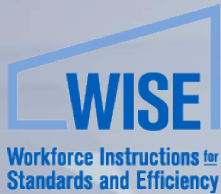


WISE

Workforce Instructions for
Standards and Efficiency



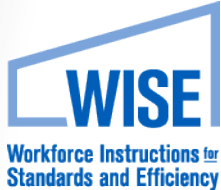


High Performance Wall and Attic Workforce Education

Presented by: Dan Krekelberg, *Project Manager, ConSol*



What is the WISE program?



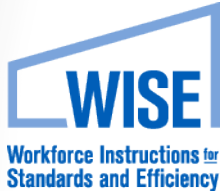
Mission: Educate professionals in California's homebuilding industry on solutions for meeting high-performance envelope requirements in California's current and future Title 24 Energy Efficiency Standards.

- Sponsored by the California Energy Commission (CEC)
- Managed by the California Homebuilding Foundation – www.myCHF.org
- Implemented by ConSol in collaboration with other industry experts
- Timeline 2016 to 2019



What's Driving High Performance Envelopes?

- State's "Big Bold Energy Efficiency Strategy"
- Goal of all ZNE in new residential construction by 2020.
- Not just solar; home envelopes must get tighter to achieve ZNE
- Title 24 Residential Energy Efficiency Standards is where policy comes into play for builders.
- 2016 Codes in effect, 2019 in formation

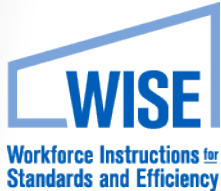


What Changed on January 1, 2017

- Five significant changes
 - High Performance Attics
 - High Performance Walls
 - 0.82 EF Tankless Water Heaters
 - High Efficacy lighting
 - Solar Trade-Off

≈30% energy savings (reg. loads)

≈\$2,750 cost per home





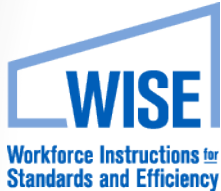
High Performance Attics (HPA)



WHAT ARE THE PRESCRIPTIVE REQUIREMENTS

Figure 3-16: Prescriptive Requirements for Roof/Ceiling Insulation (§150.1(c).1)

Strategy	How to Comply
High-Performance Ventilated Attics	
Option A	<p>Vented attic with continuous insulation applied above the roof deck. (Figure 3-18).</p> <p>Ceiling insulation required separately above finished attic ceiling.</p>
Option B	<p>Vented attic with batt, spray in cellulose/fiberglass secured with netting, or SPF. (Figure 3-18).</p> <p>Ceiling insulation required separately above finished attic ceiling.</p>
Ducts in Conditioned Space	
Option C	<p>Vented attic with no insulation at roof deck. Ceiling insulation required separately above finished attic ceiling.</p> <p>Ducts and air handler equipment in conditioned space that is NOT a sealed attic.</p>

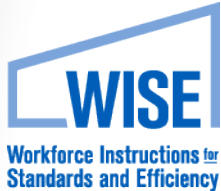




High Performance Walls (HPW)



What is a High Performance Wall?



A. Wall Insulation

1. Framed Walls

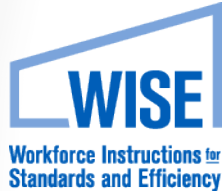
§150.1(c)1B

The Package A prescriptive requirements (Table 150.1-A) call for a U-factor of 0.051 in Climate Zones 1-5 and 8-16, and a U-factor of 0.065 in Climate Zones 6 and 7.

The designer may choose any wall construction from Reference Joint Appendix JA4 (Tables 4.3.1 and 4.3.4) that has a U-factor equal to or less than 0.051 or 0.065, depending on the climate zone. U-factors can also be calculated by building the construction assembly in Commission-approved compliance software, including the inside finish, sheathing, cavity insulation, and exterior finish. JA4 Table 4.3.4 shows that a 2x6 wood-framed wall at 16" on center can achieve a U-factor of 0.051 with R-19 batt insulation in the cavity and R-5 exterior insulation. Some examples of various wood-framed wall assemblies, associated construction, and U-values are provided in Figure 3-30.



