**Proposed New HERS Method Test Suite**

**Approved by RESNET Board of Directors June 16, 2016**

**Intent**

Create a new set of HERS Method Tests in two climate zones (3 & 5) based on current building standards (2015 IECC) where modifications to the base case home are made one feature at a time so that the impacts of the individual modifications are not confounded by multiple changes.

**Home Geometry**

Identical to ASHRAE 140 base case L100A home except with 2 ft. high vented crawlspace foundation instead of raised floor over ambient. This is the base case geometry for the ASHRAE 140 test suite, which all accredited software must pass. Thus, all accredited software providers already have a building input file of this geometry. All that is necessary is to change the foundation from a raised floor to a crawlspace and modify the envelope and equipment efficiency characteristics as specified below.

**Climate Zone 3 Cases:**

Case L100AL-06 (base case configuration):

General:

TMY3 file: Las Vegas McCarran International

Number of bedrooms = 3

Appliances = all electric same as HERS Reference Home

Lighting = all default

Foundation:

2 ft. high crawlspace above grade

Vented as in HERS Reference Home

Roof:

Solar absorptance = 0.75

Emittance = 0.90

Slope = 18.4 degrees (pitch = 4/12)

Ceiling:

Blown insulation = R-38, grade I

Framing fraction = 0.11

Walls:

Cavity insulation = R-13, grade I

Continuous sheathing insulation = R-5

Framing fraction = 0.25

Solar absorptance = 0.75

Floor:

Cavity insulation = R-19, grade I

Framing fraction = 0.13

Covering = 100% carpet and pad

Windows:

U-factor = 0.35

SHGC = 0.25

Doors:

U-factor = 0.35

Enclosure:

Leakage = 3 ach50

HVAC systems:

Programmable thermostat = No

Cooling: Air conditioner SEER = 14

Heating: gas furnace AFUE = 80%

Sized in accordance with relevant RESNET Standard

Air Distribution System:

100% in conditioned space, including air handler

R-6 duct insulation

Zero (0) air distribution system leakage

Mechanical ventilation system:

Exhaust fan = 58.7 cfm, continuous

Fan power = 14.7 watts

Water heating system:

Type: 40 gallon storage

Fuel: gas

Efficiency: EF = 0.62

Recovery Efficiency: RE = 0.78

Location: conditioned space

Pipe insulation: none

Piping length = Reference Home piping length

All other climate zone 3 cases are modifications of the above base case:

Case L100AL-07

Same as Case L100AL-06 except with high-efficiency gas furnace with AFUE = 96%

Case L100AL-08

Same as Case L100AL-06 except with tankless gas water heater with EF=0.83

Case L100AL-09

Same as Case L100AL-06 except with 2 bedrooms with exhaust mechanical ventilation =   
51.2 cfm continuous with fan power = 12.8 watts

Case L100AL-10

Same as Case L100AL-06 except with 4 bedrooms with exhaust mechanical ventilation =   
66.2 cfm continuous with fan power = 16.6 watts

Case L100AL-11

Same as Case L100AL-06 except with gas clothes dryer, range and oven

Case L100AL-12

Same as Case L100AL-06 except with standard electric water heater EF = 0.95, RE = 0.98

Case L100AL-13

Same as Case L100AL-06 except with electric heat pump water heater EF = 2.5

Case L100AL-14

Same as Case L100AL-06 except with high efficiency air conditioner SEER = 21

Case L100AL-15

Same as Case L100AL-06 except with fan-cycler (CFIS) mechanical ventilation system at flow rate of 176.1 cfm and 33.33% duty cycle (8 hours per day)

Case L100AL-16

Same as Case L100AL-06 except with hot water recirculation system with recirculation loop length = 156.92 ft.; branch piping length = 10 ft.; pump power = 50 watts; R-3 piping insulation; and control = none

Case L100AL-17

Same as Case L100AL-16 except with control = manual

Case L100AL-18

Same as Case L100AL-06 except with Drain Water Heat Recovery (DWHR) with all facilities connected; equal flow; DWHR eff = 54%

Case L100AL-19

Same as Case L100AL-06 except with heat pump HVAC system with SEER=14, HSPF = 8.2

Case L100AL-20

Same as Case L100AL-06 except with heat pump HVAC system with SEER=14, HSPF = 12.0

Case L100AL-21

Same as Case L100AL-06 except with 75% high efficiency interior and exterior lighting.

