

California Building Envelope Solutions

Attics & Walls

October 2017

What's New in 2016 Title 24

Attics

- “High Performance Attic”
- New prescriptive requirements
- Roof deck insulation in many CZs

Walls

- “High Performance Walls”
- New prescriptive requirements
- Based on U-factor instead of R-value

Other: LED lighting, water heating, duct leakage, duct insulation



2016 Title 24 Requirements for Attics

- Air handler & ducts in the attic

Goals

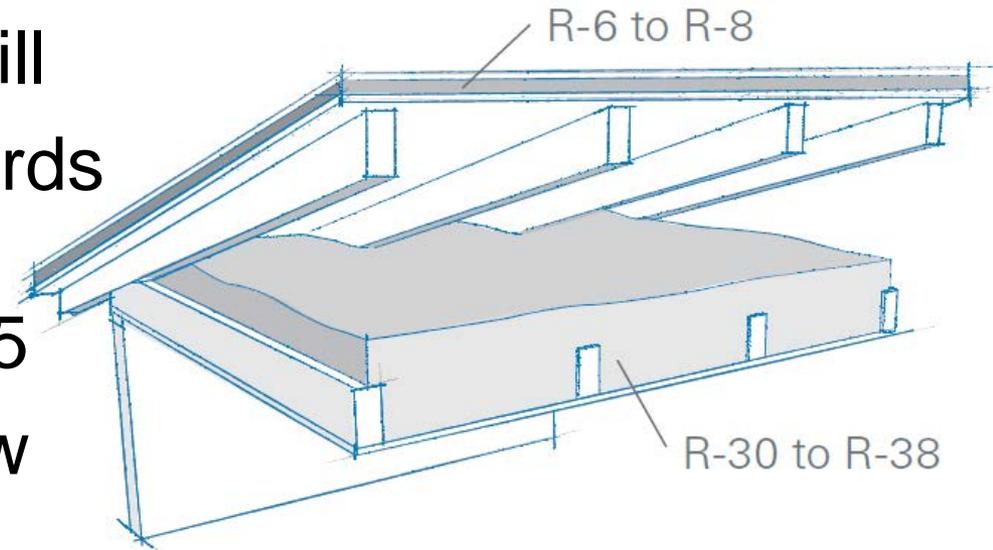
- Reduce heat load on HVAC & ducts in attic space
- Encourage bringing ducts into cond. space, or unvented attic

Option	Climate Zones	Duct insul, <5% leakage	Radiant barrier	Ceiling insulation	Roof deck insulation
Prescriptive A	2	R-8	X	R-38	
	3, 5-7	R-6	X	R-30	
	4, 8-16	R-8	X	R-38	R-6ci/R-8ci
Prescriptive B	4, 8-16	R-8		R-38	R-13/R-18
Performance	All	R-4.2			R-22 min.

Attic Solutions

Prescriptive Option A

- Vented attic, air-seal ceiling
- R-30 or R-38 loose-fill
- R-6 or R-8 foam boards above roof deck in climate zones 4, 8-15
- Radiant barrier below roof deck in climate zones 2-15



JM Climate Pro® & R-panel™

Attic Solutions

Prescriptive Option B

- Climates zones 4, 8-15
- Vented attic, air-seal ceiling
- R-30 or R-38 loose-fill
- R-13 or R-18 FG batts below roof deck (wired in-place)



JM Climate Pro® & Formaldehyde-Free™ Fiberglass



Attic Solutions

Performance Option – Unvented Attic

- All climates zones
- Unvented attic; air-seal @ roof deck
- $\geq R-30$ FG batts or
- JM Corbond® oc SPF $\geq R-22$ or
- JM Corbond MCS™ or
JM Corbond III®, $\geq R-22$

JM Corbond SPF or Formaldehyde-Free™ Fiberglass



Unvented Attics

Benefits

- All CA climates zones
- Reduced air leakage throughout the attic
- Reduced energy loss from leaky ducts
- Reduced size for HVAC system
- May allow for savings due to tradeoffs

**Unvented attics are a Performance option only.
Energy modeling is required!**

Unvented Attics

Fiberglass Batts

- Air-seal roof deck, block & seal eaves, seal gables
- $\geq R-30$ to cover truss top chords
- Full 24" wide, unfaced batts
- Wire or strapping ≤ 12 " spacing
- Compress no more than 1"
- Climate zones 2-15



Unvented Attics

Fiberglass Batts

- Gable ends must be air-sealed & insulated as exterior walls.



