Title 24 HERS Rater Field Verification and Diagnostic Testing

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Primer on Title 24

- Performance Standards Emphasis
- Detailed Rules on How to Model Buildings and Eligibility Criteria for Measures
- Residential and Nonresidential Buildings
- New Buildings, Additions, Alterations
- First in effect in 1978; periodically updated
- 16 Climate Zones, 550 Bldg. Depts.

Why Diagnostic Testing and Field Verification?

- 1995 Field Research - Massive Duct Leaks; Ducts in Attics; Peak Demand Problem
- **Focus Standards on Construction Quality**
  - Duct Sealing, Design, Location, Surface Area
  - Building Envelope Sealing
  - Air Conditioner Installation (Charge, Airflow)
  - Insulation and Air Barrier Installation
  - SEER – Hot/Dry Climates, Fan Energy
  - Air Conditioner Over-sizing

Why HERS Raters?

- Field Verification requires diagnostic tools, qualified people, adequate time to verify
- Beyond the capabilities, resources and priorities of local building departments
- Can't rely solely on installers, third party required – Important to Builders
- State legislation gives Commission authority to oversee HERS raters

Why Not Just Require HERS Ratings?

- Commission originally proposed HERS ratings as a compliance option
- Demonstrated Problem is with inadequate installation of certain components
- Performance Standards infrastructure exists with energy consultants doing simulations
- Local Building Departments capable of checking for the presence of measures

Why is Third Party Verification Important to Builders?

- Construction Defect Litigation
  - Expanded Dramatically in mid-1990's
  - Class Action Suits
  - Boon for Attorneys/Forensic Architects
  - Liability Insurance Premiums Soared/Not Available
  - Builders Deep Pockets; 10 Year Liability in California
  - Field Verification Increases Quality Control, Demonstrates Responsibility, Holds Subcontractors Accountable

What does the HERS Rater do?

- Serves as a Special Inspector
- Completes diagnostic testing and field verification using Commission protocols for specific components and equipment
- Builder can choose to have field verification for 100% of the houses or use sampling
- Specific rules for sampling, resampling, and corrective action if necessary

What are the Components of Quality Construction Compliance Options?

- Algorithms for Calculating Energy Implications that can be Programmed into Compliance Software
- "Default" Level Representing Degraded Current Practice (field research)
- "Target" Level Representing Reasonable Improved Practice (field research)
- Protocols Required for Proper Installation and Field Verification

What Do the Protocols Cover?

- Purpose and Scope – Relationship to Standards Requirements and Compliance
- Instrumentation Specifications
- Detailed Step-by-step Procedures for Conducting Each Diagnostic Test or Verification
- Used for Training Installers and HERS Raters

What Protocols Has the Commission Developed?

- Air Distribution Systems (ASHRAE 152 and California
- Ducts Buried in Attic Insulation (Building America)
- Refrigerant Charge (Superheat and Temperature Split)
- Airflow and Air Handler Fan Wattage (California research)
- Air Conditioner Sizing (ASHRAE Handbook)
- High Quality Insulation Installation (California and ORNL research; Industry task force)
- Thermostatic Expansion Valve and High EER Air Conditioner

HERS Quality Construction Measure	Standards Adoption (Option or Required)		
	1998	2001	2003
Ducts			
Sealing	New – O	New – R	New – R Alt – R
Design	New – O	New – O	New - O
Location	New – O	New – O	New – O
Surface Area	New – O	New – O	New – O
Buried in Insulation			New – O
Nonresidential Sealing		New - O	New – R Alt - R
Envelope Sealing	New - O	New - O	New - O

New = New Buildings and Additions Alt = Alterations

O = Option R = Required

HERS Quality Construction Measure	Standards Adoption (Option or Required)	
	2001	2003
Air Conditioners		
Refrigerant Charge and Airflow	New – R	New – R
Or	Alt - R	Alt - R
Thermostatic Expansion Valve		
EER		New - O
Fan Wattage		New - O
Sizing		New - O
Insulation		New - O

New = New Buildings and Additions Alt = Alterations

O = Option R = Required

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- Click "Title 24 Building Standards"
  - Residential Manual
    - Chapter 4, Compliance Through Quality Construction
  - Training Videos
  - Home Energy Rating Systems
  - Quality Homes
  - 2005 Standards
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