

Residential Appendix RA2

Appendix RA2 – Residential HERS Verification, Testing, and Documentation Procedures

RA2.1 California Home Energy Rating Systems

Compliance for certain energy efficiency measures, as specified by the Commission, requires field verification and diagnostic testing of as-constructed dwelling units by a certified Home Energy Rating System (HERS) rater. The Commission approves HERS providers, subject to the Commission's HERS regulations, which appear in the California Code of Regulations, Title 20, Division 2, Chapter 4, Article 8, Sections 1670-1675. Approved HERS providers are authorized to certify HERS raters and are required to maintain quality control over HERS rater field verification and diagnostic testing activities.

When ~~compliance-~~ the Certificate of Compliance documentation for a dwelling unit indicates field verification and diagnostic testing of specific energy efficiency measures as a condition for complying with Title 24, Part 6, an approved HERS provider and certified HERS rater shall be used to conduct the field verification and diagnostic testing according to the applicable procedures in Appendix RA2. HERS providers and HERS raters shall be considered special inspectors by enforcement agencies and shall demonstrate competence, to the satisfaction of the building official, for the visual inspections and diagnostic testing that they perform. Per California Code of Regulations, Title 20, Division 2, Chapter 4, Article 8, Section 1673(i)(2)[jrm1], "Providers and raters shall be independent entities from the builder and from the subcontractor installer of energy efficiency improvements field verified or diagnostically tested." An "Independent Entity means having no financial interest in, and not advocating or recommending the use of any product or service as a means of gaining increased business with, firms or persons specified in CCR Title 20, Division 2, Chapter 4, Article 8, Sections 1671 and 1673(i).[jrm2]" Third Party Quality Control Programs approved by the Commission may serve some of the functions of HERS raters for field verification purposes as specified in Section RA2.7.

The remainder of this ~~chapter-~~ Appendix RA2 describes the:

1. Measures that require field verification or diagnostic testing;
2. ~~Required~~ Requirements for documentation and communication and communication steps for HERS verification compliance processes;
3. Responsibilities assigned to each of the parties involved in the field verification and diagnostic testing process;
4. Requirements for ~~installation-procedures for installing contractors and Installation Certificate documentation~~ certification by the installer;
5. Requirements for HERS rater field verification and diagnostic testing and documentation procedures;
6. Requirements for sampling procedures for HERS verification compliance;
7. Requirements for Third Party Quality Control Programs;
8. Requirements for HERS verification compliance when performing alterations;

RA2.2 Measures that Require Field Verification and Diagnostic Testing

Table RA2-1 describes the measures that require installer certification and HERS rater field verification and diagnostic testing, and identifies the protocol or test procedure in the Reference Residential Appendices that shall be used for completing installer and HERS rater field verification and diagnostic testing.

Table RA2-1 – Summary of Measures Requiring Field Verification and Diagnostic Testing

Measure Title	Description	Protocol or Test Procedure
Duct Measures		
Duct Sealing	Component Packages require that space conditioning ducts be sealed. If sealed and tested ducts are claimed for compliance, field verification and diagnostic testing is required to verify that approved duct system materials are utilized, and that duct leakage meets the specified criteria	Reference Residential Appendix RA3.1
Supply Duct Location, Surface Area and R-value	Compliance credit can be taken for improved supply duct location, surface area and R-value. Field verification is required to verify that the duct system was installed according to the design, including location, size and length of ducts, duct insulation R-value and installation of buried ducts. ¹ The system must also meet the Verified Prescriptive Cooling Coil Airflow requirement. For buried ducts measures, Duct Sealing and High Quality Insulation Installation is required.	Reference Residential Appendix RA3.1
Low Leakage Ducts in Conditioned Space	Compliance credit can be taken for verified duct systems that have air leakage to outside conditions equal to or less than 25 cfm when measured in accordance with Reference Residential Appendix Section RA3.1.4.3.9. Field Verification for ducts in conditioned space is required. Duct sealing is required.	Reference Residential Appendix RA3.1
Low Leakage Air Handlers	Compliance credit can be taken for installation of a factory sealed air handler unit tested by the manufacturer and certified to the Commission to have achieved a 2 percent or less leakage rate. Field verification of the air handler's model number is required. Duct Sealing is required.	Reference Residential Appendix RA3.1
Air Conditioning Measures		
Improved Refrigerant Charge	Component Packages require in some climate zones that split system air conditioners and heat pumps be diagnostically tested in the field to verify that the system has the correct refrigerant charge. For the performance method, the Proposed Design is modeled with less efficiency if diagnostic testing and field verification is not performed. The system must also meet the prerequisite minimum Cooling Coil Airflow requirement.	Reference Residential Appendix RA3.2[jrm3]
Installation of Charge Indicator Display	Component Packages specify that a Charge Indicator Display can be installed as an alternative to refrigerant charge testing. The existence of a Charge Indicator Display has the same calculated benefit as refrigerant charge testing. Field verification is required.	Reference Residential Appendix RA3.4
Verified Cooling Coil Airflow	Compliance credit can be taken when airflow is higher than the criteria specified. Field verification and diagnostic testing is required.	Reference Residential Appendix RA3.3
Air Handler Fan Watt Draw	Compliance credit can be taken for reductions in fan power. Diagnostic testing and field verification is required. The system must also meet the Verified Prescriptive Cooling Coil Airflow requirement.	Reference Residential Appendix RA3.3
High Energy Efficiency Ratio (EER)	Compliance credit can be taken for increased EER by installation of specific air conditioner or heat pump models. Field verification is required. ²	Reference Residential Appendix RA3.4
Maximum Rated Total Cooling Capacity	The calculations for determining Maximum Rated Total Cooling Capacity need not be field verified, but the prerequisites to taking the credit – Prescriptive Cooling Coil Airflow, duct sealing, and EER – must be field verified and diagnostically tested.	Reference Residential Appendix RA3.1, RA3.3, RA3.4
Evaporatively Cooled Condensers	Compliance credit can be taken for installation of evaporatively cooled condensers. Duct Sealing is required. Field verification is required.	Reference Residential Appendices RA3.1, RA3.4, RA4.3.2
Ice Storage Air Conditioners	Compliance Credit can be taken for installation of distributed energy storage equipment. Duct sealing is required. Field verification is required	Reference Residential Appendices RA3.1, RA3.4, RA4.3.1
Building Envelope Measures		

Measure Title	Description	Protocol or Test Procedure
Building Envelope <u>Air Leakage/Sealing</u>	The default building envelope Specific Leakage Area (SLA) is specified in Residential ACM Manual Section 3-3.3. The building envelope shall be designed and constructed with a continuous air barrier. Air barriers shall be installed according to manufacturer's instructions and have been inspected by a HERS rater to comply with RA3 and shall be deemed to comply with an air leakage rate of 7 Air Changes per hour at 50 Pa (ACH50). Compliance credit can be taken for improved building envelope <u>air leakage/sealing by testing the building's tightness of less than 7.0 ACH50. Testing shall be performed by a fan pressurization technique in accordance with ASTM E779. The lower limit of allowed tested air leakage reduction for compliance credit is 1.0 ACH50[p4].</u> Field verification and diagnostic testing is required to confirm reduced infiltration.	ASTM E779-03[jrm5]
High Quality Insulation Installation	Compliance Software recognizes standard and improved envelope construction. Compliance credit can be taken for quality installation of insulation. Field verification is required.	Reference Residential Appendix RA3.5[jrm6]
Quality Insulation Installation for Spray Polyurethane Foam	Closed-cell spray polyurethane foam insulation must be installed pursuant to the procedures of JA7 <u>Reference Residential Appendix RA3.5</u> . If the installation pursuant to JA7 <u>Reference Residential Appendix RA3.5</u> is certified by a HERS rater, a compliance credit can be taken.	<u>Reference Residential Appendix RA3.5[jrm7]</u> Reference Joint Appendix JA7[jrm8]
Solar Measures		
PV Field Verification Protocol	To receive rebates for photovoltaic installations pursuant to the New Solar Home Partnership, the output of the installed system must be measured and shown to comply with the output specified on the rebate application (taking into account variables such as the solar insolation, the time, and the temperature).	Reference Residential Appendix RA3.6
<p>1. Note: Compliance credit for increased duct insulation R-value (not buried ducts) may be taken without field verification if the R-value is the same throughout the building, and for supply ducts located in crawlspaces and garages where all supply registers are either in the floor or within 2 feet of the floor. These two credits may be taken subject only to enforcement agency inspection.</p> <p>2. Note: The requirement for verification of a high EER does not apply to equipment rated only with an EER.</p>		

~~All features that require field verification and/or diagnostic testing shall be listed in the *Field Verification and Diagnostic Testing* section of the *Certificate of Compliance*. The listing shall include "eligibility and installation criteria" for such features. Field-verified and diagnostically tested features shall be described in the *Compliance Supplement*. Installers shall certify that the requirements for compliance have been met on the *Installation Certificate*. Field Verification and diagnostic testing shall be performed by a HERS rater and documented on the *Certificate of Field Verification and Diagnostic Testing*.~~

RA2.3 Summary of Documentation and Communication Requirements for HERS Verification Compliance

The building energy compliance features, HERS field verification requirements, and applicable special feature eligibility criteria shall be identified on a Certificate of Compliance that conforms to the requirements in Standards Sections 10-103(a)1 and 10-103(a)2. The builder or subcontractor shall submit all applicable Installation Certificate documentation in conformance with the requirements in Standards Section 10-103(a)3 and the procedures described in RA2, and shall provide certification that the construction/installation complies with all applicable requirements on the Certificate of Compliance and complies with all applicable field verification and eligibility criteria. Field verification shall be performed by a HERS rater and documented on applicable Certificate of Field Verification and Diagnostic Testing documentation that conforms to the requirements of Standards Section 10-103(a)5 and the procedures in RA2.

