

RESNET® HERS® Addendum 103

Direct Expansion HP & AC Modeling Supplement

Power

Date Approved:	May 15, 2026
Voluntary Compliance Date:	TBD
Mandatory Compliance Date:	TBD
Transition Period:	TBD
Proponent:	SDC 300
Organization:	RESNET

Purpose:

Addendum 103 supplements Addendum 82 requirements for modeling direct expansion AC/HP systems. It provides criteria for pan heaters and criteria for supplemental electric and fossil fuel heating.

Amendment:

Modify the ANSI/RESNET/ICC 301-2022 Appendix C as follows:

C.6 Direct Expansion Modeling

C.6.7 Variable Capacity Systems (Systems with Three or More Stages)

<u>Value</u>	<u>Equation</u>
<u>P5full</u>	$P5_{max} \times (Qr5_{full} \times EIRr5_{full})$
<u>PTminmax</u>	$P5_{max} \times ((QTminmax/Q5max) \times (1 - EIRmslopeLCTmax \times (5^{\circ}F - Tmin)))$

PTminmin	$P5min \cdot \frac{1}{((QTminmin/Q5min) \cdot \frac{1}{(1 - EIRslopeLCTmin \cdot (5^\circ F - Tmin))})}$
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C.6.11 Defrost

The integrated heating capacity and power of the heat pump shall be reduced for any outdoor drybulb temperature lower than the maximum defrost temperature (40°F) using the equations below¹.

$$f_{def}(T_{odb}) = \max(\min(0.134 - 0.003 \cdot T_{odb}, 0.08), 0)$$

$$Q_{gross,int,htg,i} = Q_{gross,ss,htg,i} \cdot [1 - 1.8 \cdot f_{def}(T_{odb})]$$

$$P_{gross,int,htg,i} = P_{gross,ss,htg,i} \cdot [1 - 0.3 \cdot f_{def}(T_{odb})]$$

While defrosting in systems with supplemental heat, the supplemental heat is active and the indoor fan is running during the defrost period. The supplemental heater is cycled or modulated to add exactly enough heat to offset the reduced capacity.

Pan heaters are assumed to operate at 150W whenever the outdoor temperature is below 32°F and above the minimum compressor operating temperature of the equipment.

C.6.16 Minimum Rated Features

Feature	Description	Source	Default	Reference Home Value
$Q_{net,tot,clg,A,full}$	Rated full load net total cooling capacity at AHRI “A” (95°F) conditions	AHRI Certificate/Directory	Required	For Air Conditioners: Sized to meet the sensible cooling load. For Heat Pump equipment: Sized to equal the larger of the building heating and sensible cooling loads.
SEER2	Seasonal Energy Efficiency Ratio as defined by AHRI 210/240-2023	AHRI Certificate	Required	12.35
EER2	Energy Efficiency Ratio at	AHRI Certificate	Required	10.7

¹ (Informative) Based on Central Valley Research Homes project data

	AHRI “A” (95°F) conditions as defined by AHRI 210/240-2023			
$Q_{net,ss,htg,H1,full}$	Rated full load net steady-state heating capacity at AHRI “H1” (47°F) conditions	AHRI Certificate	Required	Sized to equal the larger of the building heating and sensible cooling loads. <u>For Electric Resistance Supplemental Heating: The building heating sensible load shall be calculated at the greater of the minimum compressor operating temperature and the heating design temperature for the location.</u> <u>For Fossil Fuel Supplemental Heating: The building heating sensible load shall be calculated at the greater of the heating design temperature for the location and 25°F.</u>
$Q_{net,ss,htg,H3,full}$	Rated full load net steady-state heating capacity at AHRI “H3”	AHRI Certificate	Required	$0.626 * Q_{net,ss,htg,H1,full}$

	(17°F) conditions			
HSPF2	Heating Seasonal Performance Factor as defined by AHRI 210/240-2023	AHRI Certificate	Required	6.55
Number of Speeds/stages	Number of speeds/stages used in compressor control: Single Stage Two Stage Variable Capacity	Product Literature	Required	Single Stage
Fan Motor Type	Type of motor used by the indoor fan	Product Literature	Permanent Split Capacitor (PSC) for single speed equipment, otherwise Brushless Permanent Magnet (BPM)	PSC
Type of Supplemental Heating	Electric Resistance Fossil Fuel Furnace None	Product literature, visual inspection	Electric Resistance	Same as Rated Home
Minimum Compressor Operating Temperature	Minimum outdoor temperature for compressor heating operation	For Electric Resistance Supplemental Heating: Product Literature, NEEP Database Lowest Catalogued Temperature (LCT)	For Electric Resistance Supplemental Heating: Number of Speeds <= 2: 05°F	For Electric Resistance Supplemental Heating: 05°F For Fossil Fuel Supplemental Heating: 40°F

		For Fossil Fuel Supplemental Heating: Fixed at 430°F	Number of Speeds > 2: - 2010 °F For Fossil Fuel Supplemental Heating: No Default	
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