U FACTOR TABLES FOR 24" OC



Spacing	Cavity Insulation	Nominal Framing Size	Rated R-value of Continuous Insulation ²										
			R-0	R-2	R-4	R-5	R-6	R-7	R-8	R-10	R-12	R-15	
			A	B	C	D	E	F	G	H	I	J	
24 in. OC	None	Any	14	0.362	0.211	0.148	0.128	0.114	0.102	0.092	0.078	0.067	0.056
	R-11	2x4	15	0.106	0.086	0.072	0.067	0.062	0.059	0.055	0.050	0.045	0.039
	R-13	2x4	16	0.098	0.079	0.067	0.062	0.058	0.055	0.052	0.047	0.043	0.038
	R-15	2x4	17	0.091	0.074	0.063	0.059	0.055	0.052	0.049	0.044	0.040	0.036
	R-19	2x6	18	0.071	0.061	0.053	0.050	0.048	0.045	0.043	0.040	0.036	0.033
	R-21 ¹	2x6	19	0.066	0.057	0.050	0.047	0.045	0.042	0.040	0.037	0.034	0.031
	R-22	2x6	20	0.069	0.060	0.052	0.049	0.047	0.044	0.042	0.036	0.036	0.033
	R-23	2x6	21	0.064	0.054	0.048	0.045	0.043	0.041	0.039	0.036	0.033	0.030
	R-25	2x6	22	0.061	0.052	0.046	0.043	0.041	0.039	0.037	0.034	0.035	0.031
	R-19	2x8	23	0.063	0.055	0.049	0.047	0.045	0.043	0.041	0.037	0.035	0.031
	R-22	2x8	24	0.058	0.051	0.046	0.044	0.042	0.040	0.038	0.035	0.033	0.030
	R-25	2x8	25	0.055	0.048	0.043	0.041	0.039	0.037	0.036	0.033	0.031	0.028
	R-30 ¹	2x8	26	0.054	0.047	0.042	0.040	0.038	0.037	0.035	0.033	0.030	0.028

Notes

- Higher density fiberglass batt is required in these cases.
- Continuous insulation may be installed on either the inside or the exterior of the wall, or both.



Solar Credit



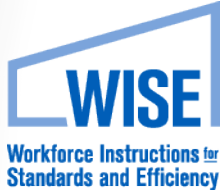
2.2.3 PV System Credit

The compliance credit available for photovoltaic (PV) systems is available for new construction only and is dependent on the climate zone and dwelling unit size. The credit may be used to tradeoff any efficiency measure, with limits as described below. The PV system must meet the eligibility and verification requirements of Residential Appendix RA4.6.1 and must meet the minimum system size described below.

The PV compliance credit for both single- and multi-family buildings is calculated by the compliance software and is equal to:



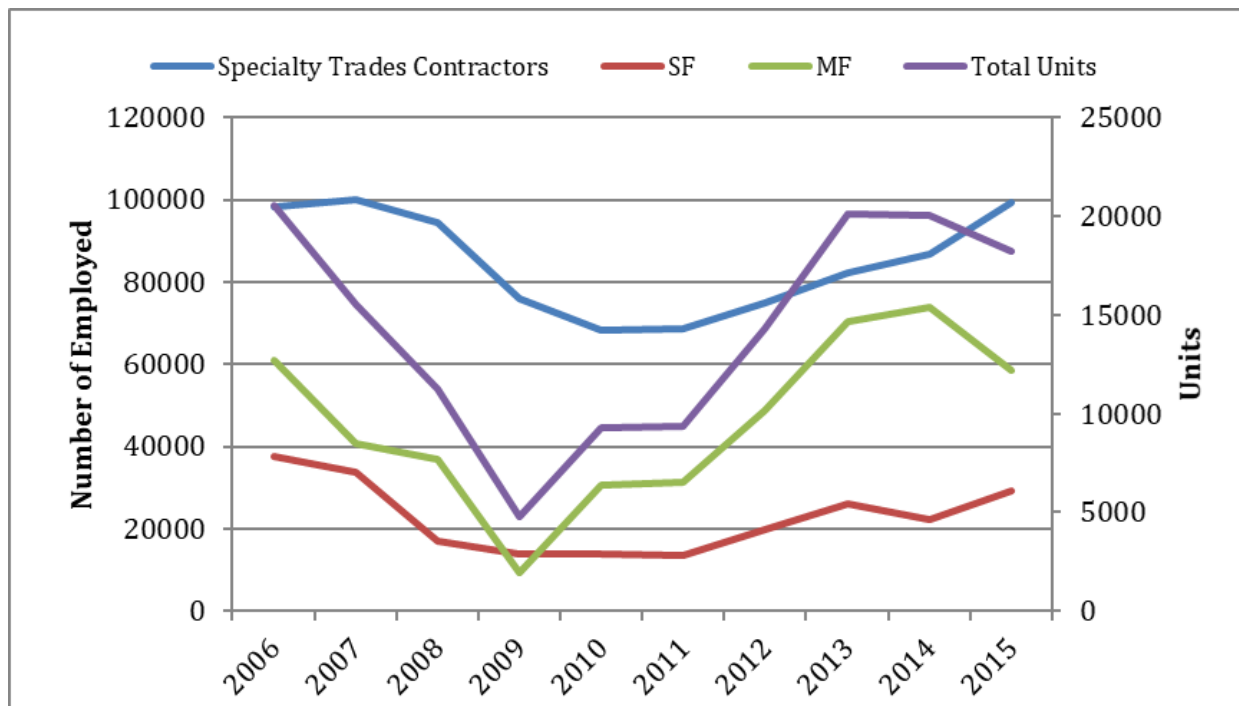
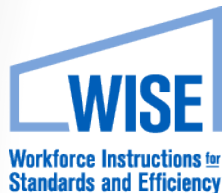
What are the WISE activities supporting this?



