TRI-COUNTY
REGIONAL ENERGY NETWORK
SAN LUIS OBISPO • SANTA BARBARA • VENTURA

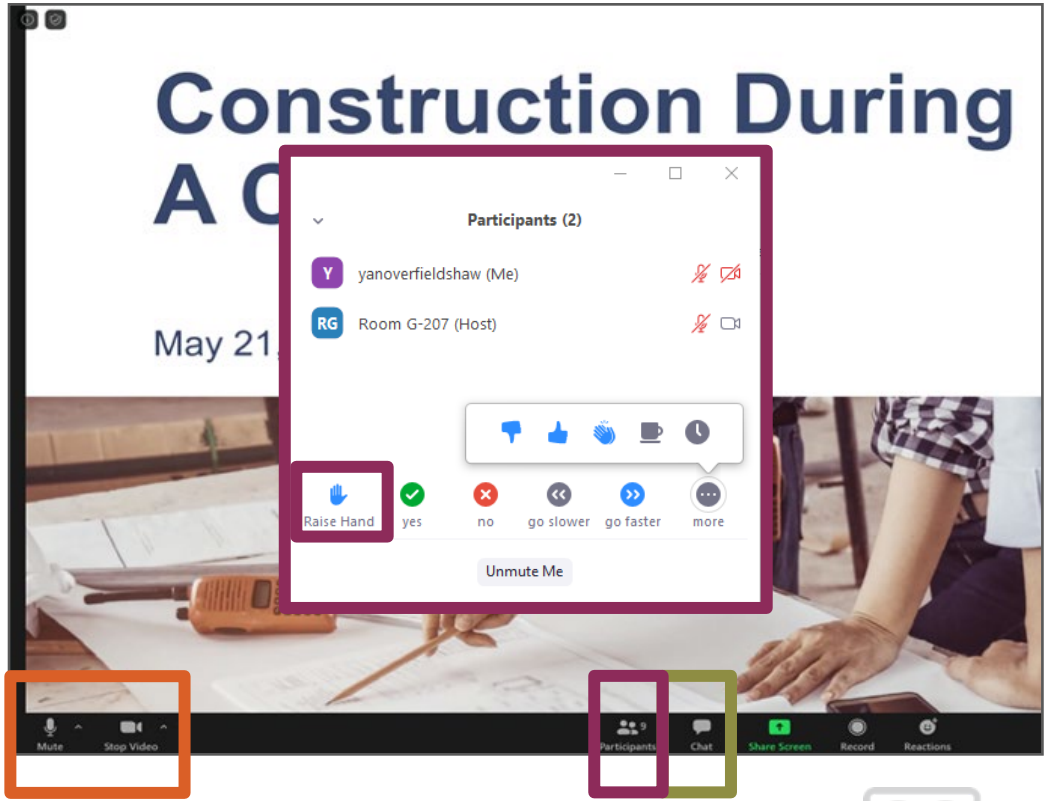
What Energy Consultants Need to Know About Quality Insulation Installation (QII)

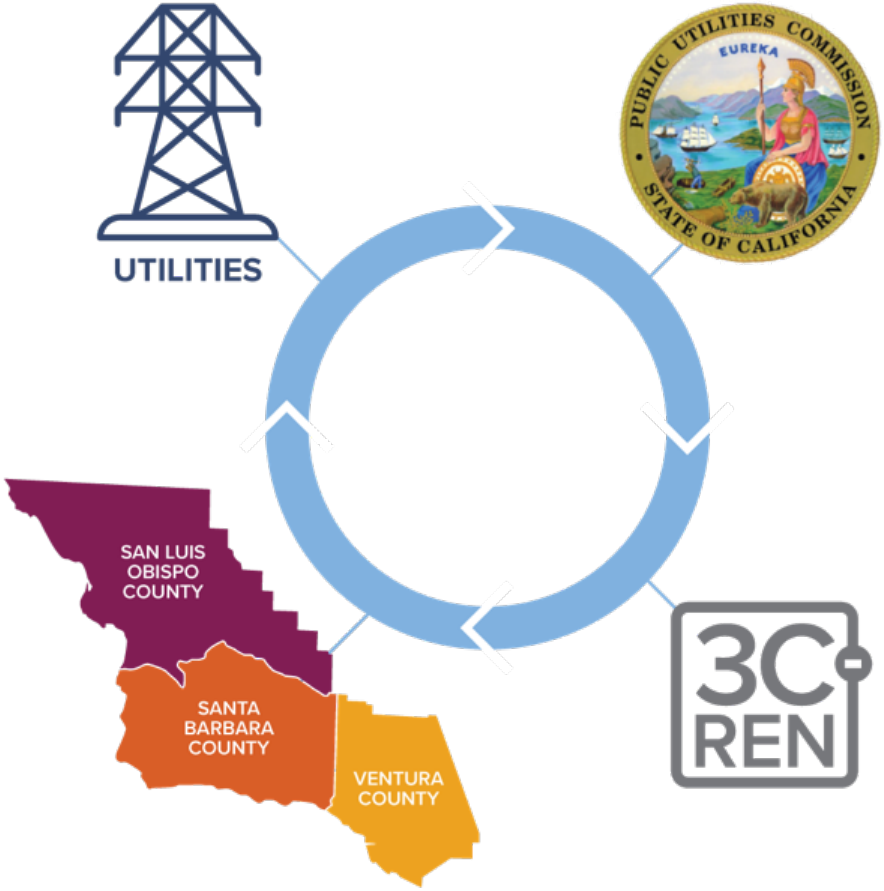
Russ King – Coded Energy

July 29, 2025

Zoom Orientation

- Add an **introduction** in the chat.
  Be sure **full name** is displayed.
- Did you call in? Please **share** first and last name with us.
- Please **mute** upon joining
- Use the "**Chat**" to share questions or comments
- Under "**Participant**" select "**Raise Hand**" to share a question or comment verbally
- Session may be **recorded** and posted to 3C-REN's on-demand page
- Slides/recording are **shared** after most events
- 3C-REN does **not** allow **AI notetakers**, unless used to accommodate a disability.





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Our programs reduce energy use for a more sustainable, equitable and economically vibrant Central Coast

Our free services are funded via the CPUC, bringing ratepayer dollars back to the region

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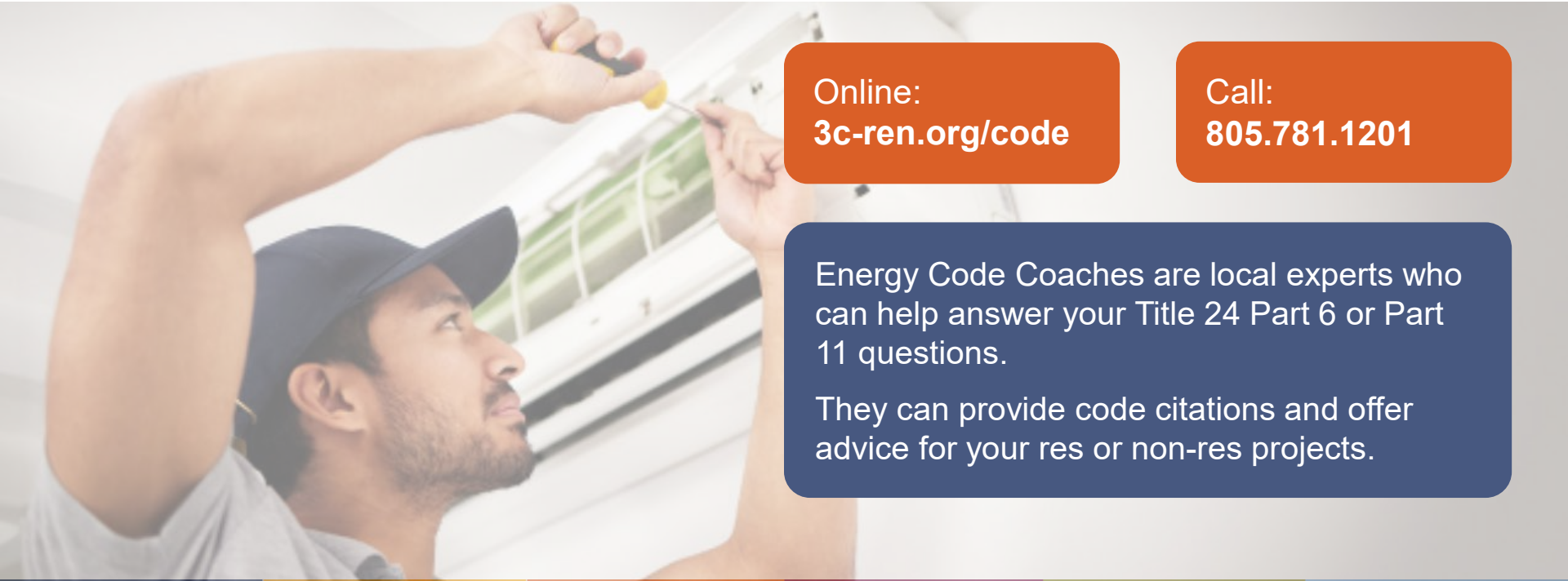

Online:
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Energy Code Coaches are local experts who can help answer your Title 24 Part 6 or Part 11 questions.

