

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 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.

Revised 12/01/2023



Exhibit 1: Expanded ENERGY STAR Reference Design Definition

Building		Exhibit 1: Expanded	LINENGI	SIAN	Kelelel	ice Desi	gii Deilililion			
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:									
		ent Wall Assembly U-factor only		ditioned be	mt.'s; if ap	plicable, insu	ulation shall be locat	ted on interio	or side of w	valls
	 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 outside of the foundation wall and then vertically below-grade to the Slab Insulation Depth 									
	Climate Zon	ard from the top of the stab off th	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
		tion R-Value:	0	0	0	10	10	10	10	10
	Slab Insulat	tion Depth (ft):	0	0	0	2	2	4	4	4
		Vall Assembly U-Factor:	0.360	0.360	0.091	0.059	0.050	0.050	0.050	0.050
Floors Over		Type: Wood frame								
Unconditioned Spaces:		Same as Rated Home								
	Insulation: 3,	⁴ Climate Zone: ⁵	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		Exterior Construction Type: Wood	d frame							
Walls:	Gross Area: Same as Rated Home Solar Absorptance = 0.75									
	Emittance =									
		Climate Zone: ⁵	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
	insulation.	Wall Assembly U-Factor:	0.082	0.082	0.057	0.057	0.057	0.048	0.048	0.048
Thermally Isolated	None	wall Assembly 0-Factor.	0.062	0.062	0.037	0.037	0.037	0.046	0.046	0.046
Sunrooms:		D								
Doors: ⁶		as Rated Home								
		Same as Rated Home	Onomile		. 4	/2-Lite	. 1/2 Lite C7	4 2 5	4/2 L Ha C	7 4 0 5
	U-Value:	Door Type:		Opaque 0.17		7 2-Lite 0.25	> 1/2-Lite CZ 1-3 ⁵ > 0.30		• 1/2-Lite CZ 4-8 ⁵ 0.30	
İ	SHGC:		0.17 N/A			0.25	0.30		0.30	
Glazing: ⁶	Total Area: (except in homes with conditioned basements and attached homes ⁷) • Same as Rated Home, where 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 301									
	External Sha	ading: None								
	Climate Zon	ne: ⁵	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
	U-Value:		0.40	0.40	0.30	0.30	0.27	0.27	0.27	0.27
	SHGC:		0.25	0.25	0.25	0.40	0.40	0.40	0.40	0.40
Skylights:	None									
Ceilings:	Construction Type: Wood frame									
		Same as Rated Home								
	Insulation: 3	Climate Zone: 5	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
A	0 1 1	Ceiling Assembly U-Factor:	0.035	0.030	0.030	0.026	0.026	0.026	0.026	0.026
Attics:		Type: Vented with aperture = 1s	q. ft. per 300 s	q. ft. ceilin	g area					
Daafa	Radiant Barrier: None Construction Type: Composition shingle on wood sheathing									
Roofs:			ood sneatning							
		Same as Rated Home								
		otance = 0.92								
Internal Mass.	Emittance =		alatina al laur ANI	CL / DECA	IET / ICC (204				
Internal Mass:		ergy Rating Reference Home, as ass specifically designed as a Th					ll be evaluded			
Lighting		· · · · · · · · · · · · · · · · · · ·						or outorior o	nd across	
Lighting, Appliances, &	Lighting: Fraction of qualifying Tier I fixtures to all fixtures in qualifying light fixture locations 90% for interior; 0% for exterior and garage									
Internal Gains:	Refrigerator: 423 kWh per year 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									
	For Compact capacity: LER = 270, GHWC = \$22.23, Elec\$ = \$0.12, Gas\$ = \$1.09, LCY = 208									
	Ceiling Fan: 122 CFM per Watt; Quantity = Same as Rated Home per ANSI / RESNET / ICC 301, either 0 or Number of bedrooms + 1									
	Clothes Washer and Dryer: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301									
	Internal Gains: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, except for adjustments for the lighting, refrigerator, dishwasher, and ceiling fans specified in this Section.									
