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Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision.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



National ERI Target Procedure ENERGY STAR Certified Homes, Version 3.1 (Rev. 10)

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 Certified Homes, Version 3.1.

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

Revised 11/01/2019



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Exhibit 1: Expanded ENERGY STAR Reference Design Definition

5 ""	Exhibit 1: Expanded	ENERGI	SIAK	Referei	nce Desi	gn Definition						
Building Component		nded ENER		Reference	e Design De	finition ¹						
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											
	 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 Zone:											
	Slab Insulation R-Value:	CZ 1 0	CZ 2 0	CZ 3 0	CZ 4 10	CZ 4 C & 5 10	CZ 6 10	CZ 7 10	CZ 8 10			
	Slab Insulation R-value:	0	0	0	2	2	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	0.300	0.300	0.031	0.059	0.050	0.030	0.030	0.030			
Unconditioned	Gross Area: Same as Rated Home											
Spaces:	Insulation: 3, 4 Climate Zone:	07.4	07.0	07.0	07.4	07.4.0.0.5	07.0	07.7	07.0			
Spaces.		CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8			
	Floor Assembly U-Factor:	0.064	0.064	0.047	0.047	0.033	0.033	0.028	0.028			
Above-Grade	Interior and Exterior Construction Type: Wood for	rame										
Walls:	Gross Area: Same as Rated Home											
	Solar Absorptance = 0.75											
	Emittance = 0.90											
	Insulation: 3 Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8			
	Wall Assembly U-Factor:	0.082	0.082	0.057	0.057	0.057	0.048	0.048	0.048			
Thermally Isolated Sunrooms:	None											
Doors: 5	Area: Same as Rated Home											
	Orientation: Same as Rated Home											
	Door Type:	Opaque		< 1/2-Lite		> 1/2-Lite CZ 1-3		> 1/2-Lite CZ 4-8				
	U-Value:	0.17		0.25		0.30		0.30				
	SHGC:	N/A		0.25		0.25		0.40				
Glazing: ⁵	Total Area: (except in homes with conditioned basements and attached homes ⁶) • Same as Rated Home, where Rated Home glazing area is less than 15% of conditioned floor area; <u>OR</u> • 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 Rat	ing Referenc	e Home, a	s defined b	y ANSI / RE	SNET / ICC Std. 301						
	External Shading: None	-										
	Climate Zone:	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	0.20	0.20	0.20	00	00	00	00	00			
Ceilings:	Construction Type: Wood frame											
Ocinings.	Gross Area: Same as Rated Home											
	Insulation: 3 Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	C7 6	CZ 7	CZ 8			
							CZ 6					
A (II)	Ceiling Assembly U-Factor:	0.035	0.030	0.030	0.026	0.026	0.026	0.026	0.026			
Attics:	Construction Type: Vented with aperture = 1sq.	π. per 300 sc	η. π. ceiling	j area								
D (Radiant Barrier: None											
Roofs:	Construction Type: Composition shingle on wood sheathing											
	Gross Area: Same as Rated Home											
	Solar Absorptance = 0.92											
	Emittance = 0.90											
Internal Mass:	Same as Energy Rating Reference Home, as de											
mitornar maco.	Additional mass specifically designed as a Ther											



National ERI Target Procedure ENERGY STAR Certified Homes, Version 3.1 (Rev. 10) Exhibit 1: Expanded ENERGY STAR Reference Design Definition (Continued)