They can provide code citations and offer advice for your res or non-res projects.

What Energy Consultants Need to Know About QII

Sponsored by 3C-REN

Introduction

- **FACT:** It is a lot *harder* to make a house comply with the code than ever before.
- **FACT:** This does result in more HERS measures being specified for compliance.
- **FACT:** Some of these HERS measures can no longer be “modeled away” if they fail inspection.

Introduction

- Don’t “check the box” without knowing exactly what the implications are.
- Energy Consultants need to communicate the potential costs and requirements of each HERS measure they specify.
- When you specify a HERS measure, send your client the RA reference (aka Protocols). See Table RA2-1.

What is QII?

QII is a Protocol for the *Verification* of Properly Installed Insulation

- Based in industry standards: NAIMA and ICAA
- How the manufacturers intend their insulation to be installed.
- Delegated to 3rd party Special Inspectors (HERS Raters)
- Reference Appendix Section RA3.5
- It can also be used as guidelines for properly *installing* the insulation.

What you should know about . . .

Quality Insulation Installation (QII)

- It is a prescriptive measure in the 2022 code.
- Exception: Prescriptive additions 700 SF or less.
- Instead of an extra credit for doing it, there is a big penalty for NOT doing it.
- Go to www.energycodeace.com and search for "Decoding QII". Download the handout from the more recent session (this year).
- Includes the "CalCERTS QII Handbook"

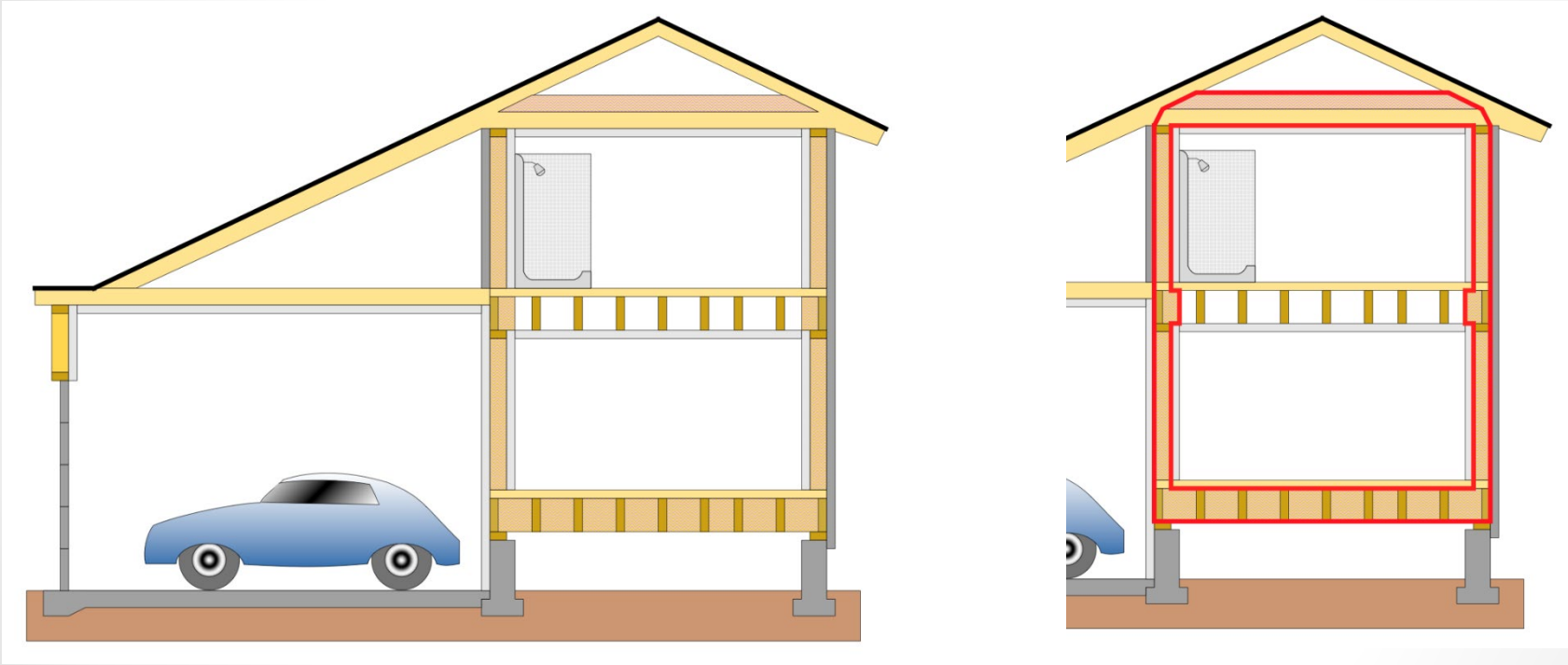
QII – WTF? (Why the Fuss?)

- There was a large study done prior to the 2005 energy code that determined that poor quality installation was very common and very poor.
- The compliance software that models a house to determine compliance automatically derates insulation by ~13.5%.
- If energy consultant selects QII, HERS verification is triggered (shows up on the CF1R-PRF-01).

QII – WTF? (Why the Fuss?)

