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Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision.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 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 Implementation Timeline 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 energystar.gov.



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 3.2.

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 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

Building	Exhibit 1: Expanded										
Component											
Foundations:	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: • 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 and crawlspace walls shall be uninsulated 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: 6	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 5	CZ 6	CZ 7	CZ 8		
	Slab Insulation R-Value:	0	0	10	10	10	10	10	10		
	Slab Insulation Depth (ft):	0	Ō	2	4	4	4	4	4		
	Basement Wall Assembly U-Factor:	0.360	0.360	0.091	0.059	0.050	0.050	0.050	0.050		
Floors Over	Construction Type: Wood frame										
Unconditioned Spaces:	Gross Area: Same as Rated Home										
	Insulation: 3, 4 Climate Zone: 6	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 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: Woo	d frame									
Walls:	Gross Area: Same as Rated Home										
	Solar Absorptance = 0.75										
	Emittance = 0.90										
	Insulation: ³ Climate Zone: ⁶	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 5	CZ 6	CZ 7	CZ 8		
T	Wall Assembly U-Factor:	0.084	0.084	0.060	0.045	0.045	0.045	0.045	0.045		
Thermally Isolated	None										
Sunrooms:	Avec Come so Date d Home										
Doors: 7	Area: Same as Rated Home Orientation: Same as Rated Home										
1	Door Type:	Opaq		< 1/2-Lite		> 1/2-Lite CZ 1-3 ⁶		> 1/2-Lite CZ 4-8 ⁶			
	U-Value:	0,17				> 1/2-Lite CZ 1-3 ° 0.30		0.30			
I				0.25 0.25		0.30		0.40			
	SHGC:	N/A	١				5	0.4	40		
Glazing: 7	SHGC: Total Area: (except in homes with conditione)	N/A d basements		0.2			5	0.4	40		
Glazing: ⁷	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Home)	d basements ne glazing ar	and attache	0.2 ed homes ⁸) an 15% of co	5 onditioned fl	0.25 oor area; <u>OR</u>			40		
Glazing: ⁷	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas	d basements ne glazing an the Rated Ho t, South, and	and attache ea is less the ome glazing West	0.2 ed homes ⁸) an 15% of co area is 15%	5 onditioned fl or more of	0.25 oor area; <u>OR</u> the conditioned	d floor area		40		
Glazing: 7	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F	d basements ne glazing an the Rated Ho t, South, and	and attache ea is less the ome glazing West	0.2 ed homes ⁸) an 15% of co area is 15%	5 onditioned fl or more of	0.25 oor area; <u>OR</u> the conditioned	d floor area		40		
Glazing: 7	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None	d basements ne glazing ar the Rated Ho t, South, and Rating Refere	and attache ea is less the ome glazing West ence Home,	ed homes ⁸) an 15% of coarea is 15% as defined b	5 onditioned fl or more of y ANSI / RE	0.25 oor area; <u>OR</u> the conditioned	d floor area	ı			
Glazing: 7	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6	d basements ne glazing ar the Rated H t, South, and Rating Refere	and attache ea is less the ome glazing West ence Home,	ed homes ⁸) an 15% of coarea is 15% as defined b	onditioned fl or more of y ANSI / RE	0.25 oor area; OR the conditioned SNET / ICC 30	d floor area	CZ 7	CZ 8		
Glazing: ⁷	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6 U-Value:	d basements me glazing an the Rated Ho t, South, and Rating Refere CZ 1 0.40	and attache ea is less the ome glazing West ence Home, CZ 2 0.40	ed homes 8) an 15% of co area is 15% as defined b	onditioned fl or more of y ANSI / RE CZ 4 0.30	0.25 oor area; OR the conditioned SNET / ICC 30 CZ 4C & 5 0.27	d floor area 01 CZ 6 0.27	CZ 7 0.27	CZ 8 0.27		
