# 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### **Historical Document**

This document is provided for reference because it has been superseded by a more recent Version or Revision.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 <a href="Implementation Timeline">Implementation Timeline</a> 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 <a href="mailto:energystar.gov">energystar.gov</a>.



This document provides detailed instructions for determining the ENERGY STAR ERI Target, the highest ERI value that a 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 Florida 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 for the State of Florida, 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 <a href="www.energystar.gov/ERIExceptions">www.energystar.gov/ERIExceptions</a>. This value, rounded to the nearest whole number, shall equal the ENERGY STAR ERI Target.

Revised 11/11/2020



#### Exhibit 1: Expanded ENERGY STAR Reference Design Definition for the State of Florida

Construction Type & Structural Mass: Same as Rated Home, except:  - For masonny floor slabs, modeled with 80% of 100 race accepted by carpet and 20% of floor directly exposed to room air Conditioning Type: Same as Rated Home, except:  - Cardwipsces shall be modeled as werted with net free vent aperture = 1sq, ft, per 150 sq, ft, of crawlepaces shall be modeled as werted with net free vent aperture = 1sq, ft, per 150 sq, ft, of crawlepaces shall be modeled as werted with net free vent aperture = 1sq, ft, per 150 sq, ft, of crawlepaces shall be modeled as werted with net free vent aperture = 1sq, ft, per 150 sq, ft, of crawlepaces shall be modeled as werted with net free vent aperture = 1sq, ft, per 150 sq, ft, of crawlepaces shall be insulation shall be located on interior side of walls - 1sq and the second of the shall be insulated to the Shall be insulation shall be located on interior side of walls - 1sq and the shall be insulated to the Shall be insulation shall be located on interior side of walls - 1sq and the shall be insulated to the Shall be insulation shall be shall be insulated to the Shall be insulation. Revalue. The insulation Depth (ft):  - Shall bis shall be insulation wall and then vertically below-grade to the Shall bis insulation. Revalue. The insulation Depth (ft): - Shall bis shall shall be shall be insulated to the Shall bis insulation. Revalue in the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulated to the Shall bis insulated to the Shall bis insulation. Per shall be insulated to the Shall bis insulated to the	Building Component		Expanded ENERGY STAR Reference Des	ian Definition <sup>1</sup>						
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Gross Area: Same as Rated Home? Insulation: \$^1.** Cross paperprise insulation level below:  - Basement Wall Assembly U-factor only applies to conditioned bemt's: if applicable, insulation shall be located on interior side of walls  - Pilora assembles above crawlespecial foundations shall be configured to meet the applicable floor assembly U-factor listed in the building  - Pilora assembles above crawlespecial foundations shall be configured to meet the applicable floor assembly U-factor listed in the building  - Robor State Insulation R-value To the state on the outside of the foundation wall and then vertically below-grade to the Stab Insulation Revalue. The insulation Depth (fig. 0 on the Outside of the Factor of Construction Type: Wood farme  Gross Area Same as Rated Home  - Construction Type: Wood farme  Gross Area. Same as Rated Home  - Construction Type: Wood farme  Gross Area. Same as Rated Home  - Insulation: ** Climate Sembly U-Factor: 0.082    Pilorate Stab Insulation State St		• Crawlspaces shall be modeled as vented with net free vent aperture = 1sq. ft. per 150 sq. ft. of crawlspace floor area								
Basement Wall Assembly U-factor only applies to conditioned barmt.s; if applicable, insulation shall be located on interior side of walls in Floors assembles above crawlapscae foundations shall be configured on meet the applicable floor assembly U-factor listed in the building component section for Floors Over Unconditioned Spaces  Sibal floors with a floor surface less than 12' below grade shall be insulated to the Slab Insulation R-value. The insulation abelieve the Slab Insulation R-value is the state of the slab insulation Depth (flip)  Bloors Over Construction Type: Wood frame  Floorage Assembly U-Factor:  Grade Grade Interior and Esterior Construction Type: Wood frame  Floorage Assembly U-Factor:  Oorage Area Same as Rated Home  Clientation: Same as Rated Home glazing area is less than 15% of conditioned floor area; Orientation: Equally distributed to North, East, South, and West  Interior: Shade Coefficient: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301  External Shading: None  Clientation: Same as Rated Home  Gross Area. Same as Rated Ho		Gross Area: Same as Rated Home <sup>2</sup>								