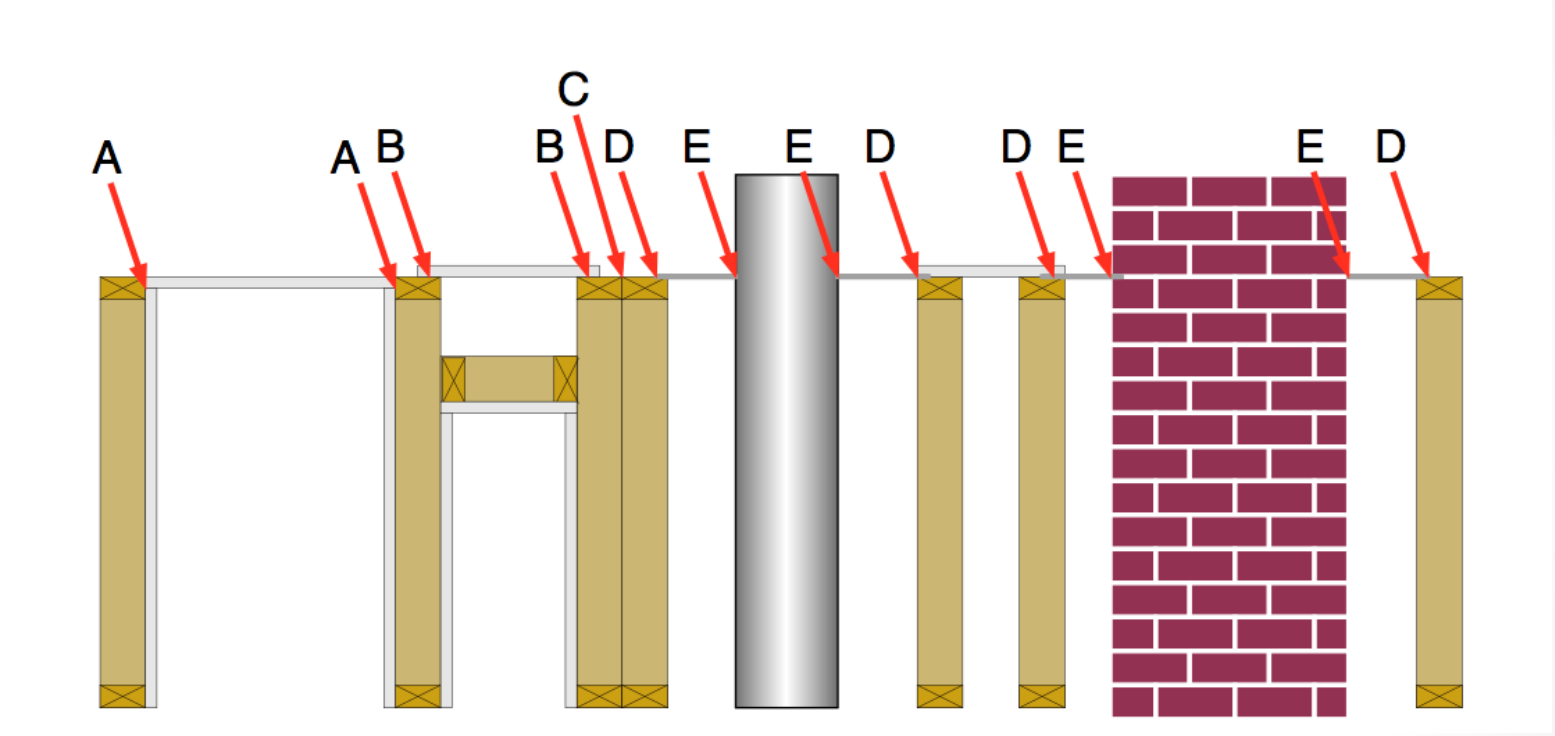
- If it is not planned for from the beginning, there will be a lot of problems.
- Coordination is key.
- Education of installers is very important.
- HERS raters inspect the insulation, but EVERYONE helps make it pass.

QII Basics – Well-Defined Thermal Boundary



Diagrams from CalCERTS QII Handbook

QII Basics – Seal All Potential Air Leaks



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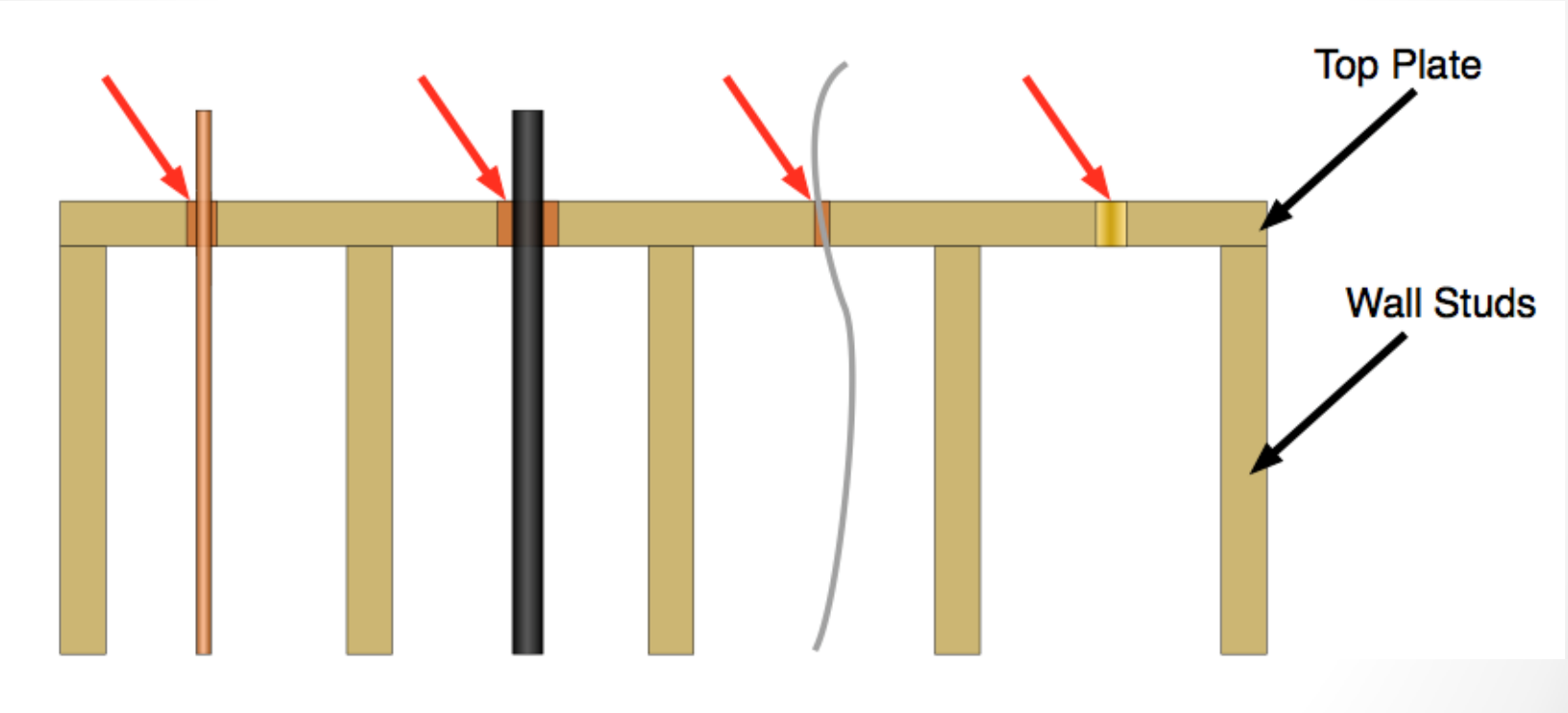

Diagrams from CalCERTS QII Handbook

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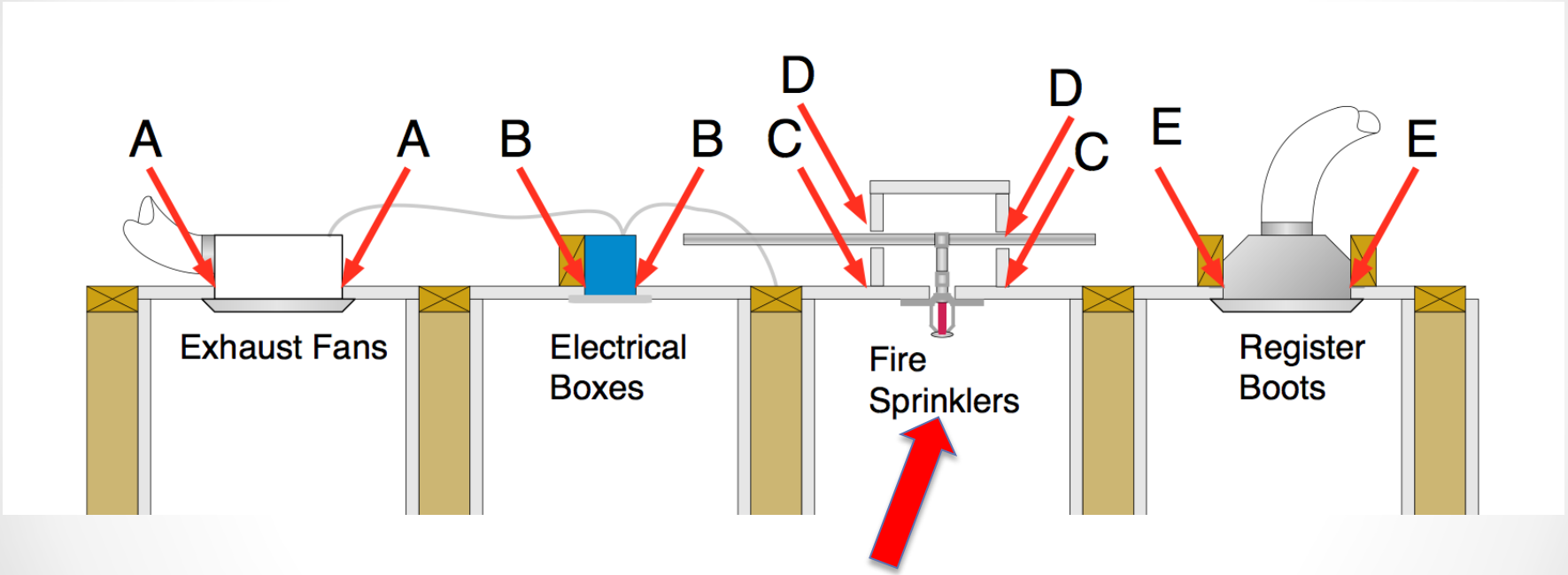
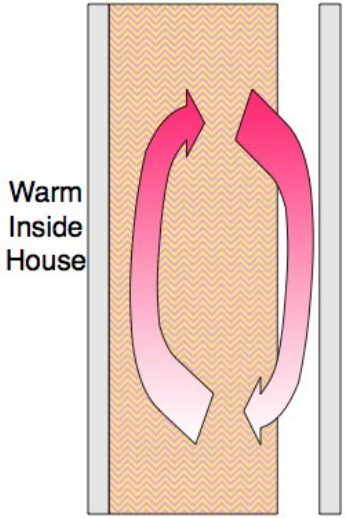