Heating	Heating capacity shall be selected in a							lated in ac	cordance			
Systems:	with ACCA Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. Fuel Type: Same as Rated Home ⁷											
	System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump in CZ 1-6 where Rated Home is											
	modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; and Reference Design shall be configured											
	with ground-source heat pump in CZ 7 & 8 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or											
	electric baseboard heat; applicable effi	ciency selected	I from below									
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 5	CZ 6	CZ 7	CZ 8			
	Gas Furn. AFUE:	80	80	80	95	95	95	95	95			
	Oil Furn. AFUE:	80	80	80 80	85 00	85 90	85	85	85 90			
	Gas Boiler AFUE: Oil Boiler AFUE:	80 80	80 80	80	90 86	90 86	90 86	90 86	90 86			
	Air-Source Heat Pump HSPF:	8.2	8.2	8.2	8.5	9.25	9.5	n/a	n/a			
	Air-Source Heat Pump Backup:	Electric	Electric	Electric	Electric	Electric	Electric	n/a	n/a			
	Ground-Source Heat Pump COP:	n/a	n/a	n/a	n/a	n/a	n/a	3.6	3.6			
	For non-electric warm furnaces and no	n-electric boiler	rs, the Elec	tric Auxiliary E	Energy shall b	e determined in	n accordance w	ith the me	thodology			
	for the Energy Rating Reference Home											
Cooling Systems:	Cooling capacity shall be selected in ac							ated in acc	cordance			
	with ACCA Manual J, Eighth Edition, A	SHRAE Handb	ook of Fund	damentals, or	an equivalent	t computation p	rocedure.					
	Fuel Type: Same as Rated Home 7											
	System Type: Same as Rated Home, e											
	modeled with air-source or ground-sou											
	with ground-source heat pump in CZ 7 & 8 where Rated Home is modeled with air-source or ground-source heat pump, electric strip heat, or electric baseboard heat; applicable efficiency selected from below. ⁹											
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8			
	AC SEER:	15	15	15	13	13	13	13	13			
	Air-Source Heat Pump SEER:	15	15	15	15	15	15	n/a	n/a			
	Ground-Source Heat Pump EER:	n/a	n/a	n/a	n/a	n/a	n/a	17.1	17.1			
Service	Use (Gallons per Day): Same as Energ											
Water	resulting from the dishwasher specified						,		3.			
Heating	Tank Temperature: Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301.											
Systems:	Fuel Type: Same as Rated Home ⁷											
	System Type: Conventional storage wa											
	heater in which case select 50 gallon to using tank size of Reference Home.	ank for gas syst	tems and 6	0 gallon tank	for electric sys	stems. Select a	pplicable efficie	ency from	below			
	Lusing lank size of Reference nome.											
		30	Gallon	40 Gallon	50 Gallon	60 Gallon	70 Gallon	80 G	allon			
	Gas Storage Tank Capacity: 11	30	Gallon 0.63	40 Gallon 0.61	50 Gallon 0.59	60 Gallon 0.57	70 Gallon 0.55		allon 53			
	Gas Storage Tank Capacity: 11 Gas DHW EF:		Gallon 0.63 Gallon					0.				
	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF:	3(0.63 0 Gallon 0.94	0.61 40 Gallon 0.93	0.59 50 Gallon 0.92	0.57	0.55	0. 80 G 0.	53 allon 89			
	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11	3(0.63 0 Gallon 0.94 0 Gallon	0.61 40 Gallon 0.93 40 Gallon	0.59 50 Gallon 0.92 50 Gallon	0.57 60 Gallon 0.91 60 Gallon	0.55 70 Gallon 0.90 70 Gallo n	0. 80 G 0. 80 G	53 allon 89 allon			
	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF:	30	0.63 0 Gallon 0.94 0 Gallon 0.55	0.61 40 Gallon 0.93 40 Gallon 0.53	0.59 50 Gallon 0.92	0.57 60 Gallon 0.91	0.55 70 Gallon 0.90	0. 80 G 0. 80 G	53 allon 89			
Thermal	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe	30 30 r 100 sq. ft. of c	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area	0.59 50 Gallon 0.92 50 Gallon	0.57 60 Gallon 0.91 60 Gallon	0.55 70 Gallon 0.90 70 Gallo n	0. 80 G 0. 80 G	53 allon 89 allon			
Distribution	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe	30 r 100 sq. ft. of cof ducts are in c	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area	0.59 50 Gallon 0.92 50 Gallon	0.57 60 Gallon 0.91 60 Gallon	0.55 70 Gallon 0.90 70 Gallo n	0. 80 G 0. 80 G	53 allon 89 allon			
	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho	30 r 100 sq. ft. of cof ducts are in o	0.63 D Gallon 0.94 D Gallon 0.55 conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space	0.59 50 Gallon 0.92 50 Gallon 0.51	0.57 60 Gallon 0.91 60 Gallon 0.49	0.55 70 Gallon 0.90 70 Gallon 0.47	0. 80 G 0. 80 G 0.	53 allon 89 allon 45			