Floor assemblies above crawlspace foundations shall be configured to meet the applicable floor assembly U-factor listed in the building component section for Floor Sever Unconditioned Spaces  Size floors with a floor surface less than 12° below grade shall be insulated to the Size Insulation Revalue. The insulation Revalue is the Size Insulation Depth (1)° by the Size Insulation Revalue is the Size Insulation Depth (1)° by the Size Insulation Revalue is the Size Insulation Depth (1)° by the Size Insulation Revalue is the Size Insulation Depth (1)° by the Size Insulation Per (1)° by the Size Insulation Revalue is the Size Insulation Per (1)° by the Size Insulation Per (1)° by the Size Insulation Revalue is the Size Insulation Revalue		Insulation: <sup>3,4</sup> Choose appropriate insulation level below:								
component section for Floors Over Unconditioned Spaces  1 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 outside of the foundation wall and then vertically, below-grade to the Slab Insulation Depth  Cimate Zone: Floors  Slab Insulation R-value: 0  Construction Type: Wood frame  Construction Type: Wood frame  Construction Type: Wood frame  Construction Type: Wood frame  Floor Assembly U-Factor: 0.064  Above-Grade  Interior and Exterior Construction Type: Wood frame  Solar Absorptance = 0.75  Emittance = 0.90  Insulation: 3 Climate Zone: Florida  Surrooms: Ploor Search Wall Assembly U-Factor: 0.082  None  Doors: 2  Area. Same as Rated Home  Oinentation: Same as Rated Home glazing area is less than 15% of conditioned floor area; QR  - Same as Rated Home, where Rated Home glazing area is less than 15% of conditioned floor area; QR  - Same as Rated Home, where Rated Home glazing area is less than 15% of conditioned floor area; QR  - Same as Rated Home, where Rated Home, glazing area is 15% or more of the conditioned floor area  Oinentation: Equally distributed to North, East, South, and West Interior Shade Coefficient: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301  External Shading; None  Climate Zone: Florida  Climate Zone: Florida  Ceilings Zone: Same as Rated Home  Gross Area: Same as Rated Hom		Basement Wall Assembly U-factor only applies to conditioned bsmt.'s; if applicable, insulation shall be located on interior side of walls								
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Basement Wall Assembly U-Factor: 0.360										
Construction Type: Wood frame										
Gross Area: Same as Rated Home			0.360							
Insulation: 3 * Climate Zone: Florida   Floor Assembly U-Factor: 0.064		,,								
Floor Assembly U-Factor: 0.064  Above-Grade Interior and Exterior Construction Type: Wood frame Gross Area: Same as Rated Home Solar Absorptance = 0.75 Emittance = 0.90 Insulation: 3 Climate Zone: Florida Wall Assembly U-Factor: 0.082  Thermally solated Sunnoons: Property Opaque 1/12-Lite 1/12-L										
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Gross Area: Same as Rated Home   Solar Absorptions = 0.90	Ale acces One ale									
Solar Absorptance = 0.75 Emittance = 0.90 Insulation: **O Climate Zone: Florida			vood frame							
Emittance = 0.90 Insulation: S Climate Zone: Florida Surrooms:  None  Area: Same as Rated Home Orientation: Same as Rated Home Orientations of Same as Rated Home glazing area is less than 15% of conditioned floor area; OR -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 Interior Shade Coefficient: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 External Shading: None Climate Zone: Climate Zone: Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: S Climate Zone: Construction Type: Vented with aperture = 1sq. ft. per 300 sq. ft. celling area Radiant Barrier: Included, with a minimum initial reflectance of 0.90 and maximum initial emittance of 0.10 Construction Type: Composition shingle on wood sheathing Gross Area: Same as Rated Home Ingulation: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301. Additional mass specifically designed as a Thermal Storage Element for the Rated Home shall be excluded.  Lighting: Fraction of qualifying Tier I fixtures to all fixtures in qualifying light fixture locations: 80% for interior, 0% for exterior and garage Appliances, & networks and the same as Rated Home, or Standard in on dishwasher in the Rated Home, Oftenwise Quantity = 0 Clothes Washer and Dyer: Same as Rated Home, or Standard in on dishwasher in the Rated Home, Otherwise Quantity = 0 Clothes Washer and Dyer: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Ref	vvalis.									