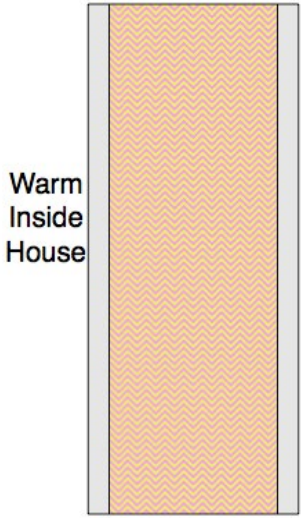
"Per Sprinkler Manufacturers"

Diagrams from CalCERTS QII Handbook

QII Basics – No Gaps or Voids



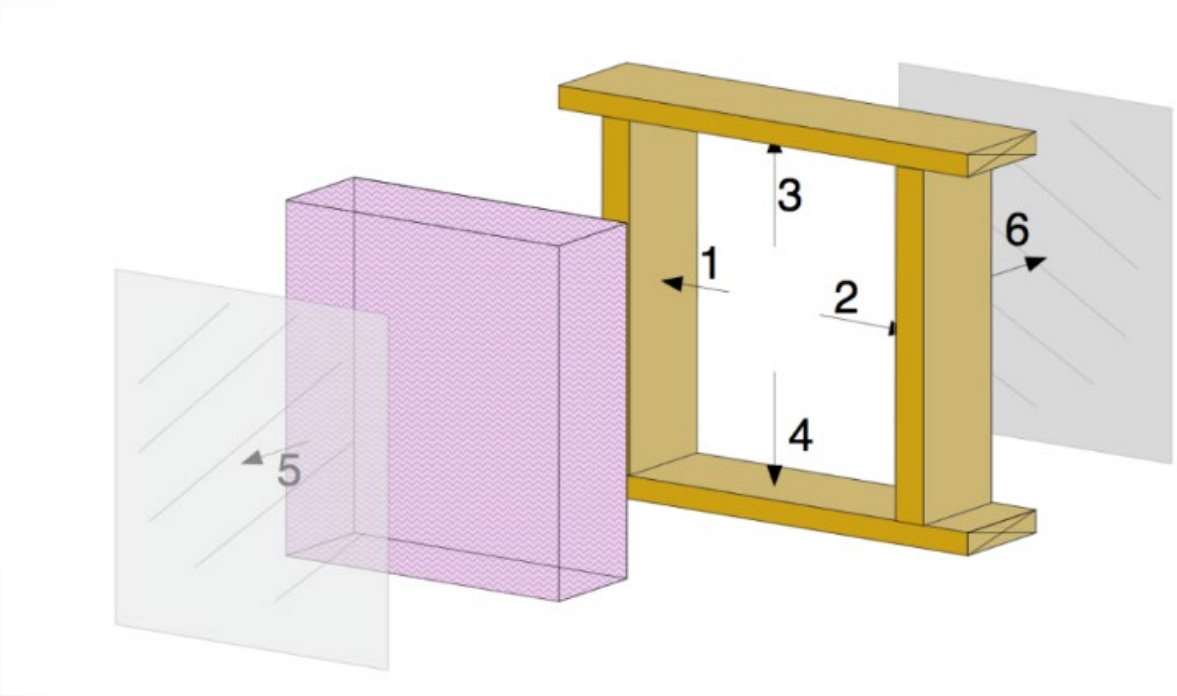
Vertical Surface
Air Barrier on
Two Sides, Void
(Some Thermosyphon)



Vertical Surface
Air Barrier on
Two Sides
(No Thermosyphon)

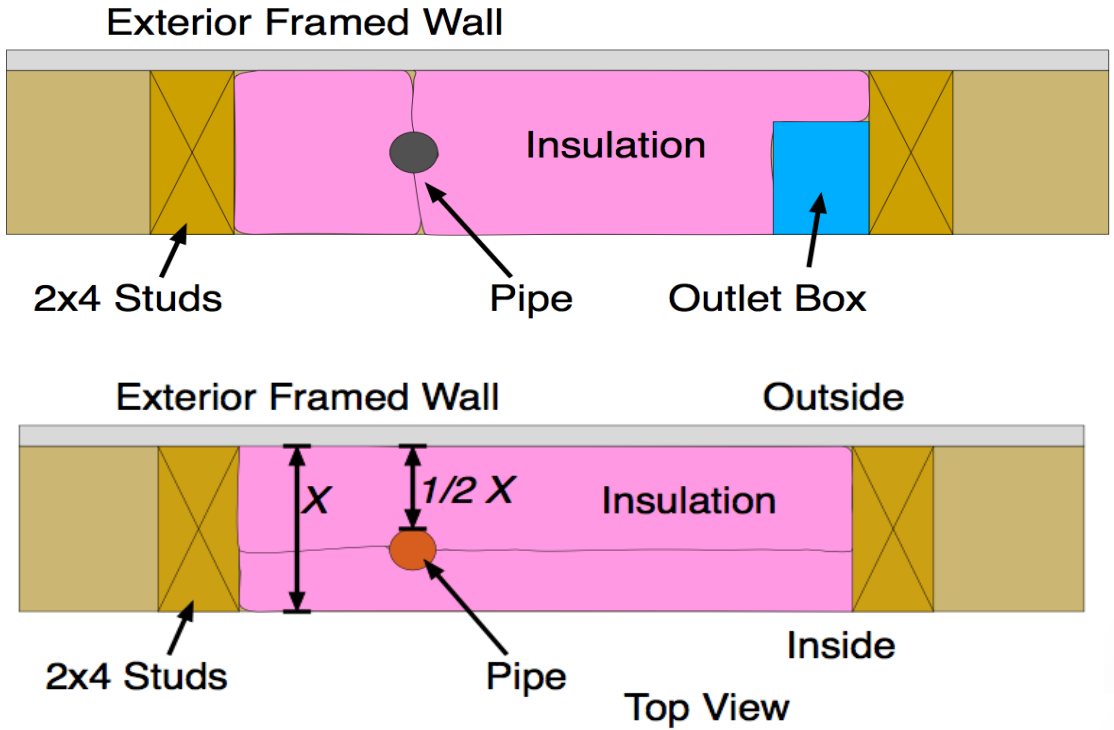
Diagrams from CalCERTS QII Handbook

QII Basics – All Walls: “6-Sided Contact”



Diagrams from CalCERTS QII Handbook

QII Basics – All Walls: "6-Sided Contact"



