ENERGY STAR[®] Residential New Construction Programs

Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision. Please find current program documents on the <u>Program</u> <u>Requirements</u> webpage.

Use of older Versions and Revisions, such as this document, are typically limited to homes and buildings with a permit date (or, for manufactured homes, a production date) prior to a specified date. Consult the <u>Implementation Timeline</u> table to assess whether a home or apartment is still eligible to be certified using this document.

For questions or more information, contact us at <u>energystarhome@energystar.gov</u>.



ENERGY STAR Single-Family New Homes National ERI Target Procedure, Version 3.1 (Rev. 11)

This document provides instructions for determining the ENERGY STAR ERI Target, the highest ERI value that each rated home may achieve to earn the ENERGY STAR. Note that, in addition to meeting the ENERGY STAR ERI Target, homes shall also meet all Mandatory Requirements for All Certified Homes in Exhibit 2 of the National Program Requirements for ENERGY STAR Single-Family New Homes, Version 3.1.

An EPA-recognized Home Certification Organization's Approved Software Rating Tool shall automatically determine (i.e., without relying on a user-configured ENERGY STAR Reference Design) this target for each rated home. This shall be done by configuring the ENERGY STAR Reference Design Home in accordance with Exhibit 1, the Expanded ENERGY STAR Reference Design Definition, and calculating its associated ERI value. The ERI value shall be calculated using ANSI / RESNET / ICC Standard 301 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the Home Certification Organization (HCO) that the home is being certified under, with approved exceptions listed at www.energystar.gov/ERIExceptions. This value, rounded to the nearest whole number, shall equal the ENERGY STAR ERI Target.