RA2.3.1 Documentation Constraints, Registration, and Validation

The performance compliance method allows for preparation of Certificate of Compliance documentation for multifamily buildings that precludes use of certain HERS verification compliance credits that would otherwise be available for compliance credit as described in Section RA2.3.1.1 below. Document registration is required

for all dwelling units that utilize building energy features for which HERS verification is required as introduced in Section RA2.3.1.2 and described in the procedures in subsequent sections of RA2. Validation of electronic documentation is introduced in section RA2.3.1.3 and is applicable to many aspects of the documentation procedures described in subsequent sections of RA2.

RA2.3.1.1 Whole-Building Compliance Approach for Multifamily Buildings

For multi-family buildings, a single Certificate of Compliance may be prepared for the whole building, however dwelling unit-specific Installation Certificate documentation and dwelling unit-specific Certificate of Field Verification and Diagnostic Testing documentation shall be required for each individual dwelling unit in the building. Thus, for the whole-building compliance approach in a multifamily building utilizing features that require HERS verification, the required energy compliance documentation for each dwelling unit shall consist of a copy of the whole-building Certificate of Compliance, the applicable dwelling unit-specific Installation Certificate documents, and the applicable dwelling unit-specific Certificate of Field Verification and Diagnostic Testing documents.

When the whole-building compliance approach is utilized for a multifamily building, some energy efficiency measures that require HERS field verification shall not be used for compliance credit in performance compliance calculations. These measures require dwelling unit-specific information input to the compliance software, and dwelling unit-specific information that must be shown on the Certificate of Compliance, thus these measures cannot be properly documented using a whole-building Certificate of Compliance that is not a dwelling unit-specific document. The HERS measures that shall not be utilized for the multifamily whole-building compliance approach are:

- Buried Ducts credit
- Deeply Buried Ducts credit
- Reduced Supply Duct Surface Area credit
- Maximum Rated Total Cooling Capacity credit
- Building Envelope Sealing credit (blower door test)

All other measures that require HERS field verification and diagnostic testing are allowed for use with the multifamily whole-building compliance approach.

RA2.3.1.2 Document Registration

For all low-rise residential buildings for which compliance requires HERS field verification, all compliance documentation (Certificate of Compliance, Installation Certificate, and Certificate of Field Verification and Diagnostic Testing) required for the dwelling unit shall be submitted for registration and retention to a HERS provider data registry. When submittal of documentation to a HERS provider data registry is required, the completed documents are referred to as registered documents, and the process of completing these documents by submitting information and certification signatures to the HERS provider data registry is called registration. Refer to Reference Joint Appendix JA1 for the definitions for HERS provider data registry, and for registered document.

RA2.3.1.3 Document Validation

Printed paper copies or electronic copies of the completed, signed, registered Certificate of Compliance, Installation Certificate, and Certificate of Field Verification and Diagnostic Testing documentation shall be allowed for document submittals to enforcement agencies, subject to verification that the information shown on a submitted document conforms to the information shown on the current revision of the registered document on file in the HERS provider data registry for the applicable dwelling unit.

The HERS provider shall make document validation services available via phone, internet, or utilization of digital technologies, to enable enforcement agency officials, builders, installation contractors, HERS raters, and other authorized users of the HERS provider data registry to verify the information shown on submitted

documentation is consistent with the information shown on the current revision of the registered document on file in the HERS provider data registry for the applicable dwelling unit.

RA2.3.2 Summary of Documentation and Communication Procedures

The documentation and communication process for measures that require field verification and diagnostic testing is summarized below. The subsequent sections of this chapter contain additional information and requirements that apply to all situations; however the section on alterations, RA2.8, applies specifically to the differences in the requirements for alterations. Section RA2.7 applies specifically to the differences in the requirements for Third Party Quality Control Programs.

~~1. The documentation author shall complete the compliance documents, including the Certificate of Compliance. A Certificate of Compliance shall be prepared in for each dwelling unit or building that requires a building permit. For multi-family buildings, a single Certificate of Compliance is typically prepared for a whole building, but separate compliance documentation shall be required for the individual dwelling units that have measures requiring field verification and diagnostic testing.~~

~~— For newly constructed low-rise residential buildings demonstrating compliance under the § 151(c)2 multiple orientation alternative for which compliance requires HERS field verification, the documentation author shall submit the Certificate(s) of Compliance for retention to a HERS provider data registry.~~

~~Submittals to the HERS provider data registry shall be made electronically. After submittal of the Certificate of Compliance information, the documentation author shall access the registered Certificate of Compliance from the provider's data registry for submittal to the builder. Beginning on October 1, 2010, these same requirements for registration and retention of Certificates of Compliance shall apply for all low-rise residential buildings for which compliance requires HERS field verification.~~

~~Refer to Reference Joint Appendix JA1 for the definitions for "HERS provider data registry", and for "registered document".~~

~~2.1. The documentation author shall provide a signed Certificate of Compliance to the builder that indicates any HERS diagnostic testing and field verification measures required for compliance, and if applicable, displays the unique registration number assigned by the HERS provider data registry. The Certificate of Compliance information shall be submitted to the HERS provider data registry, and shall be verified and signed by the documentation author and by the principal designer/owner to register the documentation prior to submittal of the Certificate of Compliance to the enforcement agency for filing with the building plans approval. These certification signatures shall be original signatures on paper documents, or electronic signatures on electronic documents. When submittal of the registration of the Certificate of Compliance to the HERS provider data registry is a requirement, the documentation author and the principal designer/owner shall submit certification to the HERS provider data registry electronically.~~

~~3.2. The builder shall make arrangements for transmittal of a signed copy of the Certificate of Compliance for dwellings that have features requiring HERS verification to the HERS provider. The builder shall also arrange for the services of a certified HERS rater prior to installation of the measures, so that once the installation is complete the HERS rater has ample time to complete the field verification and diagnostic testing without delaying final approval of the dwelling unit by the enforcement agency. The Builder shall make available to the HERS rater a copy of the Certificate of Compliance that was approved/signed by the principal designer/owner and submitted to the enforcement agency. The copies submitted to the HERS provider and to the HERS rater shall be in paper or electronic format.~~

~~4.3. For all low-rise residential buildings, the builder or subcontractor shall install the measure(s) that require field verification and diagnostic testing. When the installation is complete, the builder or subcontractor shall perform diagnostic testing on the installation using the applicable procedures specified in Reference Residential Appendix ~~RA3 and~~ RA2.5, RA3, and RA1. If testing confirms compliance, the builder or subcontractor shall complete and sign an submit the required information and signatures electronically to the HERS provider data registry to register the applicable Installation Certificate(s), and then post a copy of the applicable registered Installation Certificate(s) at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit.~~

~~For newly constructed low-rise residential buildings demonstrating compliance under the § 151(c)2 multiple orientation alternative for which compliance requires HERS field verification, when the installation is complete, the builder or subcontractor responsible for the performance of the installation shall perform diagnostic testing on the installation using the procedures specified in Section RA2.5, and if testing confirms compliance, make arrangements for transmittal/submittal of the Installation Certificate information to the HERS provider data registry. After submittal of the Installation Certificate information, the builder or subcontractor shall access the registered Installation Certificate from the provider data registry, provide an electronic certification to the registry or sign a copy of the registered Installation Certificate accessed from the registry, provide a copy of the signed registered Installation Certificate to the HERS rater, and, post a copy of the registered Installation Certificate at the building site for review by the enforcement agency. These filings shall be paper or electronic documents as applicable. The copy submitted to the rater shall be in paper or electronic format. Beginning on October 1, 2010, this procedure for registration and retention of Installation Certificates shall be required for all low-rise residential buildings for which compliance requires HERS field verification.~~