Unvented Attics



Unvented Attics

Spray Foam

- $\geq R-22$ (mandatory minimum per T24)
 - JM Corbond® oc SPF ≥ 6.1 "
 - JM Corbond MCS™ ≥ 3.5 "
 - JM Corbond III®, ≥ 3.1 "
- Blocking needed @ eaves
- Gable ends must be air-sealed and insulated as an exterior wall



Be aware of fire approvals

Unvented Attics

Closed-cell Spray Foam

Corbond MCS™

Corbond III®

- Appendix X approval = left exposed if access for utilities only (no storage)
- Thermal barrier coating needed for homeowner access.



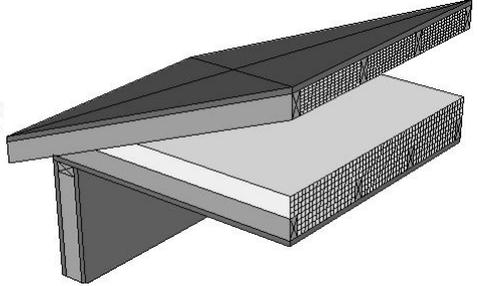
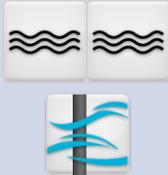
Unvented Attics

Open-cell Spray Foam Corbond® Open-cell SPF

- Thermal barrier coating needed for homeowner access or storage.
- Unvented Attic Approval = left exposed if access for utilities only (no storage) AND pull-down hatch per IRC §807
- Corbond ocx SPF has Appendix X approval.



Attic Solutions Pros & Cons

Product	Perf.	Cost	Labor	
Fiber glass – vented		\$		
UVA w/ fiberglass batts		\$		
UVA w/ spray foam		\$\$\$		

2016 Title 24 Requirements for Walls

Mandatory minimums

- R-13 in 2x4
- R-19 in 2x6

Prescriptive U-factors

- Climate Zones 5 & 6, Max U-0.065
- Climate Zones 1-4, 7-16, Max U-0.051

Many options depending on:

- Framing type & spacing
- Cladding – stucco, 1-coat stucco, siding
- Insulation – cavity and/or continuous

Wall Systems

Cavity insulation

Product Type	Thickness	R-values
Fiber glass batts	3½", 5½"	13, 15 19, 21
JM Spider® Plus	3½", 5½"	14 - 23
JM Corbond® oc SPF	3½", 5½"	13.3, 20.9
JM Corbond III®	3"+	21+ (R-7/inch)

**JM Corbond III + Spider Plus or batts =
effective hybrid option**



Wall Systems

Continuous insulation

- AP™ Foil-Faced Foam Sheathing
 - Taped for WRB & air barrier
 - Can resist lateral wind loads
 - Thicknesses up to 4½” available
- JM Corbond III® can be exterior CI if fully sheathed