Exhibit 1: Expanded ENERGY STAR Reference Design Definition

Component		anded ENED		Deference		inition 1					
Component Foundations:	Expanded ENERGY STAR Reference Design Definition ¹ Construction Type & Structural Mass: Same as Rated Home, except:										
	For masonry floor slabs, modeled with 80% of floor area covered by carpet and 20% of floor directly exposed to room air Conditioning Type: Same as Rated Home, except:										
	Conditioning Type: Same as Rated Home, except: Crawlspaces shall be modeled as vented with net free vent aperture = 1sq. ft. per 150 sq. ft. of crawlspace floor area										
	Gross Area: Same as Rated Home ²										
	Insulation: ^{3, 4} Choose appropriate insulation level below:										
	Basement Wall Assembly U-factor only applies to conditioned bsmt.'s; if applicable, insulation shall be located on interior side of walls										
	Floor assemblies above crawlspace foundations shall be configured to meet the applicable floor assembly U-factor listed in the building										
	 component section for Floors Over Unconditioned Spaces Slab floors with a floor surface less than 12" below grade shall be insulated to the Slab Insulation R-value. The insulation shall extend 										
	downward from the top of the slab on the										
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8		
	Slab Insulation R-Value:	0	0	0	10	10	10	10	10		
	Slab Insulation Depth (ft):	0	0	0	2 0.059	2	4	4	4		
Floors Over	Basement Wall Assembly U-Factor: Construction Type: Wood frame	0.360	0.360	0.091	0.059	0.050	0.050	0.050	0.050		
Unconditioned	Gross Area: Same as Rated Home										
Spaces:	Insulation: ^{3, 4} Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8		
	Floor Assembly U-Factor:	0.064	0.064	0.047	0.047	0.033	0.033	0.028	0.028		
Above-Grade	Interior and Exterior Construction Type: Wood										
Walls:	Gross Area: Same as Rated Home										
	Solar Absorptance = 0.75										
	Emittance = 0.90										
	Insulation: ³ Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8		
	Wall Assembly U-Factor:	0.082	0.082	0.057	0.057	0.057	0.048	0.048	0.048		
Thermally Isolated	None										
Sunrooms:	None										
Doors: 5	Area: Same as Rated Home										
	Orientation: Same as Rated Home										
	Door Type:	Opaque	Ð		/2-Lite	> 1/2-Lite CZ	1-3 >	> 1/2-Lite C	Z 4-8		
	U-Value: SHGC:	0.17).25	0.30		0.30			
Glazing: ⁵	Total Area: (except in homes with conditioned	N/A	d attached).25	0.25		0.40			
Glazing.	Same as Rated Home, where Rated Home				onditioned flo	oor area: OR					
							area				
	15% of the conditioned floor area, where the Rated Home glazing area is 15% or more of the conditioned floor area Orientation: Equally distributed to North, East, South, and West										
	Orientation: Equally distributed to North, East,	Interior Shade Coefficient: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301									
	Interior Shade Coefficient: Same as Energy Ra		e Home, a	s defined b	DY ANOL / RE	SINE 1 / ICC SIU. 30					
	Interior Shade Coefficient: Same as Energy Ra External Shading: None	ating Referenc									
	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone:	ating Referenc CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8		
	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value:	ating Referenc CZ 1 0.40	CZ 2 0.40	CZ 3 0.30	CZ 4 0.30	CZ 4 C & 5 0.27	CZ 6 0.27	0.27	0.27		
Cladiabte	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC:	ating Referenc CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6				
Skylights:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None	ating Referenc CZ 1 0.40	CZ 2 0.40	CZ 3 0.30	CZ 4 0.30	CZ 4 C & 5 0.27	CZ 6 0.27	0.27	0.27		
Skylights: Ceilings:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame	ating Referenc CZ 1 0.40	CZ 2 0.40	CZ 3 0.30	CZ 4 0.30	CZ 4 C & 5 0.27	CZ 6 0.27	0.27	0.27		
	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home	ating Referenc CZ 1 0.40 0.25	CZ 2 0.40 0.25	CZ 3 0.30 0.25	CZ 4 0.30 0.40	CZ 4 C & 5 0.27 0.40	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40		
	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone:	CZ 1 0.40 0.25	CZ 2 0.40 0.25 CZ 2	CZ 3 0.30	CZ 4 0.30 0.40 CZ 4	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5	CZ 6 0.27 0.40	0.27	0.27 0.40 CZ 8		
	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home	CZ 1 0.40 0.25 CZ 1 0.035	CZ 2 0.40 0.25 CZ 2 0.030	CZ 3 0.30 0.25 CZ 3 0.030	CZ 4 0.30 0.40	CZ 4 C & 5 0.27 0.40	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40		
Ceilings:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor:	CZ 1 0.40 0.25 CZ 1 0.035	CZ 2 0.40 0.25 CZ 2 0.030	CZ 3 0.30 0.25 CZ 3 0.030	CZ 4 0.30 0.40 CZ 4	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40 CZ 8		
Ceilings:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on woo	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc	CZ 2 0.40 0.25 CZ 2 0.030	CZ 3 0.30 0.25 CZ 3 0.030	CZ 4 0.30 0.40 CZ 4	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40 CZ 8		
Ceilings: Attics:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc	CZ 2 0.40 0.25 CZ 2 0.030	CZ 3 0.30 0.25 CZ 3 0.030	CZ 4 0.30 0.40 CZ 4	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40 CZ 8		
Ceilings: Attics:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc	CZ 2 0.40 0.25 CZ 2 0.030	CZ 3 0.30 0.25 CZ 3 0.030	CZ 4 0.30 0.40	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40 CZ 8		
Ceilings: Attics: Roofs:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 so bod sheathing	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling	CZ 3 0.30 0.25 CZ 3 0.030 g area	CZ 4 0.30 0.40 CZ 4 0.026	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40 CZ 8		