					by ANSI / F	RESNET/IC	C 301, except for ac	djustments fo	or the light	iiig,



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

Gas Furn. AFUE: 80 80 80 80 80 95 95 95 95 95 95 95 85 85 85 85 85 85 85 85 85 85 85 85 85		Exhibit 1: Expanded E	ENERGYS	IAN NE	Herenice L	resign bei		muliu c u)			
Systems: systems degraded capacity from Grade Ill Insalial shall be accounted for using same methodology applied to Energy Rating Reference from Fuel Type; Same as Rated Home as affective and the state of the stat	Heating	Heating capacity shall be selected in a	ccordance with	n ACCA Ma	nual S based	on building hea	ating and coolin	g loads calcula	ated in acco	ordance	
systems, degraded capacity from Grade III install shall be accounted for using same methodology applied to Energy Rating Reference Nor- Fuel Type: Same as Rated Home is a Rated Home is	•										
Fuel Type: Same as Rated Home Fuel 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. Hore Rated Home has air-source or ground-source heat pump, electric strip heat, or electric bestpoard heat, applicable efficiency placed from below. ** Climate Zone: C2 C2 C2 C2 C3 C4 C4 C8 C6 C7 C7 C8 C8 C7 C7 C8 C8	0,0100.										
Installation Quality: For forced-air HVAC systems, Grade III artiflow and wast draw, for air-source heat pumps, also Grade III ref. charge.			o in motali one	iii bo accou	into a for admig	camo momodo	nogy applica to	Lifergy Hatting	110101010	0 1 101110.	
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 besboard heat; applicable efficiency parker (from below.*) Climate Zone: ** Cilmate Zone: ** Cilmate Zone: ** Cilmate Zone: ** Cilmate Zone: ** By 80 80 80 80 85 95 95 95 95 95 95 95 95 95 95 95 95 95											
Source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable lefficiency selected from below. ** Climate Zone: ** Cas Furn, AFUE:											
Climate Zone: \$ CZ1 CZ2 CZ3 CZ4 CZ4 C&5 CZ6 CZ7 CZ6											
Gas Furn AFUE: 80 80 80 80 90 95 95 95 96 96 96 96 96 96 96 97 97 97 98 97 98 97 98 98 98 98 98 98 98 98 98 98 98 98 98											
Oil Furn. AFUE: 80 80 80 80 80 80 90 90 90 90 90 90 90 90 90 90 90 90 90										CZ 8	
Gas Boller AFUE: 80 80 80 80 90 90 90 90 90 90 90 90 90 80 80 80 80 80 86 86 86 86 86 86 86 86 86 86 86 86 86		Gas Furn. AFUE:	80	80	80		95	95	95	95	
Oil Boiler AFUE: 80 80 80 80 86 86 86 86		Oil Furn. AFUE:	80	80	80	85	85	85	85	85	
Air-Source Heat Pump BSPE:		Gas Boiler AFUE:	80	80	80	90	90	90	90	90	
Air-Source Heat Pump Backup: Electric		Oil Boiler AFUE:	80	80	80	86	86	86	86	86	
For non-electric boilers, the Electric Auxiliary Energy shall be determined in accordance with the methodology for the Energy Rating Reference Home in ANSI / RESNET / ICC 301. Cooling appacity shall be selected in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual S legible for Energy Rating Reference Hore Fuel Type: Same as Rated Home as a function of the property of the prope		Air-Source Heat Pump HSPF:	8.2	8.2	8.2	8.5	9.25	9.5	9.2	9.2	
For non-electric boilers, the Electric Auxiliary Energy shall be determined in accordance with the methodology for the Energy Rating Reference Home in ANSI / RESNET / ICC 301. Cooling appacity shall be selected in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordance with ACCA Manual S legible for Energy Rating Reference Hore Fuel Type: Same as Rated Home as a function of the property of the prope		Air-Source Heat Pump Backup:	Electric	Electric	Electric	Electric	Electric	Electric	Electric	Electric	
Home in ANSI / RESNET / ICC 301.											
