No Longer a Black Box

Rating Software Testing Process - HERS Reference Home

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Reporting Requirements

At a minimum, all software tools must report the following values for the reference home:

1. Area and overall u-value of the ceiling, wall, floor, windows and doors.
2. Shading coefficient (SC) or solar-heat gain coefficient (SHGC) of the windows during heating season.
3. Shading coefficient (SC) or solar-heat gain coefficient (SHGC) of the windows during cooling season.
4. AFUE, COP, or HSPF of heating system, as appropriate.
5. SEER or EER of the cooling system, as appropriate.
6. EF of the water heating system.

Reference Home Tests

Test 1: Run BESTEST L100 building, modified to include an enclosed, vented crawlspace, in **Dallas**, TX (using 2420 HDD) with the following mechanical equipment – 95 AFUE **gas furnace**, 12 SEER **A/C** and a 40 gallon 0.56 EF **gas water heater**.

Purpose: Check U-values, infiltration rate for this climate; window area, SHGC; efficiency of gas furnace, A/C, gas water heater; distribution efficiency.

Reference Home Tests

Test 2: Run BESTEST L100 building, modified to include an enclosed, vented crawlspace, in **Las Vegas** (using 2535 HDD) with the following mechanical equipment – 7.5 HSPF / 12 SEER electric **air-source heat pump**, and a 40 gallon 0.95 EF **electric water heater**.

Purpose: Check U-values, infiltration rate for this climate; window area, SHGC; efficiency of heat pump, electric water heater; distribution efficiency.

Reference Home Tests

Test 3: Run BESTEST L100 building, modified to include an enclosed, vented crawlspace, in **Colorado Springs** (using 6353 HDD) with the following mechanical equipment – 100% efficient **electric baseboard heat**, **no A/C**, and a 40 gallon 0.95 EF **electric water heater**.

Purpose: Check U-values, infiltration rate for this climate; window area, SHGC; ensure reference home has heat pump; distribution efficiency.

Reference Home Tests

Test 4: Evaluate the reference homes created in Tests 1 through 3 as if they were rated homes.

Purpose: A secondary test to help ensure reference home is being replicated correctly.

Reference Home Test Acceptance Criteria

	Test 1	Test 2	Test 3	Test 4
Reference Home Characteristics				
Ceiling Uo (Btu/hr/sf/F)	0.036	0.036	0.026	–
Wall Uo (Btu/hr/sf/F)	0.085	0.085	0.058	–
Floor Uo (Btu/hr/sf/F)	0.070	0.050	0.050	–
Window Area – North (sf)	69.3	69.3	69.3	–
Window Area – South (sf)	69.3	69.3	69.3	–
Window Area – East (sf)	69.3	69.3	69.3	–
Window Area – West (sf)	69.3	69.3	69.3	–
Window U-value (Btu/hr/sf/F)	0.542	0.526	0.338	–
Window SC/SHGC (heating)	0.675/0.581	0.675/0.581	0.675/0.581	–
Window SC/SHGC (cooling)	0.541/0.466	0.541/0.466	0.541/0.466	–
Door Area (sf)	40.0	40.0	40.0	–
Door Uo (Btu/hr/sf/F)	0.200	0.200	0.200	–
Infiltration (ach)	0.51	0.46	0.56	–
Heating Nominal Efficiency	78% AFUE	6.8 HSPF	6.8 HSPF	–
Cooling Nominal Efficiency	10 SEER	10 SEER	10 SEER	–
DHW Nominal Efficiency	0.54 EF	0.88 EF	0.88 EF	–
Distribution System Efficiency	0.80	0.80	0.80	
Rating Score	–	–	–	>=79.9 and <=80.1