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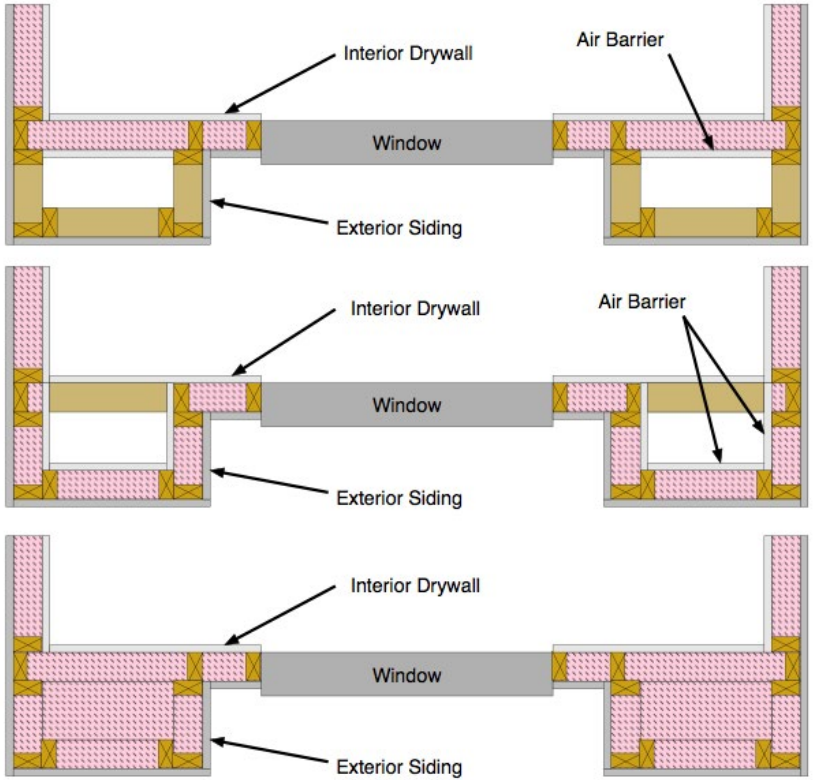
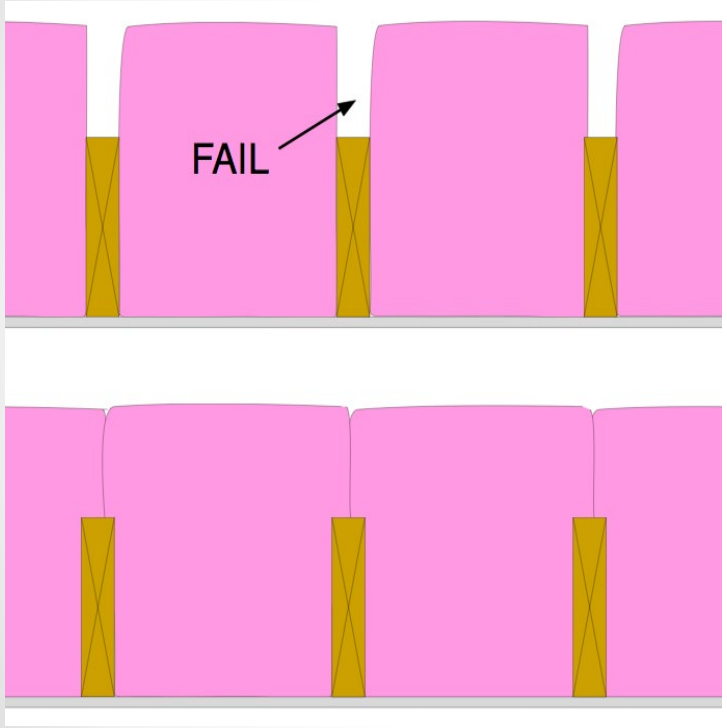
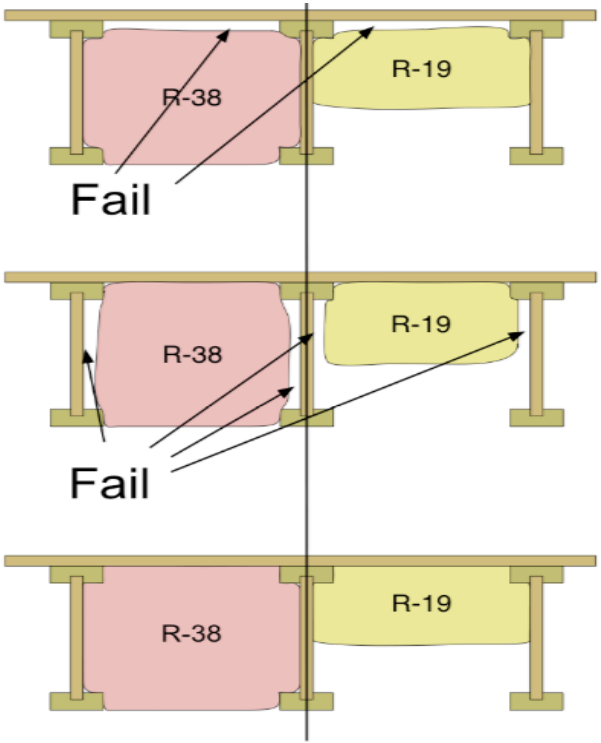
QII Basics – All Walls: "6-Sided Contact"



Diagrams from CalCERTS QII Handbook

QII Basics – Full Width Batts

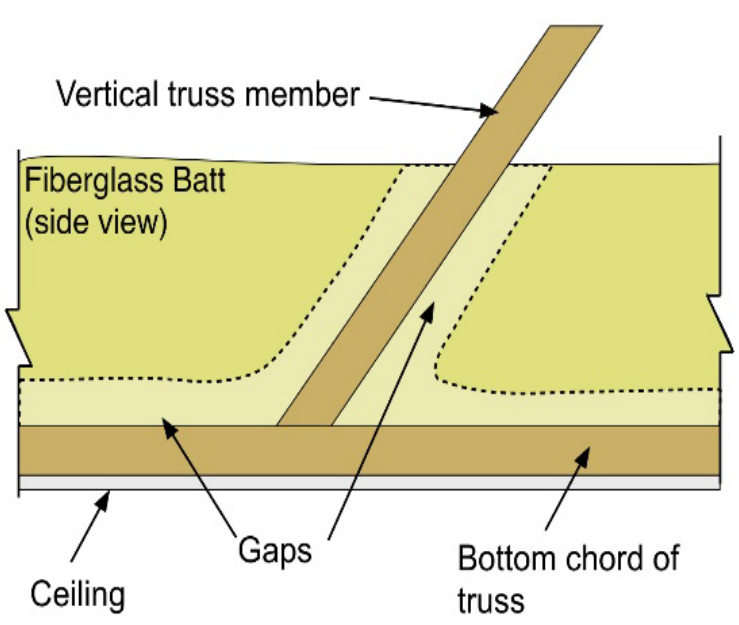




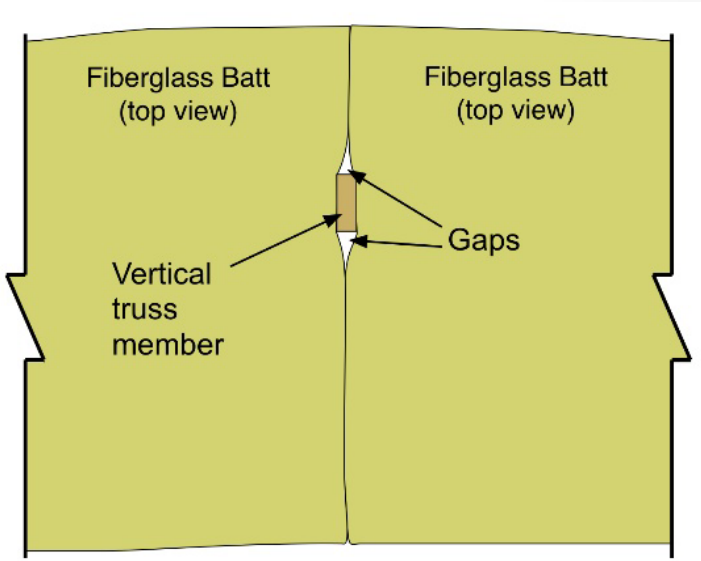
Diagrams from CalCERTS QII Handbook

QII Basics : Batts + Trusses = Gaps + Voids

Side View



Top View



Diagrams from CalCERTS QII Handbook

Avoid if possible. Use blown in.