·	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6 U-Value: SHGC:	d basements ne glazing ar the Rated H t, South, and Rating Refere	and attache ea is less the ome glazing West ence Home,	ed homes ⁸) an 15% of coarea is 15% as defined b	onditioned fl or more of y ANSI / RE	0.25 oor area; OR the conditioned SNET / ICC 30	d floor area	CZ 7	CZ 8		
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Skylights: Ceilings: Attics: Roofs:	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6 U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: 3 Climate Zone: 6 Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1: Radiant Barrier: None Construction Type: Composition shingle on w Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90	d basements me glazing an the Rated He t, South, and Rating Refere CZ 1 0.40 0.25 CZ 1 0.035 sq. ft. per 300 vood sheathin	and attache ea is less the ome glazing West ence Home, CZ 2 0.40 0.25 CZ 2 0.026 0 sq. ft. ceiling	0.2 ed homes 8) an 15% of co- area is 15% as defined b CZ 3 0.30 0.25 CZ 3 0.026 ag area	onditioned floor more of y ANSI / RECZ 4 0.30 0.40	0.25 cor area; OR the conditioned ESNET / ICC 30 CZ 4C & 5 0.27 0.40 CZ 4C & 5	CZ 6 0.27 0.40	CZ 7 0.27 0.40	CZ 8 0.27 0.40		
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Skylights: Ceilings: Attics: Roofs: Internal Mass:	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6 U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: 3 Climate Zone: 6 Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1: Radiant Barrier: None Construction Type: Composition shingle on w Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90	d basements me glazing an the Rated He t, South, and Rating Refere CZ 1 0.40 0.25 CZ 1 0.035 sq. ft. per 300 vood sheathin s defined by A hermal Storage	and attache ea is less the ome glazing West ence Home, CZ 2 0.40 0.25 CZ 2 0.026 0 sq. ft. ceiling	o.2 ed homes 8) an 15% of co- area is 15% as defined by CZ 3 0.30 0.25 CZ 3 0.026 ag area	onditioned floor more of y ANSI / RE CZ 4 0.30 0.40 CZ 4 0.024	0.25 oor area; OR the conditioned ESNET / ICC 38 CZ 4C & 5 0.27 0.40 CZ 4C & 5 0.024	CZ 6 0.27 0.40 CZ 6 0.024	CZ 7 0.27 0.40 CZ 7 0.024	CZ 8 0.27 0.40		
Skylights: Ceilings: Attics: Roofs: Internal Mass: Lighting,	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6 U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: 3 Climate Zone: 6 Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1s Radiant Barrier: None Construction Type: Composition shingle on v Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as Additional mass specifically designed as a TI Lighting: Fraction of qualifying Tier II fixtures	d basements me glazing an the Rated He t, South, and Rating Refere CZ 1 0.40 0.25 CZ 1 0.035 sq. ft. per 300 vood sheathin s defined by A hermal Storage	and attache ea is less the ome glazing West ence Home, CZ 2 0.40 0.25 CZ 2 0.026 0 sq. ft. ceiling	o.2 ed homes 8) an 15% of co- area is 15% as defined by CZ 3 0.30 0.25 CZ 3 0.026 ag area	onditioned floor more of y ANSI / RE CZ 4 0.30 0.40 CZ 4 0.024	0.25 oor area; OR the conditioned ESNET / ICC 38 CZ 4C & 5 0.27 0.40 CZ 4C & 5 0.024	CZ 6 0.27 0.40 CZ 6 0.024	CZ 7 0.27 0.40 CZ 7 0.024	CZ 8 0.27 0.40		
Skylights: Ceilings: Attics: Roofs: Internal Mass: Lighting,	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy F External Shading: None Climate Zone: 6 U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: 3 Climate Zone: 6 Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1s Radiant Barrier: None Construction Type: Composition shingle on v Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as Additional mass specifically designed as a T Lighting: Fraction of qualifying Tier II fixtures Refrigerator: 450 kWh per year Dishwasher: Capacity: Same as Rated Home	d basements me glazing an the Rated He t, South, and Rating Reference CZ 1 0.40 0.25 CZ 1 0.035 sq. ft. per 300 vood sheathing s defined by A hermal Storag to all fixtures	and attache ea is less the ome glazing West ence Home, CZ 2 0.40 0.25 CZ 2 0.026 0 sq. ft. ceilling ANSI / RESN ge Element is in qualifying d capacity if	o.2 ed homes 8) an 15% of co area is 15% as defined b CZ 3 0.30 0.25 CZ 3 0.026 ng area NET / ICC 30 for the Rated g light fixture	onditioned floor more of y ANSI / RE CZ 4 0.30 0.40 CZ 4 0.024	0.25 oor area; OR the conditioned: SNET / ICC 36 CZ 4C & 5 0.27 0.40 CZ 4C & 5 0.024	CZ 6 0.27 0.40 CZ 6 0.024	CZ 7 0.27 0.40 CZ 7 0.024	CZ 8 0.27 0.40		