Cooling capacity shall be selected in accordance with ACCA Manual S based on building heating and cooling loads calculated in accordange with ACCA Manual J. Eighth Edition, ASHRA 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 Hor Fuel Type: Same as Rated Home 8 Fuel Type: Same as Rated Home 8 System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pumps, also Grade III ref. cha System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pumps, also Grade III ref. cha System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pumps, also Grade III ref. cha System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pumps, also Grade III ref. cha System Type: Same as Rated Home except Reference Design shall be configured with air-source heat pumps, also Grade III ref. cha System Type: Same as Rated Home except Reference Design shall be configured with air-source heat pumps, also Grade III ref. cha System Systems are configured with air-source heat pumps, also Grade III ref. cha System Systems Page Systems Sy			Amary Eriorgy	orian bo do	ionimioa in ac	oordanoo wiin		,, 101 1110 21101	gy rtating r	1010101100	
with ACCA Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems, Gargaded capacity from Grade III install shall be accounted for using same membrating same as Rated Home? Installation Quality. For forced-air HVAC systems, Grade III airflow and wait draw, for AC's & air-source heat pumps, also Grade III ref. characteristics of the process of the proce	Cooling		noordonaa with	ACCA Ma	nual C based	on huilding hos	ting and soalin	a loodo ooloul	atad in aga	ordonoo	
systems, degraded capacity from Grade III install shall be accounted for using same methodology applied to Energy Rating Reference Hor Fuel Type: Same as Rated Home, except Reference Design shall be confliqued with air-source heat pumps, also Grade III ref. cha System Type: Same as Rated Home, except Reference Design shall be confliqued with air-source heat pumps, selected from below." Climate Zone: CZ1 CZ2 CZ3 CZ4 CZ4 CZ4 CZ 4 CZ 4 CZ 4 CZ 5 CZ 6 CZ7 CZ AI-AIT-Source Heat Pump SEER: 15 15 15 13 13 13 13 13 13 13 13 13 13 13 13 13											
Fuel Type: Same as Rated Home Installation Quality: For forced-air MVAC systems, Grade III airflow and watt draw; for AC's & air-source heat pumps, also Grade III ref. cha 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; applicable efficiency selected from below. ** Collimate Zone: CZ1 CZ2 CZ3 CZ4 C											
Installation Quality: For forced-air HVAC systems, Grade III airflow and watt draw; for AC's & air-source heat pump, slas Grade III refl. cha 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; applicable efficiency selected from below. ** Climate Zone: ** C2			e iii instali sna	iii be accou	nted for using	same memouc	logy applied to	Energy Raung	Reference	е потте.	
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; applicable efficiency selected from below. **O CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 CZ 4 CZ 5 CZ 6 CZ 7 CZ 7 CZ AC SEER: 15 15 15 15 15 15 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16											
Source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below. 10											
Climate Zone:		System Type: Same as Rated Home, e	xcept Referen	ce Design :	shall be config	jured with air-s	ource heat pum	p where Rate	d Home ha	s air-	
Climate Zone:		source or ground-source heat pump, el	ectric strip hea	at, or electri	c baseboard h	neat; applicable	efficiency sele	cted from belo	W. ¹⁰		
AC SER:										CZ 8	
Air-Source Heat Pump SEER: 15 15 15 15 15 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16		AC SEER.						13		13	
