

Appendix G

Verification of the Existing Features of a Home for Existing + Addition + Alteration Performance Approach

When adding to or altering an existing home, compliance credit can be taken for upgrading existing features by using the performance approach when the existing features are verified by a qualified HERS rater prior to registration of the certificate of compliance (CF1R).

The performance approach provides a means to trade off against features that may not meet the prescriptive requirements, such as exceeding the allowed maximum glass area, by demonstrating that the project (proposed design) achieves the same level of efficiency as it would if it were built to the prescriptive requirements (standard design). The standard design is a hypothetical building with prescriptive requirements from Table 150.1-A or 150.1-B that sets the target energy budget for the proposed project.

The Existing + Addition + Alteration approach gives further credit for upgrading existing features. It does this by modifying the standard design for an altered building feature to match the requirements specified in Section 150.2, particularly Table 150.2-C. The greater the efficiency of the altered building feature is relative to the existing energy efficiency, the greater the compliance credit will be. Third-party verification of the features prior to the construction is required to achieve the maximum compliance credit.

The proposed design is calculated using the actual energy efficiency values of the existing unaltered components of the existing building, and the proposed values of the altered components, plus the proposed addition's features. Each building component must be modeled with one of the following classifications to determine the standard design:

1. "Existing" – building components that remain unchanged (e.g., exterior walls in the existing portion of the building that will not be altered).
2. "Altered" – existing building components that are being changed (e.g., added roof insulation, or a furnace that is being replaced).
3. "New" – building components that do not exist prior to the construction work (e.g., new walls added to create the addition). This includes building components in a previously unconditioned space being converted to conditioned space.

All of these building components determine how the standard design is calculated. Existing features are modeled the same in both the proposed and standard designs. New

features are modeled in the standard design according to prescriptive requirements, Table 150.1-A or Table 150.1-B. Altered features are modeled in the standard design according to Table 150.2-C.

There are two columns in Table 150.2-C. One column defines how the standards design is calculated for altered components when the existing features are not verified by a HERS rater. The other column indicates how the standards design is calculated when the existing features are verified by a HERS rater prior to construction.

For the building to comply, the proposed design (proposed project details as modeled) must be equal to or less than the standard design. When a feature in the proposed design is better than the standard design, it receives a compliance credit that can be used to trade against less efficient features. For example, without third-party verification, windows to be altered are assumed to have 0.40 U-factor and 0.35 solar heat gain coefficient (SHGC). With HERS verification, if the existing windows are single pane metal framed, they are assumed to have 1.28 U-factor and 0.80 SHGC, resulting in substantial potential compliance credit if the new windows meet current prescriptive requirements of 0.30 U-factor and 0.23 SHGC.

Example:

Consider the house in Figure G-1 in climate zone 12. The shaded area is the addition. Some windows and walls are removed to build the addition. These are ignored. The existing home has the following features:

1. Single-pane metal framed windows
2. 2x4 R-0 walls, and R-19 attic insulation
3. AFUE 75 furnace

Figure G-1 – The Proposed Addition and Alterations

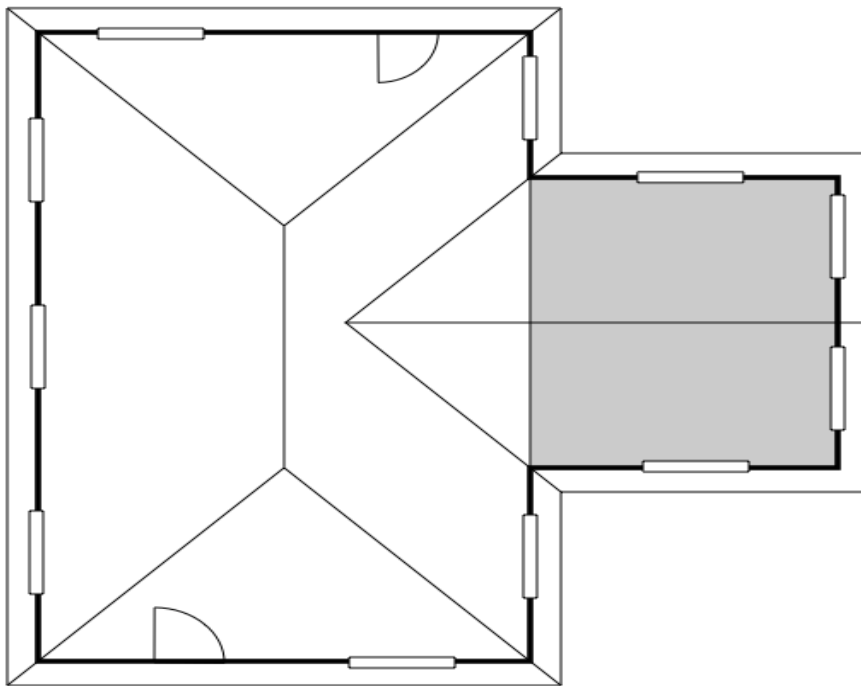


Table G-1

Component	Status	Proposed	Standard Design w/o verification	Standard Design w/verification
Attic ¹	Existing/Altered	R-38	R-22 (U=0.043)	R-19 (U=0.049)
	New	R-38	R-38	R-38
Walls ²	Existing/Altered	R-15	R-13 (U=0.102)	R-0 (U=0.356)
	New		R-19+4	R-19+4
Window	Existing/Altered	0.30/0.23	0.40/0.35	1.28/0.80
	New	0.30/0.23	0.30/0.23	0.30/0.23
Furnace	Existing/Altered New	0.92	0.80	0.75
1. Depending on the size of the addition, roof deck insulation may be included in the standard design. 2. Under some conditions (unconditioned existing space converted to conditioned space, or wall extensions), the standard design may not include continuous insulation. See Chapter 9 for more detail.				

Part of the construction work includes replacing all of the windows with low-E vinyl windows to match the new windows in the addition, adding insulation to the existing attic and replacing the existing furnace.

For the proposed design, none of the attic is modeled as existing because insulation is being added to the existing building (“altered”), and the attic in the addition is “new.” None of the windows are modeled as existing (unless any are not replaced). Replaced windows in the existing building are “altered” and the windows in the addition are “new.” The furnace, even though it is new, is modeled as “altered” because it is replacing an existing heating system. The walls, windows, and other components that are removed as part of the addition and alterations are ignored.

Table G-1 illustrates how the proposed features and the standard design features are calculated, depending on whether there is HERS verification of the existing conditions.

The HERS rater must complete the verification of the existing conditions in order to register the certificate of compliance (CF1R).

HERS raters follow the protocols for a Whole-House Home Energy Rating (WHHER) when verifying existing conditions. The HERS rater is trained by a HERS provider to verify the existing conditions of the home consistent with Energy Commission approved HERS provider training for the verification requirements specified in Table 150.2-C. The Data Registry will generate a CF3R-EXC-20-H compliance document based on the output from the performance compliance software. The CF3R-EXC-20-H will list the features of the existing conditions that must be field verified by the HERS rater. A registered CF3R-EXC-20-H that agrees with the existing conditions input for the proposed building is required by the HERS Registry as a prerequisite the registration of the CF1R for the project.

The WHHER protocols are established by the HERS Technical Manual (CEC-400-2008-012). Appendix A of that document details the protocols for verification of each component. Raters must follow all Energy Commission approved procedures established by the HERS provider. The HERS Technical Manual can be downloaded from:

<http://www.energy.ca.gov/title24/2019standards/index.html>