ENERGY STAR Single-Family New Homes National Program Requirements, Version 3.2 (Rev. 12)

Exhibit 1: ENERGY STAR Reference Design Home 11

The ENERGY STAR Reference Design Home is the set of efficiency features modeled to determine the ENERGY STAR ERI Target for each home pursuing certification. Therefore, while the features below are not mandatory, if they are not used then other measures will be needed to achieve the ENERGY STAR ERI Target. In addition, note that the Mandatory Requirements for All Certified Homes, Exhibit 2, contain additional requirements such as total duct leakage limits, minimum allowed insulation levels, and minimum allowed fenestration performance. Therefore, EPA recommends that partners review the documents in Exhibit 2 prior to selecting measures.

Hot and Mixed Climates (2021 IECC Zones 1,2,3,4A,4B) [12]	**Cold Climates** (2021 IECC Zones 4C,5,6,7,8) [12]
Cooling Equipment (Where Provided)	
• Cooling equipment modeled at the applicable efficiency levels below:	
• ENERGY STAR AC: 16 SEER • Heat pump (See Heating Equipment)	• AC: 14 SEER • Heat pump (See Heating Equipment)
• Installation quality modeled at -20% blower fan airflow deviation, 0.52 W / CFM blower fan efficiency, and Grade III refrigerant charge	
Heating Equipment	
• Heating equipment modeled at the applicable efficiency levels below, dependent on fuel and system type:	
○ Gas furnace: CZ 1-3: 80 AFUE; CZ 4A & 4B: 90 AFUE [12] ○ Gas boiler: CZ 1-3: 80 AFUE; CZ 4A & 4B: 90 AFUE [12] ○ ENERGY STAR air-source heat pump: 9.2 HSPF / 16 SEER	○ ENERGY STAR gas furnace: 95 AFUE ○ ENERGY STAR gas boiler: 95 AFUE ○ ENERGY STAR air-source heat pump: 9.2 HSPF / 16 SEER
• Installation quality modeled at -20% blower fan airflow deviation; 0.52 W / CFM blower fan efficiency; and, as applicable, Grade III refrigerant charge	
Envelope, Windows, & Doors	

1. Insulation levels modeled to 2021 IECC levels and Grade I installation per ANSI / RESNET / ICC 301
2. Infiltration rate modeled at 3 ACH50
3. ENERGY STAR windows and doors modeled, as illustrated below:

Climate Zone: [12]	1 - 2	3	4A & 4B	4C - 8
Window U-Value:	0.40	0.30	0.30	0.27
Window SHGC:	0.25	0.25	0.40	Any

Door Type:	Opaque	≤½ Lite	>½ Lite	
Climate Zone: [12]	All	All	1 - 3	4 - 8
Door U-Value:	0.17	0.25	0.30	0.30
Door SHGC:	Any	0.25	0.25	0.40

Water Heater

• DHW equipment modeled at the following applicable efficiency levels, dependent on fuel type: Gas: 0.90 UEF; Electric: 2.20 UEF

Thermostat & Ductwork

1. Programmable thermostat modeled
2. All ducts and air handlers modeled within conditioned space, uninsulated, with no leakage to the outside

Lighting & Appliances

1. ENERGY STAR refrigerators, dishwashers, and ceiling fans modeled
2. ENERGY STAR light bulbs modeled with Tier 2 efficiency in 100% of Qualifying Light Fixture Locations, as defined by ANSI / RESNET / ICC 301

11. Note that the efficiency levels of ENERGY STAR certified products aligned with these product specifications when this Version was first released. These efficiency features form the basis of the ENERGY STAR ERI target, regardless of any subsequent revisions to ENERGY STAR certified product specifications. EPA recommends, but does not require, that current ENERGY STAR products be included in ENERGY STAR homes. For current ENERGY STAR products, visit www.energystar.gov/products.

12. 2021 IECC Climate Zone designations, as defined and illustrated in Section R301 of the code, are used to configure the ENERGY STAR Reference Design Home. Note that some locations have shifted to a different Climate Zone in the 2021 IECC compared to prior editions.