~~5.4. The HERS rater shall confirm that transmittal to the HERS provider data registry registration of the Certificate(s) of Compliance ~~information~~ and the applicable Installation Certificate(s) ~~information has has~~ been completed for each dwelling unit ~~having features requiring that requires~~ HERS verification. The HERS rater shall complete the applicable field verification and diagnostic testing as specified in Section RA2.6. The HERS rater shall enter-submit the test results required field verification and diagnostic testing information and signatures electronically into to the HERS provider data registry to register at the applicable Certificate of Field verification and Diagnostic Testing documentation.~~

~~6.5. The HERS provider shall make available registered copies of the Certificate(s) of Field Verification and Diagnostic Testing to the HERS rater, builder, enforcement agency and other authorized users of the HERS provider data registry.~~

~~7.6. The enforcement agency shall not approve a dwelling unit until the enforcement agency has received a the required completed signed registered copy of the Certificate(s) of Field Verification and Diagnostic Testing, ~~that has been~~ posted at the building site for review in conjunction with requests for final inspection for the dwelling. The HERS provider shall make document verification services available, ~~via phone or internet communications interface~~, to enforcement agencies, builders and contractors, HERS raters, the Energy Commission, and other authorized users of the HERS provider data registry. The HERS provider shall ~~insure ensure~~ that the content and approval signatures for copies of submitted Certificate(s) of Compliance, Installation Certificate(s), and Certificate(s) of Field Verification and Diagnostic Testing are retained per Title 20, Division 2, Chapter 4, Article 8, Section 1673(d)[jrm11].~~

RA2.4 Summary of Responsibilities

~~This section~~Section RA2.4 summarizes responsibilities set forth in ~~this chapter~~Appendix RA2 and organizes them by the responsible party. This section is not, however, a complete accounting of the responsibilities of the respective parties.

RA2.4.1 Builder

The builder shall make arrangements for ~~transmittal submittal~~ of the ~~signed~~ Certificate of Compliance ~~information and certifications signatures to the HERS provider, data registry~~ for dwelling units ~~having with~~ features that require HERS verification, ~~to the HERS provider~~. The builder shall make arrangements for the services of a certified HERS rater prior to installation of the ~~measures features~~, so that once the installation is complete the HERS rater has ample time to complete the field verification and diagnostic testing without delaying final approval of the building permit by the enforcement agency. The Builder shall ~~provide make~~ available to the HERS Rater a copy of the Certificate of Compliance that was approved/signed by the principal designer/owner and submitted to the enforcement agency.

The builder or subcontractor responsible for ~~the performance of~~ the installation shall complete and sign all applicable the Installation Certificate(s) to certify that the installation work meets the requirements for compliance credit shown on the Certificate of Compliance and that ~~the all applicable~~ field verification and diagnostic test results reported on ~~the~~ Installation Certificate(s) are accurate. The builder or subcontractor shall post a copy of

~~the all applicable~~ Installation Certificates at the construction site for review by the enforcement agency, in conjunction with requests for final inspection for each dwelling unit. The builder or subcontractor shall also ~~provide make available to the HERS rater a copy-copies of the all applicable~~ Installation Certificates ~~to the HERS rater~~.

If the builder utilizes group sampling for HERS verification compliance, the builder, builder's authorized representative, or the HERS rater shall identify the dwelling units to be included in the sample group for field verification and diagnostic testing. The HERS rater, with no direction from the installer or builder, shall randomly select one dwelling unit from a sample group for field verification and diagnostic testing upon receiving the builder's or builder representative's request for HERS verification of that group.

The builder shall arrange for copies of a all applicable registered ~~copy of the~~ Certificates of Field Verification and Diagnostic Testing to be posted at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit.

When re-sampling reveals a failure, the builder is required to offer at no charge to all building owners for occupied dwelling units in the group to complete field verification, diagnostic testing and corrective action if necessary. Building owners may decline to have field verification and diagnostic testing and corrective action completed for the dwelling unit. The builder shall report the identifying location of any dwelling unit in which the building owner declines field verification and diagnostic testing and corrective action to the HERS provider. The builder shall take corrective action as required in all unoccupied dwelling units in the group and in occupied dwelling units in the group where building owners have accepted field verification, diagnostic testing and corrective action.

The builder shall leave in the building, for the building owner at occupancy, copies of all compliance, operating, maintenance, and ventilation information specified in applicable sections of Title 24, Part 1, Section 10-103(b).

RA2.4.2 HERS Provider and Rater

The HERS provider shall maintain a data registry with the capability to receive and store electronic data and image information provided by authorized users of the data registry sufficient to facilitate administration of all applicable the of document registration procedures and HERS compliance verification procedures and documentation procedures as described in ~~this~~ Appendix RA2 and Joint Appendix JA9. Data registry capabilities shall include a secure web-based interface accessible by authorized users, and the ability to receive data transfer files as specified by ~~Residential ACM Manual Appendix D~~ Joint Appendix JA9 [jrm12]. For sampling purposes, the HERS provider shall maintain a list of the dwelling units in a group, the number of HVAC systems within each dwelling unit from which sampling is drawn [jrm13], the dwelling units selected for sampling, the dwelling units sampled, the results of the sampling, any dwelling units selected for re-sampling, the dwelling units that have been tested and verified as a result of re-sampling, and any corrective action taken.

For all dwelling units that require HERS verification for compliance, the HERS provider shall retain records of all information content and approval signatures for completed ~~forms~~: Certificate of Compliance, Installation Certificate, and Certificate of Field Verification and Diagnostic Testing documents for a period of five years per Title 20, Division 2, Chapter 4, Article 8, Section 1673(d) [jrm14].

The HERS rater ~~providing the who provides~~ field verification and diagnostic testing shall transmit all the required test results and certification signatures to the HERS provider data registry. Registered Certificates of Field Verification and Diagnostic Testing from the provider ~~and signed by the rater~~ shall be made available for the tested dwelling unit and each of the remaining untested dwelling units from a designated group for which compliance is verified based on the results of a sample. The ~~provider's~~ registered ~~copy of the~~ Certificates of Field Verification and Diagnostic Testing shall be made available ~~or submitted~~ to the HERS rater, the builder, the enforcement agency, and to other authorized users of the HERS provider data registry.

The HERS rater shall produce a separate Certificate of Field Verification and Diagnostic Testing for each dwelling unit that meets the diagnostic requirements for compliance. The registered Certificate of Field Verification and Diagnostic Testing shall have unique HERS provider-designated identifiers for registration number and sample group number, and shall include lot location or address, building permit number, time and date stamp, provider logo, water mark or official seal, and indicate if the dwelling unit has been tested or if it

was an untested dwelling unit approved as part of sample ~~testing~~group. The HERS rater shall not ~~sign-submit~~ a Certificate of Field Verification and Diagnostic Testing for a dwelling unit that does not have ~~an a completed~~ Installation Certificate ~~signed-submitted~~ by the installer as required in Section RA2.5.

If field verification and diagnostic testing on a sampled dwelling unit identifies a failure to meet the requirements for compliance credit, the HERS rater shall report to the HERS provider, the builder, and the enforcement agency that re-sampling will be ~~required~~[rm15].

If re-sampling identifies another failure, the HERS rater shall report to the HERS provider, the builder, and the enforcement agency that field verification and diagnostic testing will be required for all the untested dwelling units in the group. The report shall specify the identifying location of all dwelling units that shall be fully tested.

The HERS provider shall also report to the builder once diagnostic testing and field verification has shown that the failures have been corrected in all of the dwelling units except those for which the building owner has declined field verification, diagnostic testing, and corrective action. When field verification and diagnostic testing confirm that the requirements for compliance have been met, the HERS provider shall make available ~~a~~ ~~the applicable~~ registered ~~copy of the~~ Certificate(s) of Field Verification and Diagnostic Testing for each dwelling unit in the group.

The HERS provider shall file a report with the enforcement agency if there has been a failure on a re-sample within a group, explaining all actions taken (including field verification, testing, corrective actions, offers to building owners for testing and corrective action, and building owner declines of such offers) to bring into compliance dwelling units for which full testing has been required.

RA2.4.3 Third Party Quality Control Program

An approved Third Party Quality Control Program shall:

1. Provide training to participating program installing contractors, installing technicians, and specialty Third Party Quality Control Program subcontractors regarding compliance requirements for measures for which diagnostic testing and field verification is required,
2. Collect data from participating installers for each installation completed for compliance credit,
3. Complete data checking analysis to evaluate the validity and accuracy of the data to independently determine whether compliance has been achieved,
4. Provide direction to the installer to retest and correct problems when data checking determines that compliance has not been achieved,
5. Require resubmission of data when retesting and correction is directed, and
6. Maintain a database of all data submitted ~~by participating program installing contractors, installing technicians, and specialty Third Party Quality Control Program subcontractors~~ in a format that is acceptable to the Commission and available to the Commission upon request.