QII Process by Construction Phase

	Predesign 1	Design 2	Design Review 3	Grading 4	Framing 5	Rough-In 6	Insulation 7	Drywall 8	Finish 9	Final Inspection 10
Energy Consultant A	Specifies QII	Kickoff Meeting	Register CF1R, assign Rater in registry							
Builder/ Architect B	Approves, selects Rater	Kickoff Meeting	Sign CF1R							Provide all documents to occupant
HERS Rater C		Kickoff Meeting Explain QII	Work out sampling details (if any)	Coordinate with trades off site	Coordinate with trades on site	ENV-21 inspections	ENV-22 inspections	ENV-23 inspections	Finish CF3Rs in registry	
Insulation Installer D		Kickoff Meeting		Acknowledges QII requirements	Understands QII requirements	Pre-insulate ENV-21	Install batt and other insulation ENV-22	Loose fill ceiling insulation ENV-23	Finish CF2Rs	
Framer E		Kickoff Meeting			Frame continuous air barrier					
Drywall Installer F		Kickoff Meeting						install and seal drywall		
Misc Trades G		Kickoff Meeting			Hard covers and draft stops	Caulk and seal ENV-21		Caulk and seal		
	1	2	3	4	5	6	7	8	9	10

Make sure this flow of information happens

QII Process by Construction Phase

	Predesign 1	Design 2	Design Review 3	Grading 4	Framing 5	Rough-In 6	Insulation 7	Drywall 8	Finish 9	Final Inspection 10
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HERS Rater C		Kickoff	Work ng (if any)	Coordinate with trades off site	Coordinate with trades on site	ENV-21 inspections	ENV-22 inspections	ENV-23 inspections	Finish CF3Rs in registry	
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Framer E		Kickoff Meeting			Frame continuous air barrier					
Drywall Installer F		Kickoff Meeting						install and seal drywall		
Misc Trades G		Kickoff Meeting			Hard covers and draft stops	Caulk and seal ENV-21		Caulk and seal		
	1	2	3	4	5	6	7	8	9	10

Oh, Crap! We failed QII. Fix it NOW!

FAIL!

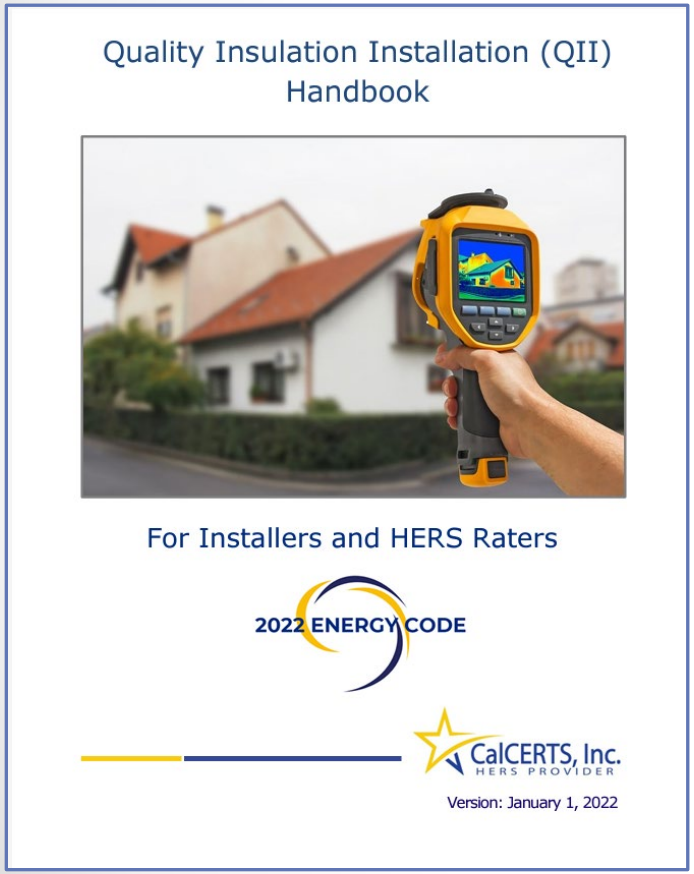
Or else . . .

QII – Builder Tips for New Projects

If the project needs QII (on CF1R-PRF-01):

- Evaluate plans very carefully. Look for unclear parts of thermal boundary. (knee walls, hard covers, bump outs, fireplaces, etc.)
- Decide exactly where the thermal boundary will be.
- Precisely define responsibilities for trades. (air barriers, blocking, attic vents, sealing around fans, electrical boxes, etc.)
- Contact HERS Rater.
  - Ask for checklists, other informational materials.
  - Meet at project early. Walk through together.
  - Learn to use CalCERTS registry.

CalCERTS QII Handbook



- Basically, a condensed version of RA3.5 with pictures and diagrams.
- 116 pages
- RA3.5 takes precedence.
- Updated for 2022. No substantive changes, just more examples.
- Downloadable from CalCERTS website. Free!

CalCERTS QII Handbook

Draft Stops

A material, device or construction installed to prevent the movement of air within open spaces of concealed areas of building components, such as crawl spaces, floor/ceiling assemblies, wall assemblies, roof/ceiling assemblies and attics. Note: Draft stops are important components of the air barrier and shall be airtight. Fire blocks constructed of porous insulation materials cannot serve as draft stops since they are not airtight.

This photo shows a draft stop cut from OSB to fit around two ducts going up through a large square chase. This is a smoke/fire requirement in many cases. Notice the open corners in the cut out holes where air can leak through (red arrows). These should be sealed with expansive foam or other approved material.

SPF can serve as a draft stop as long as it meets the minimum thickness required to be an air barrier.

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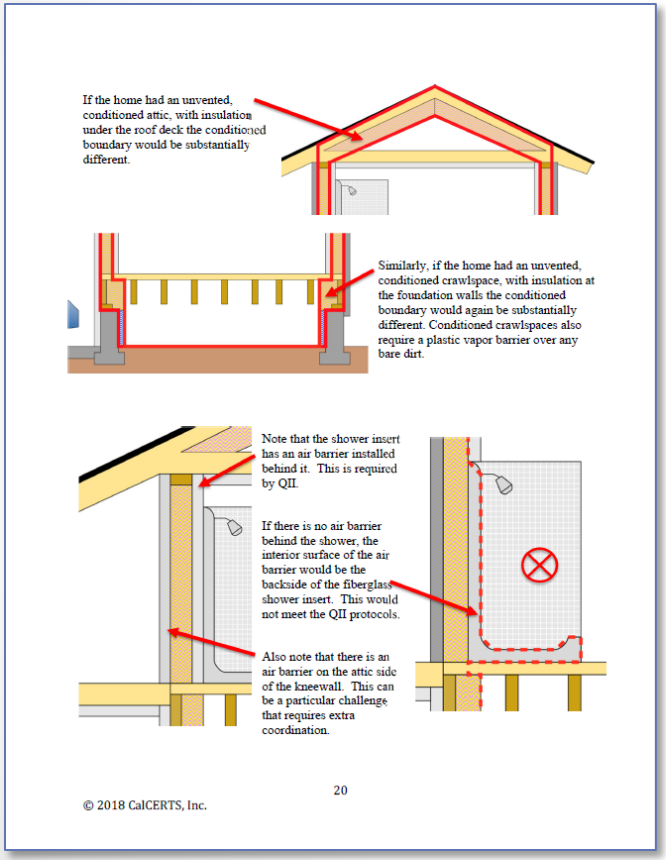
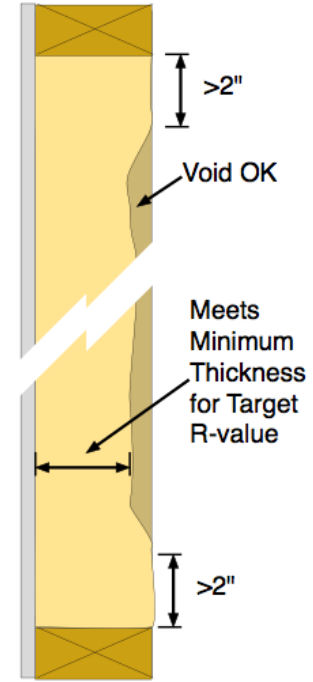
- Draft Stops
- Make ceiling as flat and level as possible.
- Prevent insulation from falling into voids.
- Prevent airflow up from house.