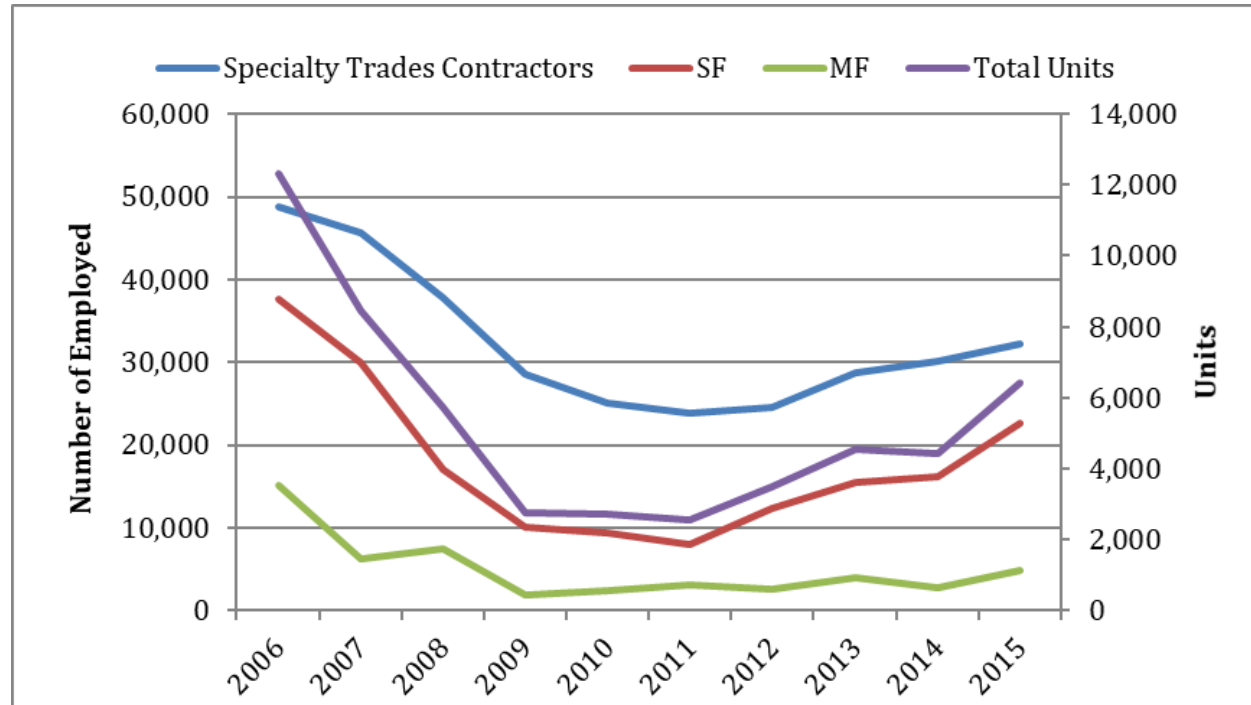
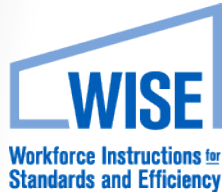
- Research where homebuilding is happening, where there are gaps in skilled labor.
- Document known barriers and solutions to achieving HPA / HPW.
- Develop training curriculum for HERS Raters and installers.
- Meet with builders and installation crews to provide training on-site training.
- Share resources to industry on products and techniques for achieving HPA/HPW.



Market Assessment – SF Bay Area



Market Assessment – Sacramento Valley



Training Modules & Coursework

- ★ Training models are being produced that will provide video instruction to installers and HERS raters on HPA/HPW installation options.



The screenshot shows a video player interface for a training module titled "High Performance Attics". The video content is split into three vertical panels: a residential house, a worker in a white protective suit, and an attic under construction. The interface includes a video player with a play button, a progress bar, and a "NEXT >" button. On the right side, there is a "Menu" section with a list of 15 items, where "1. High Performance Attics" is currently selected. The "CONSOL" logo is visible in the top right corner of the video player area.

High Performance Attics

CONSOL WISE Workforce Instructions for Standards and Efficiency

High Performance Attics

Menu

1. High Performance Attics
2. Workforce Instruction for Stan...
3. AIA Continuing Education
4. Copyright
5. What You Will Learn
6. Welcome
7. QJI Requirements
8. General Requirements: Flame s...
9. General Requirements: Therm...
10. General Requirements: Below...
11. General Requirements: Below...
12. General Requirements: Ceiling
13. General Requirements: Ceiling
14. General Requirements: Cellin...
15. Rigid Foam Board Insulation

Search...

On the Job TRAINING!



Create a working group including:

Builder, WISE team, Architect, Engineers,
Energy Consultant, HERS Rater, Relevant
Subcontractors and Product Manufactures

- ✦ Working Group will ensure that:
 - ✦ All plans and details are done correctly to implement the chosen solution;
 - ✦ All subcontractors, consultants and builder staff understand all installation requirements;
 - ✦ Nothing is being bid that is unnecessary by reviewing all contract scopes of work and subcontractor bids;
 - ✦ Installers are working efficiently and the product is installed properly through on-site training.



www.wisewarehouse.org

Presented by: Dan Krekelberg, WISE Program Manager