Distribution	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha	30 r 100 sq. ft. of cof ducts are in come Il be configured	0.63 D Gallon 0.94 D Gallon 0.55 conditioned conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Rat	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does	0.55 70 Gallon 0.90 70 Gallon 0.47	0. 80 G 0. 80 G 0.	53 allon 89 allon 45			
Distribution	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit	30 r 100 sq. ft. of cof ducts are in come ll be configured h conditioned u	0.63 D Gallon 0.94 D Gallon 0.55 conditioned conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to	0.55 70 Gallon 0.90 70 Gallon 0.47	0. 80 G 0. 80 G 0. f the cond aditioned s	53_allon 89_allon 45			
Distribution	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type:	30 r 100 sq. ft. of cof ducts are in come Il be configured h conditioned u	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned according unit below),	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in con	0. 80 G 0. 80 G 0. 6 f the conductioned s Basemen	53 allon 89 allon 45 itions space.			
Distribution	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade:	30 r 100 sq. ft. of cof ducts are in come Il be configured h conditioned u Slab 100% Conditio	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below),	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to ace	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in col	0. 80 G 0. 80 G 0. of the conditioned s Basemen % Condition	53 allon 89 allon 45 itions space. it			
Distribution Systems:	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Two Story Above Grade:	30 r 100 sq. ft. of cof ducts are in come Il be configured h conditioned u	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below),	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to ace	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in col	0. 80 G 0. 80 G 0. 6 f the conductioned s Basemen	53 allon 89 allon 45 itions space. it			
Distribution	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Two Story Above Grade: Type: Programmable	30 r 100 sq. ft. of confidence are in come Il be configured the conditioned used to the condition of the con	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in col 100	0. 80 G 0. 80 G 0. of the conditioned s Basemen % Condition	53 allon 89 allon 45 itions space. it oned oned			
Distribution Systems:	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Two Story Above Grade:	30 r 100 sq. ft. of confidence are in come Il be configured the conditioned used to the condition of the con	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in col 100	0. 80 G 0. 80 G 0. of the conditioned s Basemen % Condition	53 allon 89 allon 45 itions space. it oned oned			
Distribution Systems:	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Two Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energy	30 r 100 sq. ft. of confidence in come Il be configured the conditioned up Slab 100% Condition 100% Condition gy Rating Reference	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in cool 100 crmostat, as def	0. 80 G 0. 80 G 0. of the conditioned s Basemen % Condition	allon 89 allon 45 itions space. it oned oned			
Distribution Systems:	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energical	30 r 100 sq. ft. of confidence are in come Il be configured the conditioned used to the condition of the con	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in col 100	0. 80 G 0. 80 G 0. of the conditioned s Basemen 9% Conditioned s Conditioned by AN	53 allon 89 allon 45 itions space. it oned oned			
Distribution Systems: Thermostat: Infiltration &	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energical Energy Programmable Temperature Setpoints: Same as Energy Programmable Temperature Setpoints: Climate Zone: ACH50: Mechanical ventilation system without I	30 r 100 sq. ft. of control of ducts are in come Il be configured the conditioned upon the conditioned upon the conditioned gy Rating References CZ 1 4 heat recovery	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned rence Home	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to ace litioned litioned	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any company in contract and contract a	0. 80 G 0. 80 G 0. 6 f the conditioned s Basemen 0% Conditioned by AN CZ 7 3	allon 89 allon 45 itions space. it oned oned SSI / CZ 8 3			