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Interior Shade Coefficient: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301  External Shading: None  Climate Zone:	Glazing: °	<ul> <li>Same as Rated Home, where Rated F</li> <li>15% of the conditioned floor area, who</li> </ul>	Home glazing area is less than 15% of condi ere the Rated Home glazing area is 15% or i		rea					
External Shading: None  Climate Zone: U-Value: 0.65 SHGC: 0.27  Skylights: None  Ceilings: Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: Ceiling Assembly U-Factor: Ceiling Assembly U-Factor: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1sq. ft. per 300 sq. ft. ceiling area Radiant Barrier: Included, with a minimum initial reflectance of 0.90 and maximum initial emittance of 0.10  Roofs: Construction Type: Composition shingle on wood sheathing Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90  Internal Mass: Additional mass specifically designed as a Thermal Storage Element for the Rated Home shall be excluded. Lighting, Pappliances, & nternal Gains: Dishwasher: Capacity Same as Rated Home, or Standard if no dishwasher in the Rated Home For Standard capacity: LER = 270, GHWC = \$22.23, Elec\$ = \$0.12, Gas\$ = \$1.09, LCY = 208 Ceiling Fan: 122 CFM per Watt, Quantity = Number of bedrooms+1 when ceiling fans present in the Rated Home; Otherwise Quantity = 0 Clothes Washer and Dryer: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301, except for adjustments for the										
Climate Zone: U-Value: SHGC: 0.65 Skylights: None Ceilings: Construction Type: Wood frame Gross Area: Same as Rated Home Insulation: 3 Climate Zone: Ceiling Assembly U-Factor: Ceiling Assembly U-Factor: 0.035 Attics: Construction Type: Vented with aperture = 1sq. ft. per 300 sq. ft. ceiling area Radiant Barrier: Included, with a minimum initial reflectance of 0.90 and maximum initial emittance of 0.10 Construction Type: Composition shingle on wood sheathing Gross Area: Same as Rated Home Solar Absorptance = 0.92 Emittance = 0.90  Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301. Additional mass specifically designed as a Thermal Storage Element for the Rated Home shall be excluded. Lighting, Appliances, & Internal Gains: Dishwasher: Capacity Same as Rated Home, or Standard if no dishwasher in the Rated Home For Standard capacity: LER = 270, GHWC = \$1.20, Elec\$ = \$0.12, Gas\$ = \$1.09, LCY = 208 For Compact capacity: LER = 203, GHWC = \$14.20, Elec\$ = \$0.12, Gas\$ = \$1.09, LCY = 208 Ceiling Fan: 122 CFM per Watt, Quantity = Number of bedrooms+1 when ceiling fans present in the Rated Home; Otherwise Quantity = 0 Clothes Washer and Dryer: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301 Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301			gy Rating Reference Home, as defined by A	NSI / RESNET / ICC Std. 301						
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#### Exhibit 1: Expanded ENERGY STAR Reference Design Definition for the State of Florida (Continued)

Heating Systems:	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 Grade III install shall be accounted for using same methodology applied to Energy Rating Reference Home.										
	Heating Equipment Location: In conditioned space										
	Fuel Type: Same as Rated Home <sup>7</sup>										
	Installation Quality: For forced-air HVAC systems, Grade III airflow and watt draw; for air-source heat pumps, also Grade III ref. charge.										