The HERS provider shall arrange for the services of an independent HERS rater to conduct independent field verifications of the installation work performed by the participating installing contractor and Third Party Quality Control Program, completing all of the responsibilities of a HERS rater as specified in this Appendix RA2 with the exception that sampling shall be completed for a group of up to thirty dwelling units and sampling and re-sampling shall be completed for a minimum of one out of every thirty sequentially completed dwelling units from the group.

RA2.4.4 Enforcement Agency

The enforcement agency at its discretion may require independent testing and field verification to be scheduled so that it can be completed in conjunction with the enforcement agency's required inspections, and/or observe the field verification and diagnostic testing performed by builders or subcontractors or the certified HERS rater in conjunction with the enforcement agency's required inspections to corroborate the results documented on the Installation Certificate(s) and on the Certificate(s) of Field Verification and Diagnostic Testing.

For dwelling units that have used a compliance alternative that requires field verification and diagnostic testing, the enforcement agency shall not approve a dwelling unit until the enforcement agency has received, in accordance with Title 24, Part 1 Section 10-103(a), Section 10-103(d) and the procedures in ~~this~~ Appendix RA2, ~~an a registered copy of the~~ Installation Certificate that has been completed and signed by the builder or subcontractor, and a registered copy of the Certificate of Field Verification and Diagnostic Testing that has been completed and signed and dated by the HERS rater in conjunction with requests for final inspection for each dwelling unit. ~~These filings shall be paper or electronic documents as applicable.~~ The HERS provider shall make document verification services available, ~~via phone or internet communications interface,~~ to enforcement agencies, builders and contractors, HERS raters, the Energy Commission, and other authorized users of the provider data registry.

If necessary to avoid delay of approval of dwelling units completed when outside temperatures are below 55°F, the enforcement agency may approve compliance ~~credit for with the~~ refrigerant charge verification requirements and airflow measurement when installers have used the Weigh-in Charging Method alternate charging and airflow measurement procedure described in Section RA3.2. This approval will be on the condition that installers ~~provide submit a signed agreement to the builder with a copy~~ to the enforcement agencies ~~agency a registered~~ Installation Certificate that includes a signed declaration indicating agreement to return to correct refrigerant charge ~~and airflow if the a~~ HERS rater determines at a later time when the outside temperature is ~~above~~ 55°F or above, that correction is necessary. The HERS provider shall track all projects for which the installer complied utilizing the Weigh-In method to ensure a HERS rater conducts refrigerant charge verification for all such systems. The HERS rater shall use the RA3.2.2 standard charge measurement procedure, or a procedure approved by the HVAC system manufacturer and Energy Commission for the refrigerant charge verification. The HERS rater shall report the diagnostic results on the applicable Certificate of Field Verification and Diagnostic Testing, and shall register the certificate with the HERS provider. When refrigerant charge testing performed by the HERS rater indicates adjustment to the charge is required, the HERS provider shall notify the installer, and the builder or building owner that correction is required. The HERS provider may also notify the enforcement agency that correction is required. All ducted split system central air conditioners and heat pumps that utilize the Weigh-In Method shall be verified by a HERS rater. Compliance with HERS verification requirements cannot utilize group sampling procedures when the installer utilized the Weigh-In Method.

RA2.5 Installer Requirements - Installation Certificate Form Documentation

Installation Certificates are required ~~when for each and every~~ dwelling units ~~that has utilize~~ features, materials, components, or manufactured devices that are required for compliance with the Appliance Efficiency Regulations and Title 24, Part 6. Installation Certificates shall indicate the installed features, materials, components, or manufactured devices as are in conformance with the specifications listed on the Certificate of Compliance for the dwelling. The builder or the installing subcontractor eligible under Division 3 of the Business and Professions Code to accept responsibility for construction/installation, in the applicable classification for the scope of work, shall complete and sign and submit the applicable sections of an Installation Certificate documentation for these items, and post a copy of the Certificate(s) at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit.

When the dwelling unit does not require HERS field verification for compliance, the Installation Certificates that are posted in the field for review by the enforcement agency at final inspection are not required to be registered certificates from a HERS provider data registry, but shall conform to all other applicable requirements of 10-103(a)3. The remainder of Section RA2.5 describes the documentation procedures for Installation Certificates for dwelling units that require HERS verification.

RA2.5.1 Field Verification, Diagnostic Testing, and Installation Certificate Registration

If any of the installed For the features, materials, components, or manufactured devices that also require field verification or diagnostic testing by a certified HERS rater, they will be are listed on the Certificate of Compliance ~~with an indication indicating that~~ HERS verification is required for compliance, ~~and~~ the builder shall arrange for the services of a certified HERS rater prior to installation of the measures, so that once the installation is complete the HERS rater will have ample time to complete the required field verification and diagnostic testing without delaying final approval of the dwelling unit by the enforcement agency.

For all low-rise residential buildings for which compliance requires HERS field verification and diagnostic testing, ~~some buildings, HERS verification procedures require~~ the Installation Certificate(s) ~~to shall be signed and submitted to a HERS provider data registry as specified in Standards Section 10-103(a)3 to certify conformance with Part 6. When this is required, the completed Installation Certificates are referred to as "registered" Installation Certificates, and the process of completing these documents by submitting information and certifications to the HERS provider data registry is called "registration".~~ ~~When Standards Section 10-103(a)3 requires document registration, all Installation Certificate documents that are applicable to the dwelling unit shall be registered. The documentation procedure for completing the Installation Certificate when registration is required, is different than the procedure for completing the Installation Certificate when registration is not required. Both procedures are described below.~~

~~For newly constructed low-rise residential buildings demonstrating compliance under the §151(c)2 multiple orientation alternative for which compliance requires HERS field verification, registration of the Installation Certificate(s) is required. Beginning on October 1, 2010, for all low-rise residential buildings for which compliance requires HERS field verification, registration of the Installation Certificate(s) shall be required.~~

~~**Procedure for completing the Installation Certificate when registration is not required:** When the installation of a measure that requires HERS field verification and diagnostic testing is complete, the builder or the builder's subcontractor shall perform field verification and diagnostic testing of the installation to confirm compliance with Title 24, Part 6 utilizing the applicable procedures specified in Reference Residential Appendix RA3. When the builder or the installing subcontractor confirms that the installation complies with Title 24, Part 6 requirements, the builder or the installing subcontractor shall complete and sign an Installation Certificate and post a copy at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit, and the builder or the installing contractor shall also provide a copy of the completed and signed Installation Certificate to the HERS rater for use during the HERS verification procedure.~~

~~**Procedure for completing the Installation Certificate when registration is required:** When the installation of a measure ~~that requires HERS field verification and diagnostic testing~~ is complete, the builder or the builder's subcontractor shall perform all required field verification and diagnostic testing of the installation(s) to confirm compliance with the Standards utilizing the applicable procedures specified in Reference Residential Appendix RA3 or RA[jrm16]1, and submit, or make arrangements for ~~transmittal/submittal of the all required~~ Installation Certificate information to a HERS provider data registry. Submittal of Installation Certificate information to the HERS provider data registry shall be done electronically.~~

HERS raters or other authorized users of the HERS provider data registry ~~shall be allowed to~~ may provide documentation author support to facilitate the ~~transmittal/submittal of the Installation Certificate information to the HERS provider data registry website on behalf of the builder or the builder's subcontractor when such facilitation has been authorized by the builder or subcontractor. Documentation authors shall provide an electronic signature to certify the documentation is accurate and complete. However, the~~ ~~The~~ builder or subcontractor who is responsible-eligible under Division 3 of the Business and Professions Code to take responsibility for the construction/installation, or their authorized representative, shall ~~still be required to sign~~ provide an electronic signature to register/certify the completed Installation Certificate, to certify confirm the accuracy of the information provided on the Certificate is true and correct, and confirm that the construction/installation complies with the requirements shown on the dwelling unit's Certificate of Compliance for the building that was approved by the enforcement agency. After submittal of the Installation Certificate information to the HERS provider data registry, the builder or subcontractor shall access the registered Installation Certificate from the provider data registry, submit an electronic certification/signature to the registry, The builder or subcontractor shall ~~or sign a copy of the registered Installation Certificate accessed from the registry by the builder or subcontractor's authorized representative, provide~~ make available a copy of the ~~completed signed~~ registered Installation Certificate to the HERS rater, and post a copy of the ~~completed signed~~ registered Installation Certificate at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit. ~~The registered copy submitted to the HERS rater shall be in paper or electronic format, except that if the builder or subcontractor provides electronic certification/signature directly to the registry, the HERS rater shall receive access to a completed signed registered copy of the Installation Certificate directly from the registry.~~