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Skylights: Ceilings: Attics: Roofs: Internal Mass: Lighting, Appliances, &	Total Area: (except in homes with conditione • Same as Rated Home, where Rated Hom • 15% of the conditioned floor area, where Orientation: Equally distributed to North, Eas Interior Shade Coefficient: Same as Energy R External Shading: None Climate Zone: 6 U-Value: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: 3 Climate Zone: 6 Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1: Radiant Barrier: None Construction Type: Composition shingle on w Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90 Same as Energy Rating Reference Home, as Additional mass specifically designed as a TI Lighting: Fraction of qualifying Tier II fixtures Refrigerator: 450 kWh per year Dishwasher: Capacity: Same as Rated Home For Standard capacity: LER = 270, GHWC = For Compact capacity: LER = 270, GHWC = For Compact capacity: LER = 203, GHWC = Ceiling Fan: 122 CFM per Watt; Quantity = N Clothes Washer: If clothes washer present in otherwise, same as Energy Rating Reference	d basements me glazing an the Rated He t, South, and Rating Refere CZ 1 0.40 0.25 CZ 1 0.035 sq. ft. per 300 vood sheathin s defined by A hermal Storay to all fixtures a, or Standary \$22.23, Elect Jumber of been the Home, as derence Home, rence Home,	and attache ea is less the ome glazing West ence Home, CZ 2 0.40 0.25 CZ 2 0.026 0 sq. ft. ceiling ANSI / RESN ge Element is in qualifying d capacity if s= \$0.12, G \$= \$0.12, G drooms + 1 to ome, efficient elefined by Al as defined less	o.2 ed homes 8) an 15% of co- area is 15% as defined by CZ 3 0.30 0.25 CZ 3 0.026 ng area NET / ICC 30 for the Rated g light fixture no dishwash Sas\$ = \$1.09 when ceiling ncy equal to 'NSI / RESNE by ANSI / RESNE	onditioned floor more of y ANSI / RE CZ 4 0.30 0.40 CZ 4 0.024 11. Home sha locations 1 Her in the Ra , LCY = 208 fans preser "Std 2018-F ET / ICC 30* SNET / ICC 30*	0.25 oor area; OR the conditioned ESNET / ICC 30 CZ 4C & 5 0.27 0.40 CZ 4C & 5 0.024 Il be excluded. 00% for interio ated Home 3 3 ht in the Rated Present" Standa	CZ 6 0.27 0.40 CZ 6 0.024 CZ 6 0.024	CZ 7 0.27 0.40 CZ 7 0.024 and garage erwise, Quar	CZ 8 0.27 0.40 CZ 8 0.024		



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

Heating Systems:	Exhibit 1: Expanded ENERGY STAR Reference Design Definition (Continued) Heating capacity shall be selected in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems, degraded capacity from other-than-Grade I installation 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 gas where Rated Home has non-electric equipment 9									
	Installation Quality: For forced-air HVAC systems, Grade II -20% blower fan airflow deviation, Grade II 0.52 W / CFM blower fan efficiency, and, for air-source heat pumps, Grade III refrigerant undercharge.									
	System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump where Rated Home has air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; efficiency selected from below. 10									
	Climate Zone: ⁶	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 5	CZ 6	CZ 7	CZ 8	
	Gas Furnace AFUE:	80	80	80	90	95	95	95	95	
	Gas Boiler AFUE:	80	80	80	90	95	95	95	95	
	Air-Source Heat Pump HSPF:	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	
	Air-Source Heat Pump Backup:	Electric	Electric	Electric	Electric	Electric	Electric	Electric	Electric	
	For non-electric boilers, the Electric At Reference Home in ANSI / RESNET /		y shall be det	termined in a	accordance v	vith the method	ology for the	Energy Rati	ng	
Cooling Systems:	Cooling capacity shall be selected in a accordance with ACCA Manual J, Eigl forced-air HVAC systems, degraded c Energy Rating Reference Home.	nth Edition, A	SHRAE Hand	book of Fun	damentals,	or an equivalen	t computatio	n procedure.		
