Draft PDS-03 BSR/RESNET/ICC 301-2014 Addendum E-201x HouseSizeIAF

Proposed IAF Addendum to ANSI/RESNET/ICC 301-2014

Add the following new Section:

x.x Index Adjustment Factor (IAF). The IAF for each Rated Home shall be determined in accordance with Sections x.x.1 through x.x.5.

x.x.1 Index Adjustment Design (IAD). An IAD shall be configured in accordance with Table x.x.1(1). Renewable Energy Systems that offset the energy consumption requirements of the Rated Home shall not be included in the IAD.

Table x.x.1(1) Configuration of Index Adjustment Design

Building Component	**Index Adjustment Design (IAD)**
General Characteristics:	Number of Stories (NS): Two (2) Number of Bedrooms (Nbr): Three (3) Conditioned Floor Area (CFA): 2400 ft^2 Number of conditioned zones: One (1) No attached garage Wall height: 17 feet (including band joist) Wall width: 34.64 feet facing N, S, E and W All heating, cooling, and hot water equipment shall be located in conditioned space.
Foundation:	Type: Vented crawlspace Venting: net free vent aperture = 1ft^2 per 150 ft^2 of crawlspace floor area. Gross floor area: 1200 ft^2 Floor U-Factor: Same as Energy Rating Reference Home Foundation wall: 2 feet tall, 2 feet above grade Wall width: 34.64 feet facing N, S, E and W Wall U-Factor: Same as Energy Rating Reference Home
Above-grade walls:	Type: Same as Rated Home. If more than one type, maintain same proportional coverage for each type, excluding any garage wall and adiabatic wall areas. Gross Area: 2360ft^2 total, 590ft^2 facing N, S, E and W ~~OR~~ ~~295 ft^2 facing N, S, E and W if Rated Home on conditioned basement foundation~~ U-Factor: Same as Rated Solar absorptance: Same as Rated Home Emittance: Same as Rated Home
~~Conditioned basement walls:~~	~~Type: Same as Rated Home~~ ~~Gross area: 295 ft^2 facing N, S, E and W~~ ~~U-Factor: Same as Rated Home~~

Building Component	**Index Adjustment Design (IAD)**
~~Floors over unconditioned spaces or outdoor environment:~~	~~Type: Same as Rated Home.~~ ~~Gross area: 1200 ft^2~~ ~~U-Factor: Same as Rated Home~~
Ceilings:	Type: Same as Rated Home. If more than one type, maintain same proportional coverage for each type. Gross projected footprint area: 1200 ft^2 U-Factor: Same as Rated Home
Roofs:	Type: Same as Rated Home. If more than one type, maintain same proportional coverage for each type. Gross area: 1300 ft^2 Solar absorptance: Same as Rated Home Values from Table 4.2.2(4) shall be used to determine solar absorptance except where test data are provided for roof surface in accordance with ASTM Standards C-1549, E-1918, or CRRC Method # 1. Emittance: Same as Rated Home Emittance values provided by the roofing manufacturer in accordance with ASTM Standard C-1371 shall be used when available. In cases where the appropriate data are not known, same as the Energy Rating Reference Home.
Attics:	Type: Same as Rated Home. If more than one type, maintain same proportional coverage for each type.
~~Foundations:~~	~~Type: Same as Rated Home.~~ ~~Gross area: 1200 ft^2~~ ~~U-Factor: Same as Rated Home~~
~~Crawlspaces:~~	~~Type: Same as Rated Home.~~ ~~U-Factor: Same as Rated Home~~
Doors:	Area: Same as Rated Home Orientation: Same as Rated Home U-Factor: Same as Rated Home
Glazing:	Total area =Same as Energy Rating Reference Home Orientation: equally distributed to four (4) cardinal compass orientations (N,E,S,&W) U-Factor: ~~Same as~~Area-weighted average U-Factor of Rated Home SHGC: ~~Same as~~Area-weighted average SHGC of Rated Home Interior shade coefficient: Summer: Same as Energy Rating Reference Home Winter: Same as Energy Rating Reference Home External shading: ~~Same as Rated Home~~None
Skylights	Same as Rated Home
Thermally isolated sunrooms	Same as Rated Home
Air exchange rate	Combined ~~Infiltration~~ infiltration flow rate plus mechanical ventilation flow rate of

