Ensuring National Consistency Verification Protocols for Rating Software Programs

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Integrated Engineered Solutions

RESNET Rating Software Testing and Accreditation Subcommittee - HERS Reference Home Working Group

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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.



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.



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.



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.



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.



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	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

Reference Home Test Acceptance Criteria



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