RA2.5.1 Installer Requirements—Measures Requiring Diagnostic Testing

~~When the Certificate of Compliance indicates a requirement for HERS verification and diagnostic testing of installed building features, the builder employees or subcontractors shall perform diagnostic testing for each feature in accordance with procedures specified in Reference Residential Appendix RA3.~~

~~**When compliance does not require Installation Certificate registration,** enter information directly on an Installation Certificate form. Enter the information from the test results for the installation, and all other information required to complete the Installation Certificate. Sign the Installation Certificate to certify that the diagnostic test results and the installation work meets the requirements for compliance. Provide a completed signed copy of the Installation Certificate to the HERS rater, and post a copy of the completed signed Installation Certificate at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit.~~

~~**When compliance requires Installation Certificate registration,** record the information from the test results for the installation, and all other information required to complete the Installation Certificate. Make arrangements for transmittal of the Installation Certificate information to a HERS provider data registry, access the registered Installation Certificate from the provider data registry, submit an electronic certification/signature to the registry or sign a copy of the registered Installation Certificate accessed from the registry to certify that the diagnostic test results and the installation work meets the requirements for compliance. Provide a completed signed copy of the registered Installation Certificate to the HERS rater, and post a copy of the completed signed registered Installation Certificate at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit. The completed signed registered copy submitted to the HERS rater shall be in paper or electronic format, except that if the builder or subcontractor provides electronic certification/signature directly to the HERS provider data registry, the HERS rater shall receive access to a completed signed registered copy of the Installation Certificate directly from the HERS provider data registry.~~

RA2.5.2 Installer Requirements—Measures Requiring Field Verification

~~When compliance includes supply duct location, surface area and R-value improvements, installation of an air conditioner refrigerant charge indicator display, high air conditioner EER, high quality building envelope construction, or special installation eligibility requirements, the builder employees or subcontractors shall perform field verification for each measure in accordance with the procedures in Reference Residential Appendix RA3.~~

~~**When compliance does not require Installation Certificate registration,** enter information directly on an Installation Certificate form. Enter the installation information required to field verify the measure, and all other information required to complete the Installation Certificate. Sign the Installation Certificate to certify that the field verification results and the installation work meets the requirements for compliance. Provide a completed signed copy of the Installation Certificate to the HERS rater, and post a copy of the completed signed Installation Certificate at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit.~~

~~**When compliance requires Installation Certificate registration,** record the installation information required to field verify the measure, and all other information required to complete the Installation Certificate. Make arrangements for transmittal of the Installation Certificate information to a HERS provider data registry, access the registered Installation Certificate from the provider data registry, submit an electronic certification/signature to the registry or sign a copy of the registered Installation Certificate accessed from the registry to certify that the diagnostic test results and the installation work meets the requirements for compliance. Provide a completed signed copy of the registered Installation Certificate to the HERS rater, and post a copy of the completed signed registered Installation Certificate at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit. The completed signed registered copy submitted to the HERS rater shall be in paper or electronic format, except that if the builder or subcontractor provides electronic certification/signature directly to the HERS provider data registry, the HERS rater shall receive access to a completed signed registered copy of the Installation Certificate directly from the HERS provider data registry.~~

RA2.6 HERS Procedures – Verification, Testing, and Sampling

At the builder's option, HERS field verification and diagnostic testing (HERS verification) shall be completed either for each and every dwelling unit, or alternatively for a dwelling unit sample from a designated group of dwelling units in which the same measure(s) requiring HERS field verification and diagnostic testing is installed in each dwelling unit in the group. If the builder elects to demonstrate compliance utilizing group sampling, the procedures described in Sections RA2.6.2, RA2.6.3, and RA2.6.4 shall be followed.

RA2.6.1 HERS Procedures - General Requirements

The general requirements in RA2.6.1 are applicable to all dwelling units that require HERS verification for compliance, and shall be incorporated into procedures specified in Sections RA2.6.2, RA2.6.3, and RA2.6.4 whenever applicable.

The builder or the builder's authorized representative shall make available to the HERS rater the names and license numbers of the subcontractors responsible for the installations in the dwelling units that require HERS verification; and a copy of the registered Certificate of Compliance that was signed and submitted by the person responsible for the building design and was approved by the enforcement agency.

Note that if multiple measures requiring field verification and diagnostic testing are installed in dwelling units, sample testing does not have to be completed for all of the measures in the same dwelling unit. Dwelling units in a designated sampling group shall all be located within the same enforcement agency jurisdiction and subdivision or multifamily housing development.

The builder, builder's authorized representative, or subcontractor shall provide make available to the HERS rater a copy of the Certificate of Compliance approved/signed by the principal designer/owner and a copy of the applicable registered Installation Certificate(s) signed/certified and submitted by the builder or subcontractors responsible for the construction/installation as specified-described in Section RA2.5.

~~**When compliance does not require document registration**, the Certificate of Compliance information and Installation Certificate information necessary to identify the dwelling, and the dwelling's sample group, shall be entered into the provider data registry by the HERS rater using the information from the signed copies provided by the designer/owner, and the builder or subcontractor.~~

~~**When compliance requires document registration**, prior Prior to performing field verification and diagnostic testing, the HERS rater shall verify that transmittal to the HERS provider data registry registration of the all applicable Certificate of Compliance information documentation, and registration of all applicable the Installation Certificate information documentation has been completed, for each-all dwelling units for which compliance requires HERS verification.~~

~~**For all HERS verification procedures**, the The HERS rater shall confirm that the Installation Certificate(s) has been completed as required, and that the installer's diagnostic test results and all other Installation Certificate information shows-indicates compliance consistent with the requirements given in the plans and specifications and registered Certificate(s) of Compliance documents approved by the local enforcement agency for the dwelling.~~

The HERS rater shall perform all applicable field verification and diagnostic testing.

If the HERS rater's field verification and diagnostic testing determines that the requirements for compliance are met, the HERS rater shall ~~transmits~~submit, or make arrangements for submittal of the Certificate of Field Verification and Diagnostic Testing results information to the HERS provider data registry.

Authorized users of the HERS provider data registry that are not certified HERS raters may provide documentation author support to facilitate submittal of the Certificate of Field Verification and Diagnostic Testing information to the HERS provider data registry on behalf of the HERS rater when such facilitation has been authorized by the HERS rater. Documentation authors shall provide an electronic signature to certify the documentation is accurate and complete.

The Certificate of Field Verification and Diagnostic Testing documentation shall be signed by the HERS rater who performed the field verification and diagnostic testing services to certify that the information provided on the Certificate is true and correct. and rater certification/signature to the HERS provider data registry,

~~whereupon the provider shall make available registered copies of the completed signed Certificate of Field Verification and Diagnostic Testing to the HERS rater, the builder, the enforcement agency, and other approved users of the HERS provider data registry. Printed copies, electronic or scanned copies, and photocopies of the completed, signed registered Certificate of Field Verification and Diagnostic Testing shall be allowed for document submittals, subject to verification that the information contained on the copy conforms to the registered document information currently on file in the provider data registry for the dwelling.~~

A completed signed registered copy of the Certificate of Field Verification and Diagnostic Testing shall be posted at the building site for review by the enforcement agency in conjunction with requests for final inspection for each dwelling unit.

The HERS provider shall make document verification services available, to enforcement agencies, builders and contractors, HERS raters, the Energy Commission, and other authorized users of the HERS provider data registry.

~~The HERS provider shall make available via phone or internet communications interface a way for enforcement agency officials, builders, HERS raters, and other authorized users of the provider data registry to verify that the information displayed on copies of the submitted Certificate(s) conforms to the registered document information currently on file in the provider data registry for the dwelling unit.~~

~~If the builder chooses the sampling option, the procedures described in Sections RA2.6.1, RA2.6.2, and RA2.6.3 shall be followed. Sampling procedures described in these sections are included in the *Residential Compliance Manual*.~~

~~RA2.6.1~~RA2.6.2 HERS Procedures - Initial Model Field Verification and Diagnostic Testing

The HERS rater shall diagnostically test and field verify the first dwelling unit of each model within a subdivision or multifamily housing development when the builder elects to demonstrate HERS verification compliance utilizing group sampling. To be considered the same model, dwelling units shall have the same basic floor plan layout, energy design, and compliance features as shown on the Certificate of Compliance. ~~Variations in the basic floor plan layout, energy design, compliance features, zone floor area, or zone volume, that do not change the HERS features to be tested, the heating or cooling capacity of the HVAC unit(s), or the number of HVAC units specified for the dwelling units, shall not cause dwelling units to be considered a different model. For multi-family buildings, variations in exterior surface areas caused by location of dwelling units within the building shall not cause dwelling units to be considered a different model. This initial testing allows the builder to identify and correct any potential construction flaws or practices in the build out of each model. If field verification and diagnostic testing determines that the requirements for compliance are met, the HERS rater shall transmit the test results to the HERS provider data registry, whereupon the provider shall make available a registered copy of the Certificate of Field Verification and Diagnostic Testing, to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry.~~

~~RA2.6.2~~RA2.6.3 HERS Procedures - Group Sample Field Verification and Diagnostic Testing

Procedures for sampling of a "closed" group of up to seven dwellings, and for sampling of an "open" group of up to five dwellings are described in this Section RA2.6.3.