Building Component	**Index Adjustment Design (IAD)**
	0.03 * CFA + 7.5 * (Nbr+1) cfm and with energy loads calculated in quadrature Infiltration flow rate shall be determined using the following envelope leakage rates: 5 ACH_{50} in IECC[1] Climate Zones 1-2 3 ACH_{50} in IECC Climate Zones 3-8
Whole-House Mechanical ventilation:	Balanced Whole-House Ventilation System with fan power = 0.70 * fanCFM * 8.76 kWh/y
Internal gains:	As specified by Table 4.2.2(3) except that lighting shall be 75% high efficiency
Internal mass:	An internal mass for furniture and contents of 8 pounds per square foot of floor area
Structural mass:	Same as ~~Rated Home~~Energy Rating Reference Home
Heating systems	Fuel type: Same as Rated Home Efficiencies: Electric: air source heat pump in accordance with Table 4.2.2(1a) Non-electric furnaces: natural gas furnace in accordance with Table 4.2.2(1a) Non-electric boilers: natural gas boiler in accordance with Table 4.2.2(1a) Capacity: sized in accordance with Section 4.3.3.1
Cooling systems	Fuel type: Electric Efficiency: in accordance with Table 4.2.2(1a) Capacity: sized in accordance with Section 4.3.3.1
Service water heating systems	Fuel type: same as Rated Home Efficiency: Electric: EF = 0.97 - (0.00132 * store gal) Fossil fuel: EF = 0.67 - (0.0019 * store gal) Use: Same as Energy Rating Reference Home (see Addendum A) Tank temperature: 125 F
Thermal distribution systems:	Thermal distribution system efficiency (DSE) of 1.00 shall be applied to both the heating and cooling system efficiencies and air distribution systems shall be located within the conditioned space
Thermostat	Type: manual Temperature set points: cooling temperature set point = 78 F; heating temperature set point = 68 F
Lighting, Appliances and Miscellaneous Electric Loads (MELs)	Same as the Energy Rating Reference Home, except that lighting shall be 75% high efficiency

[1] Climate zones shall be as specified by the 2012 IECC

x.x.2 ~~A RESNET accredited~~An approved[2] Energy Rating Software Tool shall be used to determine the Energy Rating Index for the IAD (ERI_{IAD}).

x.x.3 The saving represented by the IAD shall be calculated using equation x.x.3-1.

$$IAD_{SAVE} = (100 - ERI_{IAD}) / 100 \quad \text{(Eq. x.x.3-1)}$$

x.x.4 The IAF for the Rated Home (IAF_{PD}) shall be calculated in accordance with equation x.x.4-1.

$$IAF_{RH} = IAF_{CFA} * IAF_{Nbr} * IAF_{NS} \quad \text{(Eq. x.x.4-1)}$$

where:

IAF_{RH} = combined Index Adjustment Factor for Rated Home

$IAF_{CFA} = (2400/CFA) ^ [0.304 * (IAD_{SAVE})]$

$IAF_{Nbr} = 1+ [$~~0.0730~~$0.069 * (IAD_{SAVE}) * (Nbr-3)]$

$IAF_{NS} = (2/NS) ^ [0.12 * (IAD_{SAVE})]$

where:

CFA = Conditioned Floor Area

Nbr = Number of bedrooms

NS = Number of stories

Modify equation 4.1-2 as follows:

$$\textbf{ERI = PEfrac * (TnML / (TRL * IAF}_{\textbf{RH}}\textbf{)) * 100} \quad \textbf{(Eq 4.1-2)}$$

where:

IAF_{RH} = Index Adjustment Factor of Rated Home

Add the following new definitions:

Index Adjustment Design – a home design comprising 2-stories and 3 bedrooms with conditioned floor area of 2,400 ft2 used to determine the percentage improvement over the Energy Rating Reference Home for the purposes of determining the Index Adjustment Factor that is applied to the Rated Home.

Index Adjustment Factor – a value calculated using the percentage improvement of the Index Adjustment Design to determine the impact of home size, number of bedrooms and number of stories on the Energy Rating Index of the Rated Home.

[2] Informative Note: The Residential Energy Services Network (RESNET) accredits Energy Rating Software Tools in accordance with RESNET Publication 002.