is draped over purlins should be installed perpendicular to the purlins. The taped seams of the insulation should also run perpendicular to purlins instead of leaving long runs of unsupported seams.



### Vapor Retarder

The vapor retarder should be installed facing the inside of the building. "Sag & Bag" installations leave purlins exposed and require the vapor barrier seams to be taped. Install full depth insulation between purlins with a continuous vapor retarder that covers purlins leaving no or few seams to tape.

# Envelope

## METAL BUILDINGS

**Notes:**

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## INSULATION – ATTIC/ROOF DECK



### Direct Ceiling Contact

Install insulation so that it is in direct contact with roof or ceiling that is continuous and well-sealed to limit infiltration. The insulation may be placed above or below the roof deck, or above the ceiling drywall.

**Code Reference:** 2013 Title 24, Part 6 Standards §110.8(e)1



### Roof Membrane

Unless the attic insulation has a maximum water absorption of 0.3% by volume, it must be installed below the roof membrane that seals the roof from water penetration.

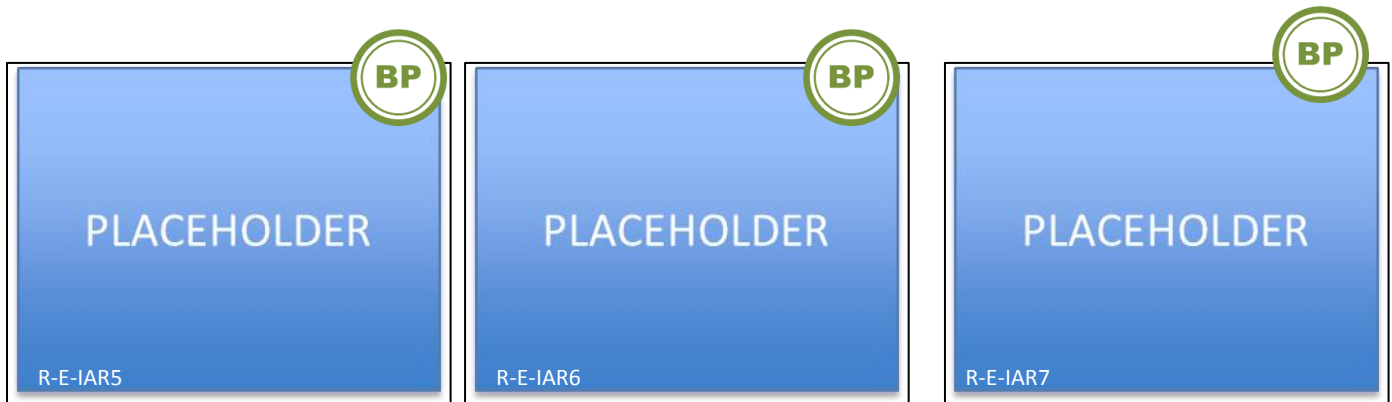
**Code Reference:** 2013 Title 24, Part 6 Standards §110.8(e)4



### Install Entirely Above the Roof Deck

Although not a code requirement, rigid insulation installed over a metal roof deck solves several issues associated with attic insulation. It alleviates thermal bridging, creates a very even R value across the entire roof, and covers the metal that otherwise acts as a conduit for heat gain or loss.

## INSULATION – ATTIC/ROOF DECK



### Open Blown or Poured Loose Fill Insulation

Loose blown attic insulation should not be installed in attics with greater than a 3:12 sloped ceiling. Otherwise it will be hard to maintain an even full depth over the vaulted area.

### Vent Baffles

Attic baffles are required in every vented bay. The baffles protect insulation from being blown away from the exterior wall, help maintain the effectiveness of the insulation at its edge, and maintain venting space under the roof deck.

### Insulating Around Equipment

Maintain insulation thickness around equipment installed in the attic. Make sure full insulation depth is maintained above can lights and below ducts. Can lights must be air tight and insulation contact rated. Compressing insulation will reduced effective R value.

### Notes:

## INSULATION – WALLS/ FOUNDATION



### More Insulation Less Frame

Install wall components to allow for as much insulation coverage as possible while meeting structural requirements. Use two or three stud corners that allow insulation to reach these cavities.



### Metal Framing

Rigid insulation installed over metal studs alleviates thermal bridging of the studs. Cavity insulation between metal studs must be in direct contact with exterior sheathing or rigid insulation if present.



### Slab Insulation

Insulation should extend all the way to the top of the slab.

## INSULATION – WALLS/ FOUNDATION

**Notes:**

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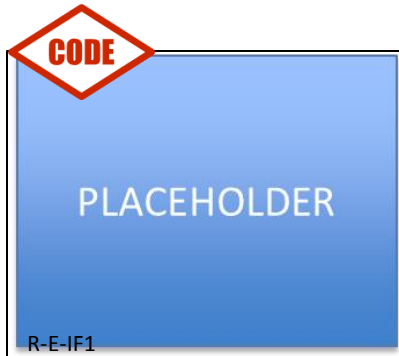
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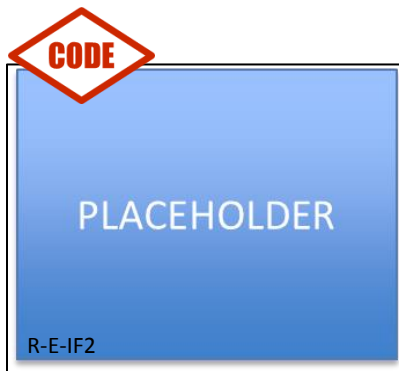
## INSULATION - FLOORS



### Heated Slab Floors

A rigid shield is installed at the exposed top edge of insulation to prevent insects from penetrating the wall structure above. Any exposed insulation is protected from moisture, UV, and other damage with a solid covering.