RA2.6.3.1 Designation of Groups

After the initial model field verification and diagnostic testing is completed as specified in RA2.6.2, the builder, or the builder's authorized representative shall determine which a sampling procedure shall to be used, and shall designate the dwelling units to include in for the the group of dwellings that require HERS field-verification and diagnostic testing. The maximum number of dwelling units allowed in a sample group is seven. (Note: refer to Section RA2.7 for additional information about the maximum number of dwelling units allowed in a sample group for Third Party Quality Control Programs).

If multiple measures requiring HERS verification are installed, each dwelling unit in a designated group shall have the same measures requiring HERS verification as the other dwelling units in the designated group. If some dwelling units have installed a different set of measures requiring HERS verification, those dwelling units shall be in a separate group.

If multiple measures requiring HERS verification are installed in the dwelling units in a designated group, sample testing is not required to be completed for all of the measures in the same dwelling unit.

Dwelling units in a designated group shall all be located within the same enforcement agency jurisdiction and subdivision or multifamily housing development. Refer also to Section RA2.8 for requirements for sample groups applicable to alterations.

If dwelling units have central forced-air space conditioning equipment that introduces outside air into the conditioned space utilizing means that connect outside air ventilation ducts directly to the dwelling unit's central forced air duct system (Central Fan-Integrated Ventilation System or CFI Ventilation System), the CFI ventilation technology shall be considered a separate measure for HERS verification sampling purposes, and dwellings with CFI ventilation systems shall be placed in separate groups from other dwelling units that do not utilize CFI ventilation technology. Procedures for sampling of a "closed" group of up to seven dwellings, and for sampling of an "open" group of up to five dwellings are described in this section.

RA2.6.3.2 Group Status - "Open" Groups and "Closed" Groups

~~Transmittal/s~~Submittal of the Installation Certificate information, for at least one dwelling, to the HERS provider data registry, is required in order to "open" a new group. Additional dwellings may be entered into the registry, and included in an "open" group over a period of time subject to ~~transmittal/~~submittal of the Installation Certificate information to the registry for each additional dwelling. However the group shall not remain "open" to receive additional dwellings for a period longer than six months from the earliest date shown on any Installation Certificate for a dwelling included in a group. A group may be "closed" at any time after the group has been "opened" at the option of the builder or builder's authorized representative, thus the size of a "closed" group may range from a minimum of one dwelling to a maximum of seven dwellings. When a group becomes classified as "closed", no additional dwellings shall be added to the group.

RA2.6.3.3 Sampling of a "Closed" Group of Up to Seven Dwellings

The following criteria shall be met as prerequisite to attaining HERS verification compliance for the group:~~requires the following conditions to be met as prerequisite to receiving HERS compliance verification for the group:~~

1. All of the dwelling units contained in the sample group have been identified. ~~Up to~~A maximum of seven dwellings are allowed to be included in a "closed" sample group for ~~the~~ HERS compliance ~~verification~~.
2. Installation of all the measures that require HERS verification has been completed in all the dwellings that are entered in the group, and ~~transmittal or submittal registration~~ of the Installation Certificates ~~information to the HERS provider data registry~~ for all the dwellings entered in the group has been completed.
- ~~3.~~ The group has been classified as a "closed" group in the provider data registry.

4.3.

At the request of the builder or the builder's authorized representative, a HERS rater shall randomly select one dwelling unit from the "closed" sample group for field verification and diagnostic testing. If the dwelling unit meets the compliance requirements, this "tested" dwelling and also each of the other "not-tested" dwellings in the group shall receive a registered Certificate of Field Verification and Diagnostic Testing.

4.

RA2.6.3.4 Sampling of an “open” group of up to five dwellings

~~requires~~ The following ~~conditions-criteria to shall~~ be met as prerequisite to ~~receiving-attaining~~ HERS ~~verification~~ compliance ~~verification~~ for the group:

1. At least one dwelling unit from the sample group has been identified. ~~Up to~~ A maximum of five dwellings are allowed to be included in an “open” sample group for ~~the~~ HERS compliance ~~verification~~.
2. Installation of all the measures that require HERS verification shall be completed in all the dwellings that are entered in the group, and ~~transmittal or submittal registration~~ of the Installation Certificate ~~s~~ information to the HERS provider data registry for all the dwellings entered in the group has been completed.
- ~~3.~~ At the request of the builder, or the builder’s authorized representative, a HERS rater shall randomly select one dwelling unit from those currently entered into the “open” sample group for field verification and diagnostic testing. If the dwelling unit meets the compliance requirements, the “tested” dwelling and also each of the other “not tested” dwellings currently entered into the group shall receive a registered Certificate of Field Verification and Diagnostic Testing. If less than five dwelling units have been entered into the group, the group shall be allowed to remain “open” and eligible to receive additional dwelling units. Dwelling units entered into the “open” group subsequent to the successful-compliant HERS ~~compliance~~ verification of the “tested” dwelling shall also receive a registered Certificate of Field Verification and Diagnostic Testing as a “not tested” dwelling subject to receipt of the registered Installation Certificate ~~information~~ by the HERS provider data registry for the dwelling. The group shall be “closed” when it reaches the limit of five dwellings or when the six month limit for “open” groups has been exceeded.
- ~~4.3.~~ ~~If multiple measures requiring field verification and diagnostic testing are installed, each dwelling unit in the group shall have the same measures requiring field verification and diagnostic testing as the other dwelling units in the group. If some dwelling units have installed a different set of measures requiring field verification and diagnostic testing, these dwelling units shall be in a separate group.~~

RA2.6.3.5 Additional Requirements Applicable to Group Sampling Procedures

~~If dwelling units have forced-air space conditioning equipment that introduces outside air into the conditioned space using means that connect directly to the dwelling unit’s air conditioning duct system, these outside air ducted systems shall be considered separate measures and must be placed in separate groups from other dwelling units not having the same outside air measure.~~

~~The builder shall identify the group of dwelling units by location of County, City and either the street address or the subdivision and lot number, or the multifamily housing project name and shall identify the names and license numbers of subcontractors responsible for installations requiring diagnostic testing or field verification. The HERS rater shall verify that transmittal/submittal to the HERS provider’s data registry – for all dwelling units contained in the group – of the Certificate of Compliance information and the Installation Certificate information has been completed for each dwelling unit having features requiring HERS verification. The HERS rater shall also confirm that the Installation Certificates have been completed as required, and that the installer’s diagnostic test results and the Installation Certificate information shows compliance consistent with the Certificate of Compliance for the dwelling unit.~~ The builder or the HERS rater may request removal of untested dwelling units from a group by notifying the HERS provider prior to selection of the dwelling sample that will be tested from an “open” or “closed” group and shall provide justification for the change. Removed dwelling units shall be field verified and diagnostically tested individually or shall be included in a subsequent group for sampling.

There are exceptions to the requirement to have completed Installation Certificate data entered into the HERS provider’s data registry prior to selection of the dwelling unit to be tested in a group. Some HERS measures require multiple verifications during the construction process. A sample group is not required to be closed before HERS field verification and diagnostic testing can begin for the following measures. For these measures the HERS rater is allowed to randomly select the dwelling unit to be field verified from those that are at the proper stage of construction to enable the first of the multiple verifications to be completed.

1. **Quality Installation of Insulation**[irm17] measure requires inspection of the air barrier and inspection of the insulation behind tubs and showers at framing rough-in. Verification of the wall, floor and ceiling

insulation must be completed prior to drywall installation. Attic insulation installation may require follow-up verification.

2. **Buried Ducts** measure requires verification of the duct design prior to verification of the attic insulation.
3. **Duct Surface Area** requires verification of the duct design prior to installation of the attic insulation.

The HERS rater, with no direction from the installer or builder, shall randomly select one dwelling unit from a "closed" sample group for field verification and diagnostic testing upon receiving the builder's or builder representative's request for HERS verification of that group. Alternatively, the HERS rater shall randomly select one dwelling unit from the dwellings currently entered into an "open" sample group upon receiving the builder's or builder representative's request for HERS verification of that group. The HERS rater shall diagnostically test and field verify the selected dwelling unit. The HERS rater shall enter the test and/or field verification results into the HERS provider data registry regardless of whether the results indicate a pass or fail. If the test fails, then the failure must be entered into the provider's data registry even if the installer immediately corrects the problem. In addition, the procedures in Section ~~RA2.6.4~~~~RA2.6.4~~~~RA2.6.3~~ shall be followed.