	System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump where Rated Home is modeled										
	with air-source or ground-source heat										
	Climate Zone:	Florida									
	Gas Furnace AFUE:	80									
	Oil Furnace AFUE:	80									
	Gas / Oil Boiler AFUE:	80									
	Air-Source Heat Pump HSPF:	8.2									
	Air-Source Heat Pump Backup:	Electric									
	For non-electric warm furnaces and no	on-electric boilers	s, the Electric Au	xiliary Energy sh	nall be determine	d in accordance wi	th the methodology				
	for the Energy Rating Reference Home						•				
Cooling	Cooling capacity shall be selected in a				ng heating and co	ooling loads calcula	ated in accordance				
Systems:	with ACCA Manual J, Eighth Edition, A										
•	systems, degraded capacity from Grad										
	Cooling Equipment Location: In condit	ioned space									
	Installation Quality: For forced-air HVA	C systems, Grad	de III airflow and	watt draw; for A	C's & air-source	heat pumps, also (	Grade III ref. charge				
	Fuel Type: Same as Rated Home 7	•					<u> </u>				
	System Type: Same as Rated Home,	except Reference	e Design shall be	e configured with	n air-source heat	pump where Rated	d Home is modeled				
	with air-source or ground-source heat	pump, electric st	rip heat, or elect	ric baseboard he	eat; applicable ef	ficiency selected fr	om below. <sup>9</sup>				
	Climate Zone:	Florida									
	AC SEER:	15.0									
	Air-Source Heat Pump SEER:	15.0									
	Ground-Source Heat Pump EER:	n/a									
Service	Use (Gallons per Day): Same as Ener	gy Rating Refere	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										
	resulting from the dishwasher specifie					, , , , , , , , , , , , , , , , , , , ,					
Water Heating	resulting from the dishwasher specifie  Tank Temperature: Same as Energy F	d in the Lighting,	Appliances, & Ir	nternal Gains Se	ction. <sup>10</sup>						
Water		d in the Lighting,	Appliances, & Ir	nternal Gains Se	ction. <sup>10</sup>						
Water Heating	Tank Temperature: Same as Energy F	d in the Lighting, Rating Reference	Appliances, & Ir Home, as defin	nternal Gains Se ed by ANSI / RE	ction. 10 SNET / ICC Std.	301					
Water Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup>	d in the Lighting, Rating Reference ater heater with t	Appliances, & In Home, as definerant size equal to	nternal Gains Se ed by ANSI / RE that of Rated H	ction. <sup>10</sup> SNET / ICC Std. Iome, unless Ra	301 ted Home uses inst	tantaneous water				
Water Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup> System Type: Conventional storage w heater, in which case select 50 gallon using tank size of Reference Home.	d in the Lighting, Rating Reference ater heater with t tank for gas syst	Appliances, & Ir Home, as defin ank size equal tems and 60 gall	nternal Gains Se ed by ANSI / RE to that of Rated F on tank for electi	ction. 10 SNET / ICC Std. Home, unless Raric systems. Sele	301 ted Home uses instact applicable efficient	tantaneous water ency from below				
Water Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup> System Type: Conventional storage w heater, in which case select 50 gallon using tank size of Reference Home. Gas Storage Tank Capacity: <sup>11</sup>	d in the Lighting, Rating Reference ater heater with t	Appliances, & In Home, as definerant size equal to	nternal Gains Se ed by ANSI / RE that of Rated H	ction. <sup>10</sup> SNET / ICC Std. Iome, unless Ra	301 ted Home uses inst	tantaneous water				
Water Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup> System Type: Conventional storage w heater, in which case select 50 gallon using tank size of Reference Home. Gas Storage Tank Capacity: <sup>11</sup> Gas DHW EF:	d in the Lighting, Rating Reference ater heater with t tank for gas syst 30 Gallon 0.63	Appliances, & Ir Home, as defin ank size equal tems and 60 gall	nternal Gains Se ed by ANSI / RE to that of Rated F on tank for electi	ction. 10 SNET / ICC Std. dome, unless Raric systems. Sele 60 Gallon 0.57	301  ted Home uses instact applicable efficient  70 Gallon  0.55	tantaneous water ency from below				
Water Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup> System Type: Conventional storage w heater, in which case select 50 gallon using tank size of Reference Home. Gas Storage Tank Capacity: <sup>11</sup>	d in the Lighting, Rating Reference ater heater with t tank for gas syst	Appliances, & Ir Home, as definition tank size equal treems and 60 gall 40 Gallon	nternal Gains Se ed by ANSI / RE to that of Rated H on tank for election	ction. 10 SNET / ICC Std. Home, unless Raric systems. Sele	301 ted Home uses instact applicable efficients 70 Gallon	tantaneous water ency from below 80 Gallon				