Distribution Systems: Thermostat: Infiltration & Mechanical	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energ RESNET / ICC Std. 301 Infiltration Rates: Climate Zone: ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr +	30 r 100 sq. ft. of control of ducts are in come Il be configured the conditioned to Slab 100% Conditioned to C	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Area	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to ace litioned litioned grammable there CZ 4 C & 5	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any company in contract and contract a	0. 80 G 0. 80 G 0. 6 f the conditioned s Basemen 0% Conditioned by AN CZ 7 3	allon 89 allon 45 itions space. it oned oned SSI / CZ 8 3			
Distribution Systems: Thermostat: Infiltration & Mechanical	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations sha below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energ RESNET / ICC Std. 301 Infiltration Rates: Climate Zone: ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF	30 r 100 sq. ft. of control of ducts are in come Il be configured the conditioned upon the condition of the	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned conditioned	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Are tate is determ	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does configured to ace litioned litioned grammable there CZ 4 C & 5 3	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any common to the second of	0. 80 G 0. 80 G 0. 6 f the conditioned s Basemen 0% Conditioned by AN CZ 7 3	allon 89 allon 45 itions space. it oned oned SSI / CZ 8 3			
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Distribution Systems: Thermostat: Infiltration & Mechanical Ventilation: Lighting, Appliances,	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations shat below (e.g. multifamily dwelling unit with Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energical Englishment of Climate Zone: ACH50: Mechanical ventilation system without In Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: Ventilation Type: Lighting: Fraction of qualifying Tier I fix Refrigerator: 423 kWh per year	30 30 31 31 31 31 31 31 31 31 31 31 31 31 31	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned conditioned con	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Are tate is determ CZ 3 Supply fying light fixt	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc CZ 4 3 ea and Nbr = N ined above CZ 4 Supply	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned grammable there CZ 4 C & 5 3 Number of Bedrecz 4 C & 5 Exhaust	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any c be 100% in cor 100 100 rmostat, as def CZ 6 3 cooms; Runtime CZ 6 Exhaust Ex	0. 80 G 0. 80 G 0. 6 f the cond onditioned s Basemen 6 Conditioned by AN CZ 7 3 2: 24 Hours CZ 7 chaust	53			
Distribution Systems: Thermostat: Infiltration & Mechanical Ventilation: Lighting, Appliances, & Internal	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations shat below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energing ESNET / ICC Std. 301 Infiltration Rates: Climate Zone: ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: Ventilation Type: Lighting: Fraction of qualifying Tier I fix Refrigerator: 423 kWh per year Dishwasher: 0.66 EF, Place Setting Ca	and the second s	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned cere Home CZ 2 4 x = Conditio lere CFM R CZ 2 Supply leres in quali	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Are tate is determ CZ 3 Supply fying light fixt	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc CZ 4 3 ea and Nbr = N ined above CZ 4 Supply ure locations 9	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned grammable there CZ 4 C & 5 3 Number of Bedrecz 4 C & 5 Exhaust	not meet any cobe 100% in core CZ 6 3 Tooms; Runtime CZ 6 Exhaust Ex ; 0% for exterior	0. 80 G 0. 80 G 0. 81 G 0. 82 G 0. 83 G 0. 84 G 0. 85 G 0. 86 G 0. 86 G 0. 87 G 0. 88	53			
Distribution Systems: Thermostat: Infiltration & Mechanical Ventilation: Lighting, Appliances,	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations shat below (e.g. multifamily dwelling unit with Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energical Englishment (Climate Zone: ACH50: Mechanical ventilation system without In Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: Ventilation Type: Lighting: Fraction of qualifying Tier I fix Refrigerator: 423 kWh per year Dishwasher: 0.66 EF, Place Setting Calcelling Fan: 122 CFM per Watt; Quant	and the second s	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned cere Home CZ 2 4 4 4 4 4 4 CONDITION CZ 2 Supply Gres in qualities B Rated Ho f bedrooms	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Are tate is determ CZ 3 Supply fying light fixt me + 1 when cei	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc CZ 4 3 ea and Nbr = N ined above CZ 4 Supply ure locations sets	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned grammable there CZ 4 C & 5 3 Number of Bedra CZ 4 C & 5 Exhaust 90% for interior	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any c be 100% in cor 100 100 rmostat, as def CZ 6 3 rooms; Runtime CZ 6 Exhaust Ex ; 0% for exteric	0. 80 G 0. 80 G 0. 81 G 0. 82 G 0. 83 G 0. 84 G 0. 85 G 0. 86 G 0. 86 G 0. 87 G 0. 88	53			