Use (Gallons per Day): Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, except for reduced usage resulting from the dishwasher specified in the Lighting, Appliances, & Internal Gains Section. ** Tank Temperature: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301. Tank Temperature: Same as Rated Home ** System Type: Conventional storage water heater with no solar heating, with tank size equal to that of Rated Home, unless Rated Home us 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: 12 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon 70 G			_	_	_	-	-	_	_		
resulting from the dishwasher specified in the Lighting, Appliances, & Internal Gains Section. Tank Temperature: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301. Fuel Type: Same as Breated Home sold System Type: Conventional storage water heater with no solar heating, with tank size equal to that of Rated Home, unless Rated Home us 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: 30 Gallon	<u> </u>										
Heating Systems Tank Temperature: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301.								except for red	uced usage	е	
Fuel Type: Same as Rated Home Suptembly System Type: Conventional storage water heater with no solar heating, with tank size equal to that of Rated Home, unless Rated Home us 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: 30 Gallon 40 Gallon 0.59 0.57 0.55 0.53											
System Type: Conventional storage water heater with no solar heating, with tank size equal to that of Rated Home, unless Rated Home us 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: 12 30 Gallon 40 Gallon 50 Gallon 0.59 0.57 0.55 0.53 Electric Storage Tank Capacity: 12 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 80 Gallon Electric DHW EF: 0.94 0.93 0.92 0.91 0.90 0.89 Oil Storage Tank Capacity: 12 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 0.89 0.89 Distribution Storage Tank Capacity: 12 30 Gallon 40 Gallon 50 Gallon 60 Gallon 70 Gallon 0.89 0.89 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 Surface Area: Same as Rated Home Supply and Return Duct Locations shall be 100% in conditioned space Dehumid- ifiers Thermostat: Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical ventilation system without heat recovery Residence of the storage			ating Reference	ce Home, a	s defined by A	NSI / RESNET	/ ICC 301.				
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: 12 30 Gallon 0.63 0.61 0.59 0.57 0.55 0.53 0.53 0.63 0.61 0.59 0.59 0.57 0.55 0.53 0.53 0.63 0.61 0.59 0.59 0.59 0.59 0.59 0.55 0.53 0.53 0.61 0.69 0.92 0.92 0.91 0.90 0.89 0.89 0.92 0.91 0.90 0.89 0.89 0.92 0.91 0.90 0.47 0.47 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	Systems:										
efficiency from below using tank size of Reference Home. Gas Storage Tank Capacity: ¹² 30 Gallon do.61 0.59 0.57 0.55 0.53 Electric Storage Tank Capacity: ¹² 30 Gallon 0.61 0.59 0.57 0.55 0.53 Electric Storage Tank Capacity: ¹² 30 Gallon 0.94 0.93 0.92 0.91 0.90 0.90 0.89 Oil Storage Tank Capacity: ¹² 30 Gallon 0.94 0.93 0.92 0.91 0.90 0.89 Oil Storage Tank Capacity: ¹² 30 Gallon 0.55 0.53 0.51 0.90 0.91 0.90 0.89 Distribution Oil DHW EF: 0.55 0.53 0.53 0.51 0.51 0.49 0.94 0.47 0.45 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 Insulation: None, because 100% of of unconditioned space Duct Insulation: None, because 100% of in conditioned space Dehumidifiers Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical ventilation system without heat recovery RESNET / ICC 301 Infiltration & ACH50: 4 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3											
Cas Storage Tank Capacity: 12 30 Gallon 40 Gallon 0.63 0.63 0.63 0.59 0.57 0.55 0.53 0.53 Electric Storage Tank Capacity: 12 30 Gallon 40 Gallon 50 Gallon 50 Gallon 60 Gallon 70 Gallon 70 Gallon 80 Gallon 60 Gallon 70 Gallon		instantaneous water heater in which ca	se select 50 g	allon tank fo	or gas system	s and 60 gallor	tank for electri	ic systems. Se	lect applica	able	
Cas DHW EF: 0.63			Reference Ho	ome.							