If field verification and diagnostic testing determines that the requirements for compliance are met, the HERS rater shall enter the test results into the HERS provider data registry. Whereupon the provider shall make available to the HERS rater, the builder, the enforcement agency, and other approved users of the HERS provider data registry, a registered copy of the Certificate of Field Verification and Diagnostic Testing for the "tested" dwelling, and for all other "not tested" dwelling units entered in the group at the time of the sample test. The registered Certificate of Field Verification and Diagnostic Testing shall report the successful diagnostic testing results and conclusions regarding compliance for the tested dwelling unit. The registered Certificate of Field Verification and Diagnostic Testing shall also provide:

1. Building permit number for the dwelling unit.
2. Registration Number ~~that conforms to the numbering convention specified in Joint Appendix JA9.~~~~a HERS provider-designated identification number unique to the dwelling unit~~
3. Group Number ~~that conforms to the numbering convention specified in Joint Appendix JA9.~~~~a HERS provider-designated identification number unique to the sample group~~
4. Time and date stamp of the provider's issuance of the registered Certificate of Field Verification and Diagnostic Testing.
5. Provider's logo, ~~water mark,~~ or official seal.
6. Indication that the dwelling was a "tested" dwelling, or was a "not-tested" dwelling in a sample group.

Whenever the builder changes subcontractors who are responsible for a feature that is being diagnostically field verified and tested, the builder shall notify the HERS rater of the subcontractor change, and terminate sampling for any affected groups. All dwelling units utilizing features that require HERS verification for compliance that were installed by previous subcontractors or were subject to verification and testing under the supervision of a previous HERS provider, for which the builder does not have a completed Certificate of Field Verification and Diagnostic Testing, shall be individually tested or included in a separate group for sampling. Dwelling units with installations completed by new subcontractors shall be individually tested or shall be included in a new sampling group.

The HERS rater shall not notify the builder when sample testing will occur prior to the completion of the work that is to be tested, or prior to ~~entry registration~~ of the Installation Certificate ~~data by into~~ the provider data registry. After the HERS rater selects the sample dwelling unit to test, and notifies the builder that testing will occur, the builder shall not do additional work on the features being tested.

The HERS provider shall "close" any "open" group within 6 months after the earliest signature date shown on any Installation Certificate for a dwelling entered in the group. When such group closure occurs, the HERS provider shall notify the builder that the group has been "closed,"⁴⁴⁴ and require that a sample dwelling shall be selected for field verification and diagnostic testing⁴⁴⁴ by a HERS rater if field verification has not yet been conducted on a sample dwelling entered in the group.

RA2.6.3RA2.6.4 HERS Procedures - Re-sampling, Full Testing and Corrective Action

“Re-sampling” refers to the procedure that requires testing of additional dwellings within a group when the selected sample dwelling from a group fails to comply with the HERS verification requirements.

When a failure is encountered during sample testing, the failure shall be entered into the provider data registry. Corrective action shall be taken on the failed dwelling unit and the dwelling unit shall be retested to verify that corrective action was successful. Corrective action and retesting on the dwelling unit shall be repeated until the testing indicates compliance and the successful compliance results have been entered into the HERS provider data registry (or the dwelling unit complies using an alternative method). Whereupon, a registered Certificate of Field Verification and Diagnostic Testing for the dwelling shall be made available to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry.

In addition, the HERS rater shall conduct re-sampling to assess whether the first failure in the group is unique, or if the rest of the dwelling units in the group are likely to have similar failings.

RA2.6.4.1 *Re-sampling procedures for a “closed” group of up to seven dwellings:*

The HERS rater shall randomly select for re-sampling one of the remaining untested dwelling units in the group for retesting of the feature that failed. If the failed dwelling was entered in a “closed” group, and the testing of the second randomly selected dwelling unit in the group confirms that the requirements for compliance credit are met on that unit, then the dwelling unit with the initial failure shall not be considered an indication of failure in the remaining untested dwelling units in the group. The HERS rater shall transmit the re-sample test results to the HERS provider registry, whereupon the provider shall make available to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry, a registered copy of the Certificate of Field Verification and Diagnostic Testing, for the remaining dwelling units in the group including the dwelling unit in the re-sample.

If field verification and diagnostic testing of the second sample results in a failure, the HERS rater shall report the second failure to the HERS provider, the builder, and the enforcement agency. All dwelling units in the group must thereafter be individually field verified and diagnostically tested. In cases where corrective action would require destruction of building components, the builder may choose to reanalyze compliance and choose different measures that will achieve compliance. In this case a new Certificate of Compliance shall be completed and submitted to the HERS provider, the HERS rater, and the enforcement agency. Even with a new Certificate of Compliance, the dwelling unit must be individually field verified and diagnostically tested. Upon verification of compliance, the HERS rater shall enter the test results into the HERS provider data registry. Whereupon the provider shall make available to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry, a registered copy of the Certificate of Field Verification and Diagnostic Testing for each individual dwelling in the group.

RA2.6.4.2 *Re-sampling procedures for an “open” group of up to five dwellings:*

4. The HERS rater shall randomly select for re-sampling one of the remaining untested dwelling units in the group for retesting of the feature that failed. If the failed dwelling was entered in an “open” group, and there are no other untested dwellings entered in the “open” group at the time of the failed HERS verification, subsequent dwellings entered into the “open” group shall not receive a Certificate of Field Verification and Diagnostic Testing until a second dwelling in the “open” group is tested and successfully complies. If the subsequent testing of the second dwelling unit in the group confirms that the requirements for compliance credit are met on that unit, then the dwelling unit with the initial failure shall not be considered an indication of failure in the untested dwelling units in the group. The HERS rater shall transmit the compliant re-sample test results to the HERS provider data registry, whereupon the provider shall make available to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry, a registered copy of the Certificate of Field Verification and Diagnostic Testing, for the re-sampled dwelling, and the remaining not yet tested dwelling units entered in the “open” group at the time of the re-sample test, and the group shall be allowed to remain open and eligible to receive additional dwelling units. Dwelling units entered into the “open” group of up to 5 dwellings following the successful HERS compliance verification of the re-sampled dwelling shall receive a Certificate of Field Verification and Diagnostic Testing as a “not tested”

dwelling subject to ~~receipt-registration~~ of the Installation Certificate ~~information~~ by the HERS provider data registry for the dwelling.

If field verification and diagnostic testing of the second sample results in a failure, the HERS rater shall report the second failure to the HERS provider, the builder, and the enforcement agency, and the provider shall require the “open” group to be “closed”. All remaining untested dwelling units entered in the group at the time of the re-sample must thereafter be individually field verified and diagnostically tested. In cases where corrective action would require destruction of building components, the builder may choose to reanalyze compliance and choose different measures that will achieve compliance. In this case, a new Certificate of Compliance shall be completed and submitted to the HERS provider, the HERS rater, and the enforcement agency. Even with a new Certificate of Compliance, the dwelling unit must be individually field verified and diagnostically tested. Upon verification of compliance, the HERS rater shall enter the test results into the HERS provider data registry. Whereupon the provider shall make available to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry, a registered copy of the Certificate of Field Verification and Diagnostic Testing for each individual dwelling in the group.

RA2.6.4.3 Corrective Action

Builders shall offer to provide the necessary field verification and diagnostic testing services and any necessary corrective action at no charge to building owners (for a definition of “building owner” and of other terms used, see Reference Joint Appendix JA1) in occupied dwelling units in the group. Builders shall report to the HERS provider the identifying location of any dwelling unit in which the building owner/occupant declines field verification and diagnostic testing and corrective action. The HERS provider shall verify that the builder has made this offer. If a building owner of a dwelling unit declines this offer, field verification, diagnostic testing, and corrective action will not be required for that dwelling unit and the dwelling unit will no longer be considered a part of the group. If a building owner accepts this offer, the builder shall take corrective action, and the HERS rater shall conduct field verification and diagnostic testing to verify that problems have been corrected. Upon verification of compliance, the HERS rater shall transmit the test results to the HERS provider data registry. Whereupon the provider shall make available to the HERS rater, the builder, the enforcement agency, and other authorized users of the HERS provider data registry, a ~~certified-registered~~ copy of the Certificate of Field Verification and Diagnostic Testing for the dwelling unit.

The HERS provider shall file a report with the enforcement agency explaining all actions taken (including field verification, diagnostic testing, corrective action, offers to building owners for testing and corrective action, and/or building owner declines of such offers) to bring into compliance dwelling units for which full testing has been required. If corrective action requires work not specifically exempted by the CMC or the CBC, the builder shall obtain a permit from the enforcement agency prior to commencement of any of the work.