Ceilings: Attics:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as of	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc bod sheathing	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling	CZ 3 0.30 0.25 CZ 3 0.030 g area	CZ 4 0.30 0.40 CZ 4 0.026	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40	0.27 0.40	0.27 0.40 CZ 8		
Ceilings: Attics: Roofs: Internal Mass:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as a Additional mass specifically designed as a The	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc bod sheathing defined by ANS armal Storage	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling SI / RESNI Element fc	CZ 3 0.30 0.25 CZ 3 0.030 g area	CZ 4 0.30 0.40 CZ 4 0.026 td. 301.	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026	0.27 0.40 CZ 8		
Ceilings: Attics: Roofs: Internal Mass: Lighting,	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as a Additional mass specifically designed as a The Lighting: Fraction of qualifying Tier I fixtures to	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc bod sheathing defined by ANS armal Storage	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling SI / RESNI Element fc	CZ 3 0.30 0.25 CZ 3 0.030 g area	CZ 4 0.30 0.40 CZ 4 0.026 td. 301.	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026	0.27 0.40 CZ 8		
Ceilings: Attics: Roofs: Internal Mass:	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as of Additional mass specifically designed as a The Lighting: Fraction of qualifying Tier I fixtures to Refrigerator: 423 kWh per year	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc od sheathing defined by ANS ermal Storage all fixtures in o	CZ 2 0.40 0.25 CZ 2 0.030 g. ft. ceiling SI / RESNI Element fc qualifying I	CZ 3 0.30 0.25 CZ 3 0.030 g area	CZ 4 0.30 0.40 CZ 4 0.026 td. 301. d Home shall locations 90	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026	0.27 0.40 CZ 8		
Ceilings: Attics: Roofs: Internal Mass: Lighting, Appliances, &	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as a Additional mass specifically designed as a The Lighting: Fraction of qualifying Tier I fixtures to	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc od sheathing defined by ANS ermal Storage all fixtures in o or Standard if	CZ 2 0.40 0.25 CZ 2 0.030 g. ft. ceiling SI / RESNI Element fc qualifying I no dishwa:	CZ 3 0.30 0.25 CZ 3 0.030 g area ET / ICC S or the Rater ight fixture sher in the	CZ 4 0.30 0.40 CZ 4 0.026 td. 301. d Home shall locations 90 Rated Home	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026	0.27 0.40 CZ 8		
Ceilings: Attics: Roofs: Internal Mass: Lighting, Appliances, &	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as of Additional mass specifically designed as a The Lighting: Fraction of qualifying Tier I fixtures to Refrigerator: 423 kWh per year Dishwasher: Capacity: LER = 270, GHWC = \$ For Compact capacity: LER = 203, GHWC = \$	CZ 1 0.40 0.25 CZ 1 0.035 CZ 1 0.035 f. ft. per 300 sc od sheathing od sheathing all fixtures in control of the second or Standard if 1 22.23, Elec\$ = 14.20, Elec\$ =	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling SI / RESNI Element fc qualifying I no dishwa: = \$0.12, Ga = \$0.12, Ga	CZ 3 0.30 0.25 CZ 3 0.030 g area ET / ICC S or the Rated ight fixture sher in the as\$ = \$1.09 as\$ = \$1.09	CZ 4 0.30 0.40 CZ 4 0.026 td. 301. d Home shal locations 90 Rated Home 9, LCY = 208 9, LCY = 208	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026	0.27 0.40 CZ 8 0.026		
Ceilings: Attics: Roofs: Internal Mass: Lighting, Appliances, &	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as a Additional mass specifically designed as a The Lighting: Fraction of qualifying Tier I fixtures to Refrigerator: 423 kWh per year Dishwasher: Capacity Same as Rated Home, For Standard capacity: LER = 270, GHWC = \$ For Compact capacity: LER = 203, GHWC = \$	CZ 1 0.40 0.25 CZ 1 0.035 cZ 1 0.035 f. ft. per 300 sc od sheathing od sheathing all fixtures in constant or Standard if 1 22.23, Elec\$ = 14.20, Elec\$ =	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling SI / RESNI Element fc qualifying l no dishwaa = \$0.12, Ga \$0.12, Ga oms + 1 w	CZ 3 0.30 0.25 CZ 3 0.030 g area ET / ICC S or the Rated ight fixture sher in the as\$ = \$1.09 hen ceiling	CZ 4 0.30 0.40 CZ 4 0.026 td. 301. d Home shal locations 90 Rated Home 0, LCY = 208 0, LCY = 208 fans presen	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026	0.27 0.40 CZ 8 0.026		
Ceilings: Attics: Roofs: Internal Mass: Lighting, Appliances, &	Interior Shade Coefficient: Same as Energy Ra External Shading: None Climate Zone: U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: ³ Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sc Radiant Barrier: None Construction Type: Composition shingle on wo Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as of Additional mass specifically designed as a The Lighting: Fraction of qualifying Tier I fixtures to Refrigerator: 423 kWh per year Dishwasher: Capacity: LER = 270, GHWC = \$ For Compact capacity: LER = 203, GHWC = \$	CZ 1 0.40 0.25 CZ 1 0.035 1. ft. per 300 sc od sheathing defined by AN: crmal Storage all fixtures in c or Standard if 1 22.23, Elec\$ = 14.20, Elec\$ = mber of bedro Rating Referen	CZ 2 0.40 0.25 CZ 2 0.030 q. ft. ceiling Element fc qualifying I no dishwa: = \$0.12, Ga = \$0.12, Ga oms + 1 w ce Home,	CZ 3 0.30 0.25 CZ 3 0.030 g area ET / ICC S or the Rateringht fixture sher in the as\$ = \$1.00 hen ceiling as defined	CZ 4 0.30 0.40 CZ 4 0.026 td. 301. d Home shall locations 90 Rated Home 9, LCY = 208 9, LCY = 208 16ans present by ANSI / Ri	CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.026	CZ 6 0.27 0.40 CZ 6 0.026	0.27 0.40 CZ 7 0.026 d garage	0.27 0.40 CZ 8 0.026		