CalCERTS QII Handbook

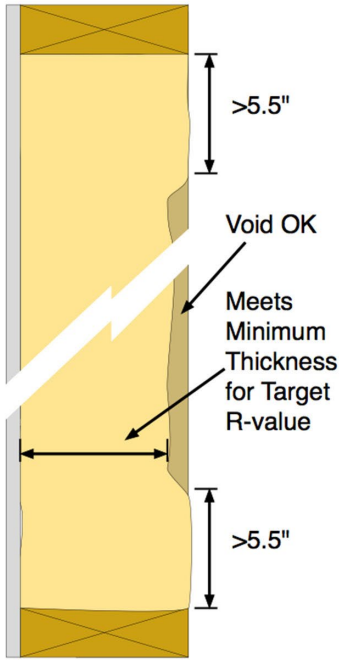


- Tub and shower inserts on an exterior wall, must have air barrier behind them.

CalCERTS QII Handbook



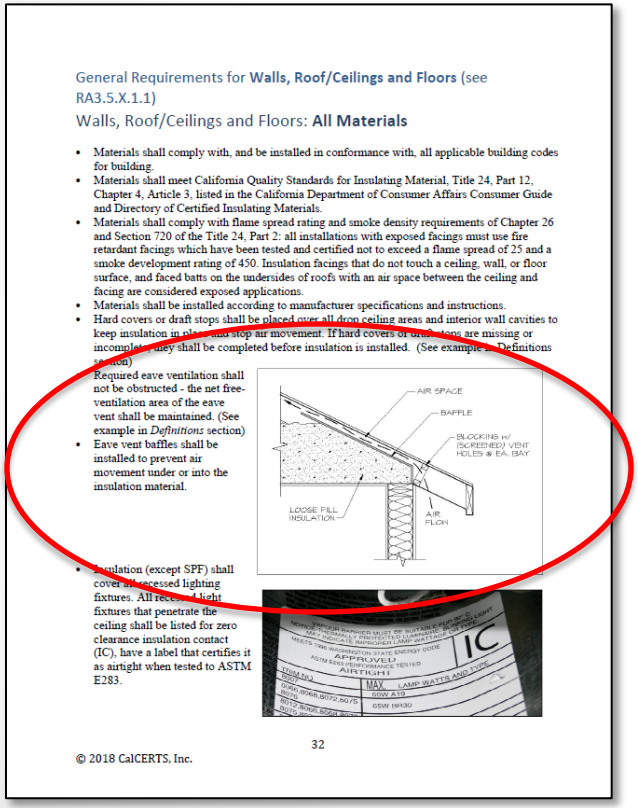
ccSPF Stud Bay
(Side View)



ocSPF Stud Bay
> 2 x 4
(Side View)

- Two kinds of spray on polyurethane foam (SPF).
- Open cell (ocSPF) and closed cell (ccSPF).
- Can be an air barrier if thick enough and voids are OK.

CalCERTS QII Handbook



General Requirements for **Walls, Roof/Ceilings and Floors** (see RA3.5.X.1.1)

Walls, Roof/Ceilings and Floors: **All Materials**

- Materials shall comply with, and be installed in conformance with, all applicable building codes for building.
- Materials shall meet California Quality Standards for Insulating Material, Title 24, Part 12, Chapter 4, Article 3, listed in the California Department of Consumer Affairs Consumer Guide and Directory of Certified Insulating Materials.
- Materials shall comply with flame spread rating and smoke density requirements of Chapter 26 and Section 720 of the Title 24, Part 2: all installations with exposed facings must use fire retardant facings which have been tested and certified not to exceed a flame spread of 25 and a smoke development rating of 450. Insulation facings that do not touch a ceiling, wall, or floor surface, and faced batts on the undersides of roofs with an air space between the ceiling and facing are considered exposed applications.
- Materials shall be installed according to manufacturer specifications and instructions.
- Hard covers or draft stops shall be placed over all drop ceiling areas and interior wall cavities to keep insulation in place and stop air movement. If hard covers or draft stops are missing or incomplete, they shall be completed before insulation is installed. (See example in Definitions section)
- Required eave ventilation shall not be obstructed - the net free-ventilation area of the eave vent shall be maintained. (See example in *Definitions* section)
- Eave vent baffles shall be installed to prevent air movement under or into the insulation material.

- Insulation (except SPF) shall cover all recessed lighting fixtures. All recessed light fixtures that penetrate the ceiling shall be listed for zero clearance insulation contact (IC), have a label that certifies it as airtight when tested to ASTM E283.

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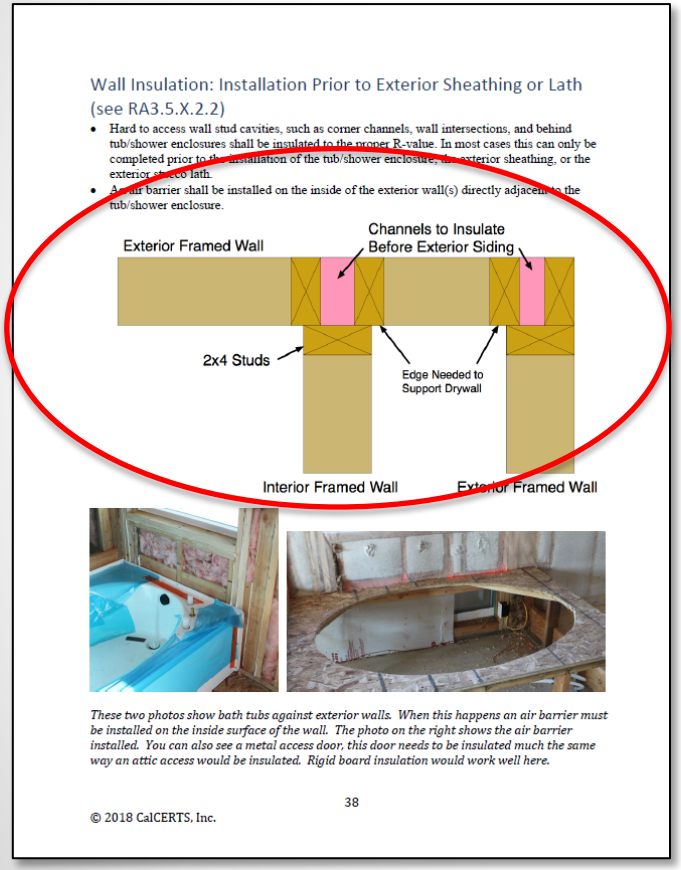
- Attic venting
- Baffling insulation away from eave vents.

CalCERTS QII Handbook



Wall Insulation: Installation Prior to Exterior Sheathing or Lath (see RA3.5.X.2.2)

- Hard to access wall stud cavities, such as corner channels, wall intersections, and behind tub/shower enclosures shall be insulated to the proper R-value. In most cases this can only be completed prior to the installation of the tub/shower enclosure, the exterior sheathing, or the exterior stucco lath.
- An air barrier shall be installed on the inside of the exterior wall(s) directly adjacent to the tub/shower enclosure.

These two photos show bath tubs against exterior walls. When this happens an air barrier must be installed on the inside surface of the wall. The photo on the right shows the air barrier installed. You can also see a metal access door, this door needs to be insulated much the same way an attic access would be insulated. Rigid board insulation would work well here.