	Fuel Type: Same as Rated Home, exc	ept Referenc	e Design sha	ll be configu	red with gas	where Rated H	lome has no	n-electric equ	uipment ⁹	
Service Water Heating Systems:	Installation Quality: For forced-air HVAC systems, Grade II -20% blower fan airflow deviation, Grade II 0.52 W / CFM blower fan efficiency, and, for AC's & air-source heat pumps, Grade III refrigerant undercharge.									
	System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump where Rated Home has air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; efficiency selected from below. ¹¹									
	Climate Zone: 6	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 5	CZ 6	CZ 7	CZ 8	
	AC SEER:	16	16	16	16	14	14	14	14	
	Air-Source Heat Pump SEER:	16	16	16	16	16	16	16	16	
	Use (Gallons per Day): Same as Ener resulting from the dishwasher and clot								se	
	Tank Temperature: Same as Energy F	Rating Refere	nce Home, as	s defined by	ANSI / RES	NET / ICC 301.				
Systems:	Fuel Type: Same as Rated Home, exc	ept Referenc		II be configu	red with gas	where Rated F		n-electric equ	uipment ⁹	
Systems:	Fuel Type: Same as Rated Home, exc System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water hea	s non-electric Vhere Rated I with no sola	e Design sha water heater Home has ele	, Reference ectric water h	Design shall leater, Refer	be configured ence Design sh	lome has no with a tankle nall be config	ss gas water ured with an	heater electric	
Thermal	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF	s non-electric Vhere Rated I with no sola ater.	e Design sha water heater Home has ele r heating and	, Reference ectric water h tank size ec	Design shall leater, Refer	be configured ence Design sh	lome has no with a tankle nall be config	ss gas water ured with an	heater electric	
Thermal Distribution	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heater	s non-electric Vhere Rated I with no sola ater.	e Design sha water heater Home has ele r heating and	, Reference ectric water h tank size ec	Design shall leater, Refer	be configured ence Design sh	lome has no with a tankle nall be config	ss gas water ured with an	heater electric	
Thermal	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per	s non-electric Where Rated I F with no sola ater. er 100 sq. ft. c	e Design sha water heater Home has ele r heating and	, Reference ectric water h tank size ec	Design shall leater, Refer	be configured ence Design sh	lome has no with a tankle nall be config	ss gas water ured with an	heater electric	
Thermal Distribution	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per Duct Insulation: None	s non-electric Vhere Rated I F with no sola ater. er 100 sq. ft. c	e Design sha water heater Home has ele r heating and of conditioned	, Reference ectric water h tank size ec	Design shall leater, Refer	be configured ence Design sh	lome has no with a tankle nall be config	ss gas water ured with an	heater electric	
Thermal Distribution Systems:	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per Duct Insulation: None Duct Surface Area: Same as Rated Home Supply and Return Duct Locations shartlype, capacity, efficacy, and dehumid	s non-electric Where Rated I with no sola ater. or 100 sq. ft. c ome all be 100% in istat setpoint	e Design sha water heater Home has ele r heating and of conditioned a conditioned same as Ene	, Reference ectric water h tank size ec l floor area space rgy Rating R	Design shall leater, Refer qual to that o	be configured ence Design sh f Rated Home,	lome has no with a tankle nall be config or 60 gallon	ss gas water ured with an tank size if F	heater electric ated	
Thermal Distribution Systems: Dehumid- ifiers	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per Duct Insulation: None Duct Surface Area: Same as Rated Home Supply and Return Duct Locations shall Type, capacity, efficacy, and dehumid when dehumidification system is present.	s non-electric Where Rated I with no sola ater. or 100 sq. ft. c ome all be 100% in istat setpoint	e Design sha water heater Home has ele r heating and of conditioned a conditioned same as Ene	, Reference ectric water h tank size ec l floor area space rgy Rating R	Design shall leater, Refer qual to that o	be configured ence Design sh f Rated Home,	lome has no with a tankle nall be config or 60 gallon	ss gas water ured with an tank size if F	heater electric ated	