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Exhibit 1: Expanded ENERGY STAR Reference Design Definition (Continued)

with ACCA Manual J. Eight Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation proceedure. For force-dair HVAC systems, Grade III antibus and back accurated to targe annembodology applied to Energy Raining Reference Phone, System Type: Same as Rated Home, except Reference Phone is modeled with air-source or ground-source heat purps, electric basebaard heat, and Reference Densign shall be configured with air-source Jones Densign shall be configured with air-source descence Densign shall be configured with air-source descence. The descence Densign shall be configured with air-source descence Densign shall be configured with air-source descence. For core dair HVAC with the methodology for the Energy Rating Reference Home in AMSI / RESNET / ICC Sid. 301. Colling Copiedly air Mills and Sid Descence Descence Descence Descence Descence Descore Descore Descence Descence Descence Descence Descence Descenc	Heating	Heating capacity shall be selected in a										
Installation Quelity: For forced air HVAC systems, Grade III airflow and wat draw, for air-source heat pump in C2 7 to share a Read Home, except Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat, and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat, applicable efficiency selected from below.* Climate Zone: C21 C22 C23 C24 C2 6 S C25 C2 C2 C23 C24 C2 6 S C25 C2 C2 C2 C2 3 C2 4 C2 5 C2 5 C3 5 N ³ N ³ S S <td rowspan="5">Systems:</td> <td colspan="10"></td>	Systems:											
System Type: Same as Ratel Home, except Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboart heat, and Reference Deain shall be configured with air-source or ground-source heat pump, electric strip heat, or electric baseboart heat, applicable difficurery selected from balow.* Climate Zone: C2 1 C2 2 C2 4 C2 4 C 5 5 C3 C2 7 C2 8 Climate Zone: C2 1 C2 2 C2 4 C2 4 C 5 5 C3 C2 7 C2 8 Climate Zone: C2 1 C2 2 C2 4 C2 4 C 5 5 C3 C2 7 C2 8 Gin Dinn, AFUE: 80 <td< td=""><td colspan="10"></td></td<>												
modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency elected from below. ⁴ Climate Zone: C2 /												
with ground-source heat pump, in C2 7 & 8 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below.** Climate Zone: C2 1 C2 2 C2 3 C2 4 C2 4 C 2 4 C 2 6 5 C2 6 C2 7 C2 6 Gas Furn, APUE: 80 80 85												
Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 CZ 6 CZ 7		with ground-source heat pump in CZ 7 & 8 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or										
Gas Furn. AFUE: 80 80 80 95						07.4	07.40.9.5	07.0				
OIF Furn. AFUE: B0												
Gas Boiler AFUE: B0												
Oil Bolier APUE: B0												
Air-Source Heat Pump Dackup: Electric Electric Electric Electric Electric Na n'a												
Ground-Source Heat Pump COP: n/a 3.6		Air-Source Heat Pump HSPF:	8.2	8.2	8.2	8.5	9.25	9.5	n/a	n/a		
For non-electric vama furnaces and non-electric boilers, the Electric Auxiliary Energy shall be determined in accordance with the methodology for the Energy Rating Reference Home in ASN / RESNET / ICC Std. 301. Cooling capacity shall be selected in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual . Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems, Grade III entitiation and watt draw, for AC's & air-source heat pumps, also Grade III entitiation and watt draw, for AC's & air-source heat pumps, also Grade III entitiation and watt draw, for AC's & air-source heat pump, in C2 + 6 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat, and Reference Design shall be configured with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat, and Reference Design shall be configured with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat, and Reference Design shall be configured with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat, and Reference Design shall be configured with air-source or ground-source heat pump. Elect is 15 15 15 15 15 15 15 15 15 15 15 15 15		Air-Source Heat Pump Backup:	Electric	Electric	Electric	Electric	Electric	Electric	n/a	n/a		
In the Energy Rating Reference Home in ANSI / RESNET / ICC Std. 301. Image: Cooling capacity shall be selected in accordnace with ACCA Manual S based on building heating and cooling loads calculated in accordnace with ACCA Manual S based on building heating and cooling loads calculated in accordnace with ACCA Manual S. Test on building heating and cooling loads calculated in accordnace with ACCA Manual S. Test on building heating and cooling loads calculated in accordnace with ACCA Manual J. Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems, Grade III install shall be accompared to the another of the accompared to the accompared												
systems: with ACc A Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems: with ACcA Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC Fuel Type: Same as Rated Home 7 Installation Quality: For forced-air HVAC systems, Grade III airflow and wat traw; for AC's & air-source heat pump, in CZ 1-6 where Rated Home is modeled with air-source heat pump, in CZ 7 & 8 where Rated Home is modeled with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Home, succept Rated Home is modeled with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Home, succept Rated Home is modeled with air-source heat Pump EER: 15 15 15 15 13						Energy shall b	e determined i	n accordanc	e with the m	ethodology		