Corrections to avoid reporting a failure to the HERS provider data registry shall not be made to a sampled dwelling unit after the HERS rater selects the sample dwelling unit. If it is evident that such corrections have been made to a sampled dwelling unit to avoid reporting a failure, field verification and diagnostic testing shall be required for 100 percent of the dwelling units in the group.

RA2.7 Third Party Quality Control Programs

The Commission may approve Third Party Quality Control Programs that serve some of the functions of HERS raters for field verification purposes but do not have the authority to sign compliance documentation as a HERS rater. Third Party Quality Control Programs shall provide training to installers regarding compliance requirements for measures for which diagnostic testing and field verification is required. Third Party Quality Control Programs shall collect data from participating installers for each installation completed for compliance credit, provide data checking analysis to evaluate the validity and accuracy of the data to independently determine whether compliance has been achieved, provide direction to the installer to retest and correct problems when data checking determines that compliance has not been achieved, require resubmission of data when retesting and correction is directed, and maintain a database of all data submitted by installers in a format that is acceptable to the Commission and available to the Commission upon request. The data that is collected by the Third Party Quality Control Program shall be more detailed than the data required for showing compliance with the Standards, shall provide an independent check on the validity and accuracy of the

installer's claim that compliance has been achieved, and shall not be alterable by the installer to indicate that compliance has been achieved when in fact compliance has not been achieved.

The HERS provider shall arrange for the services of a HERS rater to conduct independent field verification of the installation work performed by the participating installing contractor and Third Party Quality Control Program. The HERS rater shall complete all of the responsibilities of a HERS rater as specified in this Appendix RA2, with the exception that sampling procedures utilized shall be limited to sampling of a "closed" group as described in Section RA2.6.3RA2.6.3RA2.6.2. However, the sample tested shall be selected and field verified from within a group of up to thirty dwelling units ~~(or thirty HVAC systems)~~. The HERS rater shall be an independent entity from the Third Party Quality Control Program. ~~If re-sampling is required~~, full testing and corrective action shall be completed as specified in Section RA2.6.4RA2.6.4RA2.6.3 with the exception that re-sampling shall be completed for a minimum of one out of every thirty dwelling units ~~(or thirty HVAC systems)~~ from the group. The Third Party Quality Control Program shall not impose restrictions on the HERS rater or the HERS provider that limit their independence, or the ability of the HERS rater or the HERS provider to properly perform their functions. For example, the Third Party Quality Control Program shall not impose restrictions on the HERS rater's use of equipment beyond those required by the Commission.

The Third Party Quality Control Program shall meet the requirements imposed on a HERS rater specified in the Commission's HERS Program regulations (California Code of Regulations, Title 20, Division 2, Chapter 4, Article 8, Sections 1670 -1675)[jrm18], including the requirement to be an independent entity from the builder, the HERS rater that provides independent field verifications, and the subcontractor installer as specified by Section 1673(i)[jrm19]. However, a Third Party Quality Control Program may have business relationships with installers participating in the program to advocate or promote the program and an installer's participation in the program, and to advocate or promote products that the Third Party Quality Control Program sells to installers as part of the Program.

Prior to approval by the Commission, the Third Party Quality Control Program shall provide a detailed explanation to the Commission of 1) the data that is to be collected from the installers, 2) the data checking process that will be used to evaluate the validity and accuracy of the data, 3) the justification for why this data checking process will provide strong assurance that the installation actually complies, and 4) the format for the database that will be maintained and provided to the Commission upon request. The Third Party Quality Control Program may apply for a confidential designation of this information as specified in the Commission's Administrative Regulations (California Code of Regulations, Title 20, Division 2, Chapter 7, Article 2, Section 2505). [jrm20]The Third Party Quality Control Program shall also provide a detailed explanation of the training that will be provided to installers, and the procedures that it will follow to complete independent field verifications.

The Third Party Quality Control Program certified installing contractor and the installing contractor's responsible installing technicians shall be required to be trained in quality installation procedures; the requirements of this Appendix RA2; and any other applicable specialized Third Party Quality Control Program-specific procedures as a condition to participation in the program. The training requirements also apply to the installing contractor's specialty subcontractors who provide Third Party Quality Control Program services. All installation verification and diagnostic work performed in the program shall be subject to the same quality assurance procedures as required by the Energy Commission's HERS program regulations.

The Third Party Quality Control Program shall be considered for approval as part of the rating system of a HERS Provider, which is certified as specified in the Commission's HERS Program regulations, Section 1674. A Third Party Quality Control Program can be added to the rating system through the recertification of a certified HERS Provider as specified by Title 20, Division 2, Chapter 4, Article 8, Section 1674(d)[jrm21].

RA2.8 Installer Requirements and HERS Procedures for Alterations

This section on alterations describes the differences that apply to alterations. Otherwise the procedures and requirements detailed in previous sections of Appendix RA2 shall also apply to alterations ~~where "HVAC system" [jrm22] is substituted for "dwelling unit"~~. For alterations, building owners or their agents may carry out the actions that are assigned to builders in previous sections of ~~Appendix this document (Reference Residential Appendix RA2)~~.

Applicable procedures for registration of compliance documents described in Appendix RA2 shall also apply to alterations.

When compliance for an alteration requires field verification and diagnostic testing, the building owner may choose for the field verification and diagnostic testing to be completed for the dwelling unit individually, or alternatively, as part of a designated sample group of dwelling units for which the same installing company has completed work that requires ~~testing and field HERS~~ verification for compliance.

~~When sampling is utilized for HERS verification compliance for alterations, the dwelling units in a designated sample group are not required to be located within the same enforcement agency jurisdiction. However, to enable the enforcement agency to schedule testing to accomplish the corroboration of field verification and diagnostic testing procedures performed by the building owner, subcontractors, or certified HERS rater as described in Section RA2.4.4, the enforcement agency may require that a separate dwelling unit from the sample group that is located within its jurisdiction be tested.~~

~~The building owner or agent of the building owner shall complete the applicable portions of a Certificate of Compliance. The building owner or agent of the building owner shall submit, or make arrangements for transmittal/submittal of the required Certificate of Compliance information to the HERS provider data registry to complete the applicable Certificate of Compliance documentation in accordance with the requirements in Standards Section 10-103(a)1 and 10-103(a)2, identifying the building features and measures that require HERS verification.~~

~~HERS raters or other authorized users of the HERS provider data registry may provide documentation author support to facilitate the submittal of the required Certificate of Compliance information to the HERS provider data registry on behalf of the building owner or agent of the building owner, when such facilitation has been authorized by the building owner or agent of the building owner. Documentation authors shall provide an electronic signature to certify the documentation is accurate and complete. The building owner or agent of the building owner who is eligible under Division 3 of the Business and Professions Code to take responsibility for the design specification for the alteration shall provide an electronic signature to register the Certificate of Compliance, to certify the information provided on the Certificate is true and correct, to certify conformance with Part 6, and shall submit the registered Certificate of Compliance to the enforcement agency for approval.~~

~~The building owner or agent shall also arrange to submit an approved/signed make available to the HERS rater a copy of the registered Certificate of Compliance approved by the enforcement agency to the HERS rater.~~

The installer shall perform diagnostic testing and the procedures specified in Section RA2.5.

When the installation is complete, the person responsible for the performance of the installation shall complete the Installation Certificate in accordance with the procedures specified in Section RA2.5.

~~The HERS rater shall perform HERS compliance the applicable verification and diagnostic testing required for compliance following the procedures in Section RA2.6. If group sampling is utilized for compliance, the sampling procedures described in Section RA2.6.3RA2.6.3RA2.6.2 for sampling of a "closed" group of up to seven dwellings units shall be used, requiring that all dwelling units (HVAC systems) within the group have been serviced by the same installing company. The installing company may request a group for sampling that is smaller than seven dwelling units (HVAC units). Whenever the a HERS rater for the group is changed, a new group shall be established.~~

~~Re-sampling, full testing, and corrective action shall be completed, if necessary, as specified by Section RA2.6.4RA2.6.4RA2.6.3.~~

The enforcement agency shall not approve the alteration until the enforcement agency has received a completed Installation Certificate as specified in Section RA2.5, and a completed Certificate of Field Verification and Diagnostic Testing as specified in Section RA2.6.

Third Party Quality Control Programs, as specified in Section RA2.7, may also be used with alterations, and shall be limited to "closed" sample group sizes of thirty dwelling units (HVAC units) or less.

When a Third Party Quality Control Program is used, the enforcement agency may approve compliance based on the Installation Certificate, where data checking has indicated that the unit complies, on the condition that if the required HERS compliance-verification procedures determine that re-sampling, full testing, or corrective action is necessary, such work shall be completed.

[Note: The preceding section has been consolidated in the Glossary, Reference Joint Appendix JA1]