Water Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup> System Type: Conventional storage w heater, in which case select 50 gallon using tank size of Reference Home.  Gas Storage Tank Capacity: <sup>11</sup> Gas DHW EF:  Electric Storage Tank Capacity: <sup>11</sup> Electric DHW EF:	d in the Lighting, Rating Reference ater heater with t tank for gas syst 30 Gallon 0.63	Appliances, & Ir Home, as defin tank size equal trems and 60 gall 40 Gallon 0.61	otternal Gains Seed by ANSI / RE that of Rated Hon tank for electrons  50 Gallon 0.59  50 Gallon 0.92	ction. 10 SNET / ICC Std. dome, unless Raric systems. Sele 60 Gallon 0.57	301  ted Home uses instact applicable efficient of the second of the sec	tantaneous water ency from below 80 Gallon 0.53				
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Nater Heating	Tank Temperature: Same as Energy F Fuel Type: Same as Rated Home <sup>7</sup> System Type: Conventional storage w heater, in which case select 50 gallon using tank size of Reference Home.  Gas Storage Tank Capacity: <sup>11</sup> Gas DHW EF:  Electric Storage Tank Capacity: <sup>11</sup> Electric DHW EF:	d in the Lighting, Rating Reference ater heater with t tank for gas syst  30 Gallon 0.63 30 Gallon 0.94	Appliances, & Ir Home, as define tank size equal to tems and 60 gall 40 Gallon 0.61 40 Gallon 0.93	otternal Gains Seed by ANSI / RE that of Rated Hon tank for electrons  50 Gallon 0.59  50 Gallon 0.92	ction. 10 SNET / ICC Std. Home, unless Raric systems. Sele  60 Gallon 0.57 60 Gallon 0.91	301  ted Home uses instact applicable efficient of the second of the sec	tantaneous water ency from below 80 Gallon 0.53 80 Gallon 0.89				
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Water Heating Systems:  Thermal Distribution	Tank Temperature: Same as Energy Fuel Type: Same as Rated Home 7 System Type: Conventional storage wheater, in which case select 50 gallon using tank size of Reference Home.  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 per Duct Insulation: None, because 100% Duct Surface Area: Same as Rated Hot Supply and Return Duct Locations shad (e.g., multifamily dwelling unit with cor	d in the Lighting, Rating Reference ater heater with t tank for gas syst  30 Gallon 0.63 30 Gallon 0.94 30 Gallon 0.55 er 100 sq. ft. of co of ducts are in co ome all be configured additioned unit belo	Appliances, & Ir Home, as defined and size equal treems and 60 gallor 40 Gallon 0.61 40 Gallon 0.93 40 Gallon 0.53 conditioned floor a conditioned space according to the ow), then duct lo	nternal Gains Seed by ANSI / RE to that of Rated Fon tank for electr  50 Gallon 0.59 50 Gallon 0.92 50 Gallon 0.51 area table below or, in cations shall be	ction. 10 SNET / ICC Std. Home, unless Raric systems. Sele  60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.49	301  ited Home uses instituted applicable efficient of the second of the	tantaneous water ency from below  80 Gallon 0.53 80 Gallon 0.89 80 Gallon 0.45				
Water Heating Systems:  Thermal Distribution	Tank Temperature: Same as Energy Fuel Type: Same as Rated Home 7 System Type: Conventional storage wheater, in which case select 50 gallon using tank size of Reference Home. 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 per Duct Insulation: None, because 100% Duct Surface Area: Same as Rated Hot Supply and Return Duct Locations show (e.g., multifamily dwelling unit with cor Foundation Type:	d in the Lighting, Rating Reference ater heater with t tank for gas syst  30 Gallon 0.63 30 Gallon 0.94 30 Gallon 0.55 er 100 sq. ft. of co of ducts are in co ome all be configured	Appliances, & Ir e Home, as defined the Home, as defined and size equal treems and 60 gallon 0.61  40 Gallon 0.93  40 Gallon 0.53  conditioned floor a conditioned space according to the ow), then duct to Cra	othernal Gains Seed by ANSI / RE to that of Rated Fon tank for electr  50 Gallon 0.59 50 Gallon 0.92 50 Gallon 0.51 area etable below or,	ction. 10 SNET / ICC Std. Home, unless Raric systems. Sele  60 Gallon 0.57 60 Gallon 0.91 60 Gallon 0.49	301  ted Home uses instict applicable efficient  70 Gallon 0.55 70 Gallon 0.90 70 Gallon 0.47	tantaneous water ency from below  80 Gallon 0.53  80 Gallon 0.89  80 Gallon 0.45  f the conditions below				
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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 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 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.
- 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 heat 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).

Revised 11/11/2020