systems, degraded capacity, from Grade III install shall be accounted for using same methodology applied to Energy Rating Reference Home, Fuel Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump, in CZ 1-6 where Rated Home is modeled with air-source for ground-source heat pump, electric trip heat, or electric baseboard heat; and Reference Design shall be configured with air-source for ground-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source for ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below. ³ Climate Zone: C21 C22 C23 CZ 4 CZ 4 C2 & S CZ 6 CZ 7 CZ 8 Ac SEER: 15 15 15 13												
Installation Quality: For forced-air HVAC systems, Grade III airflow and watt draw, for AC's & airsource heat pumps, also Grade III ref, charge System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with ground-source heat pump in C27 & 8 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below. ⁹ Climate Zone: C21 C22 C23 C24 C24 C & 5 C26 C27 C28 Air-Source Heat Pump SER: 15 15 15 15 15 15 15 16 n/a			le III install sha	all be accou	nted for using	same method	ology applied	to Energy R	ating Referer	nce Home.		
System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source neat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured with air-source heat pump, electric strip heat, or electric baseboard heat; and Reference Home, and a m/a m/a m/a m/a m/a m/a m/a m/a m/a m			C systems G	rade III airflo	w and watt dr	aw: for AC's &	2 air-source he	at numns a	lso Grade III	ref charge		
modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below. ⁹ Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C 2 5 CZ 7 CZ 8 AC SEER: 15 15 15 15 15 15 15 15 15 15 15 15 17.1												
with ground-source heat pump in CZ 7 & 8 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below.* Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4												
Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 AC SEER: 15 15 15 15 13 17 17 17 17 17 17 17 17 17 17 17 17 17 17 13 13 13 13 13 15 15 <td></td> <td>with ground-source heat pump in CZ 7</td> <td>& 8 where Ra</td> <td>ated Home is</td> <td>modeled with</td> <td></td> <td></td> <td></td> <td></td> <td></td>		with ground-source heat pump in CZ 7	& 8 where Ra	ated Home is	modeled with							
AC SEER: 15 15 15 15 13 15 15 <						C7 4	C74C&5	C7 6	C7 7	C7 8		
Air-Source Heat Pump SEER: 15 15 15 15 15 15 15 16 17.1			-									
Ground-Source Heat Pump EER: n/a												
ervice Vater Use (Gallons per Day): Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301, except for reduced usage resulting from the dishwasher specified in the Lighting, Appliances, & Internal Gains Section. ¹⁰ Tank Temperature: Same as Rated Home ⁷ System Type: Same as Rated Home ⁷ System Type: Conventional storage water heater with tank size equal to that of Rated Home, unless Rated Home uses instantaneous water heater in which case select 50 gailon tank for gas systems and 60 gallon tank for electric systems. Select applicable efficiency from below using tank size of Reference Home. Gas Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon 80 Gallon Oil DHW EF: 0.63 0.61 0.59 0.57 0.53 0.53 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area 0.55 0.53 0.51 0.49 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned space Crawlspace Basement Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned 100% Conditioned Istribution wells instructure Setopints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 Resement Two Story Above Grade:												
Vater leating tystems: resulting from the dishwasher specified in the Lighting, Appliances, & Internal Gains Section. ¹⁰ Yeating tystems: Tank Temperature: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301. Fuel Type: Same as Rated Home ⁷ System Type: Conventional storage water heater with tank size equal to that of Rated Home, unless Rated Home uses instantaneous water heater in which case select 50 galon tank for gas systems and 60 gallon tank for electric systems. Select applicable efficiency from below using tank size of Reference Home. Gas Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 60 Gallon 70 Gallon 80 Gallon Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned space 0.53 0.51 0.49 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned space Cawhyspace Basement	Convice											
Heating Systems: Tank Temperature: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301. System Type: Conventional storage water heater with tank size equal to that of Rated Home, unless Rated Home uses instantaneous water heater in which case select 50 gailon tank for gas systems and 60 gailon tank for electric systems. Select applicable efficiency from below using tank size of Reference Home. Gas Storage Tank Capacity: '' 30 Gailon 40 Gailon 50 Gailon 60 Gailon 70 Gailon 80 Gailon Gas Storage Tank Capacity: '' 30 Gailon 40 Gailon 50 Gailon 60 Gailon 70 Gailon 80 Gailon Gas Storage Tank Capacity: '' 30 Gailon 40 Gailon 50 Gailon 60 Gailon 70 Gailon 80 Gailon Ietertric DHW EF: 0.63 0.61 0.59 0.92 0.91 0.90 0.89 Oil DHW EF: 0.55 0.53 0.51 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area Duct leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned space Supply and Returm Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditioned space. Supply and Returm Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditioned two below (e.g., multifamily dwellin								1. 301, excep		usaye		