Cas DHW EF: 0.63		Gas Storage Tank Capacity: 12	30	Gallon	40 Gallon	50 Gallon	60 Gallon	70 Gallon	80 Gal	lon	
Electric DHW EF: 0.94 0.93 0.92 0.91 0.90 0.89				0.63	0.61	0.59	0.57	0.55	0.53	3	
Electric DHW EF: 0.94 0.93 0.92 0.91 0.90 0.89		Electric Storage Tank Capacity: 12	30) Gallon	40 Gallon	50 Gallon	60 Gallon	70 Gallon	80 Gal	lon	
Oil Storage Tank Capacity: 12			•								
Thermal Distribution Systems: Determined 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 Surface Area: Same as Rated Home Supply and Return Duct Locations shall be 100% in conditioned space Dehumid- iffiers Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301. Infiltration & Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 C 8 5 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust Exhaust Don-Site Power None			3(
Duct Leakage to Outside: 0 CFM25 per 100 sq. ft. of conditioned floor area			30								
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 100% in conditioned space Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 5 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust Exhaust			. 400 (1 - (0.51	0.49	0.47	0.40	,	
Dehumid- ifiers Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 CZ 4 CZ 4 CZ 4 CZ 4 CZ 5 CZ 6 CZ 7 CZ 6 CZ 7 CZ 6 CZ 7 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust											
Supply and Return Duct Locations shall be 100% in conditioned space Dehumid- ifiers Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 5 CZ 6 CZ 7 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust Exhaust Exhaust	Systems:										
Dehumid- ifiers Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 5 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust Exhaust		Duct Surface Area: Same as Rated Home									
Dehumid- ifiers Type, capacity, efficacy, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC 301, who dehumidification system is present in Rated home; otherwise none. Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 5 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust Exhaust											
Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: Me											
Thermostat: Type: Programmable Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: Mechanical Ventilation: Mechanical Ventilation: 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: 5 Ventilation Type: Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust On-Site Power None						iciciioc i iciiic,	as defined by	ANOIT INCOINE	. 1 / 100 00	i, wiioii	
Temperature Setpoints: Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI / RESNET / ICC 301 Infiltration & Mechanical Ventilation: Mechanical Ventilation: 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: 5	itiers	I dehilmidification system is present in R	atou nomo, ot	HOI WIGO HOI	110.						
RESNET / ICC 301		:-								21.7	
Infiltration & Mechanical Ventilation: Wentilation: Mechanical Ventilation: Mechanical Ventilation: Mechanical Ventilation: Mechanical Ventilation: 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: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 CZ 4 C & 5 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust		Type: Programmable	5 5		1 . 1.1					SI /	
Mechanical Ventilation: ACH50: 4 4 3 2 2 4 4 4 4 4		Type: Programmable Temperature Setpoints: Same as Energ	gy Rating Refe	erence Hom	ne, but with off	sets for a progi	rammable thern	nostat, as defi	ned by ANS	J1 /	
Ventilation: 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: 5		Type: Programmable Temperature Setpoints: Same as Energing RESNET / ICC 301							•		
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: 5	Thermostat:	Type: Programmable Temperature Setpoints: Same as Energing RESNET / ICC 301							•	CZ 8	
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: 5	Thermostat: Infiltration &	Type: Programmable Temperature Setpoints: Same as Energing RESNET / ICC 301 Infiltration Rates: Climate Zone: 5	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7		