Thermal Distribution Systems: Dehumid- ifiers	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per Duct Insulation: None Duct Surface Area: Same as Rated Home Supply and Return Duct Locations share Type, capacity, efficacy, and dehumid when dehumidification system is present the supply and Return Duct Locations share the supply and Return Duct Locations shared the supply sha	s non-electric Where Rated I with no sola ater. or 100 sq. ft. c ome all be 100% in istat setpoint ent in Rated In	e Design sha water heater Home has ele r heating and of conditioned a conditioned same as Ene nome; otherwi	, Reference ectric water h tank size ec I floor area space rgy Rating R se none.	Design shall leater, Refer qual to that o	be configured ence Design sh f Rated Home,	lome has no with a tankle hall be config or 60 gallon by ANSI / R	ss gas water ured with an tank size if F	heater electric cated	
Thermal Distribution Systems: Dehumid- ifiers Thermostat:	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per Duct Insulation: None Duct Surface Area: Same as Rated Home Supply and Return Duct Locations share Type, capacity, efficacy, and dehumid when dehumidification system is present the solution of the system is present.	s non-electric Where Rated I with no sola ater. or 100 sq. ft. c ome all be 100% in istat setpoint ent in Rated In	e Design sha water heater Home has ele r heating and of conditioned a conditioned same as Ene nome; otherwi	, Reference ectric water h tank size ec I floor area space rgy Rating R se none.	Design shall leater, Refer qual to that o	be configured ence Design sh f Rated Home,	lome has no with a tankle hall be config or 60 gallon by ANSI / R	ss gas water ured with an tank size if F	heater electric cated	
Thermal Distribution Systems: Dehumid- ifiers Thermostat: Infiltration & Mechanical	System Type: Where Rated Home has with 0.90 UEF with no solar heating. V heat pump water heater with 2.20 UEF Home uses tankless electric water heat Duct Leakage to Outside: 0 CFM25 per Duct Insulation: None Duct Surface Area: Same as Rated Howard Supply and Return Duct Locations shate Type, capacity, efficacy, and dehumid when dehumidification system is present the programmable Temperature Setpoints: Same as Ener RESNET / ICC 301 Infiltration Rate: 3 ACH50	s non-electric Where Rated I with no sola ater. er 100 sq. ft. co ome all be 100% in istat setpoint ent in Rated h rgy Rating Re	e Design sha water heater Home has ele r heating and of conditioned a conditioned same as Ene nome; otherwi	, Reference ectric water h tank size ec I floor area space rgy Rating R se none.	Design shall leater, Refer qual to that o	be configured ence Design sh f Rated Home,	lome has no with a tankle hall be config or 60 gallon by ANSI / R	ss gas water ured with an tank size if F	heater electric cated	
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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, for the purposes of the ENERGY STAR Reference Design, the slab insulation R-value and depth shall be modeled even in jurisdictions designated by a code official as having Very Heavy Termite Infestation for the purpose of determining the ENERGY STAR ERI Target. This is in contrast to the total UA limit in Item 3.1 of the National Rater Design Review Checklist, which shall be calculated by replacing the code-required slab insulation R-value and depth with the slab insulation R-value and depth specified in the Rated Home for such jurisdictions.
- 2021 IECC Climate Zone designations, as defined and illustrated in <u>Section R301</u> of the code, shall be used to configure the ENERGY STAR Reference Design Home in Version 3.2. Note that some locations have shifted to a different Climate Zone in the 2021 IECC compared to prior editions.
- 7. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion.
- 8. 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 below-grade 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.
- 9. 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.
- 10. 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.
- 11. For a Rated Home without a cooling system, the ENERGY STAR Reference Design Home shall be configured with a 13 SEER electric air conditioner.
- 12. That is to say, representative of standard-flow plumbing fixtures, reference or "Std 2018-Present" Standard Clothes Washer Model 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.

Revised 09/15/2022