Case L100AL-22

Same as Case L100AL-06 except with crawlspace air distribution system with measured distribution system leakage of 4 cfm25 per 100 ft2 CFA with 50% return side and 50% supply side leakage.

**Climate Zone 5 Cases:**

Case L100AC-06 (base case configuration):

General:

TMY3 file: Colorado Springs Municipal

Number of bedrooms = 3

Appliances = all electric same as HERS Reference Home

Lighting = all default

Foundation:

2 ft. high crawlspace above grade

Vented as in HERS Reference Home

Roof:

Solar absorptance = 0.75

Emittance = 0.90

Slope = 18.4 degrees (pitch = 4/12)

Ceiling:

Blown insulation = R-49, grade I

Framing fraction = 0.11

Walls:

Cavity insulation = R-13, grade I

Continuous sheathing insulation = R-5

Framing fraction = 0.25

Solar absorptance = 0.75

Floor:

Cavity insulation = R-30, grade I

Framing fraction = 0.13

Covering = 100% carpet and pad

Windows:

U-factor = 0.32

SHGC = 0.40

Doors:

U-factor = 0.32

Enclosure:

Leakage = 3 ach50

HVAC systems:

Programmable thermostat = No

Cooling: Air conditioner SEER = 13

Heating: gas furnace AFUE = 80%

Sized in accordance with relevant RESNET Standard

Air Distribution System:

100% in conditioned space, including air handler

R-6 duct insulation

Zero (0) air distribution system leakage

Mechanical ventilation system:

Exhaust fan = 56.2 cfm, continuous

Fan power = 14.0 watts

Water heating system:

Type: 40 gallon storage

Fuel: gas

Efficiency: EF = 0.62

Recovery Efficiency: RE = 0.78

Location: conditioned space

Pipe insulation: none

Piping length = Reference Home piping length

All other climate zone 5 cases are modifications of the above base case:

Case L100AC-07

Same as Case L100AC-06 except with high-efficiency gas furnace with AFUE = 96%

Case L100AC-08

Same as Case L100AC-06 except with tankless gas water heater with EF=0.83

Case L100AC-09

Same as Case L100AC-06 except with 2 bedrooms with exhaust mechanical ventilation =   
48.7 cfm continuous with fan power = 12.2 watts

Case L100AC-10

Same as Case L100AC-06 except with 4 bedrooms with exhaust mechanical ventilation =   
63.7 cfm continuous with fan power = 15.9 watts

Case L100AC-11

Same as Case L100AC-06 except with gas clothes dryer, range and oven

Case L100AC-12

Same as Case L100AC-06 except with standard electric water heater EF = 0.95, RE = 0.98

Case L100AC-13

Same as Case L100AC-06 except with electric heat pump water heater EF = 2.5

Case L100AC-14

Same as Case L100AC-06 except with high efficiency air conditioner SEER = 21

Case L100AC-15

Same as Case L100AC-06 except with fan-cycler (CFIS) mechanical ventilation system at flow rate of 168.6 cfm and 33.33% duty cycle (8 hours per day)

Case L100AC-16

Same as Case L100AC-06 except with hot water recirculation system with recirculation loop length = 156.92 ft.; branch piping length = 10 ft.; pump power = 50 watts; R-3 piping insulation; and control = none

Case L100AC-17

Same as Case L100AC-16 except with control = manual

Case L100AC-18

Same as Case L100AC-06 except with Drain Water Heat Recovery (DWHR) with all facilities connected; equal flow; DWHR eff = 54%

Case L100AC-19

Same as Case L100AC-06 except with heat pump HVAC system with SEER=13, HSPF = 8.2

Case L100AC-20

Same as Case L100AC-06 except with heat pump HVAC system with SEER=13, HSPF = 12.0

Case L100AC-21

Same as Case L100AC-06 except with 75% high-efficiency interior and exterior lighting

Case L100AC-22

Same as Case L100AC-06 except with crawlspace air distribution system with measured distribution system leakage of 4 cfm25 per 100 ft2 CFA with 50% return side and 50% supply side leakage.