Systems: Fuel Type: Same as Rated Home ⁷ System Type: Conventional storage water heater with tank size equal to that of Rated Home, unless Rated Home uses instantaneous water heater in which case select 50 gallon tank for gas systems. Select applicable efficiency from below using tank size of Reference Home. Gas Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Gas DHW EF: 0.63 0.61 0.59 0.57 0.55 0.53 Electric Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area 0.51 0.49 0.47 0.45 Duct Issulation: None, because 100% of ducts are in conditioned space Duct Issulation: None, because 100% of ducts are in conditioned space Basement Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditioned space. Crawlspace <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>)1</td><td></td><td></td></t<>)1				
System Type: Conventional storage water heater with tank size equal to that of Rated Home, unless Rated Home uses instantaneous water heater in which case select 50 gallon tank for gas systems and 60 gallon tank for electric systems. Select applicable efficiency from below using tank size of Reference Home. Gas Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Gas DHW EF: 0.63 0.61 0.57 0.57 0.53 0.53 Electric Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon 0 iii DHW EF: 0.94 0.93 0.92 0.91 0.90 0.89 Oil DHW EF: 0.94 0.93 0.92 0.91 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area 0.51 0.49 0.47 0.45 Duct Insulation: None, because 100% of ducts are in conditioned space Duct Surface Area: Same as Rated Home Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% (conditioned 100% Conditioned 100	•		taing referen				17100 010.00	,				
Gas Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Gas DHW EF: 0.63 0.61 0.59 0.57 0.55 0.53 Electric Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil DHW EF: 0.94 0.93 0.51 0.49 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area Duct Insulation: None, because 100% of ducts are in conditioned space Duct Insulation: None, because 100% of ducts are in conditioned space Experiment Experiment 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area Duct Insulation: None, because 100% of ducts are in conditioned space Experiment Experiment Experiment Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor Area 100% Conditioned 100% conditioned 100% conditioned<		System Type: Conventional storage w heater in which case select 50 gallon t	System Type: Conventional storage water heater with tank size equal to that of Rated Home, unless Rated Home uses instantaneous water									
Gas DHW EF: 0.63 0.61 0.59 0.57 0.55 0.53 Electric Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Dil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil DHW EF: 0.55 0.53 0.51 0.49 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area 0.45 0.45 0.45 Duct Insulation: None, because 100% of ducts are in conditioned space 0.45 0.45 0.45 Duct Isulation: None, because 100% conditioned unit below), then duct locations shall be configured to be 100% in conditioned space. Foundation Type: Basement Supply and Return Duct Locations shall be conditioned 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned 100% Conditioned Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating			ank ioi yas sy									
Electric Storage Tank Capacity: '' 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil Storage Tank Capacity: '' 0.94 0.93 0.92 0.91 0.90 0.89 Oil Storage Tank Capacity: '' 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil DHW EF: 0.55 0.51 0.49 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area 0.49 0.47 0.45 Duct surface Area: Same as Rated Home Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 Infiltration & Alerst: Mattes: Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6				stems and 6	0 gallon tank	for electric sys	stems. Select a	applicable ef	ficiency from	below		
Electric DHW EF: 0.94 0.93 0.92 0.91 0.90 0.89 Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil DHW EF: 0.55 0.53 0.51 0.49 0.47 0.45 Thermal Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area 0.49 0.47 0.45 Duct Insulation: None, because 100% of ducts are in conditioned space Duct Surface Area: Same as Rated Home 50 Gallon 0.49 0.47 0.45 Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned 100% Conditioned 100% Conditioned Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 Infiltration Rates: Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Mechanical		Gas Storage Tank Capacity: ¹¹		stems and 6 30 Gallon	0 gallon tank	for electric sys	stems. Select a	applicable ef 70 Gal	ficiency from	below Gallon		
Oil Storage Tank Capacity: ¹¹ 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Oil DHW EF: 0.55 0.53 0.51 0.49 0.47 0.45 Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area Duct Insulation: None, because 100% of ducts are in conditioned space		Gas Storage Tank Capacity: ¹¹ Gas DHW EF:	3	stems and 6 30 Gallon 0.63	0 gallon tank 40 Gallon 0.61	for electric system 50 Gallon 0.59	stems. Select a 60 Gallon 0.57	applicable ef 70 Gal 0.55	ficiency from lon 80 (5 0	below Gallon .53		
Oil DHW EF: 0.55 0.53 0.51 0.49 0.47 0.45 Inernal Distribution Systems: Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area Duct Insulation: None, because 100% of ducts are in conditioned space Image: Conditioned floor area Image: Condit area Image: Conditioned f		Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹	3	stems and 6 0 Gallon 0.63 30 Gallon	0 gallon tank 40 Gallon 0.61 40 Gallon	for electric systems 50 Gallon 0.59 50 Gallon	stems. Select a 60 Gallon 0.57 60 Gallon	70 Gal 0.55 70 Gal	ficiency from Ion 80 (5 0 Ion 80 (below Gallon .53 Gallon		
Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area Distribution Systems: Duct Insulation: None, because 100% of ducts are in conditioned space Duct Surface Area: Same as Rated Home Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 Infiltration & /entilation: Infiltration Rates: Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 AcH50: 4 4 3 3 3 3 3 3 Mechanical ventilation system without heat recovery Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + 1), where CFA = Conditioned Floor Area and Nbr = Number of Bedrooms; Runtime: 24 Hours / Day Fan Watts: Watts = CFM Rate / 2.8 CFM per Watt, where CFM Rate is determined above Climate Zone: CZ 1 CZ 2 CZ 3		Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹ Electric DHW EF:	3	stems and 6 0 Gallon 0.63 30 Gallon 0.94	0 gallon tank 40 Gallon 0.61 40 Gallon 0.93	for electric sys 50 Gallon 0.59 50 Gallon 0.92	60 Gallon 0.57 60 Gallon 0.91	70 Gal 0.55 70 Gal 0.55 70 Gal 0.90	Ion 80 C 5 0 Ion 80 C 0 0	below Gallon .53 Gallon .89		
Duct Insulation: None, because 100% of ducts are in conditioned space Duct Surface Area: Same as Rated Home Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Infiltration ACH50: 4 4 3		Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹ Electric DHW EF: Oil Storage Tank Capacity: ¹¹	3	stems and 6 0 Gallon 0.63 30 Gallon 0.94 30 Gallon	0 gallon tank 40 Gallon 0.61 40 Gallon 0.93 40 Gallon	for electric sys 50 Gallon 0.59 50 Gallon 0.92 50 Gallon	60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.91	70 Gal 0.55 70 Gal 0.90 70 Gal 0.90 70 Gal	Ion 80 (Constraint) 5 0 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint)	Sallon .53 Sallon .89 Sallon		
Bystems: Duct Surface Area: Same as Rated Home Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Mechanical ventilation: ACH50: 4 4 3<	Thermal	Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹ Electric DHW EF: Oil Storage Tank Capacity: ¹¹ Oil DHW EF:	3	stems and 6 0 Gallon 0.63 30 Gallon 0.94 30 Gallon 0.55	0 gallon tank 40 Gallon 0.61 40 Gallon 0.93 40 Gallon 0.53	for electric sys 50 Gallon 0.59 50 Gallon 0.92 50 Gallon	60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.91	70 Gal 0.55 70 Gal 0.90 70 Gal 0.90 70 Gal	Ion 80 (Constraint) 5 0 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint)	Sallon .53 Sallon .89 Sallon		
Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Mechanical ventilation system without heat recovery Infiltration Rates: Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Mechanical ventilation system without heat recovery Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + 1), where CFA = Conditioned Floor Area and Nbr = Number of Bedrooms; Runtime: 24 Hours / Day Fan Watts: Watts = CFM Rate / 2.8 CF		Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹ Electric DHW EF: Oil Storage Tank Capacity: ¹¹ Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe	3 	stems and 6 0 Gallon 0.63 30 Gallon 0.94 30 Gallon 0.55 conditioned	0 gallon tank 40 Gallon 0.61 40 Gallon 0.93 40 Gallon 0.53 Ifloor area	for electric sys 50 Gallon 0.59 50 Gallon 0.92 50 Gallon	60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.91	70 Gal 0.55 70 Gal 0.90 70 Gal 0.90 70 Gal	Ion 80 (Constraint) 5 0 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint)	Sallon .53 Sallon .89 Sallon		
below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in conditioned space. Foundation Type: Slab Crawlspace Basement One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 Infiltration Rates: Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Acehanical / entilation: Mechanical ventilation system without heat recovery Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + 1), where CFA = Conditioned Floor Area and Nbr = Number of Bedrooms; Runtime: 24 Hours / Day Fan Watts: Watts = CFM Rate / 2.8 CFM per Watt, where CFM Rate is determined above Climate Zone: CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8	Distribution	Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹ Electric DHW EF: Oil Storage Tank Capacity: ¹¹ Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100%	3 	stems and 6 0 Gallon 0.63 30 Gallon 0.94 30 Gallon 0.55 conditioned	0 gallon tank 40 Gallon 0.61 40 Gallon 0.93 40 Gallon 0.53 Ifloor area	for electric sys 50 Gallon 0.59 50 Gallon 0.92 50 Gallon	60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.91	70 Gal 0.55 70 Gal 0.90 70 Gal 0.90 70 Gal	Ion 80 (Constraint) 5 0 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint) 10n 80 (Constraint)	Sallon .53 Sallon .89 Sallon		
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One Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Two Story Above Grade: 100% Conditioned 100% Conditioned 100% Conditioned Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC Std. 301 Infiltration & Mechanical Ventilation system without heat recovery ACH50: 4 4 3	Distribution	Gas Storage Tank Capacity: ¹¹ Gas DHW EF: Electric Storage Tank Capacity: ¹¹ Electric DHW EF: Oil Storage Tank Capacity: ¹¹ Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha	r 100 sq. ft. of of ducts are in ome Il be configure	stems and 6 0 Gallon 0.63 30 Gallon 0.94 30 Gallon 0.55 conditioned a conditioned	0 gallon tank 40 Gallon 0.61 40 Gallon 0.93 40 Gallon 0.53 floor area 5 space to the table b	for electric sys 50 Gallon 0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Rat	stems. Select a 60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.49 ted home does	applicable ef 70 Gal 0.55 70 Gal 0.90 70 Gal 0.47 	ficiency from Ion 80 (5 0 Ion 80 (0 0 Ion 80 (7 0 10 10 10 10 10 10 10 10 10 1	below Sallon .53 Sallon .89 Sallon .45 ditions		
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ENERGY STAR Single-Family New Homes National ERI Target Procedure, Version 3.1 (Rev. 11)