Thickness	R-values
½”, ⅝”, ¾”	2.7, 3.5, 5.0
1”, 1½”, 1.65”	6.0, 9.3, 10.0

Walls

Climate zones 5 & 6, Max U-0.065

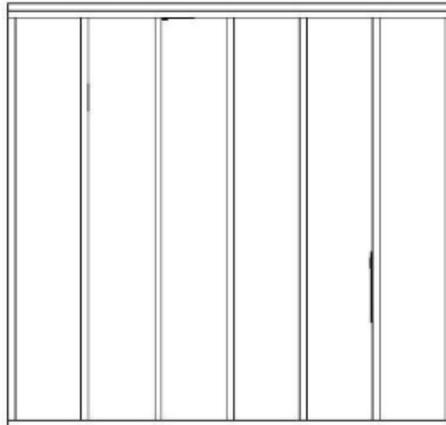
Climate zones 1-4, 7-16, Max U-0.051

Cladding Type	Framing	Cavity insulation	Continuous insulation	U-value
3-coat stucco or siding	2x4, 16" o.c.	R-13 FG or 3.5" Corbond oc SPF	1.5" JM AP Foil	0.050
		3.1" Corbond III	1" JM AP Foil	0.049
		R-15 FG	0.75" JM AP Foil	0.065
	2x6, 16" o.c.	R-19 FG or 5.5" Corbond oc SPF	0.85"	0.051
		R-21 FG or 3" Corbond III	0.75"	0.051
		1.5" Corbond III + R-13 FG	0.625"	0.043
		2" Corbond III + R-13 FG	0.5"	0.051
	2x6 Adv. Framing	R-19 FG	0.75"	0.051
		R-21 FG or 5.5" Corbond oc SPF	0.625"	0.049
		R-23 FG (Spider or BIBS) or 3.25" Corbond III	0.5"	0.050
2" Corbond III + R-13 FG		None	0.051	
1-coat stucco	2x4, 16" o.c.	R-15 FG or 2.4" Corbond III		0.065
	2x6, 16" o.c.	R-21 FG or 1.5" Corbond III + R-13 FG or 5.5" Corbond oc SPF	Assumes R-4 from 1" EPS	0.051-0.046
	2x6 Adv.			0.047-0.040

High Performance Walls - Fiberglass

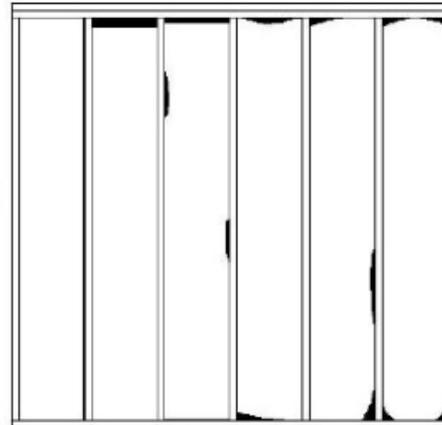
Cavity insulation install considerations

- Batts
- Spray-in



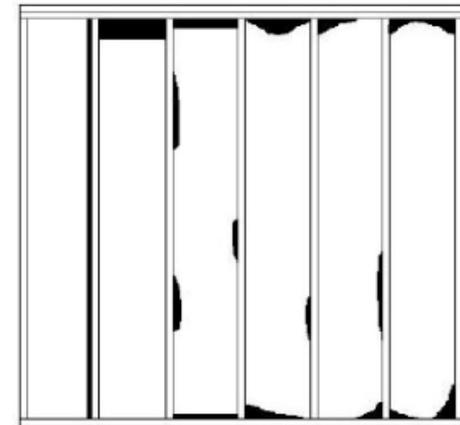
Grade I

VS



Grade II

OR



Grade III

Need Grade I installation for QII

High Performance Walls - SPF

Cavity insulation install considerations

- Corbond® oc SPF
- Corbond® III
- Manufactured on-site
 - Training is critical
- Safety
 - Occupancy
 - PPE
- Install process
 - Weather
 - Equipment
 - Thickness



JM | Tech>Connect™
Johns Manville | OnLine, OnCall, OnSite.
can eliminate issues →

High Performance Walls

Continuous insulation install considerations

- $< 1\frac{1}{2}$ " , direct cladding attachment may be OK
- $\geq 1\frac{1}{2}$ " , furring recommended
- Windows may need buck or Thermal Buck