**Code Reference:** 2013 Title 24, Part 6 Standards §110.8(g)2



### Heated Slab Insulation

Perimeter insulation installed on the exterior of the foundation extends 16" down from the level of the top of the slab; greater if the frost line is deeper. However it may stop at the footing if this is reached first. If the slab is below grade, insulation shall extend from the top of the foundation wall to the bottom of the foundation wall, footing or frost line; whichever is greater. When a heated slab is insulated between the slab and outside wall, the vertical insulation extends from the top of the slab down to the horizontal insulation. The horizontal insulation extends 4' inward from the outside edge of the vertical insulation.

**Code Reference:** 2013 Title 24, Part 6 Standards §110.8-A

R-E-IF1: PLACEHOLDER  
R-E-IF2: PLACEHOLDER

# Envelope

## INSULATION – FLOORS



### Mass Floors

Install continuous rigid insulation under a mass floor so that none of the floor is visible through the insulation..



### Steel Joist Floor

When insulating a steel joist floor, insulation should be in direct, continuous contact with the floor above. This is most easily achieved with spray on foam insulation. If insulation is not installed for permanent contact, it will lose effectiveness.



### Wood Framed Floor

For full benefits of thermal insulation installed below wood framed floors, the insulation should be in direct contact with the under side of the floor deck. Cantilevers also require that the insulation be blocked in the joist bays above the exterior wall.

**Notes:**

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# Envelope

## AIR BARRIERS



### Insulation Enclosed On All Sides aka “insulation sandwich”

When batt insulation is used with wood framing, wall Insulation should be enclosed on all sides including top, bottom and side framing as well as front and back sheathing or drywall. If the wall backs up to an attic space, the back side of the insulation needs an air barrier.



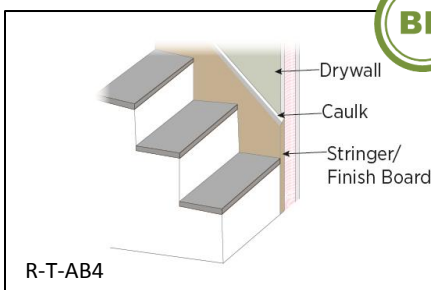
### Hard to Reach Areas

Some areas require early coordination with other trades, such as framers. Otherwise it may be difficult to install an air barrier or the area may become inaccessible. The area behind a shower, or other areas that will not have interior finishes but that separate conditioned & unconditioned space, need special attention. Another example is a fireplace.



### Lids and Floors

Vertical and horizontal chases need air barriers where they meet the attic and unconditioned space below. Make sure these spaces have lids and floors. Other areas that need an air barrier = cantilever where it meets the rim joist.



### Stair Walls

Install an air barrier on the conditioned side of walls under stairs that are adjacent to the exterior wall. These areas are sometimes used for storage and still need the air barrier enclosing the wall Insulation.

R-T-AB5: © Architectural Energy Corporation  
R-T-AB6: © PLACEHOLDER  
R-T-AB7: © Architectural Energy Corporation  
R-T-AB8: © Environmental Protection Agency

# Envelope

## AIR BARRIERS

**Notes:**

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# Envelope

## AIR SEALING

**CODE**

PLACEHOLDER

R-T-AS1

### Field Fabricated Fenestration

Windows and exterior doors that are field fabricated must be caulked between the window or door and the building, and doors weatherstripped. Seal all joints and penetrations to limit air infiltration. Note: field fabricated fenestration defines windows where wood frames are constructed from raw materials at the site or salvaged windows with no NFRC label, and have default U values.

**Code Reference:** 2013 Title 24, Part 6 Standards 110.6(b)

**BP**



R-T-AS2

### Electrical, Duct & Pipe Penetrations

Seal all electrical, duct and pipe penetrations through exterior walls, ceilings, rim joists, top/bottom plates; anywhere air might leak between conditioned and unconditioned space. Use appropriately rated sealing material.

**BP**

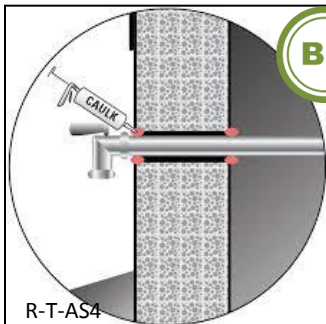


R-T-AS3

### Outlet Boxes

Seal electrical outlet box with fire rated putty. These boxes inevitably leak. Baby outlet covers used for safety also help stop the air leaks!

**BP**



R-T-AS4

### Exterior Wall Penetrations

Air seal everything that passes through the exterior wall such as plumbing and refrigerant lines.

R-T-AS1: © Architectural Energy Corporation  
R-T-AS2: © Architectural Energy Corporation  
R-T-AS3: © Baechler, Gilbride, Hefty, Cole, Love  
R-T-AS4: © DOE's Office of Energy Efficiency and Renewable Energy

# Envelope

## AIR SEALING

**Notes:**

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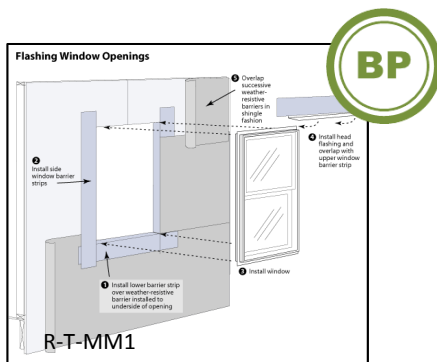
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## MOISTURE MANAGEMENT



### Windows

Flash windows in proper sequence. Coordinate with building wrap to maintain continuous air barrier and proper drainage plane. Install pan flashing at the rough sill opening of the window to help protect the sill and direct water to the exterior.

## MOISTURE MANAGEMENT

**Notes:**

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