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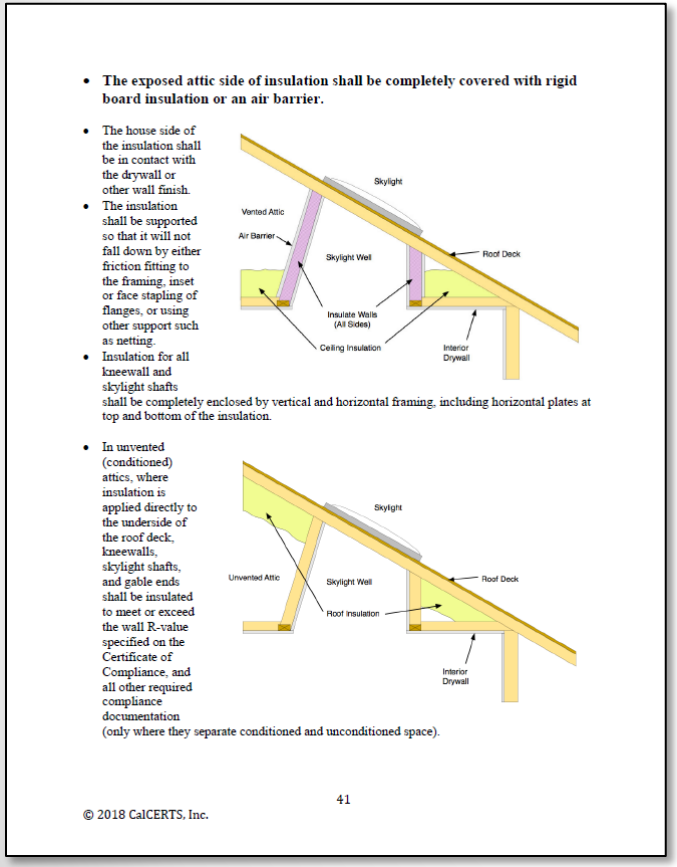
- Exterior channels must be pre-insulated.
- Recommend alternative framing (turn one stud sideways)

CalCERTS QII Handbook



- **The exposed attic side of insulation shall be completely covered with rigid board insulation or an air barrier.**
- The house side of the insulation shall be in contact with the drywall or other wall finish.
- The insulation shall be supported so that it will not fall down by either friction fitting to the framing, inset or face stapling of flanges, or using other support such as netting.

- Insulation for all kneewall and skylight shafts shall be completely enclosed by vertical and horizontal framing, including horizontal plates at top and bottom of the insulation.
- In unvented (conditioned) attics, where insulation is applied directly to the underside of the roof deck, kneewalls, skylight shafts, and gable ends shall be insulated to meet or exceed the wall R-value specified on the Certificate of Compliance, and all other required compliance documentation (only where they separate conditioned and unconditioned space).

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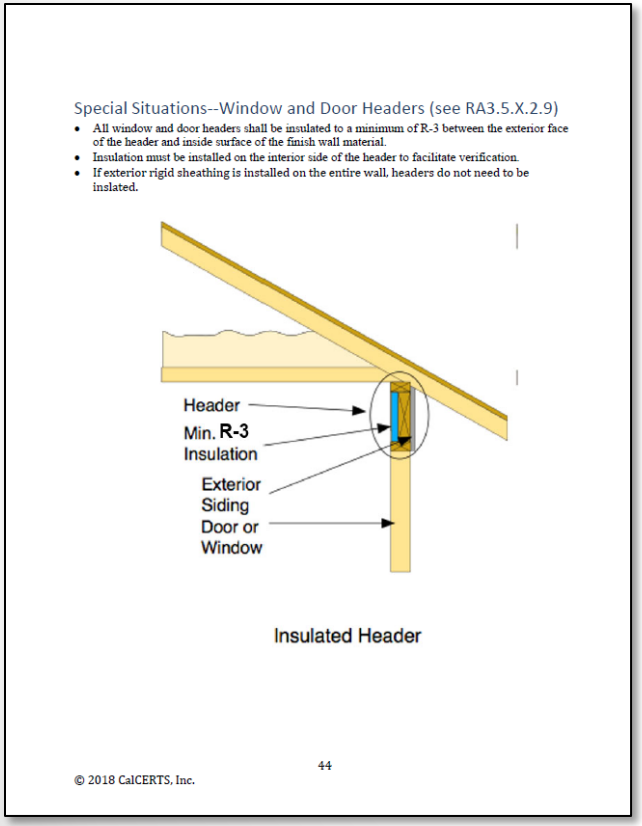
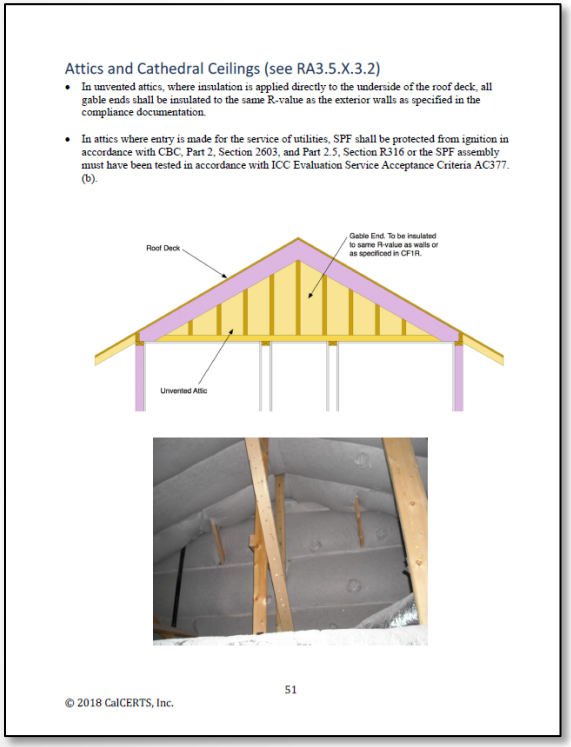
- Knee walls and skylight shafts.
- Must have air barrier on both sides.
- Same R-value as other walls (or modeled separately)
- Same framing as other walls? If not, check CF1R.

CalCERTS QII Handbook



- Window and Door Headers
- Must be insulated
  - Min R-3 for 2x4
  - Min R-5 for 2x6 or larger
- If rigid exterior siding is used, insulated headers not required
- Must be on interior side for inspection (must be inspectable)

CalCERTS QII Handbook



Attics and Cathedral Ceilings (see RA3.5.X.3.2)

- In unvented attics, where insulation is applied directly to the underside of the roof deck, all gable ends shall be insulated to the same R-value as the exterior walls as specified in the compliance documentation.
- In attics where entry is made for the service of utilities, SPF shall be protected from ignition in accordance with CBC, Part 2, Section 2603, and Part 2.5, Section R316 or the SPF assembly must have been tested in accordance with ICC Evaluation Service Acceptance Criteria AC377. (b).

- Unvented attics
- Not *exactly* “conditioned space”.
- Different than “high performance attics” which have insulation at roof deck and ceiling and are vented.

CalCERTS QII Handbook

- At very end of Handbook:
- Check Lists
  - ENV-21
  - ENV-22
- Helpful document: “How to Read the Insulation Requirements on a CF1R-PRF-01”

HERS Measure:

SPF Non-standard R-value

- A subset of QII, but if QII is not already triggered will trigger a single special verification by HERS rater
- Reference: **RA3.5.6**
  - Requires manufacturer's specs to support R-value modeled.

Thank You

Closing

Continuing Education Units Available

- Contact dresurreccion@co.slo.ca.us for AIA and ICC LUs

Coming to Your Inbox Soon!

- Slides & Recording

Free HERS Rater and EPA 608 Certification Training:

- Option for non-SoCalGas Customers within the 3C-REN Region
- Option for SoCalGas Customers

Upcoming Courses:

- Aug 12 – Next Generation Passive Solar IN-PERSON in Santa Barbara
- Aug 13 – CALGreen Code – 2025 Update
- Aug 20 – Best Practices for Hot Water Distribution
- Aug 26 – Ask the Experts: Enclosures (Office Hour Format)

Any phone numbers who joined? Please share your name!

Thank you!

More info: **3c-ren.org**

Questions: **info@3c-ren.org**

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