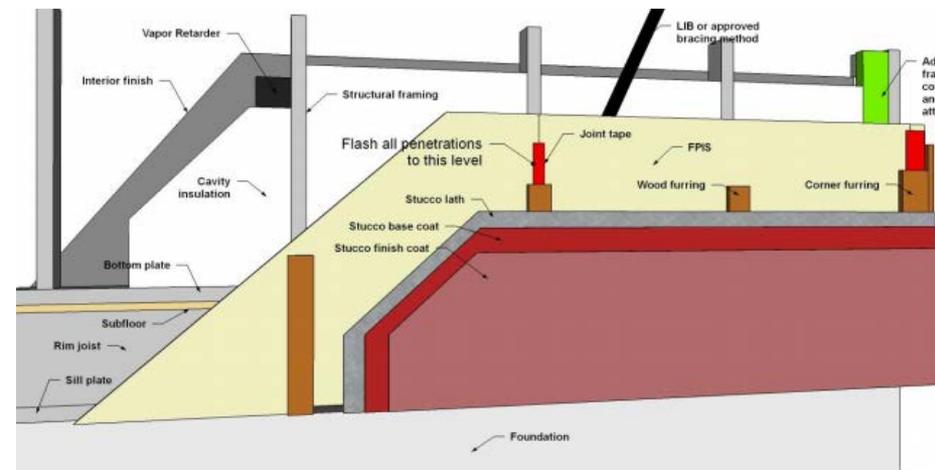
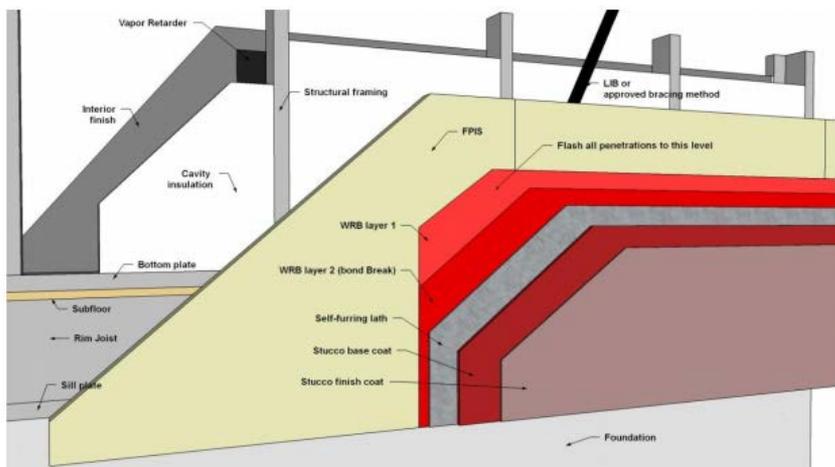


Image credit: Construction Details for the Use of Foam Plastic Insulating Sheathing in Light-Frame Construction, report DRR 1205-05

Decide where WRB layer is

Summary

Many insulation options for attics & walls

- Attics
 - Vented prescriptive options
 - Unvented performance options
- Walls
 - Fiberglass or spray foam + foam sheathing for most
 - Install quality is still critical
 - Foam sheathing may be the largest learning curve
- Leverage your resources!

**JM is your source for complete
insulation systems**

Proposed changes for 2019 T24

Overall

- New Energy Design Rating, similar to HERS but with separate efficiency & PV parts

Attics

- Removed Prescriptive Option A (above deck insulation), Option B to become Option A
- All below deck to be R-19 (Option A)

Proposed changes for 2019 T24 cont'd

Walls

- New mandatory minimum wall insulation:
R-15 in 2x4 frames walls
R-20 in 2x6 framed walls
- QII to be a prescriptive requirement
- CZ 1 & 11-16 walls move to U-0.043 prescriptive
U-0.043 = R-21+R-7.5 in 2x6, 16"o.c.
 - 2x4 16"o.c. + R-13 (cavity) + R-13 (2" AP Foil) =
U-0.041
 - 2x6 16"o.c. + R-18 (cavity) + R-9.3 (1.5" AP Foil) =
U-0.039
 - 2x6 AWF + R-23.5* (cavity) + R-4.4 (3/4" AP Foil) =
U-0.043 *1½" JM Corbond III+R-13 FG



JR Babineau

Building Scientist

Johns Manville Corporate R&D

Francis.Babineau@jm.com

Title 24 Climate Zones