Distribution Systems: Thermostat: Infiltration & Mechanical Ventilation: Lighting, Appliances, & Internal	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations shat below (e.g. multifamily dwelling unit wit Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energing ESNET / ICC Std. 301 Infiltration Rates: Climate Zone: ACH50: Mechanical ventilation system without I Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: Ventilation Type: Lighting: Fraction of qualifying Tier I fix Refrigerator: 423 kWh per year Dishwasher: 0.66 EF, Place Setting Ca Ceiling Fan: 122 CFM per Watt; Quant Clothes Washer and Dryer: Same as E	and the second s	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned conditioned conditione	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Are tate is determ CZ 3 Supply fying light fixt me + 1 when ceilome, as defired.	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc CZ 4 3 ea and Nbr = N ined above CZ 4 Supply ure locations sets by ANSI /	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned grammable ther CZ 4 C & 5 3 Number of Bedr CZ 4 C & 5 Exhaust 90% for interior	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in cool 100 crmostat, as def CZ 6 3 cooms; Runtime CZ 6 Exhaust Ex ; 0% for exterior d Home; othervers Std. 301	0. 80 G 0. 80 G 0. 81 G 0. 82 G 0. 83 G 0. 84 G 0. 85 G 0. 86 G 0. 86 G 0. 87 G 0. 88 G 0.	allon 89 allon 45 itions space. it oned oned NSI / CZ 8 3 s / Day CZ 8 Exhaust age			
Distribution Systems: Thermostat: Infiltration & Mechanical Ventilation: Lighting, Appliances, & Internal	Gas Storage Tank Capacity: 11 Gas DHW EF: Electric Storage Tank Capacity: 11 Electric DHW EF: Oil Storage Tank Capacity: 11 Oil DHW EF: Duct Leakage to Outside: 0 CFM25 pe Duct Insulation: None, because 100% of Duct Surface Area: Same as Rated Ho Supply and Return Duct Locations shat below (e.g. multifamily dwelling unit with Foundation Type: One Story Above Grade: Type: Programmable Temperature Setpoints: Same as Energical Englishment (Climate Zone: ACH50: Mechanical ventilation system without In Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + Fan Watts: Watts = CFM Rate / 2.8 CF Climate Zone: Ventilation Type: Lighting: Fraction of qualifying Tier I fix Refrigerator: 423 kWh per year Dishwasher: 0.66 EF, Place Setting Calcelling Fan: 122 CFM per Watt; Quant	30 30 31 31 31 31 31 31 31 31 31 31 31 31 31	0.63 0 Gallon 0.94 0 Gallon 0.55 conditioned conditioned l according unit below), oned oned conditioned conditione	0.61 40 Gallon 0.93 40 Gallon 0.53 floor area space to the table b then duct loc e, but with off CZ 3 3 ned Floor Are tate is determ CZ 3 Supply fying light fixt me + 1 when cei lome, as defir	0.59 50 Gallon 0.92 50 Gallon 0.51 elow or, if Ratations shall be Crawlsp 100% Cond 100% Cond sets for a proc CZ 4 3 ea and Nbr = N ined above CZ 4 Supply ure locations sets by ANSI /	0.57 60 Gallon 0.91 60 Gallon 0.49 ed home does e configured to ace litioned grammable ther CZ 4 C & 5 3 Number of Bedr CZ 4 C & 5 Exhaust 90% for interior	0.55 70 Gallon 0.90 70 Gallon 0.47 not meet any cobe 100% in cool 100 crmostat, as def CZ 6 3 cooms; Runtime CZ 6 Exhaust Ex ; 0% for exterior d Home; othervers Std. 301	0. 80 G 0. 80 G 0. 81 G 0. 82 G 0. 83 G 0. 84 G 0. 85 G 0. 86 G 0. 86 G 0. 87 G 0. 88 G 0.	allon 89 allon 45 itions space. it oned oned NSI / CZ 8 3 s / Day CZ 8 Exhaust age			



National ERI Target Procedure ENERGY STAR Certified Homes, Version 3.1 (Rev. 10)

Footnotes:

- 1. Any parameter not specified in this exhibit shall be identical to the value entered for the Rated Home.
- "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 heater recovery.
- 11. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equations: Gas DHW EF ≥ 0.69 (0.002 x Tank Gallon Capacity); Electric DHW EF ≥ 0.97 (0.001 x Tank Gallon Capacity); Oil DHW EF ≥ 0.61 (0.002 x Tank Gallon Capacity).

Revised 11/01/2019