Footnotes:

- 1. Any parameter not specified in this exhibit shall be identical to the value entered for the Rated Home.
- 2. "Same as Rated Home" indicates that the parameter shall be identical to the value entered for the Rated Home.
- 3. Slab insulation R-values represent nominal insulation levels; and assembly U-factors for foundations, floors, walls, and ceilings represent the overall assembly, inclusive of sheathing materials, cavity insulation, installation quality, framing, and interior finishes.
- 4. If software allows the user to specify the thermal boundary location independent of the conditioned space boundary in the basement of the rated home, then the thermal boundary of the ENERGY STAR Reference Design shall be aligned with this boundary. For example, if the thermal boundary is located at the walls, then the wall insulation shall be configured as if it was a conditioned basement. If the thermal boundary is located at the floor above the basement, then the floor insulation shall be configured as if it was a floor over an unconditioned space.
- 5. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion.
- 6. When determining the ENERGY STAR ERI Target for homes with conditioned basements and for attached homes, the following formula shall be used to determine total window area of the ENERGY STAR Reference Design:

$AG = 0.15 \times CFA \times FA \times F$

Where:

- AG = Total glazing area
- CFA = Total conditioned floor area
- FA = (Gross above-grade thermal boundary wall area) / (Gross above-grade thermal boundary wall area + 0.5 x Gross belowgrade thermal boundary wall area)
- F = 1 0.44 x (Gross common wall area) / (Gross above-grade thermal boundary wall area + Gross common wall area)

And where:

- Thermal boundary wall is any wall that separates Conditioned Space from Unconditioned Space, outdoor environment, or the surrounding soil;
- Above-grade thermal boundary wall is any portion of a thermal boundary wall not in contact with soil;
- Below-grade thermal boundary wall is any portion of a thermal boundary wall in soil contact; and
- Common wall is the total wall area of walls adjacent to another conditioned living unit, not including foundation walls.
- 7. Fuel type(s) shall be same as Rated Home, including any dual-fuel equipment where applicable. For a Rated Home with multiple heating, cooling, or water heating systems using different fuel types, the applicable system capacities and fuel types shall be weighted in accordance with the loads distribution (as calculated by accepted engineering practice for that equipment and fuel type) of the multiple systems.
- 8. For a Rated Home without a heating system, the ENERGY STAR Reference Design Home shall be configured with a 78% AFUE gas furnace system, unless the Rated home has no access to natural gas or fossil fuel delivery. In such cases, the ENERGY STAR Reference Design Home shall be configured with a 7.7 HSPF air-source heat pump.
- 9. For a Rated Home without a cooling system, the ENERGY STAR Reference Design Home shall be configured with a 13 SEER electric air conditioner.
- 10. That is to say, representative of standard-flow plumbing fixtures, reference clothes washer gallons per day, standard distribution system water use effectiveness, a hot water piping ratio of 1.0, no pipe insulation, and no drainwater heater recovery.
- 11. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equations: Gas DHW EF ≥ 0.69 (0.002 x Tank Gallon Capacity); Electric DHW EF ≥ 0.97 (0.001 x Tank Gallon Capacity); Oil DHW EF ≥ 0.61 (0.002 x Tank Gallon Capacity).