Fan Watts: Watts = CFM Rate / 2.8 CFM per Watt, where CFM Rate is determined above Climate Zone: 5 CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust On-Site Power None	Thermostat: Infiltration & Mechanical	Type: Programmable Temperature Setpoints: Same as Energing RESNET / ICC 301 Infiltration Rates: Climate Zone: 5 ACH50:	CZ 1 4	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8	
Climate Zone: ⁵ CZ 1 CZ 2 CZ 3 CZ 4 CZ 4 CZ 6 CZ 7 CZ 8 Ventilation Type: Supply Supply Supply Supply Exhaust Exhaust Exhaust Exhaust Exhaust Power None	Thermostat: Infiltration & Mechanical	Type: Programmable Temperature Setpoints: Same as Energing RESNET / ICC 301 Infiltration Rates: Climate Zone: 5 ACH50: Mechanical ventilation system without I	CZ 1 4 neat recovery	CZ 2 4	CZ 3	CZ 4 3	CZ 4 C & 5	CZ 6 3	CZ 7	CZ 8	
Ventilation Type: Supply Supply Supply Supply Exhaust	Thermostat: Infiltration & Mechanical	Type: Programmable Temperature Setpoints: Same as Energy RESNET / ICC 301 Infiltration Rates: Climate Zone: 5 ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr +	CZ 1 4 neat recovery 1), where CF/	CZ 2 4 A = Condition	CZ 3 3	CZ 4 3 ea and Nbr = N	CZ 4 C & 5	CZ 6 3	CZ 7	CZ 8	
On-Site Power None	Thermostat: Infiltration & Mechanical	Type: Programmable Temperature Setpoints: Same as Energy RESNET / ICC 301 Infiltration Rates: Climate Zone: 5 ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF	CZ 1 4 neat recovery 1), where CF/M per Watt, w	CZ 2 4 A = Condition	CZ 3 3 oned Floor Are Rate is determ	CZ 4 3 ea and Nbr = Nined above	CZ 4 C & 5 3 umber of Bedro	CZ 6 3 poms; Runtime	CZ 7 3	CZ 8 3	
Power None	Thermostat: Infiltration & Mechanical	Type: Programmable Temperature Setpoints: Same as Energy RESNET / ICC 301 Infiltration Rates: Climate Zone: 5 ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: 5	CZ 1 4 neat recovery 1), where CF/M per Watt, w CZ 1	CZ 2 4 A = Condition here CFM F CZ 2	CZ 3 3 oned Floor Are Rate is determ CZ 3	CZ 4 3 ea and Nbr = N ined above CZ 4 CZ	CZ 4 C & 5 3 umber of Bedro 4 C & 5	CZ 6 3 noms; Runtime	CZ 7 3 : 24 Hours	CZ 8 3 / Day	
	Thermostat: Infiltration & Mechanical Ventilation:	Type: Programmable Temperature Setpoints: Same as Energy RESNET / ICC 301 Infiltration Rates: Climate Zone: 5 ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: 5	CZ 1 4 neat recovery 1), where CF/M per Watt, w CZ 1	CZ 2 4 A = Condition here CFM F CZ 2	CZ 3 3 oned Floor Are Rate is determ CZ 3	CZ 4 3 ea and Nbr = N ined above CZ 4 CZ	CZ 4 C & 5 3 umber of Bedro 4 C & 5	CZ 6 3 noms; Runtime	CZ 7 3 : 24 Hours	CZ 8 3	
Production	Thermostat: Infiltration & Mechanical Ventilation: On-Site	Type: Programmable Temperature Setpoints: Same as Energy RESNET / ICC 301 Infiltration Rates: Climate Zone: 5	CZ 1 4 neat recovery 1), where CF/M per Watt, w CZ 1	CZ 2 4 A = Condition here CFM F CZ 2	CZ 3 3 oned Floor Are Rate is determ CZ 3	CZ 4 3 ea and Nbr = N ined above CZ 4 CZ	CZ 4 C & 5 3 umber of Bedro 4 C & 5	CZ 6 3 noms; Runtime	CZ 7 3 : 24 Hours	CZ 8 3 / Day	
	Thermostat: Infiltration & Mechanical Ventilation: On-Site Power	Type: Programmable Temperature Setpoints: Same as Energy RESNET / ICC 301 Infiltration Rates: Climate Zone: 5	CZ 1 4 neat recovery 1), where CF/M per Watt, w CZ 1	CZ 2 4 A = Condition here CFM F CZ 2	CZ 3 3 oned Floor Are Rate is determ CZ 3	CZ 4 3 ea and Nbr = N ined above CZ 4 CZ	CZ 4 C & 5 3 umber of Bedro 4 C & 5	CZ 6 3 noms; Runtime	CZ 7 3 : 24 Hours	CZ 8 3 / Day	



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.
- 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. 2012 IECC Climate Zone designations, as defined and illustrated in Section R301 of the code, shall be used to configure the ENERGY STAR Reference Design Home in National v3.1.
- 6. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion.
- 7. 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.
- 8. 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.
- 9. 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.
- 10. For a Rated Home without a cooling system, the ENERGY STAR Reference Design Home shall be configured with a 13 SEER electric air conditioner.
- 11. 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.
- 12. 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).

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