



Lesson #2: Requirements for High Performance Walls (3 class periods)

Objectives

Students will be able to...

- Define the mandatory wall assembly requirements.
- Identify key strategies for meeting or exceeding the prescriptive HPW requirements.
- Define and illustrate a high-performance wall assembly.

Standards

LS11-12.6
RSIT 11-12.2
Technology 4.1, 4.2, 4.3,
Problem Solving and Critical Thinking 5.1, 5.2, 5.3, 5.4
Health and Safety 6.3, 6.6,
Ethics and legal responsibilities 8.1,
Leadership and Teamwork 9.1, 9.2, 9.3
Technical Knowledge and Skills 10.1, 10.2, 10.3, 10.4
Demonstration and Application 11.1

Materials

- Internet or other resource for instruction
 - Slides from the Train-the-trainer presentation
 - Link to the Energy Code Ace – 2019 Reference Ace
 - <https://energycodeace.com/content/reference-ace-2019-tool>
 - Section 150.1, Prescriptive Package Table 150.1-A
 - 2019 Reference Joint Appendices, Joint Appendices JA4
 - <https://ww2.energy.ca.gov/2018publications/CEC-400-2018-021/CEC-400-2018-021-CMF.pdf>
 - Table 4.3.1 – U-factors of Wood Framed Walls
 - WISE Warehouse Resources – Wall Assembly Table
 - <https://www.wisewarehouse.org/wp-content/uploads/2018/05/WISE-Wall-Assembly-table-PR01.pdf>
 - WISE Warehouse Video

Quality of Insulation Installation (QII) - <https://youtu.be/4Qfo1YpDejY>

Lesson Sequence

▪ Lecture

- What is the main purpose of the high-performance wall requirements?
 - Reduce thermal bridging, limit heat transfer through walls
- Mandatory wall assembly requirements
 - Energy Code - Section 150.0(c)
 - Opaque portions of above grade walls separating conditioned spaces from unconditioned spaces or ambient air
 - 2x4s U-Factor 0.102 (R-13 Cavity Insulation)
 - 2x6s U-Factor 0.071 (R-20 Cavity Insulation)
- Prescriptive wall assembly requirements
 - Energy Code – Section 150.1(c)1B and Table 150.1-A
 - Prescriptive requirements can be met (or exceeded) using any combination of framing, cavity insulation and continuous insulation so long as the U-Factor has been met for that climate zone
 - CZ 1-5, 8-16
 - U-Factor 0.048
 - CZ 6-7
 - U-Factor 0.065
 - These two climate zones have relaxed wall assembly requirements due to the mild temperatures
 - Factors to consider when designing a high-performance wall assembly
 - Cost of materials
 - Depth of continuous insulation (interior or exterior)
 - Amount of materials used (16" OC v 24" OC framing)
 - Structural engineering needs
 - Difficulty of construction

▪ Individual activity

- Sketch and label a high-performance wall assembly that will comply with the prescriptive requirements for a 0.048 U-Factor wall assembly. Contrast the requirements for a 0.065 wall assembly, and identify which requirement applies to your climate zone.

- **Supplemental activity:** Have students research material prices using a big box store website (such as Home Depot, Lowes, etc.) for necessary materials to build 12' long by 8' high section of their high-performance wall.
 - Once the students have sketched and specified their wall assembly, have them run a cost analysis for a specified amount of wall square footage.
 - Assume that all other variables in the assembly remain the same, that only the framing, cavity insulation, and continuous insulation are variables. Have students compare and discuss results.

Assessment

Use individual activity as assessment. Check for student understanding during individual activity. Have class discussion after student's complete activity. Have students compare and discuss their results.

Accommodations/Modifications

Extra time if needed
Extra support during individual activity
Peer support
Check for understanding